Teaching with Educational Technology in the 21st Century

The Case of the Asia Pacific Region

Yukiko Inoue & Suzanne Bell

Teaching with Educational Technology in the 21st Century: The Case of the Asia-Pacific Region

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Dedication

To Kazuko Onodera and the late Kanta Yamamoto, both generous academic and lifelong mentors who never lost faith in my scholarly endeavors and personal actualizations.

Yukiko Inoue

To the memory of my parents, Germaine and George Thierry, who were generous with loving inspiration and were remarkably way ahead of their time.

To my sons Eric and Jeff, whose love and wisdom I treasure.

Suzanne T. Bell

Teaching with Educational Technology in the 21st Century: The Case of the Asia-Pacific Region

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Foreword

One of the more demanding challenges of educational and library administrators and practitioners is the selection of the right combination of technology for multiple educational objectives. Every place is different. Every student has his or her individual needs and interests. Various curricula will require different technological approaches. Faculty members bring their own strengths and weaknesses. Institutions often have their limitations, whether they are budgetary or visionary.

The two authors are well qualified to address educational technology as the means to enhance learning opportunities in this digital age with careful attention to factors that are particularly important within traditional cultural contexts. They several voices to highlight multicultural educational technology experiences in teaching and to depict the need for selectivity and judgment in keeping pace with technological change in areas with limited resources.

Some years back, in a conversation with the director of the newly created Institute of Museum and Library Services, I stressed that many of the institutions most in need of technological grants were the least likely to produce a workable five-year technology plan. What is needed, I said, are individuals knowledgeable about the many innovative educational technologies available who could advise and assist local educators and librarians in integrating a practical technology plan with local conditions and objectives. I believe this publication could serve such a purpose by enabling educators and librarians to determine the technology alternatives and applications that hold the most promise for their communities.

Resistance to change is also discussed. However, as a parenthetical aside, I believe it is often not the fear of change itself, but the concern about the appropriateness of the concept or even the agenda, motives, and qualifications of the people proposing the change. Fair-minded administrators know that it is important to build trust and to distinguish between legitimate opposition to what may be perceived as a poor idea and actual hostility to technological change. It is wise to prudently listen and evaluate opposing views, because you may discover that they are right.

The authors frankly discuss the proliferation of technology and future demands for the increasing levels of digital competency, as well as need for administrative skills to justify institutional monetary and political investment in technical infrastructure and personnel. I add my own recommendation for step-by-step incremental technological change, as it offers the opportunity to test as you go, make adjustments, seek feedback, and fine-tune each application with an eye toward sustainability (including provision for maintenance and spare parts). I remember well that the first personal computer installed in the joint College-Public Library on the island of Tinian was short-circuited by an exploring but ill-fated gecko that caused a delay of more than a month.

Educational and informational technology is a vital tool for educational specialists as the Internet and communication revolution expands to unforeseen horizons and we attempt to keep watch over our educational ramparts. As the book depicts, the deft application of educational technology repeatedly involves the art of interpersonal relations as well as the science of cyberspace. I emphasize that these educational and information technology tools will further transform all our lives—students, faculty, librarians, administrators and systems managers. We are asking people to take on new tasks, break old habits, and give up ownership of local programs to become a collaborative partner in a larger interconnected and ever-changing world. In most cases, this means relinquishing local authority and that enters the realm of politics. This is not mere change; this is truly transformational. Yet, the potential educational results in overcoming time, distance, learning disparities and jurisdictional boundaries are well worth the daunting challenge.

Fortunately, Yukiko Inoue and Suzanne Bell, an educator and a librarian, respectively, have made the task easier with this remarkable study of educational technology applications in the Asia-Pacific. The two University of Guam academics have, quite logically, based their research on Micronesia, but their publication is also a timely text that I recommend for anyone involved in educational technology at colleges and universities—especially for those faced with difficult geographic, demographic, and societal challenges throughout the world.

Paul Joseph Steere
Field Director, Library of Congress Office, Africa
Nairobi, Kenya

Preface

Why technology? Technology has spawned a sphere of influence that encompasses a profound impact on the world of education. It alters teaching, learning, and thinking. The trend of higher education in the 21st century will continue to experience enormous growth in the areas of information and communication technology. Although technology is not the solution to poor teaching, it is clear that technology is facilitating the move from curriculum-centered to learner-centered, from individual to collaborative tasks, and from passive learning to active learning. Web-based learning, e-learning, online learning, technology-mediated learning, and technology-enhanced learning are the realities of today's education.

Personal computers have developed into powerful and inexpensive machines capable of multimedia presentations using graphics, animation, audio, and interactive video. As computers have become smaller, more powerful, and more cost-effective, their use in educational settings has increased rapidly. The software has followed this advancement and has become easier to learn and more user friendly. One of the significant technological innovations in this digital age has been the Internet. Certainly Internet technologies increase communication flexibility while reducing cost by permitting the exchange of large amounts of data instantaneously, regardless of geographic distance (McNeal, Tolbert, Mossberger, & Dotterweich, 2003). Today's reality makes clear that through Internet technologies, the learning process will never again be contained within a restrictive area.

What This Book Is About

This book explores a range of demanding challenges of technology-enhanced learning providing background information, and makes future predictions about educational technology for those interested in higher education, yet restricted by geographical distances such as the Asia-Pacific region. We were motivated to write this book because of the need to encourage collaboration across geographical borders to promote information literacy to facilitate the learning process, and to establish a greater infusion of technology throughout the Asia-Pacific region. This book is intended as a teaching resource. We look clearly at the impact of online Distance education (DE) programs, articulation issues, faculty computer competency levels, and offer solutions for policy makers and educators to remain current with basic technological applications. We explain how education is no longer confined to a geographical space and we offer a model to all interested in promoting quality higher education across geographical and cultural borders. Therefore, with the emphasis on faculty experiences and efforts to enhance higher learning in less developed regions such as Guam and Micronesia, we offer practical cases of teaching applications involving information technology. Sprinkled across the vast Pacific region, higher education teachers in the trenches share their fascinating journeys in the process of keeping pace with change and the challenges of technology-enhanced learning. We intend for this book to have understandable information and helpful resources and to be most useful to individuals who are enthusiastic about the potential of technology to improve higher learning. This book is a readable resource for educators to reference teaching examples that are relevant to a university or college setting.

Principal Objectives of this Book

We expect this book to be an insightful, practical guide for educators, with an emphasis on the following five principal objectives: (1) to examine educational technology, learning theories, human learning and cognition, and the multicultural implications of the Asian-Pacific region, (2) to provide firsthand experiences in which *higher learning* and *educational technology* have become successful academic partners, (3) to explore the impacts of technology integration in geographically remote regions such as Guam and Micronesia, (4) to assess *technology reluctance* among university faculty members and to offer remedies for keeping academics in stride in this digital age, and (5) to discuss the e-learning journey and associated challenges for the 21st century.

More specifically, the authors of this book (1) share with agriculture teachers throughout Micronesia the fascinating firsthand experiences from the initial design to the final assessment of a pioneer grant program to provide a DE baccalaureate degree, (2) encourage readers to expand their perspectives of educational technology to view applications with a broader lens, stepping outside their own technical environments to consider the vast Asia-Pacific region where technology becomes a global tool and opportunity involving 26 languages and a range of cultural traditions, (3) explain reasons for technical apprehension among faculty and offer institutional approaches to developing and sustaining appropriate levels of educational computing expertise to remain current, (4) address global language with emphasis on a unified global English as one solution for offering an equitable platform for academic programs across vast and multicultural regions, while remaining sensitive to the various versions of English, (5) offer future predictions in which technology will impact the Asia-Pacific region involving methods for establishing collaborative policies, hardware and software applications, and areas in which literacy and cultural aspects of the Pacific communities will be enhanced, and (6) provide examples that delve into the promotion and tenure process to look at how institutions regard technical innovations and applications during the peer review process.

The Audience for this Book

Although the audience for this book is not limited to the educational community, it goes beyond a discussion of online DE, providing a look at cultural and lifelong learning contexts and applications. The goal of the book is to appeal to individuals with a professional interest in colleges and universities: professors, researchers, librarians, learning resources directors, media specialists, directors of instructional design and development, coordinators of information and communications technology, curriculum and instruction supervisors, computer training personnel, software and courseware designers, and lifelong learning program directors.

How This Book Is Organized

This book falls into five parts and contains a total of nine chapters. Section I has one chapter and provides an introduction to Guam and Micronesia that will elaborate on the rich and unique qualities of this region as a case study site. In particular, Guam is comprised of diverse ethnic elements that draw its strength from Asian, American, and European sources, though the Chamorros (the indigenous people of Guam) still constitute the largest group and still control the political structure of the government of Guam. Guam is a regional learning center in the western Pacific.

Section II consists of two chapters and discusses the connection between educational technology and human learning. Chapter II is an overview of educational technology and instructional media, in addition to a seminar report on U.S. government e-resources. Chapter III discusses educational technology and learning theories, and also provides a discussion on human information processing theory. One of the central metaphors of the information age is that the human mind is a computer. Just as the human mind has functions that receive data, store them in memory, and retrieve them as needed, the computer has functions that accept data, process them, and display information. Today human information processing theory is particularly applied to cognitive development, looking at knowledge bases, strategies for dealing with cognitive material, and self-awareness as a knower or as a processor of information (Lefrançois, 1999). Chapter III focuses on human learning and information technology, comparing cognitive theory (which views learning as an acquisition of knowledge and cognitive structures because of information processing, focusing on the brain processing such as the memory) with behavior theory (which views learning as a change in the frequency of behavior as the consequence of environmental events, focusing on the way in which the stimulus-response relationship is formed).

Section III consists of three chapters and focuses on faculty's voices regarding technology integration. This section begins with Chapter IV, which presents higher education faculty experiences in teaching with educational technology in Guam, and Chapter V continues by focusing on the experiences of college and university teaching with educational technology throughout Micronesia. The highlight of these two chapters is the faculty's voices concerning professional development for technology integration, the *connection of technology to student learning, hands-on technology use in teaching,* and technological literacy to support meaningful learning. Chapter VI deals with technology competency and associated challenges among faculty members in general, with a focus on the cases of Guam's faculty members in particular. Like any other educational innovations, when used for the purpose of the teaching-learning process, technology needs to be accepted by teachers before it can be utilized productively and effectively.

Section IV has one chapter that discusses e-learning, online learning, and distance learning based on three online programs in higher education, and examines the critical issues in online DE in Micronesia. Challenges involving DE are not new in the American Pacific. An article titled *From Coconut Wireless to High Speed Video Teleconferencing* states as follows:

When ADAP's (Agricultural Development in the American Pacific) five Land-Grants joined forces in 1988, fax machines, computers, and even telephones were scarce in some locations. Investment in a communication system became one of ADAP's first priority purchases, starting with hardware, such as fax machines (and for some, phones), and later computer hardware and software. Computers were followed by on-site computer training to develop local staff capacity. (ADAP, 2004, p. 1)

In Chapter VII, the authors emphasize that technologies today have begun to globalize educational opportunities, especially in language literacy and training, while accommodating multicultural diversity. A regional project titled the University Challenge Grant Program is described in detail as to how this particular DE program had been designed, implemented, and evaluated.

Finally, Section V of the book, consisting of two chapters, is about technological values and challenges in the Asia-Pacific region. Chapter VIII focuses on academic digital database resources that support those involved in education programs and higher education research in all capacities. The prevalence of specific databases focused on academic and scholarly clientele, accessible by remote areas such as the Asian Pacific region, is "reaping the benefits of information and communication technologies" (Rao, 2003, p. 48). In this chapter, the authors identify scholarly databases as well as specific gateways to U.S. government information available on the Web, representing a sampling of resources either initiated by academic interests or a source for the dissemination of public information. In Chapter IX the authors discuss future directions of technology-enhanced teaching and learning in general; in particular, they identify a range of opportunities, challenges, and strategies of educational technology appropriate for the Asia-Pacific region. These new directions for teaching and learning with instructional technology include both the critical and changing roles of higher education faculty and policymakers.

The purpose of teacher education is the self-development of the teacher, and the ultimate goal of education is to enhance the students' development and learning. No matter how technology plays an increasing and necessary role in learning today, every teacher in higher education faces four areas of concern: (1) designing and preparing courses, (2) teaching and lecturing in the classroom, (3) assessing student learning, and (4) evaluating the effectiveness of teaching. Teaching is very complex and demanding, especially in a diverse learning environment. The ongoing faculty development of those currently in the teaching force is the key to educational improvement, which, in turn, helps and facilitates students to live and to work in today's global world. Education itself is becoming a global product, having a definite practical application, such as information technology as used on the Internet. Higher education in contemporary times must be understood as a globalizing process. This process includes an important mission of higher education to assist students in participating in the global economy. For this reason and to facilitate the practical application of human learning concepts, the authors provide an education essay at the end of each chapter.Higher education faculty members are defined as teachers, scholars, and researchers. Keeping this notion in mind, each essay is also a reflection related to faculty development to motivate and engage students in ways that are consistent with teachers' philosophies of teaching and learning and also consistent with theories of development, motivation, and learning.

Unique characteristics of this book can be summarized as follows: the authors of this book through firsthand experiences, (1) provide a window on technical approaches and applications in higher education, (2) address cultural diversity among faculty and students as a natural resource, (3) march forward by addressing faculty members' technological reluctance and provide remedies for academic technophobes, and (4) with the objective of enhancing teaching effectiveness and efficiency with technology, link theory to practice. Further, from an international perspective, the authors (1) look at global language, computer literacy, and a variety of ways to reach diverse learners, and (2) provide a comprehensive study of educational technology and its applications, including identifying the responsibilities of both faculty and administrators to support and take full advantage of technology initiatives and investments.

It is intended that this book, which contains instructional technology case studies based on faculty technology experiences voices regarding technology, library services, electronic resources, and global language in the Asia-Pacific region, will be instrumental in promoting and advocating information and communication technology in higher education. Finally, of great significance to the authors is that this book will inspire tomorrow's communities of e-learners and will serve as a practical tool for all devoted to emerging partnerships of digital information and the processes of teaching and learning.

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Mangilao, Guam

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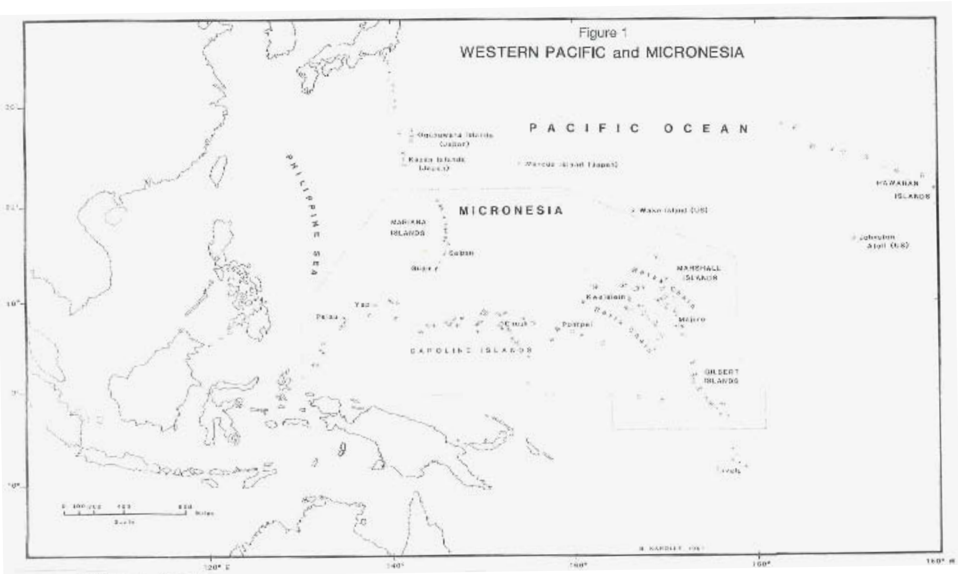
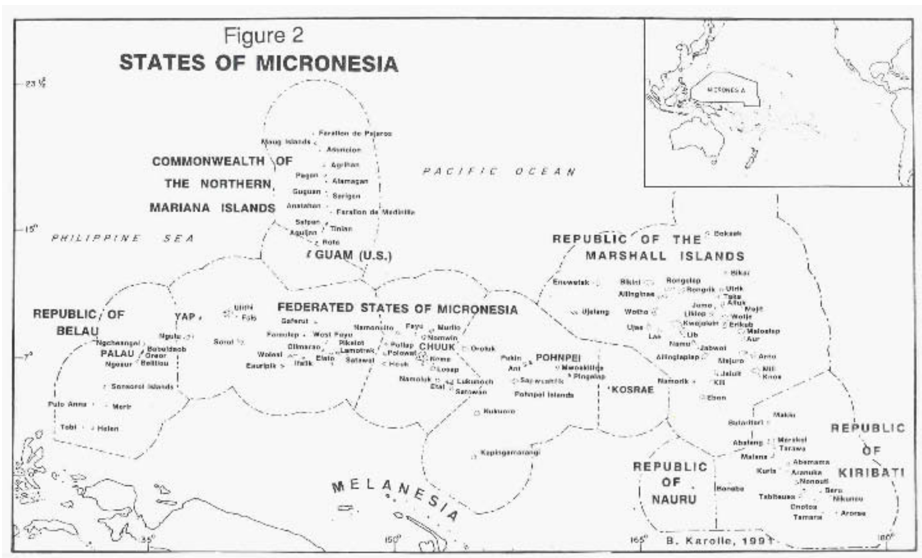
And finally the authors would like to extend a special thanks to Paul Steere for his enthusiastic approval of this book and for agreeing to write the Foreword. Associated with institutions of higher learning in the Asia-Pacific region and now currently the Field Director, Library of Congress Office, Nairobi, Kenya, Paul has an experienced voice when speaking of visions involving multicultural collaboration and technology applications. We value his contribution.

Figure 1. Western Pacific and Micronesia



Source: Karolle, B. G. (1992, Atlas of Micronesia. Guam Publication Inc., p. 2. Used with permission.

Figure 2. States of Micronesia



Source: Karolle, B. G. (1992, Atlas of Micronesia. Guam Publication Inc., p. 3. Used with permission.

Section I

Introduction to the Magical Region

Chapter I

Guam and Micronesia: Research Sites in the Asia-Pacific Region

Pacific means "peaceful." Ferdinand Magellan named it when he became the first European to sail across the ocean in 1521. Since it was so calm, he called it the Pacific Ocean. Magellan never saw one of the Pacific typhoons. A few years before Magellan, a Spanish explorer named Balboa was the first European to see the ocean when he walked across the Isthmus of Panama. Since he was facing south, he named the ocean the South Seas. Actually, most of the ocean was to the west of him. If you look at a globe of the Earth, you will notice that the Pacific Ocean is the single largest feature on Earth. All other oceans and all continents are smaller than the Pacific. (Ridgell, 1995, p. 3)

While teaching at a high school in Guam, Ridgell became frustrated with the lack of educational materials on the Pacific island. He developed a textbook to give ninth-grade students a background in Pacific geography, culture, and history, in addition to a general overview of the different Pacific island groups (basically Micronesia, Melanesia, and Polynesia). The importance of the Micronesian region has been recognized because of its geographical location and diverse cultures. The term "Micronesia" has gained popular usage as a political entity referring to the former Trust Territory of the Pacific Islands (Wang, 1992).

The island of Guam is geographically a part of Micronesia. Today, Guam is a modern and cosmopolitan community that reflects the cultures of its original Chamorro inhabitants influenced by European, American, Asian, and Micronesian populations. (Note: Appendix A is a list of Web sites on Guam and Micronesia.) Guam and Micronesia have been selected as research sites, and the purposes of this book are listed as follows:

1. To share challenges of technology, encouraging collaboration throughout the region to promote information literacy and facilitate the learning process
2. To provide multiple perspectives with which to view technology in higher education
3. To provide a regional baseline understanding of technological access and competency levels
4. To establish a greater infusion of technology throughout the region
5. To promote the embracing of technology across geographical borders
6. To delineate concerns and provide guidance for regional collaboration of resource sharing

The focus of this book is the use of technologies for enhancing teaching and learning in the Asia-Pacific region. To best understand and appreciate the rich and unique qualities of this region as a research site, this chapter provides an introduction to Guam and Micronesia including the following areas:

- Pacific Nations and Territories
- A University as a Regional Learning Center
- Multiculturalism and Higher Education in Guam

Pacific Nations and Territories

Because the tropic zone gets more direct sunlight than other parts of the Earth, as Ridgell (1995) describes, it is consistently warm even in winter. There are two basic seasons in tropical Pacific weather: the rainy and dry seasons. (The tropics do not experience the four classic seasons known as spring, summer, autumn, and winter.) Typhoons, powerful Pacific storms known as hurricanes in the Atlantic, are common occurrences in the tropics. The islands of the Pacific are divided into three groups: (1) Melanesia (Papua New Guinea, Solomon Islands, Vanuatu, New Caledonia, and Fiji); (2) Polynesia (American Samoa, Western Samoa, Tuvalu, Tokelau, Niue, Cook Islands, Tonga, Pitcairn Islands, Norfolk, Wallis and Futuna, French Polynesia, Easter, and Hawaii); and (3) Micronesia, (two independent nations: Nauru and Kiribachi; one U.S. commonwealth: Northern Mariana Islands; three entities with U.S. affiliation: Palau, Marshall Islands, and Federated States of Micronesia; and one U.S. territory: Guam.

The Magical Region

The Micronesian languages are part of the large Austronesian family of languages, and they reveal Micronesia's cultural kinship with the peoples of Polynesia (the triangle of Hawaii, New Zealand, and Easter Island), coastal Melanesia (including Papa New Guinea, Solomon Island and Vanuatu), and parts of Southeast Asia (Indonesia and the Philippines). The Micronesian population is almost entirely Christian (Rubinstein, 1992). Domeny de Ridenzi first used the name Micronesia, derived from the Greek words *mikro* (small) and *nesos* (island), in 1831 in a submission to the Société de Géographie de Paris (Karolle, 1992). Where and when did the original settlers of the Micronesian island originate? Who were these people? Why and how and when did they migrate to and settle these inhospitable outposts in the vast Pacific Ocean? Addressing these questions, Noble (2004) noted as follows:

> *Most of the wonders of Micronesia are little known outside this magical region. Micronesia has been little more than a footnote in the tomes of History and Art. Nevertheless, there are remains of ancient, monumental, and incredibly sophisticated societies on many of the islands. Their origins remain murky.* (pp. 8-9)

While focusing on agriculture, tourism, fishing, and small business for economic growth, the islands of Micronesia currently face a range of cultural and geographic challenges: "There are about 20 different languages spoken throughout the islands. Land area is small, resources are limited, and the islands are spread out over a vast distance" (Ridgell, 1995, p. 58). "The Pacific Ocean occupies an area (69,364,200 square miles, or 179,700,000 square kilometers) more than a third of the globe's surface and greater than the world's total land area. Micronesia is one of the principal geographical regions in this vast ocean" (Wang, 1993, p. 247). The great distance separating the various islands and political entities with Micronesia plays a determining role in transportation difficulties in the region. Specifically,

The distance between the small island of Tobi, in Palau, within a few hundred miles of Indonesia and the Philippines, at 131.10 degrees east longitude, and the easternmost atoll of Arorae, Kiribati, at 176.54 degrees east longitude, is approximately 2,726 nautical miles (3,135 statute miles), or about the same as the distance across the United States from coast to coast. (Karolle, 1992, p. 1)

Within less than a century, the Micronesian islands underwent four different colonial regimes: Spanish, German, Japanese, and American. The colonial government that had the greatest impact was the American regime, which began immediately after World War II.

These changes touched every aspect of Micronesian societies. American-style schools were built on every island. American cultural influences arrived as well with movies and television, and thousands of Peace Corps Volunteers. U.S. federal education grants enabled thousands of Micronesian college students to study in the United States. (Rubinstein, 2002, p. 34)

Guam and Its People

Guam, the westernmost territory of the United States since 1898, is the southernmost of the Mariana islands, located approximately 3,700 miles South West of Hawaii, 1, 500 miles east of the Philippines, and 1,550 miles South of Japan. Guam mirrors not only the U.S. government and institutional models, but also the U.S. schools and educational systems. Guam is an Americanized island society comprised of diverse ethnic elements that involve America, the Pacific islands, and Asia. With a population of 155,000 (2000 Census of the Population), Guam is the largest island in Micronesia. Although English is spoken as its official language, the local people still speak their native Chamorro language.

Since 1521 when Ferdinand Magellan crossed the Pacific and arrived in Guam (the first known contact with the West), the Pacific basin has developed into an important trade highway in the world.

Guam and other islands in Micronesia lie on the trade routes to the primary markets of Asia and the South Pacific (Wang, 1992). Miguel Lopez de Legazpi officially claimed Guam and the other islands of the Mariana chain for the Spanish Crown, beginning the Spanish era in Guam that would last for the next 333 years (Sanchez, 1998). In the Spanish era (1565-1898), Christianity was firmly established. After the American period (1898-1941) and the Japanese occupation (1941-1944), Guam was returned to the Americans (1944-present). In 1949, the U.S. President Harry Truman signed the Organic Act, making Guam an unincorporated territory of the United States with limited self-governing authority. This granted American citizenship to the people of Guam, and this is how it remains today.

Guam is a frontier border between Asia and America where the peoples, politics, and economics of these countries have mingled and where global immigrations have met domestic migrations (Nomura, 1996). Guam is the hub of the western Pacific and Micronesia's most cosmopolitan destination. In addition to the indigenous Chamorros and "stateside" Americans, Guam boasts a range of resident populations of Filipinos, Chinese, Koreans, Japanese, and Pacific islanders from Palau, the Marshall Islands, and the Federated States of Micronesia (comprised of Pohnpei, Chuuk, Yap, and Kosrae).

The initial inhabitants of Guam are believed to have been of Indo-Malays descent originating from Southeast Asia with linguistic and cultural similarities to Malaysia, Indonesia, and the Philippines. Guam today embraces a unique culture, the core of which is the ancient Chamorro traditions heavily influenced by the Spanish occupations and its Catholic Church. American influence is evident because of the celebrations of many public holidays and the form of government. Although Chamorros still constitute the largest group and control the political structures, the ethnic composition of Guam has undergone a dramatic transformation since the early 1900s (see Table 1). Guam was truly the island of the Chamorros, with only 8% of the population comprising ethnic groups other than Chamorro in 1920. This situation progressively changed by

Table 1. Ethnic groups in Guam: 1920-2000

Ethnicity	1920	1940	1960	1980	1990	2000
Chamorro	12,216 (92.0%)	20,177 (90.5%)	34,762 (51.9%)	44,299 (41.8%)	49,935 (37.5%)	57,297 (37.0%)
Filipino	396 (3.0%)	569 (2.6%)	8,580 (12.8%)	22,447 (21.2%)	30,043 (22.6%)	40,729 (26.3%)
Stateside/Caucasian	280 (2.1%)	785 (3.5%)	20,724 (30.9%)	26,901 (25.4%)	19,160 (14.4%)	10,509 (6.8%)
Other	383 (2.9%)	759 (3.4%)	2,978 (4.4%)	12,332 (11.6%)	34,014 (25.5%)	46,270 (29.9.0%)
Total	13,275 (100.0%)	22,290 (100.0%)	67,044 (100.0%)	105,979 (100.0%)	133,152 (100.0%)	154,805 (100.0%)

Source: Johnson & Inoue (2003, p. 261)

1990 (only 38% of the population was Chamorro). It is estimated that Filipinos will become the dominant ethnic group in Guam in the next two decades. Other ethnic minorities (i.e., Asian, Micronesian, and European) have also progressively increased (Johnson & Inoue, 2003).

A University as a Regional Learning Center

There are two institutions of higher learning in Guam: The University of Guam (UOG) (http://www. uog.edu) and Guam Community College (http://www.guamcc.edu). There are four junior colleges in Micronesia: Palau Community College (http://www.palau.edu); Northern Marianas College in Saipan (http: www.nmcnet.edu); College of Micronesia in Pohnpei (http://www.comsfm.fm); and The College of the Marshall Islands (http://www.cmiedu.net).

The UOG is the only established four-year land-grant institution of higher education accredited by the Western Association of Schools and Colleges (WASC) in the western Pacific. The history of UOG dates back to 1952 when the island government established the Territorial College as a teacher training institution. In 1963, the College first received accreditation and after the establishment of three undergraduate schools, the College was renamed the University of Guam. In spring 2004, the total student enrollment reached almost 2,800 with a full-time faculty base of 174. (For detailed faculty information, see

Chapter IV.) Like the social fabric of Guam, UOG is a culturally diverse and rich environment. Manuel Esteban, president of California State University at Chico and co-chair of the WASC accreditation team that visited UOG in 2000, described UOG in the following terms:

> *People in the mainland talk about diversity, and most struggles just to get a student body that is representative of a region. But here you have an exceptionally diverse population, both in terms of the students, the faculty, and the administration.* (*WASC 's answers*, 2000)

At the UOG, the discourse of multicultural education is important within this context because almost 60% of the faculty are Caucasian and 90% of the student body are either indigenous, Asian, or of Pacific islander descent (Johnson & Inoue, 2003). This makes for a very unique classroom setting regarding multicultural curriculum and pedagogy, and teaching is a challenging experience at UOG.

Emphasizing that Micronesia has to rely on established institutions of higher learning, Perkins (1969) has stated that ideally a Micronesian university should be established, however, not in the foreseeable future. Because of its location, the UOG, located in Micronesia, is strategically situated to serve the Mariana and Marshall island groups, along with the Carolines, including all six districts of the Trust Territory (i.e., Yap, Palau, Truk, and Ponape that are in the Carolines, in addition to Mariana and Marshall island groups). Cruz (1984) has proposed to establish a "Campus of the Pacific" for the 21st century, which would provide for curriculum coordination and allow cross-registration and the transfer of credits among the colleges in Micronesia. This system ultimately could evolve into a fully articulated network of two-year colleges, then after graduation, feeding students into the four-year program at UOG. The Campus of the Pacific has not yet become a reality but, according to Karolle (1992), DE experiments initiated by UOG in 1985 have responded to the Republic of the Marshall Islands, Kosrae, Pohnpei, Chuuk, and Yap, using a commercially produced videotape series and single-sided band radio for sessions between students and instructors; and the mail system and facsimile transmissions for the exchange of printed material. With the installation of satellite dishes at UOG, the option to utilize computer-assisted instruction (CAI) and computer interactive sessions via the satellite has opened up additional opportunities to provide training to those isolated island groups. These early experiments have resulted in the following cultural findings:

- DE has eliminated the concept of the traditional classroom (e.g., students are no longer sitting in front of a instructor listening to a lecture; they are reading independently, and viewing videotapes, allowing the option for continuous, student-initiated repetition of content).
- During a radio interactive session, which was typically one hour and 30 minutes long each week, Micronesian students tended to ask more content-specific questions. (In a traditional classroom, Micronesian students are usually reluctant to participate in a discussion.)
- DE has facilitated the willingness of the students to question the cultural relevancy of course content to their unique socio-economic environment during the internship in education courses; this has also allowed immediate feedback, and modified applications of the content. (p. 71)

In 1992, UOG started a DE, Distance Education Enhancing Nursing (DEEN), for health workers in Micronesia. The convenience of taking DEEN courses on the home island was the most significant advantage. Disadvantages were related to limitations in technology use, including interactive computer fees involving expensive telephone time (Fochtman, Allen, & Gurusamy, 1997).

Research Institutes

Major research institutes at UOG include The Richard Flores Taitano Micronesian Area Research Center (MARC), The Marine Laboratory, The Water and Environmental Research Institute of the Western Pacific (WERI), Institute for Micronesian Health and Aging Studies, Micronesian Language Institute (MLI), and The University Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

- MARC, established in 1967, has developed a major collection of Micronesian area materials. The collection includes slides, photographs, cinema files, videocassettes, and musical scores.
- The Marine Laboratory, established in 1970, is a research, teaching, and service facility located on the shore of Pago Bay below the main campus. The Laboratory research focuses on tropical reef studies.

- WERI was established in 1975. Its role is to provide water and environmental resource information by conducting interdisciplinary basic and applied research, teaching, and disseminating research results.
- The Institute for Micronesian Health provides the framework for health and aging research. The various departments of the National Institutes on Health and the National Science Foundation funded this research.
- MLI, established in 1990, has focused on the development of Micronesian language resources. CEDDERS is one of 66 federally funded centers across the nation. The Center's mission is to create pathway that enhance, improve, and support the quality of life of individuals with developmental disabilities and their families; CEDDERS provides technical assistance and community outreach, direct service through Guam System for Assistive Technology. (UOG Undergraduate Catalog 2003-2004).

Multiculturalism and Higher Education in Guam

McNergney and Herbert (1998) maintain that multicultural education "attempts to alter existing education programs to respond more effectively to diversity" (p. 312). A theoretical framework by Ortiz and Rhoads (2000) to further the pedagogy of multicultural education is based on four assumptions: (1) Culture is a misunderstood construct, but one that is key for helping students to understand diversity and to confront their own racism; (2) students in general have a difficult time identifying their own cultural connections; (3) cultural diversity is a fact of life and efforts to build a common culture often privilege the dominant culture; and (4) multiculturalism is a valued and desired view for students to develop.

The above theoretical framework consists of the following five steps (p. 84): (1) Understanding culture (fully understanding how culture shapes their lives and how they shape culture through their interactions); (2) Learning about other cultures (building energy and enthusiasm for learning about other cultures); (3) Recognizing and deconstructing White culture (helping students to see that White culture has become in many ways the unchallenged, universal basis for racial identity); (4) Recognizing the legitimacy of other cultures (recognizing that cultures other than one's own are just as valuable and meaningful to another individual); and (5) Developing a multicultural outlook (helping students to recognize that all cultures within a given society shape each other and that the inclusion of all cultures requires the reconstruction of a given society).

Higher education faculty members must be leaders in the field of multicultural education. Faculty members must not only be proponents, but also be practitioners in their daily teaching. Faculty members have a dual responsibility for developing and actively undertaking a process of introspection and self-examination regarding diversity and multiculturalism in higher education (Gorski, 2000).

Multicultural Education Questionnaire Research

Common methods of surveys are interviews (such as focus groups and personal interviews) and questionnaires (using telephones, mails, and e-mails): "A survey is a system for collecting information to describe, compare, or explain knowledge, attitudes, and behavior" (Fink, 1995, p. 1). Questionnaire surveys provide an efficient way to collect data. They can reach large numbers of people at relatively low cost, they ensure anonymity, and they can be written for specific purposes. Fink (1995) has identified the following six requirements for a useful questionnaire survey: specific, measurable objectives, sound research design, sound choice of population or sample, reliable and valid instruments, appropriate analysis, and accurate reporting of the results. Each requirement was considered in developing, conducting, and analyzing two questionnaire research studies re-posted briefly in Tables 2 and 3.

Research 1. Faculty Attitudes towards Diversity and Multiculturalism[1]

We conducted this questionnaire research to examine the UOG faculty members' attitudes toward multicultural education, with the general focus on diversity, ethnicity, and pluralism. Approximately 51% of the full-time faculty participated in this survey questionnaire (N = 104). Results of the survey indicated that 71% of the respondents strongly agreed with the notion of pluralism; that is, cultural and ethnic diversity are assets that enrich the learning process. The respondents, regardless of gender, age, ethnic background, or teaching experience, rated the importance of diversity and multiculturalism very high. The results further indicated that Guam was a "colorful salad bowl" of humanity, and multicultural education was an important facet of course development in higher education.

Sample and Data Collection

The intended population for this questionnaire research was the entire full-time faculty UOG. All the faculty members received a survey questionnaire, and the usable response rate was 51%. Of the 104 respondents, as seen in Table 2, the largest ethnic group was from a Caucasian background (50%), and the Chamorro group comprised the second largest (17%). We designed a questionnaire (For the detailed information of the questionnaire, see Appendix B.) consisting of three sections. A panel of faculty members piloted and examined the content for validity and reliability.

We utilized five elements of teachers' knowledge bases (Haberman & Post, 1998, pp. 98-99) to develop 18 diversity and multiculturalism questions in the

Table 2. Demographic data for faculty participants (N = 104)

	Frequency	Percentage
Age (in years):		
25 or less	1	0.9
26-35	6	5.8
36-45	35	33.7
46-55	37	35.6
56-65	22	21.1
66 or over	3	2.9
Highest academic degree:		
Associate	1	1.0
Bachelor	1	1.0
Master	25	24.0
Doctorate	77	74.0
Other	0	0.0
Total years of teaching (outside and within UOG, including all educational levels):		
5 or less	15	14.4
6-10	16	15.4
11-15	25	24.0
16-20	12	11.5
21 or over	31	29.8
No answer	5	4.8

Table 3. Rank order by mean scores for the five elements of teachers' knowledge bases

Elements	M	SD	N
Relationship Skills:			
To be friends with someone from a different culture in Guam or anywhere (#1)	3.76	1.02	104
To collaborate on research and teaching with colleagues from the same cultural and ethnic backgrounds as your own (#9)	2.81	1.25	103
Internal consistency reliability = .2848			
Community Knowledge:			
To understand or be aware of other cultures and heritage (#17)	4.45	.88	104
To be exposed to a culturally diversified environment (#4)	4.19	.98	104
To take the time to learn about students' backgrounds and cultural characteristics (#11)	4.13	.88	104
To respect and accommodate students' individual and culture-based learning styles (#10)	4.04	.90	104
Internal consistency reliability = .7724			
Empathy:			
To support the academic success of students from different cultural and ethnic backgrounds than your own (#7)	4.57	.80	104
To challenge and avoid using stereotypes in your teaching (#18)	4.45	.94	104
To become a culturally sensitive and responsive teacher (#13)	4.52	.78	103
To become informed about cultural and ethnic differences (#3)	4.29	.81	104
Internal consistency reliability = .7935			
Cultural Conflicts:			
To eradicate prejudice in your professional life (#16)	4.71	.71	104
To eradicate prejudice in your personal life (#15)	4.64	.79	104
To employ Eurocentric pedagogy in your teaching (#5)	3.30	1.00	101
To associate with people from the same cultural and ethnic backgrounds as your own (#2)	3.21	1.15	104
Internal consistency reliability = .5078			

first section of the questionnaire (see Table 3). We gave ratings on a five-point Likert-type scale ranging from 1 = not important to 5 = of utmost importance. Similarly, in the second section, one question asked for the perceived value of pluralism on a five-point Likert-type scale from 1 = strongly disagree to 5 = strongly agree. The third section contained five demographic items: gender, age, ethnic background, academic degree, and years of teaching.

With confidentiality assured and the permission of the UOG's Human Resources Office, we distributed the survey questionnaire to all of the 205 full-time faculty members during the fall semester of 1999. Internal consistency reliability estimated by computing alpha coefficients for the clusters ranged from .28 (relationship skills) to .79 (empathy). The coefficient alpha of .28 is unreliable, indicating that items in relationship skills are not measuring the same thing. We used analysis of variance to examine if the obtained sample and potential sample would differ significantly on the variables of gender, age, ethnicity, and teaching experience in each of the elements. A large percentage of the sample was Caucasian and we grouped other ethnic categories into one. We calculated frequencies and percentages for the perceived value of pluralism applied to education.

Results and Discussion

Nearly 92% of the UOG students are from minority groups: 48% of them are native Pacific Islanders, 32% Filipino, and 8% other Asian. The faculty members are less diverse: 60% are from Caucasian backgrounds, 22% native Pacific Islanders, 10% Asian, and 5% from Filipino backgrounds. This contrast between the ethnic composition of the students and that of the faculty is well known on campus, and there are continual efforts to encourage and train faculty to work within this multicultural environment.

Faculty Attitudes Toward Multicultural Education

The participants answered the 18 questions, such as "How important is it for you to integrate multicultural perspectives in teaching?" Overall, no significant differences were found at the alpha level of .01. This means that no significant differences were determined on the four demographic variables in the five elements (relationship skills, community knowledge, empathy, cultural conflicts, and relevant curriculum). As one dimension of multicultural education reads, "The equitable pedagogy dimension concerns ways to modify teaching so as to facilitate academic achievement among students from diverse groups" (Banks, 1994, p. 4). In this regard, the mean score of the participants for item #7 (to support the academic success of students from different cultural and ethnic backgrounds than your own) is high (M = 4.57, SD = .80). The four elements (#7, #18, #13, and #3) in empathy are fairly high. These mean scores might be an indication of the participants' willingness to enhance positive attitudes toward different cultural and ethnic groups. Even though the majority of the UOG faculty were Caucasians (60%), the sample was evenly distributed between Caucasians (50%) and non-Caucasians (50%). We assumed that non-Caucasians might be more interested in multicultural education than Caucasians. There was no difference between the two groups, however. This study also indicated that teaching experience was not a significant factor in the attitudes toward multicultural education. Cross-cultural experiences may be the key variable rather than teaching experience that is related to multicultural awareness (Pohan, 1996).

Perceived Value of Pluralism in Education

Indeed, 95% of the respondents agreed with pluralism (cultural/ethnic diversity is an asset that enriches the learning process). Cultural pluralism is the mutual respect for all cultural groups and allows minorities to express their own cultures (McDonald & Balgopal, 1998). The faculty ranked the need for multicultural education very high. This is a hopeful finding, given the fact that UOG is a minority university and students from a diversity of cultures, languages, and worldviews comprise it.

Research 2. From Theory to Practice: An Analysis of Multicultural Education

This questionnaire research explored multicultural education at a minority university in the Pacific. This was Phase II of a research project that began in 1999 with the goal of further understanding the practice of multicultural pedagogy in higher education. Phase I measured the perceptions of faculty toward diversity and multiculturalism and Phase II attempted to narrow the focus to the actual practice of multiculturalism in the classroom and curriculum. Through survey methodology and descriptive analysis, a picture emerged of the link between perception and actual practice. We found that faculty ranked high on their willingness to engage and incorporate multicultural strategies in their teaching. Many often did not feel, however, that they had the skills or knowledge to do so. Many also felt that they were not well equipped to deal with a multicultural environment. While the data suggest that many are willing and open to diversity and multiculturalism, they harbor ethnocentric belief systems. We argued that what seems like contradictions are more likely the leaking of the underlying attitudes and beliefs within an environment influenced by political correctness.

Sample and Data Collection

With the permission of the Human Resources Office of the UOG, we mailed a questionnaire survey to each of the 198 full-time faculties in 2000. The intended population of the study was the entire UOG full-time faculty. The usable return rate was 33% (N = 65). The largest ethnic group among the faculty who responded to the survey was from a Caucasian background (48%), which was expected because 60% of the entire faculty members were Caucasian. The next largest group was Chamorro, comprising 23%. Asian made up 5% and Filipino represented 6%. Teaching experience varied considerably, with 11% having five or fewer years of teaching, and 25% having more than 21 years.

A panel of faculty members developed, piloted, and examined the survey for content validity and reliability. The survey consisted of 26 questions in three sections. For the detailed information of the survey questionnaire, see Appendix C. In the first section, we asked the participants to rate 17 questions (such as "How often do you accommodate different viewpoints of your students regardless of their cultural and ethnic backgrounds?") on a five-point scale (from 5 = very frequently to 1 = very seldom). We asked one question ("Do you evaluate attitudes and behaviors of other cultural/ethnic groups from your own cultural/ethnic standard?") on a five-point scale from 1 = never to 5 = always. The second section had three parts measuring (1) the faculty's practice of multiculturalism in teaching (e.g., how often the faculty selected a textbook based on multicultural perspectives), (2) the avenues that the faculty choose to enhance their knowledge about multiculturalism, and (3) the faculty's open-ended comments on the state of multicultural education at UOG. The third section contained five demographic items, such as gender, age, ethnicity, academic degree, and years of teaching.

Results and Discussion

As seen in Table 4, three "very frequently" occurring questions were: (1) "Support the academic success of your students regardless of their cultures and ethnic backgrounds" (80%); (2) "have high expectations for your students regardless of their cultural and ethnic backgrounds" (66%); and (3) "listen to your students interactively and attentively regardless of their cultural/ethnic backgrounds" (66%). The reliability coefficient alpha across the 17 questions was .87.

Table 4. Frequencies and percentages for the 17 multicultural education questions (N = 65)

Questions "How often do you........?"	Very Frequently	Frequently	Sometimes	Seldom	Very Seldom
1. accommodate different student viewpoints regardless of their cultural/ethnic background?	34 (52.3%)	27 (41.5%)	1 (1.5%)	1 (1.5%)	2 (3.1%)
2. utilize interdisciplinary approaches in teaching?	1 (1.5%)	16 (24.6%)	22 (33.8%)	11 (16.9%)	0(0.0%)
3. try to get every student involved in discussion?	35 (53.8%)	20 (30.8%)	7 (10.8%)	2 (3.1%)	1 (1.5%)
4. have high expectations for students regardless of their cultural/ethnic background?	43 (66.2%)	17 (26.2%)	3 (4.6%)	1 (1.5%)	1 (1.5%)
5. accommodate different learning styles of students regardless of their cultural/ethnic background?	27 (41.5%)	23 (35.4%)	13 (20.0%)	0(0.0%)	1 (1.5%)
6. have a collaborative and collegial partnership with colleagues from the same cultural/ethnic background in teaching?	17 (26.2%)	20 (30.8%)	11 (16.9%)	7 (10.8%)	9 (13.8%)
7. use culturally relevant or responsive textbooks in teaching?	19 (29.2%)	19 (29.2%)	12 (18.5%)	5 (7.7%)	9 (13.8%)
8. encourage students whose second language is English to express themselves in the classroom?	33 (50.8%)	22 (33.8%)	6 (9.2%)	1 (1.5%)	3 (4.6%)
9. integrate multicultural perspectives in teaching?	34 (52.3%)	19 (29.2%)	7 (10.8%)	4 (6.2%)	1 (1.5%)
10. support the academic success of students regardless of their cultural/ethnic background?	52 (80.0%)	11 (16.9%)	0(0.0%)	0(0.0%)	2 (3.1%)
11. engage in collaborative partnership with colleagues from different cultural/ethnic backgrounds in teaching?	23 (35.4%)	26 (40.0%)	9 (13.8%)	4(6.2%)	2 (3.1%)
12. listen to students attentively regardless of their cultural/ethnic background?	43 (66.2%)	16 (24.6%)	3 (4.6%)	1 (1.5%)	2 (3.1%)
13. provide students with multicultural instructional materials (videos, films, etc.)?	25 (38.5%)	12 (18.5%)	12 (18.5%)	7 (10.8%)	9(13.8%)
14. have high expectations for students regardless of their cultural/ethnic background?	32 (49.2%)	14 (21.5%)	16 (24.6%)	2 (3.1%)	1 (1.5%)
15. attempt to eradicate prejudice and stereotypes that students may have?	41 (63.1%)	17 (26.2%)	4 (6.2%)	2 (3.1%)	1 (1.5%)
16. accommodate cultural/ethnic differences of students in the class?	39 (60.0%)	16 (24.6%)	8 (12.3%)	1 (1.5%)	0(0.0%)
17. incorporate cultural/ethnic differences in teaching methodology?	23 (35.4%)	21 (32.3%)	16 (24.6%)	3 (4.6%)	2 (3.1%)

Three questions had the highest mean scores: (1) "To support the academic success of students regardless of their cultural/ethnic backgrounds" (M = 4.71, SD = .76); (2) "to have higher expectations for students regardless of their cultural and ethnic backgrounds" (M = 4.54, SD = .79); and (3) "to listen to the students attentively regardless of their cultural/ethnic backgrounds" (M = 4.49, SD = .90) (see Table 5).

Table 5. Descriptive statistics for the 17 multicultural education questions

Item	M	SD	Minimum	Maximum	N
1	4.38	.86	1	5	65
2	4.08	.84	2	5	62
3	4.32	.90	1	5	65
4	4.54	.79	1	5	65
5	4.17	.86	1	5	64
6	3.45	1.37	1	5	64
7	3.52	1.40	1	5	64
8	4.25	1.02	1	5	65
9	4.25	.98	1	5	65
10	4.71	.76	1	5	65
11	4.00	1.02	1	5	65
12	4.49	.90	1	5	65
13	3.57	1.45	1	5	65
14	4.14	1.00	1	5	65
15	4.46	.87	1	5	65
16	4.45	.78	1	5	64
17	3.92	1.04	1	5	65

Note: The values represent mean responses to items coded 5 (very frequently), 4 (frequently), 3 (sometimes), 2 (seldom), and 1 (very seldom).

In question 9 we asked, "How often do you integrate multicultural perspectives in teaching?" and faculty ranked relatively high (about 80% answered "very frequently" and "frequently"). Nevertheless, when asked a similar question with a slight change in the specific focus (Q13: How often do you provide your students with multicultural instructional materials?), respondents who answered in the affirmative dropped to 56%. This draws the attention to the subtle difference between the two questions. One was referring to multicultural perspectives, and the other was referring to instructional materials. Only 24% incorporate multicultural instructional materials in teaching. This is understandable when considering how faculty in higher education are trained to be teachers. It may be that grade school teachers have more training in the art of instruction than do college professors. Faculty members in higher education might have good intentions to relate to student perspectives of a multicultural nature, but many of them have never been trained to incorporate multicultural pedagogic strategies into teaching.

This survey attempted to explore the level of ethnocentrism in the classroom. A standard sociology text book offers this definition of ethnocentrism: "The use of one's own culture as a yardstick for judging the ways of other individuals or societies, generally leading to a negative evaluation of their values, norms and behaviors" (Henslin, 1997, p. 36). Those sampled for this survey ranked high on most questions regarding their approach to multicultural education, addressing the diversity needs of students. Faculty make efforts in selecting appropriate textbooks, incorporating students' comments into teaching plans, opening discussion encouraging students to participate, and inviting colleagues to observe and offer feedback. These findings are promising and encouraging. Yet, on the question "Do you evaluate attitudes and behaviors of other cultural/ethnic groups from your own cultural/ethnic standards?", a high number of the faculty answered in the affirmative. Ethnocentrism can have severe negative consequences. It can lead to harmful discrimination and unfair treatment toward groups whose beliefs and behaviors are different from our own. This is unsettling especially in a classroom environment in which 60% of the faculty belong to one culture or ethnicity and 92% of the students to another.

Improving Reliability and Validity in Questionnaire Research

Questionnaires are a practical method for obtaining many types of information from people and, in many circumstances, the most economical method. A misconception is that it is easy to design and conduct a survey questionnaire. However, "there are good surveys and bad ones … good surveys yield critical information and provide important windows into the heart of the topic of interest" (Litwin, 1995, p. 1).

To improve future studies, it is necessary to discuss the limitations shown by the above two questionnaire surveys. First, although the instruments were revised as a result of expert opinion, and although they were pilot tested, they might still not have been as valid (accurate) and as reliable (consistent) as standardized or published instruments. To achieve reliability, test-retest reliability should be applied (that is, having the same respondents complete the same survey at two different points in time). Or alternate-form reliability should be performed (that is, using differently worded items or changing the order of items to measure the same attribute). These tests are useful, even though, in practice, their usefulness can be limited by the fact that people might "become familiar with the items and simply answer based on their memory of what they answered the last time" (Litwin, 1995, p. 13). Second, a 7-point or 9-point scale might have yielded more accurate results than the 5-point scale used in Tables 1 to 3, because the mean scores suggested no clear distinction between the significance of each item.

Finally, in regard to recipients completing the questionnaires in an accurate and timely manner, Wiersma's (2000) following observations are certainly useful: "the purpose of the questionnaire is clearly stated, confidentiality is assured, a deadline is given for the return of the questionnaire, and appreciation for completing the questionnaire is expressed" (p. 173). Without respondents, questionnaire analysis is impossible and the cover letter is the passage to the successful questionnaire research.

Summary

The term Micronesia has gained popular usage as a political entity referring to the former Trust Territory of the Pacific Islands (Wang, 1992). The island of Guam is geographically a part of Micronesia. This chapter has explained why we selected the Asia-Pacific region, specifically Guam and Micronesia, for this particular topic. Guam is a modern and cosmopolitan community that reflects the cultures of its original Chamorro inhabitants influenced by European, American, Asian, and Micronesian populations.

Teachers in Guam and Micronesia especially have a dual responsibility for developing and actively undertaking a process of introspection and self-examination regarding diversity and multiculturalism in higher education. With this perspective in mind, we discussed two faculty multicultural research studies in this chapter. Specifically, multicultural practitioners (Reed, 2002): (1) Are aware of themselves as cultural beings whose biases and values, which are largely socially, historically, and culturally constructed, and influence all aspect of their teaching, and learning; (2) are sensitive to the patterns of prejudice and bias in evaluation instruments, curriculums, instructional structure, and human interactions that effect educational outcomes; (3) are responsive to the linguistic, cultural, and learning-style differences that their students bring to the classroom and are careful not to see these differences as deficiencies; (4) understand the complex challenges that migrant, immigrant, and indigenous parents and students face in responding to the norms of the dominant culture; and (5) realize that the process of becoming multicultural literate is a lifelong endeavor that has social, professional, economic, and personal benefits.

Furthermore, in the Asia-Pacific region, technology plays an ever-changing and necessary role in higher education: (1) The increased use of technology integration into education, especially in higher learning; and (2) the increased use of technology experiences and proficiencies among faculty members. We address the issues and problems consistently throughout this book, particularly in Chapters IV and V. We have overviewed educational technology in Chapter II, and Chapter III goes on to look at a connection between educational technology and human learning.

Postscript (Courses Linked to Guam and the Pacific Island)

- **AN320:** People of the Pacific (a study of the anthropology of Melanesia, Micronesia, and Polynesia, including current theories of the settlement of the Pacific islands)
- **FN.AN333:** Literature of Guam, Micronesia, the Pacific (a survey of myths, legends, folktales, historical accounts and literacy works of the literature of Guam and Micronesia)
- **EN/MI/WG461G:** Pacific Women Writers (an intensive study of representative works of Pacific women writers to acquaint the students with nuances of their work)
- **HI211:** History of Guam (examines the pre-Magellan period, the Spanish regime, Guam's political development under the United States Naval Government, and the island's present civil government)
- **PI486:** Guam's Tourism Product (an inventory of the visitor industry on Guam that focuses on the island's attractions and its identity of a distinct tourist destination)
- **ED265:** Culture and Education in Guam (a study of Guam's cultural development focusing on the island and the concomitant implications for educators) (UOG Undergraduate Catalogue, 2004-05)

Endnote

1 The entire paper of Research 1 ("Faculty attitudes toward diversity and multiculturalism") by Inoue & Johnson has been published in 2002 in

Research in the School, 9(1), 51-59. The entire paper of research 2 ("Diversity and multicultural pedagogy") by Johnson & Inoue has been published in 2003 in *Journal of Research in International Education, 2*(3), 251-276. We used these papers with permission from the publishers.

Education Essay

Source: Inoue, Y. (2001, Summer). Improving teaching in higher education. APA Perspective, 1.

Improving Teaching in Higher Education: Quality and Diversity Travel Together

We, as faculty members, can improve higher learning at the UOG by making quality teaching the focus of our efforts in educating students from diverse backgrounds. American universities are increasingly multicultural, but the teaching force continues to be predominantly white: "As a society, we seek a sense of cultural pluralism—a state in which people of diverse ethnic, racial, religious, and social groups maintain autonomous participation within a common civilization" (McNergney & Herbert, 1998, p. 297). In this regard, the diverse student population at UOG provides faculty with such a perfect setting for practicing multicultural education and for conducting responsive research. I believe that we should see our students as faculty members of tomorrow, and that they demand a curriculum that reflects their ethnic and cultural backgrounds. Nearly 90 percent of the UOG students are racial and ethnic minorities, and I see the University facing the challenge of a transformation that will only be possible by discovery and implementation of knowledge through teaching and research.

Higher education faculty members are teachers, scholars, and researchers and, therefore, are members of a profession where learning should never cease. In my view, teaching and research are "two sides of the same coin." Teaching is so closely intertwined with research that we cannot discuss one without discussing the other. This means that faculty members must devote their energies to developing and improving their scholarly competencies by keeping current in their disciplines and at the same time must continue to improve as instructors. This means improvement in curriculum development, classroom practice, student assessment, and evaluation of teaching effectiveness. Advanced teaching, relevant research, and community services are the missions of institutions of higher education, and faculty members are expected to become the collective minds of the academic community. Although teaching is indeed a highly personal activity, it should not be a private affair that goes on between a professor and students. Inviting colleagues and experts to the classroom is one way to integrate multicultural perspectives across the curriculum. UOG Faculty can derive maximum benefits from collaboration and Collegiality in teaching and research. Collaboration will increase productivity, maintain motivation, and stimulate creativity. Accordingly, collaboration will enhance knowledge, improve scholarship, and contribute new research findings. By the same token, collegiality among faculty members will decrease the isolation of teaching and research. By sharing and disseminating research findings, we become resources for each other. The research can provide the direction and substance for making decisions. As faculty, we need to remind ourselves of the significance of what we are doing. While research is a way to update and modify teaching methodologies or techniques, teaching is a way to implement and evaluate new research findings.

Quality and diversity must go hand in hand. With the collaborative/collegial partnership seasoned with innovative/creative thinking and sharing/dissemination, I strongly believe that our faculty can develop an institution that is sensitive to pluralism. This, in turn, will provide the students with a learning environment that nourishes and encourages their academic success and development. To reach our goal of quality education for diversity in higher learning in Guam, the UOG faculty must work together. We must set ourselves to work today.

Section II

Learning and Technology: A Connection

Chapter II

Technology, Educational Media, and E-Resources

Digital computers have been around for some 50 years. Their influence has been felt in fits and starts. Early significant applications were in science, engineering and mathematics. In the last 20 years, we have seen computing become relatively universal with stand-alone PCs and workstations commonplace in homes, offices and factories. Both computational power and data storage capacity have become relatively cheap. Powerful application packages for word-processing, numerical processing and graphical work are readily available. Data of all kinds can now be represented and manipulated digitally, including photographs, video and audio tracks. Increasingly all of this is possible not just on stand-alone computers but also over networks and in particular the Internet. (Ryan, Scott, Freeman, & Patel, 2001, p. 9)

In this modern and advancing age, technology is a powerful complement to traditional teaching methods in higher education. Professors can help maintain students' interest and excitement by using technologies to provide a variety of instructional techniques and presentations in the class.

Many terms that describe the use of technology for learning are no longer appropriate for a digital world; e-learnin" is a commonly used term now (Rosenberg, 2001). Defining e-learning as the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance, Rosenberg (2001) provides three fundamental criteria (pp. 28-29): (1) E-learning is networked, which makes it capable of instantly updating, storing and retrieving, distributing, and sharing instruction or information; (2) it is delivered to the end-user via a computer using standard Internet technology; and (3) it focuses on the broadest view of learning—learning solutions that go beyond the traditional paradigms of training. Also, e-learning spans distance; however, distance learning includes correspondence courses. Therefore, e-learning is a form of distance learning, but distance learning is *not necessarily* e-learning.

While developed countries have concentrated their efforts on expanding advanced technologies and e-learning, the Micronesian islands have also focused on technology-enhanced learning, which is stated in this chapter. This chapter begins with an introduction to educational technology as follows:

- An Overview of Educational Technology
- Educational Media in Curriculum and Instruction
- Government E-Resources for Teacher Education

An Overview of Educational Technology

A computer is powerful, indeed. Its power "derives from its capability of performing the information processing cycle with speed, reliability, and accuracy; its capacity to store large amounts of data and information; and its capability of communicating with other computers" (Shelly, Cashman, Gunter, & Gunter, 2004, p. 1.11). The following is a brief history of computer technology development adapted from Shelly et al. (2004, pp. 1.42–1.56):

Milestones in Computer History

- 1937: John V. Atanasoff and Clifford Berry design and build the first electronic digital computer.

- 1943: During World War II, British scientist Alan Turing designs the Colossus, an electronic computer created for the military to break German codes.
- 1945: John V. Nuemann writes a brilliant paper describing the stored program concept.
- 1951: The first commercially available electronic digital computer, the UNIVAC I (UNIVersal Automatic Computer), is introduced by Remington Rand.
- 1953: The IBM model 650 is one of the first widely used computer systems.
- 1959: More than 200 programming languages have been created.
- 1965: Digital Equipment Corporation (DEC) introduces the first mini-computer, PDP-8.
- 1969: ARPANET (Advanced Research Projects Agency Network), a predecessor of the Internet, is established.
- 1975: MITS, Inc. advertises the first microcomputer, the Altair.
- 1981: The IBM PC is introduced, signaling IBM's entrance into the personal computer marketplace.
- 1983: Instead of choosing a person for its annual award, *TIME* magazine names the computer Machine of the Year for 1982, acknowledging the impact of computers on society.
- 1984: Apple introduces the Macintosh computer (a unique, easy to learn graphical user interface).
- 1991: AskERIC (Educational Resources Information Center) starts as a project of the ERIC Clearinghouse on Information and Technology at Syracuse University.
- 1993: Marc Andreessen creates a graphical Web browser called Mosaic. The success leads to the organization of Netscape Communication Corporation.
- 1996: An innovative technology called WebTV combines television and the Internet by providing viewers with tools to navigate the Web.
- 1997: The International Society for Technology in Education (ISTE) releases the second edition of "Technology Standards for Teachers" (the

first edition released in 1993).DVD (Digital Video Disc), the next generation of optical disc storage technology, is introduced.

- 1998: Apple Computer introduces the iMac, the latest version of its popular Macintosh computer.
- 2000: ISTE releases the National Educational Technology Standards (NETS) for teachers and K-12 students.
- 2001: Wireless technology, especially handheld computers, achieves significant market penetration.
- 2003: Wireless desktop computer components such as keyboards, mouse devices, home networks, and public Internet access points become commonplace.

The Field of Educational Technology

Educational technology is a term widely used in the field of education. Ely (2000) provides the following background information and sources that help in understanding the concept of educational technology:

- **Definition:** Educational technology refers to a particular approach to achieving the ends of education. Instructional technology refers to the use of such technological processes for teaching and learning. The Association for Educational Communications and Technology (AECT) defines instructional technology as the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning. In *Educational Technology* (magazine for Managers of Change in Education):

> *Educational technology refers to the application of science-based knowledge to educational and instructional planning and to the olution of basic teaching-learning problems. Technology in this sense is applied science. It is concerned with education processes as well as hardware and software systems.* (What is Educational Technology?, 2002, p. 23)

- **Roots of educational technology:** This field was a 20th century movement with the major developments occurring during and immediately after World War II. What began with an emphasis on audiovisual communications media gradually focused on the systematic development of teaching and learning procedures that were based in behavioral psychology.
- **Educational technologists:** They design instruction, produce instructional materials, and manage instructional computing services or learning resources collections. Many are still employed in schools and universities, but increasing numbers are being employed by training agencies in business, industry, government, the military, and the health professions.
- **Educational technology associations** include:
  - Association for Learning Technology (ALT)
  - Association for Media and Technology in Education in Canada (AMTEC)
  - American Society for Training and Development (ASTD)
  - AECT
  - Association for the Advancement of Computing in Education (AACE)
  - Consortium of College and University Media Centers (CCUMC)
  - Federal Educational Technology Association (FETA)
  - International Society for Performance Improvement (ISPI)
  - ISTE
  - National Association of Media and Technology Centers (NAMTC)
  - National Education Computing Association (NECA)
  - Society for Applied Learning Technology (SALT)

Technology and Counseling Education

Emphasizing the fact that counselors use technology is largely unknown, Myers and Gibson (1999) report the results of the Association for Counselor Education and Supervision's survey on 12 technology competencies for counselor educators: (1) Using productivity software to develop Web pages; (2) using such audiovisual equipment as video recorders, audio recorders, projection and playback units; (3) able to subscribe, participate in, and sign off counseling-related Listserv; (4) using counseling-related CD-ROM; (5) using e-mail; (6) using computerized statistical packages; (7) using computerized testing; (8) helping clients search for various types of counseling-related information through the Internet; (9) having knowledge about the legal and ethical codes via the Internet; (10) having knowledge about the strengths and weaknesses of counseling services provided via the Internet; (11) using the Internet for continuing education opportunities in counseling; and (12) evaluating the quality of Internet information. Of the 92 counselor educators who responded, the three competencies with the highest levels were using e-mail, accessing Listserv, and using audio-visual equipment. The three lowest competencies were using computerized testing, knowledge of Web counseling, and using computerized statistical packages.

Teaching in Distance Education

DE serves as an alternative method for delivering academic coursework to students unable to attend traditional campus-based classes. Mielke's (1999) discussion includes the following:

- **Definition:** DE is a method of education in which the learner is physically separated from the teacher and the institution sponsoring the instruction. Originally, DE involved teachers traveling to remote sites to teach classes or teachers corresponding with students. Technology has raised the quality of individualized distance instruction.
- **Forms of DE:** There are video and audio models of DE that involve broadcast and cable television, satellites, microwaves, fiber optics, and audio graphics. The linking of computer technology via the Internet or CD-ROM with television transmission provides a new dimension to DE, and can link professors to students in a distance setting. Another form of interaction is the use of computer conferencing. This method utilizes asynchronous communication in such forms as an e-mail list group, an Internet discussion group, or other types of conferencing software.
- **Adaptability:** Traditional programs that are heavily based in skill development and demonstration or require laboratory work can be offered in a DE format using interactive video interfaced with computers to facilitate

a hands-on learning approach. Classes that use lectures and laboratory experiences are easily adapted to a DE situation.

- **Effective teaching and learning with DE:** DE dictates changes in behavior for both the teacher and the learner; successful students develop persistence and skills in self-directing work. Critical elements for successful distance teaching are (1) instructor enthusiasm (comfort in front of the camera or with the technology); (2) organization (teaching materials must be prepared in advance); (3) strong commitment to student interaction; (4) familiarity with the technology used in the class format; and (5) critical support personnel (production staff, graphic designers, and technical staff members).

Educational Principles and Technology

Driscoll (2002) discuses four principles that offer a framework to teachers for thinking about how technology can support teaching: (1) Learning *occurs* in context, including the ways technology can facilitate learning by providing real world contexts that engage learners in solving complex problems, and computer simulations and computer-based micro worlds that offer contexts for learners to explore and understand complex phenomena in a variety of subject areas; (2) learning is *active*, including the use of brainstorming, concept mapping, or visualization software, as well as simulations that enable learners to experiment with modeling complex ideas; (3) learning is *social*, including software that supports a networked, multimedia environment in which students collaborate on learning activities; and (4) learning is *reflective*, including technologies that promote communication within and outside the classroom, making it easier for feedback, reflection, and revision to occur.

Multicultural Education and Technology

In recent years, multicultural education and technology have emerged as key issues in education. Marshall (2001) describes how technology can support multicultural education efforts based on the five critical dimensions of multicultural education: (1) Content integration is intended to expand the curriculum by incorporating contributions of diverse cultures into traditional disciplines of study; (2) knowledge construction promotes critical literacy by making explicit the manners in which scholars contribute to their respective fields of study; (3) prejudice reduction is about eliminating all forms of bigotry and involves promoting healthy personal identity devoid of the tendency to need to denigrate people who are different; (4) equity pedagogy is about equalizing opportunities to learn, involving incorporating various strategies that attend to learning styles and intelligence types; and (5) DE (i.e., everyone has access to specific courses or programs) is one example of empowering school cultures and social structures. Therefore, teachers at all levels accept that technology has become an integral aspect of the teaching-learning process, but it is too soon to crown the duo a perfect pair.

Evaluating Web Sites

Abdullah's (1998) criteria for evaluating a Web site includes (1) technical considerations (verify that the Web site's important capabilities, such as graphics critical to the subject matter, can be utilized with the technology); (2) purpose (should be clear and its content should reflect that purpose); (3) content (should be comprehensive, appropriate, and of value to the intended audience); (4) authorship (the Web site's author or manager should be providing contact information for uses to make comments or ask questions); (5) functionality (language used in messages should be clear, concise, and easy to understand); and (6) design/aesthetics (should be appropriately appealing to its intended audience).

Educational Resources Information Center

ERIC, a national information system funded by the U.S. Department of Education's Institute of Education Sciences, produces the world's premier database of education literature (e.g., reports, speeches, conference papers, tests, evaluation instruments, guides, dissertations/theses, historical materials, information analysis, statistical data, viewpoints, and reference materials). ERIC has been selecting documents since 1966 and indexing articles from key journals since 1969. The new ERIC online system, released in September 2004, provides the public with a centralized ERIC Web site. On October 1, 2004, ERIC introduced, for the first time, free full-text non-journal ERIC resources. These materials include more than 105,000 full-text documents authorized for electronic ERIC distribution from 1993 through July 2004, previously sold through the ERIC Document Reproduction Service. ERIC has just started to accept conference papers electronically for possible inclusion in the ERIC database. To access ERIC Documents, search the free online version of ERIC at: http://www.eric.ed.gov. Table 1 is a summary of the recent ERIC documents on technology and higher education.

Table 1. The 2003 ERIC documents on educational technology and higher education

Title	Author(s)		ERIC No.	Publication type
Enhancing a face-to-face course with online lectures	Keefe, T.	For technology to be used to its full advantage, it should be used to create an active learning environment.	ED479241	REPORT Evaluative/ Feasibility
Enduring principles of teaching (technical disciplines) in the 21st Century	Byrd, R.	Attention is focused on two areas: leadership in the classroom and appropriate use of technology. The right leadership style will motivate students to give extra effort in the course. Specific examples are provided.	ED479240	REPORT Evaluative/ Feasibility
StarTEC: A technology project in education reform	Hawley, H., et al.	StarTEC (Staff, Teacher, and Restructured Technology Education Consortium) can contribute to technology integration through an increased understanding of the complexities of higher education reform related to technology integration and the key elements of technology training plans.	ED478067	REPORT Project Description
Technology development of teacher education faculty by net generation mentors	Denton, J.; Davis, T.; Strader, A.; Clark, F.; Jolly, D.	The Technology Mentor Fellowship Program matched technologically proficient preservice teachers with K-12 teachers and university faculty to model technology as an instructional tool in K-12 and college classes.	ED477711	REPORT Project Description
Effective IT integration in the composition classroom: Instructor and student perspectives	Clayton, M.	Beyond the benefits of making course materials available and linking students via email, IT allows teachers to develop assignments that capitalize on electronic small group activities promoting process-based composition instruction.	ED479239	TEST, EVALUATION INSTRUMENT
Integrating Web conferencing and field work for preparing rural special educators	Chapman, C.; Knapczyk, D.	The approach of integrating Web conferencing with program and course components has proven a useful "survival tool" for rural special educators, overcoming barriers of geographic isolation.	ED476217	REPORT Descriptive
Electronic portfolios: Technology skills + portfolio development = powerful preservice teachers	Capraro, M. M.	An electronic portfolio is a collection of work captured by electronic means that serves as an exhibit of individual efforts, progress, and achievements. The video clips proved to be valuable to administrators in determining teacher candidate effectiveness.	ED476367	REPORT Research/ Technical
Do Instructor-provided on-line notes facilitate student learning	Barnett, J. E	Technologies have made it easy to provide students an outline of notes prior to lectures and for later review. The use of PowerPoint may make providing notes unnecessary.	ED476465	REPORT Research/ Technical
It should have been stressed in all education classes: Preparing pre-service teachers to teach with technology	Hardy, M. D.	Participants had difficulty identifying specific technological resources for teaching, and tended to be less positive in their perceptions of both the extent to which their degree program prepared them to teach via technology and the extent to which their instructors modeled the use of technology.	ED478379	REPORT Research/ Technical

Electronic Journals: The Curriculum Resources Center at Washburn University (http://www.washburn.edu/mabee/crc/edejournals.html) provides education-related electronic journals that are scholarly, peer-reviewed, full-text and accessible to all without cost. Such electronic journals of the following five categorical areas are listed in Appendix D of this book: Educational Research, Higher Education, Multicultural Education, Teacher Education, and Technology.

Educational Media in Curriculum and Instruction

The educational media can be divided into four categories (Laurillard, 1998): (1) *Descriptive* (both teacher's and student's conceptions are accessible to the other, and both topic and task goals can be negotiable); (2) *adaptive* (teacher can use the relationship between his or her own conception and the student's conception to determine the task goals for the continuing dialogue, in the light of the topic goals and previous interactions); (3) *interactive* (at the level of actions, the students can act to achieve the task goal); and (4) *reflective* (teachers must support the process by which students link the feedback on their actions to the topic goal).

Keeping these categories in mind, Laurillard (1998) classifies the teaching media as follows:

- **Audio-visual media:** Include print (both text and graphics), audiocassette, audio-visual (an audio-cassette talking accompanied by separate visual material), broadcast television, and videocassette.
- **Hypermedia:** Computer-based software system for organizing and storing information to be accessed inconsequentially, such as hypertext and multimedia resources.
- **Interactive media:** Computer-based simulations (programs that embody some model of an aspect of the world, allow the user to make inputs to the model, run the model, and display the results).

Figure 1. Logo of the UOG's Instructional Media Unit

- **Adaptive media:** The main difference between the tutoring system and the tutorial simulation lies in the fact that the teacher's conception is expressed explicitly in the former.
- **Discursive media:** Bring people together for discussion. They are grouped under the generic category "teleconferencing," or "conferencing at a distance." (pp. 108-164)

Instructional Media in Academia

Although remote areas such as Micronesia are behind in integrating technologies into teaching, the Instructional Media (IM) Unit at UOG has been making efforts to support the faculty and curriculum with effective applications of audio-visual media, multimedia, and related technologies to enhance the quality of instruction. Digital media production is at the heart of the unit's services, and its services include the following: photography (images or illustrations); Web design (Web pages to meet instructional and academic needs, promoting class sites to provide students with both academic materials and share student presentation); CD (audio CD, video CD-ROM, data CD, and DVD) development (develop collections of class presentations, student portfolios or reference materials); and presentation design (create dynamic presentations for teaching or research). IM provides media production assistance and facilities to meet the growing needs of Guam. The following is a list of the IM's services in seven areas.

Instructional Technology

- Assists in locating and acquiring media and educational technology software resources.

- Coordinates scheduling and circulation of University's media and technology materials and equipment.
- Researches, selects, purchase, inventories, and maintains technology equipment on campus.
- Maintains a supply of commonly needed audio-visual supplies and replacement parts.
- Maintains electronic cataloging of University's media and technology software collection.
- Provides collection and storage of media and technology software for faculty, staff, and student use.
- Provides a collection of current educational technology software directories, guides, and catalogs.
- Provides for media and educational technology setups in University facilities.
- Provides information about emerging educational technologies and software.
- Provides workshops for training on the application and use of educational technologies.
- Provides individual and group instruction in the use of media and technology equipment.
- Provides or trains equipment operators for special University needs.
- Schedules media and educational technology presentations at University facilities.
- Supports the application and integration of technology into instructional presentations.
- Supports the design and equipping of learning facilities to support educational technologies.
- Duplicates audio and videocassettes following copyright law guidelines.

Training Services

- Consults on message design and planning.

- Assists in selection of multimedia computer hardware and software to meet educational needs.
- Assists with the visualization of computer-based multimedia programs.
- Assists in computer courseware development.
- Maintains a collection of computer-based multimedia programs for presentation development .
- Maintains both Macintosh and IBM equipment for development of computer-based multimedia.
- Provides workshops in instructional design, telecommunications, media production and message design.

Digital and Imaging Services

- Consults on message design and planning.
- Performs detailed production, including scripting assistance, budgeting, and production scheduling.
- Performs multi-image planning, production and programming.
- Designs and produces articles, booklets, newsletters, and journals.
- Plans designs displays and exhibits.
- Designs and produces presentation visuals.
- Designs and develops of Web sites.
- Designs logos and promotional materials.
- Produces charts, diagrams, graphs, signs, posters, and certificates.
- Performs layout and design of materials for print and screen.
- Prepares artwork and computer images for a wide range of visual media.
- Performs typesetting and lettering.
- Designs, produces, and prints transparencies.
- Creates computer-based presentations.
- Modifies existing artwork and typesetting.
- Performs studio and location photography.
- Performs photographic copying of artwork in both black and white (B&W) and color.

- Develops and prints B&W 35mm film.
- Creates computer-generated slides.
- Mounts slides.
- Mounts pictures and other flat materials.
- Laminates materials.
- Performs sound-slide program production.
- Performs soundtrack recording, mixing, and synchronization.

Engineering and Maintenance

- Consults on facility design and equipping to support the use of educational technology.
- Consults and trains on technical use of educational technology equipment.
- Performs minor repair maintenance of university-owned media and educational technology equipment.
- Supervises media and technology application of mediated classroom at the University.

Media Lab

- Provides equipment and software for students and faculty to use for their technology productions.
- Assists students and faculty with their projects.
- Provides a facility in which materials and equipment are stored for student and faculty use.
- Provides private viewing stations for slide, video, CD-ROM, and audio CD presentations.
- Provides mounting facilities for dry mounting and laminating.
- Performs photographic copying, slide copying, and B&W photo production.

Audio Service

- Assists in message design and production.
- Provides studio and location recording.
- Performs edits and repair of audiotape.
- Assists with arrangements for professional narration.
- Assists in the selection of copyright-free music for soundtracks.
- Performs mixing and balancing narration, music, and sound effects for soundtracks.
- Performs duplication of recordings and changing of formats while following applicable copyright laws.
- Provides consultation on the design of audio production facilities and purchase of audio equipment.

Video Services

- Assists in message design and production planning.
- Provides studio and location recording.
- Assists with arrangements for video digitizing and compression.
- Edits videotapes in analog and digital formats.
- Assists with arrangement for professional narration.
- Assists in the selection of copyright-free music for soundtracks.
- Video and audio mixing using image, narration, music, and sound effects.
- Performs duplication of recordings and changing of formats while following applicable copyright laws.
- Provides consultation on the design of video production facilities and purchase of video equipment.

An Interview

On July 7, 2004, the UOG IM Unit coordinator said as follows:

Some faculty are five to six years behind in the exposure to new technologies and their applications, and they prefer old-fashioned ways, and are not risk takers. For example, they use only slide projectors (old graphic system) not digital projectors; digital ones are available and more flexible. Slide projectors may enhance their teaching areas but not in the knowledge base or skills of new technologies. University faculty should be encouraged to use technologies for four major reasons: (1) Feel a sense of modern capabilities in current learning environment; (2) teaching materials are better-organized, reviewed, and modified; (3) lectures and classroom presentations developed using media are shared and repeated; and (4) put value on teaching more because they spend time and energy to develop materials. In short, flexibility, speedy, mobility, and distribution are the advantages.

Government E-Resources for Teacher Education

A Case Study of Implementing Educational Online Resources

Abstract

This case study documented online government publications and their applications to enrich lesson plans and classroom instruction, with materials appropriate for K-12 educators. Focusing on subject areas such as science, history, math, geography, and language arts, the sources included: Federal Resources for Educational Excellence, National Park, World Fact Book, NASA, and Eisenhower National Clearinghouse. Schoolteachers enrolled in the University of Guam's education master's program participated in a seminar on U.S. government Web sites. This seminar's objective was to open a door leading to the discovery and awareness of digital educational resources, along with the opportunity to select appropriate materials to utilize in the classroom. This study is instrumental in developing an understanding about the role that the

Internet plays in enhancing lesson plans and the curriculum for K-12 educators, especially in remote areas, such as western Pacific island communities, who face long standing ailing budgets and limited alternatives.

The teaching and learning Web site seminar was one of the initiatives in Indiana State to help teachers; the seminar gave the teachers an opportunity to review state and national content standards, develop Web-enhanced lessons, and evaluate a variety of Web resources for teaching K-12 school subjects (Yoho, 1998). After identifying grade-appropriate standards, the teachers in the above seminar explored examples of ways to use Web resources (published by Access Indiana at the Teaching and Learning Center) to enhance their daily teaching. The lessons on the Web sites were listed by grade level and topic, along with their objectives, background, concepts, activities, and procedures. Schnackenberg (1999) advocates the usefulness of online lesson plan workshops (teacher in-service training) to determine if an existing traditional lesson plan is suitable for the incorporation of Internet resources, and to locate World Wide Web (WWW or Web) resources that can be incorporated into technology based lessons. Teachers can use Web resources to inform themselves, to access lesson plans, to locate curriculum materials, and to identify Web-based interactive learning activities for their students (Berson & Berson, 1999).

Guam: A Case Study Site

Guam (209 square miles) and Singapore (239 square miles) are relatively the same size. Singapore is one of the few countries that has integrated the use of information technology (IT) into its preservice teacher training program. In 1997, the Singapore government launched the Master Plan for Information Technology in Education (Capper, 2000). Guam lags behind Singapore in this vital area of instructional technology education. This educational drought includes the lack of basic school materials, such as textbooks and library acquisitions. This has been a serious, chronic, and long-standing problem for the Guam public school system. For instance, "Only 19 of 37 public schools in Guam will be wired and connected to the Internet by June of 2004" ("Schools to Go Online," 2004, p. 1). The lack of electronic exposure is compounded by budgetary constraints that inhibit the schools from securing equipment and promoting opportunities for digital information access.

Online Government Resources

The U.S. Government Printing Office (GPO) began operation according to a Congressional Joint Resolution in 1860, with the mission to inform the nation by producing, procuring and disseminating publications from congress, executive departments and establishments of the Federal Government. The GPO continues its mission today, and Judith Robinson (1998), in her work *Tapping the Government Grapevine,* refers to the GPO as "The Mother Load," considering that it is the U.S. Federal Government's primary reproducer and distributor of information. For more than 100 years, the Federal Depository Library Program (FDLP) has been an important channel through which the U.S. government has made information available to the public (Lopresti & Gorin, 2002). However, diminished funding for federal publishing and developing technologies have accelerated the migration and rapid growth of online electronic content delivery ("Library programs," 2000). "The government's target of making all its services available electronically by 2005 is a milestone in the application of electronic communications" (Ryan, 2002, p. 48).

Another milestone currently realized is the impact for information seekers in remote areas such as Pacific island communities. With this electronic revolution from print to digital format comes a smorgasbord of resources available through the Internet. This feast of e-resources for educators facing limited budgets and limited alternatives is revolutionary.

The Library

Providing access to government publications for research and instructional applications is a goal of the UOG library. This library has evolved into the largest library and research facility in the western Pacific, providing over one million of library holdings, serving UOG as well as the community of Guam (UOG Undergraduate Catalog, 2003-04). The library is a selective repository receiving 38% of the materials produced by the GPO. This partnership with UOG and the FDLP links the UOG academic community and the public with government information. The library, an FDLP affiliate, recently established a government documents computer laboratory. UOG's School of Education's mission of teacher preparation and training has naturally adopted the promotion of online access to enrich lesson plans. The federal government, through this emerging digital program, provides an indispensable educational contribution, one that remote regions such as the Pacific islands consider an information lifeline.

There are many online articles directing educators to good sources of information, useful for K-12 school assignments and curriculum units, in a variety of formats (Stewart, 2002). A remedial prescription for limited resources is currently at hand; now is the appropriate time for schoolteachers in Guam to open a door leading to the discovery and awareness of classroom support, such as digital U.S. government resources. With this intention, one important goal of the Robert F. Kennedy (RFK) Memorial Library at UOG remains to provide access to cost-free government publications to the Guam's community.

Purpose of the Study. With this study, the intention was to spark curiosity and to inspire those dedicated to curriculum support in order to further explore the wealth of educational materials and lesson plans offered through the U.S. government. Educators located in remote areas now have extraordinary opportunities for information access. Opportunities are now available cost-free with the click of a mouse. The purpose of this case study was to provide a better understanding of the role that Internet technology plays in enhancing curricula for the K-12 educators.

Method

The Educational E-Resources Seminar

This seminar was a collaborative effort between a government documents librarian and a School of Education faculty member at UOG. The first portion of the seminar was a documentation of hands-on training utilizing U.S. government Web sites for educators. The second portion was dedicated to Internet search exercises, involving government education Web sites. Focusing on school subjects (such as science, history, math, geography, computer skills, and language arts), the initial presentation included the Federal Resources for Educational Excellence (FREE), the National Park, *The World FactBook*, NASA, and the Eisenhower National Clearinghouse.

The following five sites based on subject areas were emphasized:

- **Science:** NASA Explores (http://education.nasa.gov/about/team/index.html). NASA has established the Education Enterprise that provides students and educators with unique teaching and learning experiences as only NASA can. Working collaboratively with NASA's Science and Technology Enterprises, the Education Enterprise promotes education as an integral component of every major NASA research mission. NASA Explores (http://nasaexplores.com) provides free, weekly K-12 educational articles on current NASA projects. Printable and downloadable, the materials incorporate and support national educational standards in math, science, geography, and technology.
- **History and Language Arts:** National Park—Teaching with Historic Places (http://www.cr.nps.gov/nr/twhp) provides lesson plans based on the National Park Service's National Register of Historic Places to teach history, social studies, geography, and civics.
- **Geography:** The CIA—*The World FactBook*, (http://www.cia.gov/cia/publications/factbook) contains country profiles, geographic backgrounds, population studies, government and economic data. Extensive data are provided relating to the country or geographical area selected.
- **Science and Computer Science:** The Federal Resources for Educational Excellence (http://www.ed.gov/free/index.html) representing over 30 federal agencies, provides a gateway to free educational materials covering a range of topics.
- **Math:** Eisenhower National Clearinghouse Web site (http://www.enc.org) provides a plethora of education resources relating to Web links, education topics, lessons, and activities.

Participants

Ten participants (five male; five female) of this seminar were recruited from the UOG education master's degree program. The participants were all K-12 teachers from the Guam public school system. First, the UOG librarian showed an online presentation about a range of government subjects and specific Web sites described earlier. Then, independently, the participants located their own lesson plans on the Internet, relying on government Web sites as a resource.

Table 2. U.S. government lesson plans selected

	Subject and level	Content area or topic	Authority	Lesson activity	Computer interactive?	Links offered?
1	Math (K-6th)	Number and operation – Counting	Eisenhower National Clearinghouse <www.enc.org>	Students answer problems by typing in the concrete answer to an addition problem within 60 seconds.	Yes	Yes
2	Science (1-12)	Environmental studies	Department of Energy <www.eere.energy.gov>	To increase awareness of energy efficiency and renewable energy.	No	Yes
3	Language Arts (10-12)	Writing, reading	Peace Corps <www.peacecorps.gov>	To write both a narrative essay and an expository essay.	No	Yes
4	History/ Geography (5-12)	American history	National Register of Historic Places <www.cr.nps.gov>	To understand the historical events of the 20th century.	No	Yes
5	Math (K-5)	Basic skills in math	Department of Education <www.ed.gov>	To understand basic addition and subtraction.	No	No
6	Social studies/ history (10-12)	World War II	National Park <www.cr.nps.gov>	To learn the effects of Japanese-Americans during World War II.	No	Yes
7	Studio arts (9-12)	Drawing art nouveau	National Gallery of Arts <http://nga.gov>	To enhance knowledge of the art nouveau style.	No	No
8	Technology (5-12)	Computer	Department of Justice <www.cybercrime.gov>	To learn about computer crimes and hackers	No	Yes
9	Social studies (5-8)	What do maps show?	Department of the Interior, Geographical survey – <www.cln.org/>	To assist in teaching the concepts of reading maps.	Yes	Yes
10	Science (K-12)	Insect study	Geographical Survey <www.nbii.gov>	Provides integrated, hands-on, inquiry about insects.	No	Yes

They were asked to print out one lesson plan from their selected Web site, answering questions as to how the chosen lesson plan would be useful in a specific content area. Table 2 is a summary of the participants' activities.

Findings and Discussion

The seminar of this case study revealed that the materials generated by the U.S. government and representing authoritative sources could be used either interactively on the computer or as printed handouts to be distributed to students. Many of the online materials could conveniently be incorporated into a curriculum, as well as utilized for the enhancement of student learning objectives.

Some important discoveries from the seminar activities:

- Many government educational Web sites feature classroom-ready lesson plans and materials for teachers with a list of additional readings.

- Online materials, often including appropriate pictures and maps, can transition to multiple disciplines (history, social studies, and geography courses, for example).
- Several Web site lesson plans are based on National Education Standards (relevant United States History Standard for Grades 5-12, for example).
- "Government publishing was nurtured by a law exempting government publications from copyright restrictions" (Robinson, 1998, p. 9).

The following questions and answers are useful in helping to understand U.S. government e-resources:

- *What is the extent of the coverage of government Web sites?* The list of significant government Web sites is extensive. Simply consider the materials held at the Library of Congress, the National Library of Education, 12 Presidential Libraries, and all the federal agencies alone to appreciate the magnitude of the quantity of materials available.
- *Are government educational publications technically approachable?* Government education Web sites (FREE, World Fact Book, NASA, and Eisenhower National Clearinghouse) are user-friendly. Many have searchable capabilities along with relevant links.
- *Are government-teaching e-resources aligned to national education standards?* Many are. For instance, Teaching with Historic Places (National Park) is based on U.S. History Standards, and lesson plans of NASA are referenced to educational standards in science, mathematics, geography, and technology.
- *How can teachers use government education online materials for the benefit of their students?* The materials can be either computer interactive or can be printed out and distributed to students.
- *Do government online lesson plans provide specific grade level and learning objectives?* Many of them do. For instance, lesson plans associated with Science from a Distance provide useful information such as grade levels, standards, and goals.

With the advent of the Internet, and particularly Web applications built on that network infrastructure, U.S. government agencies have made great strides in providing new levels of access to government information; and the search engine applications developed for the Web also give the impression of new, easy-to-use tools to discover resources with simple keyword searching (Moen, 2001).

The seminar reported in this paper supports Soong, Chan, Chua, and Loh's (2001) observation: "E-resources are to be successful when: students use and enjoy using the resource; students find the resource enriching and helpful; and educators find that the introduction of the resource promotes higher learning" (p. 104). Teachers classically are responsible for assisting students in acquiring data and traditionally act as information givers. Knowing how to get *timely* and *necessary* information is the key to success in daily practice in the classroom for teachers. Lessons learned from the seminar include: (1) In order to be current, Uniform Resource Locators (URLs) must be verified periodically to remain viable resources; and (2) the seminar activities supported Lopresti and Gorin's (2002) observation that "While the Web can be a useful vehicle for disseminating information, some categories of material are different to use online, such as long reports and maps, which are often slow to print or download" (p. 19).

As a result of the Government Print Office (GPO) currently migrating from print materials to digital format, this case study described the impetus of the migration and the increasing opportunities that now exist for educators to obtain and teach with government online materials or e-resources. This prescription for educators facing ailing budgets and limited alternatives, such as in the western Pacific island communities, provides a healthy array of resources to meet the broad cultural demands associated with teacher training and curriculum support. Clearly U.S. government e-resources are one solution to counter the current national epidemic of slashed education budgets and addressing the information challenges of geographically remote educational institutions. The list of significant user-friendly government Web sites available provides a unique and significant cost-free benefit for all.

Future Direction of the Study

As a progression from this case study, future plans call for innovative initiatives. The first is to approach the UOG library reference coordinator to request that

U.S. government documents and their electronic applications be incorporated into the Bibliographic Instruction course, currently offered to all education students. This exposure would accomplish twofold, the introduction to a vast resource for classroom support, while aiding ongoing academic research. In addition, Internet searching skills will be reviewed to insure that the digital information retrieval process can be accomplished beyond the course structure. The next initiative involves the Guam Library Association (GLA), whose membership includes school librarians. The plan involves an in-depth training of GLA members, with the objective of establishing further information partnerships involving technology, government education resources, and individuals seeking quality, cost-free curriculum and classroom support.

Summary

This chapter has examined and defined educational technology from various angles, including the concepts that educational technology tends to be considered as instructional technology or technology in education. Specifically, educational technology refers to the application of science-based knowledge to educational and instructional planning and to the solution of basic teaching-learning problems. With the advent of Internet technologies, new levels of access to the U.S. government educational e-resources and materials are available to enrich lesson plans and instruction. This chapter has reported such government materials appropriate for K-12 educators and beyond. E-resources, often including appropriate pictures and maps, can be used for multiple disciplines as discussed in this chapter. Computers are definitely an integral part of the teaching-learning process, and students learn best while *doing,* just as emphasized by constructivism. The great ancient Chinese Confucius said: "If I hear, I forget; if I watch, I remember; and if I do, I understand" (Shelly, Cashman, Gunter, & Gunter, 2004). This theory can be applied to e-learning, simply because learning is not about memorizing isolated facts, but is about connecting and experiencing them. Indeed, educational technology is a theory about how problems are identified and solved, resulting in learning, particularly learning theories and technology integration, which will be discussed in the next chapter.

Education Essay

Source: Inoue, Y. (2003). The computer as a research tool. Triton's Call, 20(3), 10.

Statistical Software and Adult Learners

H. G. Wells in the early 20th century made a prediction about the statistical knowledge of people, and he was right. Gordon and Gordon (1995) cite him as follows: "The time may not be very remote, it will be as essential for efficient citizenship that everyone be able to think statistically as it now is to be able to read or write" (p. 2). Although the effects of statistics are not limited to academic areas, statistics has become a necessary element in most academic studies, including engineering, business, economics, psychology, medicine, nursing, and education.

Many of the graduate students are so apprehensive of taking the research and statistics courses that I teach. It appears that their expectations for these courses are extremely high, however. For instance, in their words: "I would like to absorb as much information from this class and often apply it to life," and "I would like to learn everything I need to know about writing an excellent research paper and a master's thesis." In my quantitative analysis course, students deal with three areas: (1) research methods, (2) quantitative analysis, and (3) the Statistical Package for Social Sciences (SPSS) software. After studying the theoretical material and doing the SPSS exercises in the class, students collect data for their own mini-research, enter the data in the SPSS program, analyze it, interpret the results, and present the results in summary reports. It is not an easy course, but has been very successful. My students' typical reflections on the course are as follows:

- This course was most certainly a rewarding, interesting, self-fulfilling, and exciting learning experience. I used to think that research was boring, something really serious that had no room for enjoyment, but I was wrong.

- Statistics was something I have already used as a classroom teacher. Calculating averages and percentages for my students' grades are statistics. (Note: Many of my students are K-12 teachers.)
- I am now more confident to embark on my master's thesis study because I feel that I am well equipped, particularly with the knowledge base of research methodologies and statistical procedures.

After the last semester, however, one student dashed into my office and complained, "I worked so hard, but I got a B in your course. I cannot understand. Explain it to me." "Grades are earned and not given by the instructor," I said, "I returned the result of each examination and each assignment to you." The student knew the grading system in this course, but one more time I fully explained how the student earned this grade based on my evaluation criteria. The student seemed to be very upset but gradually understood and eventually confessed. "I did my undergraduate studies long ago. I am now in the graduate program and realize that technology is an important part of the curriculum. I was so scared of doing SPSS exercises through computers." Then the student said, "Can I visit you whenever I have questions about computer software even though I am not taking your course?" "Please do," I said.

The above experience reminds me of another adult student who is afraid of having access to the e-mail system and cannot send electronic messages to me. The above experience makes me further realize that American higher education has changed with regard to educational goals and the means used to attain them. In addition to a diversified student population in terms of ethnicity, social background, and expectations, the proportion of non-traditional aged students is increasing significantly. The university I teach is not an exception. American higher education has a mission to provide adult learners with reeducation or retraining so that they are able to remain competitive in today's technologically sophisticated society.

Chapter III

Educational Technology and Learning Theories

Because of the changing nature of today's students, economic pressures, and rapid implementation of distance learning courses and programs, definitions of what constitutes education and learning are changing, too. Whatever years ago instructors viewed their students as blank slates whose minds could be filled with the information they were imparting, current constructivist theory holds that students, through their interaction with one another, the instructor, and their environment, create knowledge and meaning. (Palloff & Pratt, 2001, p. 3)

Educational technology is a theory about how problems are identified and solved, a field involved in applying a complex, an integrated process to analyze, problem solving in human learning, and a profession made up of an organized effort to implement the theory, involving intellectual techniques, and practical application of educational technology (Definition of Educational, 2004). Laurillard's (1998) book, *Rethinking University Teaching*, starts with the premise that university teachers "must take the main responsibility for what and how their students learn" (p. 1). Good teaching motivates and engages students in ways that are consistent with teachers' philosophies of teaching and learning, based on theories of development, motivation, and learning. In today's technologically sophisticated age, "a constant challenge to educators is the chasm between educational technology and teaching practice" (Gorski, 2001, p. 9). Keeping this challenge in mind especially, this chapter focuses on the following:

- Human Learning and Cognition
- Technology Enhanced Teaching and Learning
- Course Syllabi and Effective Teaching

Human Learning and Cognition

Cognitive psychology has replaced behaviorism as the dominant school of thought in American psychology. What brought about this cognitive revolution? Why were the early leading advocators of human information processing (HIP) dissatisfied with behaviorism? Which of behaviorism's assumptions did HIP researchers reject? What evidence and arguments were used against behaviorism? Why did both behaviorists and HIP researchers reject the notion of stages? HIP brands of cognitive psychology take a different view of development than do Piagetians. This section discusses the following:

- Cognitive revolution in American psychology
- The HIP approach
- Methods of behaviorists and HIP theorists
- Piagetians versus the HIP approach
- Knowledge versus mind
- The rejection of the stage theory

Cognitive Revolution in American Psychology

The terms *behaviorism* and *learning theory* were used as if they were synonymous for many years in American psychology. This is because early psychologists assumed that people think, have ideas and sensations, and act through the power of free will. As the psychologists observed it, their task was to catalog the nature of these ideas and sensations using introspection as a tool. Introspection became something of an art, particularly when Wilhelm Wundt (1832-1920), often regarded as the founding father of modern psychology, trained people to look inside themselves and to report their internal experiences as they thought, perceived, and learned. John B. Watson (1878-1958), the father of behaviorism, was a vocal opponent to the use of introspection. Watson argued that the field of psychology should concentrate its efforts on the study of behavior and leave the understanding of the internal mental states. With regard to human learning, Watson asserted that the observable events would be physical stimuli, which give rise to overt response. Eventually, from about 1910 to 1950, behaviorism dominated scientific psychology in the United States (Barasalou, 1992). After that, the attempt to understand behavior in terms of mental processes was replaced by explanations in terms of laws of learning, which concentrated on the functional relations between environmental stimuli and behavioral responses.

As Watson's behaviorism was his reaction to the earlier mentalism, so cognitive psychologists felt that the time had come to look more closely at internal events that were completely rejected by behaviorists. Piaget, in particular, argued that human subjects are not just passive receivers of stimuli and producers of responses. Piaget further argued that learning is an *active process* that involves the use of strategies and the transformation of sensory experiences into new categories and organized conceptions. The term *cognition* began to receive wider use throughout experimental psychology and came to be used as a general term to describe the mental process. Human learning, engaging in active responding, organizing, and recognizing materials almost always involves some kind of cognitive activity. Behaviorism rejected the subjective study of mental phenomena to make psychology a science and to equip it with the tools of objectivity and measurement. Similarly, cognitive psychology later rejected the narrowness of the stimulus-response view of behaviorism regarding human activities, setting as its goal a scientific study of behavior. Cognitive psychologists hope to understand and to explain the internal mental states that lie just between the stimulus and the response.

The HIP Approach

Cognitive revolution occurred in American psychology during the 1950s and 1960s. The most salient features of this new approach to psychology at that time were the acceptance of *mental processes* and the representation of knowledge as necessary components in understanding human learning and the rejection of the narrow approach by behaviorists. Two major forces have shaped modern theories of cognitive development. The first force is the work and ideas of Jean Piaget (1896-1980) of Switzerland, who was much influenced by B. T. Baldwin (1861-1934), the first major modern developmental theorist. The second force is the HIP approach, which was not the product of any particular person. Barasalou (1992) recognizes computer science as the third major force that has contributed to the demise of behaviorism and the rise of cognitivism, describing that the components of cognitive theory are similar to computer components, as is their organization. In other words, the central theme that unites cognitive psychology and computer science is information processing; both disciplines focus on how systems acquire, store, retrieve, transform, and produce information to perform intelligent activities.

Humans are limited information processors. In one sense, this is correct. Information processing, whether in humans or in machines, involves two separate domains: hardware and software. In psychobiology, the functioning of *hardware* means the physical interconnections of neurons and intraneuronals affected by learning. *Software* refers to the ways in which data are referenced, accessed, and manipulated. Because humans cannot process a vast amount of data to produce information quickly, completely, and accurately, they are called *limited information processors*. Humans, however, are *active* processors of information, whose memory banks differ from those in computers. Information is stored for a short time in short-term memory (STM) and then is rehearsed and encoded for storage in long-term memory (LTM). Memory goes through a process of reconstruction from the abstracted cues that are remembered. Information is stored precisely in a computer, whereas human memory is less precise but colorful or informative. Humans process many items at the same time, whereas computers do one thing at a time.

Who were the early leading advocates of HIP? John Flavell, a developmental psychologist, and Noam Chomsky, a linguist, should be named definitely. Why were they dissatisfied with behaviorism? The major reason for their dissatisfaction was that behaviorists did not share common views on what was learned, how it was learned, or what class of theoretical conceptions was most appropriate to account for human learning (MacKenzie, 1977). How does a child learn to think about the world, to use mathematical reasoning, and to master the syntactic structure of language? In order to answer these questions, it is necessary to explain what is developing and how development occurs.

Which of behaviorism's assumptions did HIP theorists reject? What evidence and arguments did they use against behaviorism? First, it is important to remember the belief of Watson: learned associations between external stimuli and observable responses are the building blocks of human development. Behaviorists clearly express a mechanistic worldview, focusing on the way in which the stimulus-response relationship is formed. They view learning as changes in the form or the frequency of behavior as the consequence of environmental events. HIP researchers reject this assumption. Instead they argue that learning is an internal mental activity that cannot be observed directly, pointing out that the behavioral view of learning conclusively differs from the cognitive view of learning as an acquisition of knowledge and cognitive structures due to information processing.

Second, we should emphasize that traditionally behaviorists have characterized the organism as a *tabula rasa*, whose behavioral habits and skills primarily reflect the particular environmental events that occur in conjunction with behavior. B. F. Skinner (1976), one of the most influential American psychologists, stresses that the essence of human development is the continual acquisition of new habits of behavior and that the learned behavior is controlled by external stimuli (such as reinforcers and punishers). HIP rejects this assumption and argues that learning results from interaction between an environmental stimulus (the information that is to be learned) and a learner (the one who processes and transforms the information). When Skinner tried to explain language learning from a behaviorist's perspective, for example, Chomsky urged that Skinner's view only considered the observable stimuli and responses in linguistic interactions and was not sufficient to account for the structural properties of human utterances (Barasalou, 1992).

Models of Behaviorists and HIP Theorists

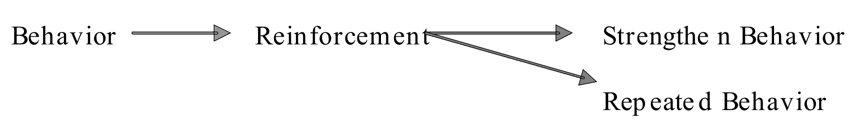
What are the different methods used by behaviorists and HIP theorists? Behaviorists use operant conditioning. Skinner (1976) has stated that human behavior is the most familiar feature of the world. Skinner advanced Watson's behavioral perspective by demonstrating and then by gaining understanding of one very important form of learning called "operant conditioning."

Operant Conditioning

Operant conditioning is defined as a learning theory or model in which voluntary behaviors are strengthened or weakened by consequences or antecedents. Classical Conditioning by Ivan Pavlov (1849-1936), a Russian physiologist and psychologist, emphasizes the relationship between antecedent stimuli and responses, while operant conditioning emphasizes the relationship between responses and their consequences. All the basic principles of Pavlovian conditioning are found in Skinner's experiment (such as Skinner box): a rat learned to press the bar more often when the behavior was reinforced by a food pellet. Similarly, a child tends to repeat behavior that has pleasant consequences and to cut down on behavior that has unpleasant consequences. Operant conditioning pair behaviors with consequences, which are only effective if they increase desired behavior or decrease undesired behavior. If the consequence weakens the behavior, then it is called punishment. In the behavioral view, consequences determine to a great extent whether a child will repeat the behavior that leads to the consequences. Reinforcement is any consequence, which strengthens the behavior it follows, as illustrated in Example 1.

Reinforcers are consequences that strengthen the associated behavior. There are two types of reinforcement: (1) *Positive* reinforcement, which occurs when the behavior produces a new stimulus; and (2) *negative* reinforcement. (The word *negative* in negative reinforcement does not imply that the behavior being reinforcement is necessarily negative.) which means something similar to something that is subtracted. Associate positive or negative reinforcement occurs by adding or subtracting something following a behavior. Negative reinforcement is often confused with punishment. A behavior followed by a punishment is less likely to be repeated in similar situations in the future. The process of punishment is illustrated in Example 2.

Example 1. Reinforcement and associated behaviors



Example 2. Punishment and associated behaviors

Behavior → Punishment → Weakened Behavior

Punishment → Decreased Frequency of Behavior

In Kimball's (2002) words:

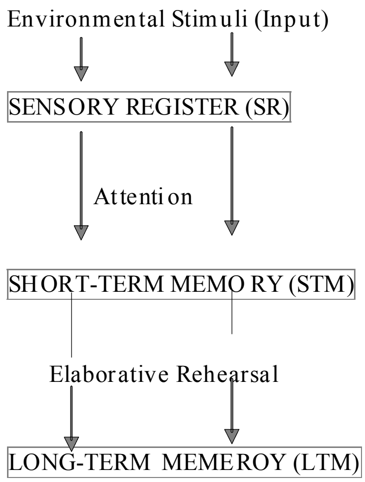
> *Through painstaking research, Skinner accumulated significant, if counterintuitive, evidence that behavior is changed less by the stimuli that precede it (though context is important) and more by the consequences that immediately follow it (i.e., consequences that are contingent upon it).* (p. 71)

In the field of special education, behavior analysis exists on three interrelated levels: (1) *Technology* (suspension bridges, and incidental teaching); (2) *science* (physics, engineering, and applied behavior analysis); and (3) *philosophy,* for instance, Skinner's description of the three-term contingency (i.e., cause-precedes-effect reasoning) as the "atom" of behavior from which effective instructional technology and cohesive theories of autism intervention have been build (Kimball, 2002).

Cognitive Model

HIP theorists use a cognitive model, which is a model of information processing of learning. One of the central metaphors of the information age is that the "human mind is a computer." In particular, computer science and artificial intelligence caused the reexamination of basic postulates of memory processing and storage, as well as of language processing and acquisition. HIP theories search for the ways the human mind *acquires*, *stores*, *recalls*, and *uses* information. These functions are very similar to the functions of computers. A poplar model of HIP does visualize three memory storages (as illustrated in Example 3) and a set of processes that determine whether and how stimuli undergo further processing. The memory system is an example of a high-level component of the HIP theory. A second characteristic of the HIP theory is an

Example 3. Three memory storages



emphasis on the codes or representations used to store information (see Example 3).

The first memory storage is the sensory register, which holds stimuli briefly (about one to three seconds) in original form for possible future processing. The short-term memory is the second memory storage (also called *working memory*), which holds about seven bits of information for about twenty seconds. The long-term memory is the third memory storage (also called the *permanent store house of information*), which is thought to have an essentially unlimited capacity. Because of the limitations of the sensory register and short-term memory, some information may be lost at each point of entry.

- **Sensory register:** Sensory register is the entry point to the memory system. Children seem to be somewhat slower than adults in forming a sensory representation of what they see; this slower speed of taking in information may restrict learning and memory for children. The process of recognition involves noting key features of a stimulus and relating them to already stored information. The most important point to remember is the recognition and meaningful processing of information. The selective focusing on a portion of the information currently stored in the sensory register is what is called "attention," and there are individual differences in attention.

- **Short-term memory:** The next source of development is short-term memory. Two of the most well established principles of human memory are *rehearsal* and *organization*. Rehearsal refers to the continuous repetition of what one is trying to hold in mind; elaborative rehearsal is based on organization (several items are grouped together on some basis and rehearsed as a set) and meaningfulness. Older children and adults are more likely to rehearse several items and to adapt rehearsal strategies to the particular domains of the task. Young children are less likely to divide a list according to stable and helpful categories, or to search categories systematically.
- **Long-term memory:** The long-term memory does play an influential role throughout the information processing system. Stored knowledge in the long-term memory is believed to be organized in schemata, which are related to Piaget's scheme. When schemata are well formed, comprehension occurs. When schemata are poorly structured or absent, on the other hand, learning is slow and uncertain. We should emphasize that both the long-term memory storage and meaningfulness can be enhanced by relating what is to be learned to what is familiar to the child.

Behaviorists vs. HIP (Topics of Interest)

Behavioral theorists believe that cognitive processes (such as thinking and sensing) are behavioral; whereas, HIP theorists believe that cognitive process is the base of behavior. Behaviorists assume that the outcome of learning is change in behavior, emphasizing the effects of external events on the individual. Human subjects actively operate on their environment to produce different kinds of consequences. Behavior modification therapy is based on the principle that behavior is learned and, therefore, it is possible to change almost any behavior by altering the individual's environment. Cognitive psychology, on the other hand, is concerned with how human subjects acquire, transform, represent, store, and retrieve knowledge, and with how the knowledge directs what they attend to and how they respond. HIP's interest is brain-processing, focusing on the following topics: attention, memory, pattern recognition, semantic organization, images, language process, thinking, judgment, reasoning, remembering, creating, and solving problems, as well as other cognitive topics that have been once considered outside the boundary of experimental psychology.

How does the brain spontaneously process information? Using top-down processing while driving down the road, the sequence of information processing can be cited as follows (Lawson, 2003):

If…	what you see in the road ahead is a puddle of water (puddle hypothesis),
And…	you continue driving toward it (proposed test),
Then…	your tires should splash through the puddle and they should get wet (predicted result),
But…	upon reaching the puddle (actual test), it disappears and your tires do not get wet (observed result),
Therefore…	the puddle hypothesis is not supported; what you saw was probably not a puddle of water (conclusion). Perhaps it was a mirage, and so on. (Hall, 2000, p. 333)

As Hall (2000) emphasizes, "this top-down hypothetico-deductive process takes place very rapidly and subconsciously; and one does not necessarily know that this is how their brain works" (p. 333).

Piagetians vs. the HIP Approach

Piaget's Stage Theory

HIP brands of cognitive psychology take a different view of development than do Piagetians. Piaget presents his stage theory of development described in the following:

- **Sensorimotor stage:** The first stage lasts from birth until about two years of age. Infants and children during this stage lack true thoughts and acquire understanding primarily through sensory impressions and motor activities, and move from having only innate reflexes at the beginning to being able to mentally represent the external world. A cognitive development milestone (object permanence) occurs between the four- and eight-month-olds. Children under the age of two tend to imitate the behavior of people or animals. These imitative behaviors show their increasing ability to think in terms of symbols. Alos, schemata develop into mental representations when children during this stage begin to store information about the world and use that information as the basis for later behavior.

Keeping Maria Montessori's thought (the hand is the tool of the intellect) in mind, Orion (2001) has noted the importance of development of the human hand in the first three years of life based on her own observation that the Japanese children live in a culture where it is still very common for exquisitely beautiful things (such as *origami*) to be made by the hand and this is an advantage.

- **Preoperational stage:** This stage usually lasts from two until seven years of age. Many symbols are derived from mental imitation and involve both visual images and bodily sensations; the schemes of this stage incorporate and build on the schemes of the previous stage. Even though children's thinking is more sophisticated, (1) they are still limited in their ability to use new symbol-oriented schemes, and (2) their thinking and behavior are illogical. In a typical conservation experiment, a child is asked to explain what happens when water is poured back and forth between containers of different sizes and shapes. The preoperational child is unable to consider more than one feature at a time and is unable to mentally reverse the action of pouring; therefore, the child is likely to maintain that a tall container holds more water than a squat container, even if the amount is the same. When asked, "Why do you think so?" preoperational children tend to reply, "Because it's taller."
- **Concrete operational stage:** This stage normally lasts from 7 to 11 years of age. Schemes develop, which allow children a greater understanding of such logic-based tasks as conservation (matters are neither created nor destroyed, but simply change shape or form), class inclusion (constructing hierarchical relationships among related classes of items), and striations (arranging items in a particular order). Operational thinking is still limited to objects that are actually present or that children have experienced concretely and directly. Furthermore, if asked to deal with a hypothetical problem, concrete and operational children are likely to be stymied. Children at the age of seven are not likely to be able to solve abstract problems by engaging in mental explorations.
- **Formal operational stages:** This stage begins at eleven years of age. It is the stage in which children reach the point of being able to generalize and to engage in mental trial and error by thinking of hypotheses and testing

> them in their heads. The term "formal" reflects the ability to respond to the form of a problem rather than to its content and to form hypotheses. Children in this stage make a movement from an ability to think and reason about concrete visible events to an ability to think hypothetically. The cognitive structure of this stage is characterized by four rules for manipulating the content of thought: identity, negation, reciprocity, and correlativity. The formal, operational thinkers can read the analogies "10 is to 30 as 1 is to 3," and they are able to deal with abstractions, form hypotheses, and engage in mental manipulations. Formal operational thinkers are also able to understand and use complex language forms, such as proverbs, metaphors, and sarcasms.

"The sheer mass of Piaget's research into children's intellectual activity and the complexity of his framework caught the English-speaking educational world by surprise in the late 1950s" (Hall, 2000, p. 161). Concerning Piaget's view that children under the age of six and a half are unable to reverse their verbal thinking, children between 7 and 11 can if they use concrete materials, and children after 11 can think propositionally, Hall has further noted:

The Piagetian notion of fixed stages, which set limits on children's use of logic, began to circulate alongside Susan Isaacs's (1885-1948) view that children use reason from an early age and can raise questions, hypothesize and experiment when conditions stimulate their interest. (p. 169)

Example 4. Developmental stages by Abiko

Stage	*Age range*	*Main center of interest*	*Primary functions and pursuits*
1	Birth to 3	Imitation and repetition in movement and behavior	Physical skills and senses
2	5 to 7	Imitation and repetition in language and numbers	Mental skills and senses
3	9 to 11	Logical thinking, research, or experiment	Main concepts and methods
4	11 to 14	Searching for a sense of self and meaning	Individuality—searching
5	14 to 20	Self-development for specialization	Individuality—development
6	20+	Self-realization	Individuality—integration

A New Theory of Human Developmental Stages

Emphasizing that in the last decade many Japanese psychologists have expressed the view that developmental stage theories are almost dead, Abiko (2002) has proposed a new theory of six developmental stages based on children's shifting interests and brain development, as illustrated in Example 4 (p. 167).

In Abiko's (2002) words:

In the course of growth, a child's interest center moves from a focus on skills and repetition, through phases of language development, memorization, and imitation, then to general concepts and logical or critical thinking, then to self-searching and self-development, and finally to self-realization. Accordingly, my proposal for a whole-school curriculum structure from elementary through secondary levels follows the first five stages. (p. 167)

On the basis of the Shifting Interest Center Theory, Abiko (2002, p. 168) proposes a structure for the whole school curriculum or education program as part of an overall lifelong education process. That is, the educational content of the school curriculum can be divided into three basis categories: (1) Life morals and skills, (2) general (main) concepts and methods, and (3) logical thinking and creativity.

Information Processing Framework

What is developing and how does it occur? These issues can be explained within the HIP framework. The central components of the framework are the innate cognitive architecture, the mechanism of learning, and the procedure and the representation that are created for information processing. HIP has become a popular approach to the study of learning. This is because the HIP approach provides psychologists with a framework for investigating the role of a learner that behaviorism had ignored (Snowman, 1991). Cognitive psychologists have come to rely more and more on ideas borrowed from the HIP approach. Regarding what develops in the information processing system, the HIP theory answers that the basic components do *not* develop because they are innate.

What develops is the control process that manipulates information. For instance, strategies adults use to process information in short-term memory are likely to be very different from the strategies children use. The general solution to this problem (i.e., "what develops?") has been provided by research on memory development and strategies for encoding the information acquired. A corollary of this is that the type of information stored in long-term memory will change as strategies develop. Given the same memory task, for instance, a four-year-old child is likely to use different encoding strategies and thus show different recall. That is why the HIP theory encompasses a large number of research studies in such areas as *perception*, *attention*, *memory*, and *comprehension*. As children grow older, however, their memory space grows with them so that they become able to process more interaction at one time, improving their cognitive performance. Control processes in both short-term and long-term storages are very convincing candidates for developmental change. The main development of recognition is not in the ability to do it but in the complexity of what is taken in and later recognized. As children grow older, they can remember more information about the stimulus and can discriminate smaller differences between the familiar stimulus and the novel one over a longer period of time. That is to say, the basic structure of memory is not thought to change during childhood, although the size of the working memory storage may increase.

Knowledge vs. Mind

In children's cognition, what develops? HIP researchers answer "knowledge," while Piagetians answer, "mind." Why the different answers? The Piagetian model and the HIP approach are both based on one key idea: there are psychological structures (such as operations, concepts, working memory, and intelligence) in children's minds that explain their behaviors (Meadows, 1993). Psychology is the study of the individual maturation or learning, or individual construction of an internal model of outside reality, or some combination of such factors in the individual mind. The work of Vygotsky, who proposed theories of child language development, is considered as the third major model of cognitive development (Meadows, 1993): one of major disagreements was that Piaget believed that development would precede learning, whereas Vygotsky (1896-1934) believed that learning would precede development.

Mind

Piagetians stress that learning is neither a product of language nor a product of perception. Learning results from contradictions that lead to states of disequilibria. Piaget observed unknown facets of child thought and behavior more than anybody else did, and proposed that children pose inherent desires to maintain a sense of organization and balance in their conceptions of the world. For Piaget, scheme is organized pattern of behavior or thought, and his basic principles of cognitive development involve organization (tendency to combine mental processes into more general systems), adaptation (tendency to adjust to environment), and equilibration (tendency to organize schemes for better understanding of experiences). These principles are important for children to learn. In organization tendencies, children think of "cats" and "dogs" as subcategories of the more general category "animals."

Knowledge

HIP theorists focus on the difference between an expert and a novice performing the same task: expert chess players see configurations and familiar patterns of pieces on the board, but poor players see individual pieces. As children learn a skill, they acquire and store increasingly complex knowledge about the skill. There is a considerable difference in the knowledge that the expert and the novice possess; this difference affects such factors as how a task is approached and what information is sought (Chi, 1978). For the HIP researchers, children are regarded as universal novices on tasks. In chess tournaments, for example, Chi stresses that the amount of knowledge an individual possesses about a specific content area can determine to a large extent how well the individual can perform in both memory and metamemory tasks. Compared with younger children, older children and adults are better predictors of their own memory performance because they can judge the usefulness of certain strategies for a task.

The Rejection of the Stage Theory

Both behaviorists and HIP researchers reject the notion of stages and why. One of the reasons for HIP's rejection comes from the concept of metacognition to explain why children of different ages deal with learning tasks in different ways (Snowman, 1991), explaining as follows: when seven-year-old children are taught how to use both a less effective technique (e.g., simple repetition) to remember pairs of nouns and a more effective technique, most of them are likely to use the less effective strategy when given a new set of pairs to learn. Most 10-year-old children are likely to use the more effective strategy. This explanation implies that the seven-year-old children have not had enough *learning experiences* to recognize that some problem-solving strategies are better than others. This lack of metacognitive knowledge makes true strategic learning impossible for young children. Metacognition covers everything children can know that relates to how information is processed. For HIP researchers, the candidates of their search for "what develops" are basic capacities, strategies, metacognition, and the knowledge base.

Behaviorism is closely associated with the stimulus-response psychology. For classical behaviorists, the structure of cognition was an associative chain of mediating responses. As the content of associations is entirely the product of learning, the structure of cognition is thus entirely the product of learning. Behaviorists assume that the outcome of learning is change in behavior, and they emphasize the effects of external events on human subjects. In addition, behaviorists stress that children are motivated when promised praises or rewards (i.e., extrinsic forms of motivation) reinforces their behavior. Skinner demonstrated that organisms tend to repeat actions that are reinforced and that behavior can be shaped by reinforcement. Skinner further developed the technique of programmed instruction (teaching machines) to make it possible for children to be reinforced for every correct response. Supplying the correct answer, teachers can motivate students to move on to the next step. For behaviorists, the specification of laws relating observable stimuli to measurable responses is sufficient for human learning.

Technology-Enhanced Teaching and Learning

As Ramsden (1999) points out, a good higher education teacher does look at four areas (i.e., organizing the content of courses and materials, selecting teaching methods, assessing student learning, and evaluating the effectiveness of teaching) involving three theories of teaching: (1) Teaching as telling or transmission (teachers define the task of teaching undergraduates as the transmission of authoritative content or the demonstration of procedures); (2) teaching as organizing student activity (teaching is seen as a supervision process involving the articulation of techniques designed to ensure that students learn); and (3) teaching as making learning possible (teaching, students, and the subject content to be learned are linked together by an overarching framework or system). Keeping these theories in mind, teachers are able to incorporate classroom assessments that motivate and engage students in ways that are consistent with teachers' philosophies of teaching and learning and with theories of development, learning, and motivation, so that meaningful classroom outcomes can be accomplished. That is the ultimate goal of education. Characteristics of meaningful learning are active, constructive, cumulative, goal oriented, and self-regulated (Shuell cited in Fardanesh, 2002); for instance, behavioral, cognitive, and constructive models of instruction are simply described as follows (Farnham-Diggory cited in Fardanesh, 2002):

> *The first stage corresponds to the behavior model in which the learner accumulates bits and pieces of isolated information. The second stage matches the developmental model in which substantive changes are made to existing schemata of the learner…the third stage conforms to the apprenticeship model that constitutes restructuring and creation of new schemata by the learner.* (p. 97)

As previously discussed, *cognitive* refers to mental processes (e.g., memory, judgment, and reasoning); whereas, *behavior* refers to the actions and activities of an organism. *Constructivism* posits that meaning is an active process of constructing rather than acquiring knowledge and that meaning is perceived as inseparable from one's own interpretation. There are two types of constructivism (Tan & Hung, 2002):

> *Vgotskian constructivism is called social constructivism because he emphasized the critical importance of interaction with people in cognitive development. Where Piagetian constructivism emphasizes cognition as an individual activity and in the head, social constructivism focuses mostly on knowledge socially constructed in the world…. To summarize, constructivist learning encourages the learner to engage in the active process of meaning—construction in real-authentic problems and situations, and where learners are able to socially construct knowledge*

with others. Importantly, more knowledgeable peers or adults can also facilitate learning construction through guidance, but the responsibility and ownership for learning must be on the learner. (p. 50)

Technology and Self-Regulation

Learners, whether inside or outside the classroom, self-regulate their learning by interacting strategically with tasks, and by engaging cognitive, metacognitive, and motivational commitment and expertise (Hadwin & Winne, 2001). Self-regulated learning is identified as the fusion of skill and will, referring to people's development of different learning strategies (Garcia & Pintrich, 1993). The process in which people actively sustain behavior and cognition is systematically oriented toward the attainment of learning goals. For improving writing skills in English, for instance, many strategies or tactics are used to encourage self-regulated learning (Inoue, 2000): (1) Reinforcement theory promotes self-monitoring and self-instruction; (2) social cognitive theory promotes self-observation, self-judgment, and self-reaction; (3) information processing theory, which includes both learning strategies and learning tactics that are effective ways to enhance positive outcome expectations and attitudes; and (4) the applications of verbalization (self-talk) in cognitive-developmental theory are helpful to build the confidence in working through the long process of improving English writing skills.

Designing instructional environments that support self-regulation demands that contemporary learning theories inspire teaching innovation and technological enhancement for the classroom (Hadwin & Winne, 2001). Certainly, "computers have potential to become powerful learning tools, rather than additional resources for classroom activities; and the teaching innovation requires that learning theories, instructional designers, teachers, and computer programmers collaborate to address four goals" (p. 312): (1) Design instructional contexts that emphasize self-regulated learning; (2) devote energy to the development of learning technologies that have potential to support engagement in self-regulated learning; (3) integrate means for collecting rich sources of data to examine classroom teaching in action, thereby moving research about learning into the complexity of the classroom; and (4) develop sophisticated methods of examining learning that draw on multiple sources of data and examine data through multiple theoretical lenses (pp. 313-314). Learners acquire a lens for seeing reidentified meanings with the opportunity to practice. Learning on the Web, therefore, may be a possible platform for situated or conceptual learning;

that is, Web-based learning is fundamentally not constrained by specific locations and classrooms, but can be infused into varying learning situations (Hung, 2001).

Three Learning Theories in Technology Education

Three influences in technology education have been the behavioral, cognitive, and constructivist philosophies, and it is apparent that technology education has been shaped by these three philosophies and retains characteristics of each one as described as follows (Dunham, Wells, & White, 2002): "*Behaviorism* has deeply rooted connections with technology education's approach to instruction. In general, within the United States, teachers are the locus of control in the classroom. Historically, this instructional approach has been similar within technology education" (p. 68). *Cognitive* learning theory also has close connections with technology education. Problem solving is a process or cognitive skill, and this suggests that a cognitive approach to learning, as manifested in the problem-solving tradition of technology education, is a core value of educational theory in technology education (Lewis, Petrina, & Hill, 1998). *Constructivist* theory frames learning as an active and continuous process whereby the learner takes information from the environment. Learning takes place as students discuss and share problems and solutions in meaningful contexts through collaboration by developing unique solutions and participating in thoughtful reflection (Jonassen, 1994). Based on survey and focus group data, Vannatta and Beyerbach (2000) have reported that "an important characteristic of a progressive technology-using educator is a dynamic, constructivist vision of technology integration" (p. 144); and "higher education faculty is a crucial component to developing technology-using preservice teachers…higher education faculty need opportunities to observe technology-rich classrooms and to converse and collaborate with technology-using educators" (p. 145).

Educators' Perceptions of Technology Integration

Brown's (2001) questionnaire research explored technology educators' perceptions about the use of the learning theory-based concepts such as schemata and metacognition. The participants ranked orders of importance from most important to least important:

- **Visualization:** Graphic organizers could be of particular interest to technology educators
- **Situated Cognition:** Transfer of learning to usefulness outside the class is a goal of technology education
- **Cognitive Modeling:** Involves conscious verbalization by the instructor of those internal cognitive strategies used by experts when solving problems and analyzing connections to existing knowledge
- **Reflection and Debriefing:** Process of looking back over the experience and performance to assess
- **Concept Mapping:** Graphically simplifying the display of concepts and the relationships between those concepts as a means of communicating, and analyzing relationships of a system of knowledge
- **Cognitive Apprenticeship:** A metaphor for the modifying of classroom instructional techniques to incorporate aspects of traditional apprenticeship training approaches
- **Metacognition:** Includes monitoring, questioning, predicting, generating, and evaluating alternatives
- **Scaffolding:** The management of intensity of instructional guidance provided by the instructor
- **Schema Theory:** Schemata of connected facts that help the individual perform efficiently

Teacher education programs must prepare teachers capable of integrating technology in meaningful ways; the need for teachers capable of integrating technology in ways that foster student learning has been heralded by the Federal government, national professional organizations, and teacher education accreditation agencies for over a decade (Cunningham & Stewart, 2003).

Instructional Designs and Learning Theories

Moallem (2001) describes the process of designing a Web-based course, *Instructional Design and Classroom Evaluation*, for an undergraduate teacher education program. This course expects prospective teachers to acquire knowledge and skills related to designing a course, a unit of instruction, and a lesson. A Web-based course management tool (Eduprise Database) for instructors (course database, forum database, library database, and test database) was used to develop the course. According to Moallem (2001), in addition to developing the course Web page (consisting of syllabus, course calendar, assignments, and readings), the course database tools are utilized to present students with the Web page. The Web page describes the overall project that students are expected to design and develop at the conclusion of the course, and a concept map of how the project is related to the course units and lessons, or the knowledge domains.

Web-based instruction will have a major impact on classroom design over the next decade (Moallem, 2001). College students already have constant online access to course syllabi, lecture notes, and other materials; digital course content is becoming richer, deeper, and more interactive; and an increasing number of studies indicate no significant difference in the amount of factual information learned when comparing traditional lectures with electronic information delivery (Graetz & Goliber, 2002). Graetz and Goliber emphasize that IT is opening the following three "new frontiers" for collaborative learning by pushing traditional lectures out of college classrooms: (1) The pace of technology adoption can be expected to quicken as universities invest in collaboration technology and as instructors gain more expertise in facilitating online collaboration; (2) a scientific understanding of the human-centered design of online collaborative workspaces is only beginning to emerge; and (3) instructors need to upload information developed during class to online, collaborative applications—the integration of virtual and face-to-face collaborative environments.

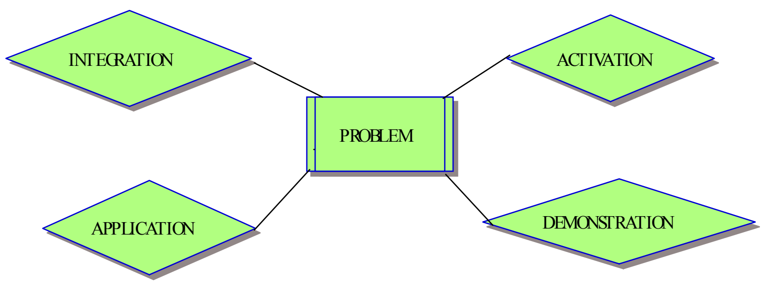
Although the roots of traditional, instructional design models can be found in behaviorism, human performance has to be treated at a higher level of abstraction, with a focus on the application of complex sets of knowledge and skills rather than the acquisition of knowledge and skills in isolation (Häkkinen, 2002). Based on the fact that cognitive approach to instructional design has begun to be adopted more widely recently in terms of learning, cognition, and knowledge, Silber (2002) emphasizes two types of knowledge. One is *declarative* knowledge, which is divided into facts (a simple association among a set of verbal and visual propositions), concepts (a category of objects, actions, or abstract ideas), and principles and mental models (a cause-effect relationship). The other is *procedural* knowledge, which is the ability to string together a series of mental and physical actions to achieve a goal, usually to solve problems. Therefore, cognition has been defined as "coming to know" (Brown, 2001). Table 1 compares the "coming to know" approach with behavioral approach in instructional design area.

Table 1. A comparison of behavioral and cognitive approaches (adapted from Silber, 2002, pp. 30-31)

Instructional design area	Behavioral approach	Cognitive approach
What is learning?	What learners *do?*	Internal coding and structuring of new information by the learner.
What factors influence teaching?	Arrangement of stimuli and consequences in the environment.	How learners attend to, organize, code, store, and retrieve information as influenced by how the context in which information is presented when it is learned and when it is used.
What is the role of memory?	Not addressed in detail.	Learning occurs when information is stored in memory in a meaningful manner so it can be retrieved when needed.
How does transfer occur?	Stimuli and responses.	Stress efficient processing strategies.
What types of learning are best explained by the approach?	Discriminations (recalling facts). Generalizations (defining and illustrating concepts).	Complex forms of learning (reasoning, problem solving). Generalization to new situations.
What basic principles of the approach are relevant to Instructional design?	Produce observable, measurable outcomes (behavioral objectives, criterion referenced testing).	Student's existing mental structures (leaner analysis). Guide and support for accurate mental connections (feedback).
Goal of instruction	Elicit desired response from learner presented with target stimulus.	Make knowledge meaningful and help learners organize and relate new information to existing knowledge in memory.
How should instruction be structured ?	Determine which cues can elicit the desired responses.	Determine how existing knowledge is organized determine how to structure new information to mesh with current knowledge structures
Specific instructional strategies	Teach fact lesson first, then concepts, then principles, then problem solving.	Teach problem solving in authentic context; teach principles, concepts, and facts in context as appropriate within the problem-solving lesson.

Merrill (2002) states that the most effective learning products or environments are those that are problem-centered and involve the student in four distinct phases of learning: *activation* of prior experience, *demonstration* of skills, *application* of skills, and *integration* of these skills into real-world activities. In the problem-centered instruction, learning is promoted (1) when learners are engaged in solving real-world problems, (2) when existing knowledge is activated as a foundation for new knowledge, (3) when new knowledge is demonstrated to the learner, (4) when the learner applies new knowledge, and (5) when new knowledge is integrated into the learner's world (see Example 5) (Merrill, 2002).

Example 5. Four phases of learning (Source: Merrill, 2002, p. 45)



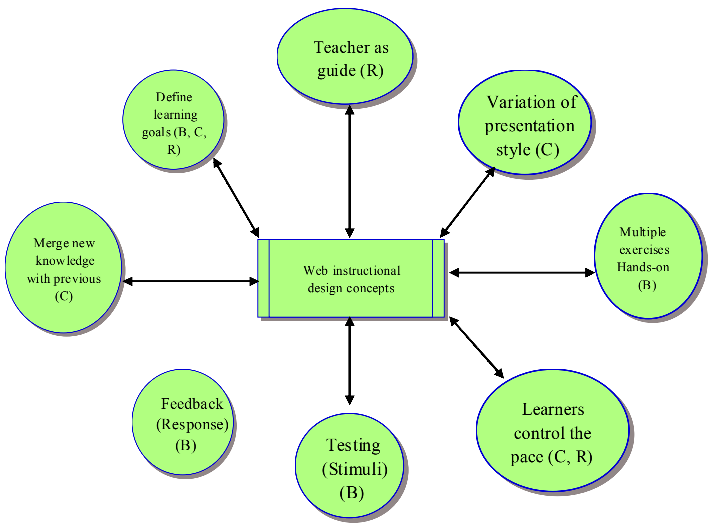
Computer-Supported Learning Systems

The ultimate goal of computer-supported learning systems is to enhance the students' development and learning. Technology does assist in learning, mainly because it provides a variety of ways to reach learners with different backgrounds, ages, and learning needs. Educational content on the Internet is rapidly increasing; resource-learning theory depicts a changing role for the instructor (from an expert dispensing knowledge to a resource and a guide). Traditional and resource-based learning teaching techniques can be summarized as follows (Janicki, Schell, & Weinroth, 2002):

Traditional	*Resource based*
Teacher as expert model	Teacher as facilitator or guide
Textbook as primary source	Variety of sources or media
Facts as primary	Questions as primary
Information is packaged	Information is discovered
Emphasis on product	Emphasis on process
Assessment is quantitative	Assessment is qualitative and quantitative

Janicki, Schell, and Weinroth (2002) propose a model for computer-supported systems (see Figure 1), synthesizing instructional design pedagogy and

Figure 1. A model for computer-supported learning systems



Source: Janicki, Schell, & Weinroth, 2002 (B-Behavioral, C-Cognitive, and R-Resource)

Web-design concepts based on key factors in computer-supported learning systems (such as providing a stimulus with rapid feedback, supporting individualism, using repetition, merging of prior knowledge with new knowledge, and changing the role of the instructor). This proposed model involves the concepts for the behavior, cognitive, and resource-learning theories. The model is also useful to understand the changing role of instructors in Web-based training, the learner's control of the learning experiences, and variation of learning styles.

Consequently, a course or training program may be designed to move students along the milestones that reflect the continuum of performance—an instructional goal to be conceptualized as a continuum of behavior, rather than as a singular, terminal behavior, based on five stages (Moisey, 2001): (1) *Precontemplation*: people have no intention of changing their behavior, and typically deny they have a problem; (2) *contemplation*: people acknowledge they have a problem and are seriously thinking about solving it; (3) *preparation*: people may be committed to action, but still feels ambivalent about making a change; (4) *action*: people engage in activities or change their environments in order to alter their problem behavior; and (5) *maintenance*: the main task is to stabilize the behavior and to avoid relapse.

Table 2. Items for which mean ratings on the first day of class and at the end of the semester differed

	First day of class		End of semester		
Item	M	SD	M	SD	N
Reading material covered by each exam	6.36*	0.98	6.15*	1.11	509
Dates and times of special events	6.33	1.11	6.12	1.29	508
Kind of assignments	6.18*	0.99	5.91*	1.17	504
Amount of work	6.04*	1.10	5.77*	1.26	508
Class participation requirements	6.04*	1.53	5.74*	1.31	475
Makeup policy	5.85	1.33	5.50	1.52	477
Late assignment policy	5.72	1.34	5.50	1.52	477
Schedule of topics to be covered	5.65*	1.30	5.32*	1.45	508
Prerequisite skills and course work	5.49	1.51	5.25	1.49	508
Where to obtain materials for the class	5.48*	1.53	5.10*	1.58	506
Course goals and objectives	5.38*	1.45	5.11*	1.45	506
Instructor information	5.19	1.40	4.94	1.58	477
Available support services	5.18*	1.63	4.51*	1.62	477
Instructor's office hours	5.10	1.42	4.83	1.59	477
Days, hours, and location of class meetings	5.43*	1.75	5.81*	1.55	508
Holidays	5.32	1.71	5.56	1.69	509
Academic dishonesty policy	4.18*	1.93	3.79*	1.91	476
Drop dates	3.68*	1.80	4.02*	1.89	508

Note: Ratings were based on a 7-point scale ranging from 1 (no attention at all) to 7 (a great deal of attention). p *<. 005 unless otherwise noted.* *p *<. 001.*

Source: Adapted from Becker & Calhoon, 1999, p. 9.

Course Syllabi and Effective Teaching

Instructors use course syllabi to communicate their expectations of what students must do to be successful in the course; therefore, it is important to identify what students focus on when reading the course syllabus (Becker & Calhoon, 1999). When initially receiving an introductory psychology syllabus and once again at the end of the semester, in Becker and Calhoon's study, students rated how they would adhere to 29 syllabus items. Rating for the first 15 items decreased from the beginning to the end of the semester (see Table 2): the rating for the final three items increased; basically students pay a great deal of attention to dates of important course events such as exams and assignments, as Becker and Calhoon (1999) noted. Nontraditional-age students paid less attention to late assignment and dishonesty policies than did traditional-age students; perhaps nontraditional-age students perceive themselves as having a strong work ethic and thus assume they will not need to make use of this information.

Developing Effective Course Syllabi

A questionnaire by Garavalia, Hummel, Wiley, and Huitt (1999) focused on the perceived importance of syllabus components. Data from 72 faculty and 83 undergraduate students indicated:

- For the faculty, items such as course description (course title, chapters and topics covered, and format of class), instructor data (instructor's name, office number, department phone number, and office hours), attendance policy (penalty for violations) and grading policy are important.
- For students, items such as course description (chapters and topics covered, and format of class), instructor data (office number, department phone number, and office hours), exams (exam format, and exam dates), papersand projects (paper length and paper format), attendance policy (penalty for violations), withdrawal policy (grade assignment policy) and grading policy are important.
- Agreeable items between faculty and students include grading policy, instructor data (office hours), and attendance policy (penalty for violations).

Another important finding from the above study is the correlation between students' grades and their perceptions of important syllabus components. Faculty members who are interested in improving the quality of their syllabi should obtain feedback from a variety of sources including students, other faculty members and administrators, and personal reflection. A course syllabus is an agreement between instructor and student, a communication device, a plan of action for the course, and a cognitive map (Matejka & Kurke, 1994). A good course syllabus is a requirement of successful teaching. That is, writing an effective syllabus is the first step in creating a climate that blends challenge and support for students.

Step 1: Constructing an Effective Syllabus

Effective course syllabi should include the following information:

- instructor's information (i.e., name, office number, telephone number, e-mail address, and office hours);
- course title, meeting days and times, and building and room numbers;
- prerequisites for the course;
- description of the course, learning objectives, and required texts and supplies;
- due dates for major assignments, and the date and time of midterm and final exams;
- grading standards and evaluation criteria;
- policies regarding academic honesty, attendance, and late submission of assignments;
- topics to be covered in sequence with dates; and
- a space for names and telephone numbers of a few classmates.

Step 2: Making the Initial Class Successful

The first day of class can be instrumental by setting standards and capturing the tone for the rest of the course. Instead of just distributing the course syllabus and relating details, we advise that on the first day of class, the instructor should get to know students, assist students to become acquainted with others in the class, and that students become familiar with the instructor. Once this is accomplished, then expectations between both the instructor and students can be identified clearly and clarify the course objectives. The instructor can stress emphasis on a professional demeanor that includes being prepared for the class, engaging in a class discussion, listening attentively to students and respect for differing points of view.

Step 3: Making a Class Meeting Meaningful

Lecturing has both advantages (placing greater emphasis upon the importance of the instructor-student interaction, for example) and disadvantages (placing students in a passive rather than an active role, for example) (McKeachie, 1994). Lectures "are of benefit when there is a lot of information to get across in a short period of time and the students already have a good background in the subject, and are committed to learning" (Halpern, 2002, p. 42). In a sense, classroom instruction in higher education should place greater emphasis on the importance of interaction between the instructor and the students based on levels of student performance: "the needs and interests of students, rather than of teachers, should be the focus of everything that happens in schools" (McNergney & Herbert, 1998, p. 104). As an example, in striving to be a facilitator rather than a teacher, the instructor should ask basic questions to stimulate a discussion on essential concepts that allow students to achieve competency in the content area. The following methods also might be useful: (1) Active teaching by demonstrating skills and conducting participatory class activities; (2) student-centered teaching by focusing on active learning and cooperative learning; and (3) teaching for mastery by providing maximum opportunities for students to practice the material and apply it. Technology is used as a delivery mechanism and as an instructional tool today. Technology integration with conventional instruction is the key to success in teaching.

Step 4: Making Questioning and Answering Effective

An effective student-teacher interaction will be promoted in an environment in which students feel free to ask questions of the instructor and their classmates. Modeling Purkey's invitational type of teaching (Biehler & Snowman, 1993) will be beneficial in the session of questions and answers, for instance, by maintaining "I-messages" that convey how the teacher feels about the situation, not about the student; listening with care (picking up subtle cues); and being real with the student (providing only deserved praise). Most importantly, if the class is relatively small, the instructor should learn students' names as soon as possible, have one-to-one contact, and try to develop rapport with each student in the class. Additionally, homework assignments provide a good opportunity to increase the teacher-student interaction: appropriate and timely feedback to each of the students' assignments should be given.

Facilitating Students' Learning Progress

Differences in learning styles of the students should be acknowledged, and teaching styles should be adapted so that all learning styles are allowed and encouraged. Learning is, indeed, a complex and self-reinforcing process, yet the instructor has profound influences upon the student's academic achievement. It is important that the instructor should not confuse the student's learning manner with the quality of the student's intellectual ability. McKeachie (1994) emphasizes the use of varied teaching approaches (such as discussion, small group activity, and laboratory) and evaluation systems of the student's work from multiple perspectives, in addition to rewarding both collaboration and individual efforts.

Facilitating students' progress largely depends upon how students learn, how the teacher teaches, and how the teacher and the students interact: "It is the teacher's responsibility to create the conditions in which understanding is possible, and the student's responsibility is to take advantage of that. Students have little control over their access to knowledge" (Laurillard, 1998, p. 1). Generally, most students know very little about the roles their own capabilities play in learning. We recommend that halfway through the semester, a class discussion be opened regarding how students are studying in the course, and the instructor should continuously monitor each student's progress to give support when needed.

Classroom Assessment Techniques (CATs)

Just as learning, teaching itself is a very complex work with classroom assessment being a very challenging task for the instructor, especially in a diverse learning environment. Beyond traditional testing, the following two CATs can be used:

Poster presentation: Akister and Kim (1998) share their experience of using poster presentations as an alternative to written assignments for assessing students' learning. Based on the fact that poster presentations are now a well-established feature of professional conferences, Akister and Kim point out that poster presentations (1) make presentations accessible to a greater audience; (2) offer a visual representation of a piece of work, providing cues that enable those viewing the poster to seek further clarification and information on areas of interest to them; and (3) provide an opportunity for direct discussion and exchange of ideas with the presenter. The *visual* and *verbal* elements of posters have added richness to an assessment profile that had been based largely on written assignments.

Marek, Christopher and Koening (2002) maintain that cognitive principles suggest that a coherent blend of *verbal-visual material* boosts retention of scientific concepts beyond the level attained by verbal summary alone, recommending using presentation software to facilitate poster presentation. Compared to traditional modes of poster preparations, PowerPoint slides or presentations facilitate alignment, arrangement, and coloring of poster components and insertion of relevant illustrative material (e.g., graphs, tables, and photos). Considering the cost of poster board, the incremental cost of a "PowerPoint poster" appears justifiable, particularly given its potentially greater impact on audiences. Marek et al. (2002) emphasize that poster presentations have the potential to shift students from a failure-driven to an aspiration-driven mode of performance. Certainly, it is a useful notion.

Oral communication: Quigley (1998) provides guidelines for faculty on designing and grading oral communication assignments. The author starts with the following perspective: the critical thinking skills required to create and convey an effective oral message are an important part of a college education; however, many students have little structured practice or systematic assessment of their oral communication skills as part of their undergraduate programs. Quigley's point is that oral assignments can (1) encourage an active, involved role in learning; (2) enhance listening skills; (3) promote articulation of ideas and opinions; (4) provide opportunities to hear how others respond to one's thinking; and (5) often provide practice in teamwork. Furthermore, oral assignments allow students to take greater responsibility for their own learning, as well as to learn significant course content from each other. Quigley (1998) made an adaptation of evaluation instruments by Carlson and Smith-Howell (1995) (see Figure 2). When given oral assignments, students benefit from clear grading criteria, structured practice, and specific feedback. Students also

Figure 2. Informative speech evaluation form (Carlson & Smith-Howell, 1995, p. 95)

INFORMATIVE SPEECH EVALUATION FORM

NAME:

TOPIC: TIME: GRADE:

Introduction (15 points)

Gained audience's attention
Established speaker's credibility and goodwill
Revealed topic
Clear informative central idea
Prepared audience for rest of speech (preview, need, definitions)

Body (40 points)

Main points clearly identified
Each main point developed with appropriate details
Topic development appropriate for assignment
Logical arrangement of ideas
Transitions used effectively
Appropriate support (examples, testimony, statistics) used
Clear source citation
Relation to and inclusion of audience
Appropriate use of visual aid (if used)

Conclusion (15 points)

Prepared audience for ending	Reinforced central idea	vivid ending used

Presentation and Delivery (30 points)

Extemporaneous delivery	Eye contact	Vocal variety
Enthusiasm for subject	Pronunciation	Fluency
Gestures/movement	Appropriate word choice	
Facial/expressions	Vivid word choice	

Additional Comments:

benefit when instructors are prepared to overcome the typical challenges that accompany oral assignments. The form illustrated in Figure 2 is a 100-point scale where content and delivery features have been assigned a certain percentage of the final grade; maximum points for the introduction of the oral presentation are 15, for the body 40, for the conclusion 15, and for presentation and delivery 30, respectively.

Additionally, although class participation is difficult to assess and subjective in a sense, grading class participation can send positive signals to students about the kind of thinking an instructor values, such as growth in critical thinking, active learning, development of listening and speaking skills needed for career success, and the ability to join a discipline's conversations (Bean & Peterson, 1998). Good teaching may incorporate assessments that motivate and engage students in ways that maximize benefits in the teaching-learning process. Why are some teachers better at teaching? In brief, the teachers' willingness, desire, and energy might be the essential ingredients of effective teaching. A syllabus plays an important role, however. Bloom's (1956) taxonomy of educational objectives (which reflects successive degrees of cognitive domain based on the following six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation) allows the instructor to create effective questioning specifically tailored to the thinking skills that students have to develop. The instructor has to facilitate each student's learning and experience, creating a productive environment. Finally, it might be useful if the syllabus closes with a statement such as: "We maintain as informal a classroom atmosphere as possible while upholding the principles of good education…. Let's have a great class!" (Matejka & Kurke, 1994, p. 117).

Postscript

Social Autism

Social autism is characterized by the lack of close and real contact with people, and by the difficulty for discussions about aspects of the course syllabus (Tenorio, 2003). In this regard, Tenorio's following remarks are instrumental for Web-based teaching and learning:

The moment I decided to work on this Web page (a subsidized university project whose aim is to analyze critically the notion of learner autonomy and its correlation with the use of ITC), I began to reflect upon my teaching practice…. I think it is crucial to set up a precise evaluation both of the teacher's performance and of the syllabus, its strengths and weaknesses; and, subsequently, to check more systematically the quality of the materials used and the degree of motivation they make students feel. Similarly, I am conscious that exercises must be varied and carefully arranged according to criteria of difficulty, as well as the student's interest and self-demand. Moreover, notions such as reflection, dialogue *and debate must be considered fundamental in this context, since their application by learners will mean that they are prepared to explore the contents of the syllabus thoroughly, to establish connections between them, and to solve any theoretical or practical problems posed in the classroom as well as in the real world.* (pp. 214-215)

Summary

As emphasized in this chapter, human learning is complex, indeed, and *meaningful learning* is active, constructive, cumulative, goal oriented, and self-regulated. Three stages (based on behavioral approach, cognitive approach, and constructive approach) of instruction are discussed. Specifically,

- *Stage 1*: The learner accumulates bits and pieces of isolated information (behavioral).
- *Stage 2*: Substantive changes are made to existing schemata of the learner (cognitive).
- *Stage 3*: Constitutes restructuring and creation of new schemata by the learner (constructive).

In the digital age, educational technology plays an ever-increasing role in meeting the demands of the instructor's role; that is, emerging technologies continue to enhance the learning activities and experiences that take place in today's classroom. It is the teacher's responsibility, however, to create the environment in which *meaningful* e-learning is possible. The modern mission of higher education increasingly focuses on effective teaching, and every university teacher faces at least four common areas of concern that must be addressed: preparing and organizing course materials; teaching and providing assignments; assessing student learning; and evaluating the effectiveness of teaching. Finally, an effective course syllabus is an important requirement of successful teaching; thus syllabus writing is the first step in creating a climate that blends challenge and support for the course and ultimately for the students.

Education Essay

Source: Inoue, Y. (2003-2004, Fall-Winter). What is critical thinking? APA Perspective, 7.

What is Critical Thinking?

Select one to complete the following sentence.
Critical thinking is

a. identifying and solving problems,
b. the skills listed in Bloom's taxonomy,
c. decision-making about important issues,
d. all of the above,
e. none of the above.

Many of my college students dislike multiple-choice test items. Instead they prefer short answers, essay topics, or matching items. Answering multiple-choice items is often difficult because oftentimes an educated guess does not work. Constructing good multiple-choice items is not easy, either. When I occasionally develop multiple-choice questions to assess student learning in my graduate courses, I simply follow McMillan's (2001) recommendations: (1) Keep the language simple and concise; (2) avoid wording such as all of the above or none of the above; and (3) include no more than four alternatives for each question. Based on McMillan's standards, the above-cited question about critical thinking is not a good example to illustrate the proper construction of multiple-choice items for this area. In this essay, however, the intent is to discuss critical thinking, which is considered an important learning outcome for college students.

What is critical thinking? The answer, as Beyer (1985) states, is not as easy as one might expect, mainly because critical thinking is so vaguely defined; the answer differs considerably throughout our classrooms, our disciplines, and our schools. For instance, according to Malekzadeh (1998), in management courses, critical skills are "to do research, analyze data, critically evaluate the results, and present the findings in well argued papers or well crafted presentation"

(p. 590). McMillan (2001) maintains that critical thinking is decision making or judgment about the merits and worth of a belief or action (p. 174). Beyer (1985) describes that one major school system uses the term critical thinking as an umbrella for just about every thinking skill that can be taught in social studies classrooms. Although educators differ about the definition of critical thinking, I agree with Beyer's (1985) notion: "Critical thinking is unique because it involves careful, precise, persistent and objective analysis of any knowledge claim or belief to judge its validity or worth" (p. 271). My interpretation is that critical thinking is the act of independently and systematically weighing evidence to make an evaluation and judgment or to determine merit.

Returning to the above question and which is the correct answer. Using the elimination technique is often the best approach to answering multiple-choice questions, an approach that I encourage my students to adopt. Although McMillan would object to using the last two options, the best answer in this case, however, is "none of the above." Beyer (1985) would agree (p. 270). We have responded to the multiple-choice question, yet the definition of critical thinking is still not clear. The question remains, critical thinking, exactly what is it?

Section III

Faculty Voices on Technology Integration

Chapter IV

Teaching with Educational Technology: A Profile of Guam

There was a time, not too many years ago, when word processing was the most popular computer activity among students. For most students, the computer was little more than a high-powered typewriter. Today, a PC can be a window into the global system of interconnected networks known as the Internet…. The World Wide Web makes the Internet accessible to people all over the planet. The Web is a huge portion of the Internet that includes a wealth of multimedia content accessible through simple point-and-click programs called Web browsers. Web browsers on PCs and other devices serve as windows into the Web's richly diverse information space. (Beekman, 2005, pp. 16-17)

As Wall and Sarver (2003) indicate, "A decade ago, most university students, faculty, and administrators were hardly aware of the Internet. Its research and communications potential is now felt on campuses nationwide" (p. 277). E-learning, the use of Internet technologies for the delivery of information and performance, is everywhere today. Basically, e-learning refers to Internet-enabled learning, Web-based learning, electronically distributed learning, technology-mediated learning, and online learning.

With a special focus on teaching with technology, this chapter features technology experiences in teaching among faculty members, individuals committed to the evolution of e-learning. The faculty's responsibility is to create the conditions in which learning is possible, and the student's responsibility is to take advantage of that (Laurillard, 1998). "Every teacher can learn how to do better" (Ramsden, 1999, p. 3). The foundation of this chapter is based on the these principals, focusing on the following:

- Technology Survey Questionnaire/Interview
- Faculty Experiences in Teaching with Technology

Technology Survey Questionnaire/Interview

The president of UOG, when describing the island of Guam, maintains that it is one of the most beautiful places on the earth. The university's three-fold mission is *Inina*, *Diskubre*, and *Setbisio*, that is, to enlighten, to discover, to serve (UOG Undergraduate Catalog, 2004-05). UOG has been serving Guam and the countries of the Pacific Rim for the past 52 years as a U.S. land-grant institution accredited by WASC. UOG consists of three colleges: The College of Natural and Applied Sciences, the College of Liberal Arts and Social

Table 1. Gender and ethnicity composition of the UOG Faculty (Spring 2004) (UOG Human Resources Office)

GENDER						
MALE	109	63%				
FEMALE	65	37%				
TOTAL	174	100%				
ETHNICITY	FEMALE		MALE		TOTAL	
ASIAN	12	18%	19	18%	31	17.8%
PACIFIC ISLANDER	29	44%	20	19%	49	28.1%
CACUASIAN	18	28%	67	62%	85	48.9%
AFRICAN AMERICAN	1	2%	0	0%	1	0.6%
HISPANIC	3	5%	1	1%	4	2.3%
OTHER	2	4%	2	2%	4	2.3%
TOTAL	65	100%	109	100%	174	100%

Note: PACIFIC ISLANDER includes CHAMORRO

Table 2. Gender and ethnicity composition of the UOG students (Spring 2004) (UOG Registrar's Office)

MALE	1070	38%
FEMALE	1710	62%
TOTAL	2780	100%

ETHNICITY			
AM. INDIAN /ALASKAN	5	CHAMORRO-SAIPAN, ROTA, TINIAN	41
AMERIND/ALASKANATIVE	1	GERMAN	1
ASIAN - THAILAND	3	HISPANIC	22
ASIAN-CHINESE	36	MICRONESIAN-CHUUKESE	39
ASIAN-FILIPINO	922	MICRONESIAN-KOSRAEN	5
ASIAN-INDIAN	7	MICRONESIAN-MARSHALLESE	8
ASIAN-JAPANESE	26	MICRONESIAN-PALAUAN	68
ASIAN-KOREAN	72	MICRONESIAN-PONAPEAN	7
ASIAN-OTHER	8	MICRONESIAN-YAPESE	18
ASIAN-VIETNAMESE	5	OTHER	30
ASIAN /PACIFIC ISLANDER	11	PACIFIC OTHER	22
BLACK NONHISPANIC	21	WHITE NON HISPANIC	160
CHAMORRO (GUAM)	1	TOTAL	2780
CHAMORRO-GUAM	1241		

Sciences, and the College of Professional Studies (Business, Education, and Nursing). As seen in Tables 1 and 2, 49% of the faculty members are Caucasian, more than 90% of the students are minority, and the majority of the students (62%) are female. English is the main language of instruction at UOG; however, English is not the home language for many students of Asian and Pacific island heritage. The faculty members are challenged not only politically and economically, but also by linguistic and cultural diversities.

Three Colleges

The College of Natural and Applied Sciences (CNAS): Academic programs of CNAS include: Agriculture, Biology, Chemistry, Computer Science, Consumer and Family Science, Mathematics, Military Science, and Environmental Science. The priorities of CNAS (www.uog.edu/cals/site/mission.html) are: (1) to conduct applied, adaptive, and basic research in agriculture, human resources development, and related fields; (2) to provide community-wide outreach educational opportunities in agriculture, families, youth, nutrition and community resource development; and (3) to provide college-level instructions in agriculture, consumer and family sciences, human and natural resources development and related fields.

The College of Liberal Arts and Social Sciences (CLASS): CLASS (www.uog.edu/class.l.index.html) has the following divisions: Communications and Fine Arts, English and Applied Linguistics, East Asian Studies and Japanese studies, Human Studies, and Social and Behavioral Sciences. The mission of CLASS is a contribution to the development of skills, knowledge, and values necessary to the continuing educational, professional, and economic advancement of the individual student. CLASS has a long tradition of sponsoring conferences on educational, community, and public policy.

The College of Professional Studies (CPS) consists of the following three schools:

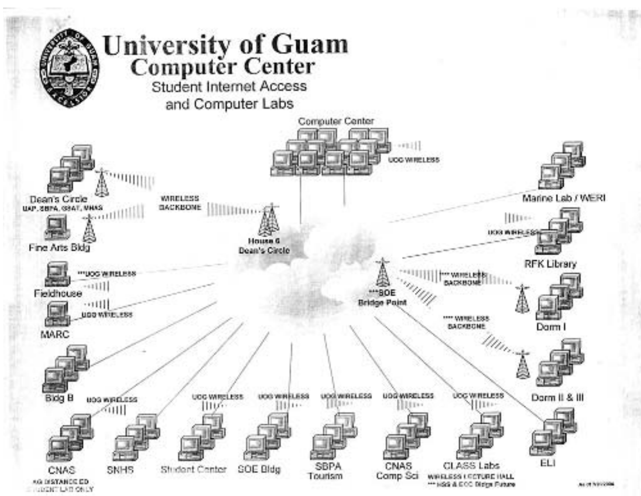
- The missions of the School of Business and Public Administration (SBPA) (www.uog.edu/sbpa.index.html) are: (1) to prepare students for leadership and managerial positions within business and government organizations in Guam and in the Asia-Pacific region; (2) to play an important role in providing needed services (small business assistance, conferences, and professional consulting); and (3) to support the expanding economics of Guam and the Asia-Pacific region.
- The mission of the School of Education (SOE) (www.uog.edu/coe/coehomepage.html) is the provision of preservice teacher education to meet the multicultural educational demands of the island's educational system, as well as providing for the region as a whole. The emerging challenges brought about by social, economic, and political changes within the region have created a need to expand the SOE's ability to deliver appropriate instruction and related educational services.
- The School of Nursing and Health Sciences (SNHS) (www.uog.edu/cnhs.index.html) adheres to the mission of the UOG. The mission of SNHS is to offer professional nursing education to the culturally and academically diverse population of the region by providing undergraduate studies to newly recruited nursing students and to nurses who have graduated from two-year and diploma programs.

The Internet and Wireless Access

The Computer Center at UOG is an all-purpose facility designed to meet and support a wide variety of academic, instructional, research-related, and administrative services for academic and administrative functions. Consistent with the regional role and mission of a land-grant university, the Center also provides technical support and services to the community. With a fiber optic and wireless data communications network, users have direct and interactive access to the central computer for program debugging, testing and other uses. In addition, the Center has an online database management information system that is able to link with other on- and off-island systems. A computer lab equipped with a network of mainframe, microcomputers, terminals, graphics devices and multimedia systems, software, and Internet access is available for student and faculty use, as illustrated in Figure 1.

The UOG wireless access is designed for students, faculty, and staff who are mobile computer users. The wireless access gives mobile users a way to connect to many of the same computing resources available to them from the campus hardwired network. Wireless *hot spots*, or access points, are located at many places on campus. Both faculty and students at UOG are increasingly using laptop computers to teach and to learn. The need to have access to technology, thus access to information anytime and anywhere, if possible, and the continuous drop in PC prices have resulted in more and more faculty and

Figure 1. Internet access on campus (UOG Computer Center)



students at UOG acquiring the technology they need. Especially, they are increasingly using flat-screen, battery-powered notebooks or laptop computers. Synopsis 1 details laptop computers.

Synopsis 1: Laptop Computer

Kontos, G. (2002). Laptops and university students: A review and survey. Educational Technology, 42(4), 55-58.

In the past, working with computers meant using terminals connected to a mainframe, but the personal computer changed this and now students can use their computers 24 hours a day. They do not have to depend on teachers' office hours or computer center hours of operation, and they do not have to rely on campus facilities as much. Benefits of laptop computers: (1) Ubiquity *(all can access to information anytime); (2)* savings *(considerable reduction in numbers of desktop computing labs); and (3)* standardization *(institutions minimize problems of support and equitable access through standardization). Issues associated with laptop computers: (1)* Size *(small size does not mean comfort in computer use); (2) faculty* workload *(developing curriculum and communicating via e-mail with students in a laptop environment tends to be more time consuming); (3)* access to online resources *(students may not visit the library because they expect everything to be found online); (4)* learning styles *(students must be responsible for their learning and the teacher becomes the facilitator of learning); and (5)* evaluation *(online exams are replacing the more traditional paper-and-pencil exams. Network availability during exams may increase the chance of cheating). Using laptop computers helps students build technology skills as well as information-gathering skills. The laptop is the primary tool that students use to complete assignments.*

Survey Overview and Purpose

We designed a survey to ascertain the baseline information regarding faculty technical experiences, as technology plays an ever-increasing and necessary role in higher learning courses (for the detailed information of this survey, see Appendix E). What is the level of interest in integrating communication delivery technologies into teaching? What are the current technological applications that challenge faculty? What is the level of awareness about IT to improve teaching among faculty members? What are the faculty voices in terms of their thoughts about enhancing the teaching-learning process defined by digital technology?

As noted previously, every teacher faces at least the following four common areas of concern that must be addressed: (1) Preparing and organizing courses, (2) teaching and providing assignments, (3) assessing student learning, and (4) evaluating the effectiveness of teaching.

Survey research is probably the single most widely used research tool in educational research (Wiersma, 2000). Survey research typically uses questionnaires or interviews for data collection. We developed a survey questionnaire, and the Committee on Human Research Subjects (CHRS) reviewed it to ensure that the rights of the participants were protected. We conducted the survey based on the procedure described in the following steps:

Step 1: We sent the following short request to the entire faculty through the campus e-mail system:

Dear UOG Faculty:

Currently we are working on a project involving the use of technology integrations and experiences among higher education faculty members within the region. Of specific interest would be examples of how technology is integrated into teaching and how technology experiences impacted instruction. Please respond to the following questions (short descriptions of your experiences would be helpful).

1. *What applications of technology have you integrated into your instruction?*
2. *What was the outcome?*

Your participation will be greatly appreciated.

Step 2: We distributed the questionnaire to faculty members who replied to the above e-mail, and we asked them to submit one syllabus. (Ideally, educational technology was reflected in it).

Step 3: To achieve a better understanding of the survey questionnaire and to get specific technology experiences, we conducted a follow-up interview when faculty replied to the questionnaire.

Survey Results

Involved were 27 UOG faculty members (8 female, or 30%; 19 male, or 70%) during the 2004 fall semester: 22 (81%) were Caucasian; 4 (15%) were Asian; and 1 was Chamorro (4%). Teaching areas of the faculty participants included: biology, economics, philosophy, geography, sociology, history, English, psychology, education, and nursing. Their typical responses are listed in the following:

Specific Questions

In what way do you use technology to prepare courses?

- Look for materials on the Web and put links to them on my own Web page.
- Use transparencies and digitize them for future presentations.
- Syllabi on the Web are done with Claris HomePage or Dreamweaver. Resources for the development come from a variety of places (clip art from CD galleries, Web sites, Photoshop, digital photography, animations, graphics found on the Web or created myself with Corel Draw or Adobe Illustrator).
- Use the outline option of Word as well as insertion of clipart and pictures in the notes for classes.
- Traditional and digital slides on a computer are developed and used in class.
- A textbook is selected, which not only provides CDs for the textbook's dialogs or drills, but also includes Web pages with the textbook drills (CDs with the course syllabi and requirements).

In what way do you use technology to teach in the classroom?

- Have the computer and projector available to show diagrams and Web pages. More often I am arranging for movies on DVD so that I don't have to pack a VCR.
- Slides or transparencies are widely used, as well as some PowerPoint presentations.
- Almost all classes involve some digital presentations. TV, VCR, CD or cassette, overhead projector, the Internet, Web site, Web board, and e-mail—all teaching tools utilized for instruction.
- The only technology I use directly for instruction is an overhead projector.
- Videos and slides, in addition to computer-generated class notes, are used on a daily basis.
- Utilize computer-assisted instruction (students have an option of using computer-based tutorials).

In what way do you use technology to evaluate or assess student performance?

- Provide personal e-mail critiques of assignments. Exams are machine-scored.
- Use Excel software to calculate grades and calculate norms of performance by each group.
- I have been a user of scan torn sheets for classes; assignments are handed in as files on floppies.
- Using Excel spreadsheet simplifies calculating grades and printing progress reports.
- Use electronic portfolio assessments and computerized testing.

What are your concerns regarding multicultural education and technology?

- Finding images that represent life or activities in the islands or cultures of the area. Most clip art is western-based, showing whites, blacks, a few Asians, but seldom-pacific islanders.
- Video presentations can help project students into other cultures and ways of looking at things.

- Any concern we have with multicultural education can also be a technology concern. One problem is access to useful, global information for students in developing countries, and the concern associated with that is that someone can be misusing the tool and biasing the information.

In what way do you think we can improve teaching with technology?

- What we need more of is effective learner-centered pedagogy, not technology.
- Technology is a great tool for instruction, but there still needs to be a good human teacher in the mix.
- If we remember that the goal is student learning and not jazzy technological displays, with technology, we can improve as teachers because we can deliver the material more effectively.
- The material still needs to be of good quality and pedagogically sound.
- Either upgrade the technology skills of a large percentage of the faculty, or dispense with their services in order to accommodate the hiring of faculty with current skill sets.
- Create technologically enhanced classrooms widespread throughout the university. Faculty development should focus on developing a climate of enrichment.

Summary of the Survey

Based on the responses, faculty members of this sample are increasingly posting their course syllabi and assignments online, communicating with their students through e-mail, and preparing customized CD-ROMs. PowerPoint presentations, multimedia visualizations, and Web searches are also commonly used among higher education faculty members. The following description taken from one of the participants may represent everything: “I use PowerPoint presentations in my classes. I also use overhead transparencies and occasional videos. I would use a DVD player in the classroom from time to time if one were available. I also use e-mail to keep in contact with and communicate with students. I assign and expect my students to use the Internet as a source of research and educational information.”

For faculty, as Brown (2000) put it, "The most commonly used techniques are e-mail, URL citation, and a course Web page that promise great benefits in increased communication, while having a low cost in professional and preparation time" (p. 8). Synopsis 2 describes details of the PowerPoint software.

Synopsis 2: PowerPoint

Perry, A. (2003, July). PowerPoint presentations: A creative addition to the research process. English Journal, 64-69.

I often find the process of student research to be frustrating. Some students choose not to write the paper, even if it means failing a class. In an attempt to make research a more pleasant and stimulating experience for my students, I added the requirement that they complete a PowerPoint presentation on their topic before turning in their paper. My decision to add a technological component to research is based on the proliferation of reports on such projects in professional literature. I demonstrated how to create text and change their font style, size, and color. When the projects were completed, a multimedia projector enabled students to project their slides onto a screen in the classroom. A portion of the students' grades depended upon their attention as audience members, and presentation skills were considered, as well as the project itself. Interviews with students indicated that the PowerPoint project benefited them: (1) In learning how to conduct research; (2) in starting their research project sooner than they would if they were only writing a research paper rather than doing both the paper and the presentation; (3) in honing presentation and public speaking skills; (4) in improving cooperative learning and social skills; and (5) in enhancing computer and technology skills. I believe that requiring students to create and present a PowerPoint project, in addition to writing a research paper, is an effective means of organizing research assignments. It helps to facilitate learning when teachers can make the learning process more enjoyable.

Advantages and Disadvantages of Technology

Typical advantages and disadvantages of technology are listed in Example 1.

As listed by the participants, one of today's useful tools is the ListServ, which is detailed in Synopsis 3.

Example 1. Advantages and disadvantages of using technology

Advantages	**Disadvantages**
Teaching practice	*Teaching practice*
• Makes teaching more interesting with greater resources • Classes are more engaged and active learning takes place. • For language learning, repetition is important, and the computer does an excellent job by providing repetitious drill and relieves the teacher of this often arduous task. • Adds a lot to a lecture, especially when students are not dealing in their first language • Allows the ability to incorporate graphics into presentations • Allows more interactive participation in the classroom • Helps keep students' attention and in-class motivation • In low enrollment courses, provides resources for students to complete the course independently • Fast and powerful means of sharing information	• Face-to-face classroom interaction cannot be duplicated. • Technical glitches will happen and can be frustrating. • Takes too much time to prepare a CD or Power Point presentation • Technology takes over and content can get lost with the bells and whistles that entertain the students. • Amount of space it takes up in the classroom • Takes time to learn and is difficult to stay up to date. • Technology is not a remedy for lack of motivation.
Student learning	*Student learning*
• Makes information available to students online, rather than having them rely exclusively on readings • Engages in learning more actively if technology is used • The efficiency of editing with a word processing program is one example that is beneficial to students. • The Internet allows even the most remote student to find out about the world • Provides a variety of visual experiences to students • Technology allows students to go at their own paces and make up for missed classes. • Has the potential of serving diverse learning styles • Reaches visual learners	• Some students are intimidated by technology. • Face-to-face classroom interaction cannot be duplicated. • There are ways to use technology so that the students are actively involved (e.g., CAI); however, it seems that too much time is required to set it up and perhaps there are more smoke and mirrors than substance. • Students tend to space out with video material, losing focus and intensity. • Students do not always know how to evaluate Internet information for purposes of gathering research literature.
Preparation and research	*Preparation and research*
• Students can access online information when convenient. • It helps to be more efficient and keeps students up to date. • It really has the potential to expand a knowledge base. • The convenience and volume of information available through a computer stroke is amazing. • It is beyond imagination teaching a course without a computer, multimedia projector, digital cameras, and the Internet, not to mention the planning and preparation. • ListServ is useful to catch up with academic discussions.	• Technological problems occur so often, even when we do have power. • Teachers have a difficult time selecting the appropriate technology tool for the job. • There is lots of incorrect and unsubstantiated information available online. • Fear of the technology, lack of expertise, and lack of access to technology

Synopsis 3: ListServ

Hyman, A. (2002). Twenty years of ListServ as an academic tool. The Internet and Higher Education, 6, 17-24.

Over the past decade, the Web has garnered growing credibility as an academic tool and is now ubiquitous in virtually all aspects of academic life (from registrar functions to library collections to its use in assessment and data collection, in addition to a teaching medium). Meanwhile, however, its older sister, ListServ, has been quietly dominating academic discourse for nearly twice as long and with little fanfare. One of the earliest nonscience scholarly uses of this technology was the list Humanist, which began in 1987 as a means of communication among a small group of people concerned with the support of humanities computing. By the time ListServ had been developed, the use of IBM mainframes as central campus computers had started to decline, spelling the early death knell for BITNET. In 1986, the ListServ program was adapted for use by UNIX-type computers, around the same time that the National Science Foundation Network backbone (NSFNet) of the ARPANet came into existence. There is little question that the most popular Internet application is electronic mail. Today, it is impossible to know either the total number of discussion groups operating, or even the total number of scholarly discussion groups. The mailing list directory, Liszt, claims a database of over 100,000 mailing lists, with nearly 4000 in its education category (over 700 in higher education). ListServ-based communities continue to dominate academic discourse, staying the course after nearly 20 years of service.

In summary, the following description taken from one of our samples may represent everything:

In regard to the advantages of technology, *first*, the Internet is basically indispensable. It is a tremendous source of Information, and I don't think I can live without e-mail; and, a familiarity with PowerPoint is a given. *Second*, technology is increasingly an undeniable and permanent aspect of life in the modern world. To be employable, our students must have a working knowledge of technology and be able to adapt to its seemingly infinite uses. As instructors, we need to model this behavior for our students. *Third*, technology offers not only innumerable choices in information, but it also offers opportunities to confer with colleagues, specialists, and experts that otherwise may not be possible.

Regarding disadvantages, *first*, I need time and training to be able to make the best use of what is available to us. *Second*, technology changes so quickly that a large investment in one type of technology quickly becomes an investment in yesterday. *Third*, the power surges, brownouts, and blackouts we experience in Guam, for example, promote more than the usual amount of wear and tear than equipment normally receives, even with proper protection. Also, lack of adequate air conditioning can allow damage due to moisture, heat, mold, and even insects. Maintenance and replacement parts can be difficult to come by and are expensive.

Higher Education Must be the Leader in the Use of Technology

An interview, September 29, 2004

The following is a summary from an interview with a technology specialist at UOG. He has worked in secondary and postsecondary educational settings involving educational technology.

Advantages of using technology in teaching: First, it definitely captures the interest of students. They have grown up with TV, video games, and more. They enjoy using a computer or anything electronic that they can interact with. Consequently they are very comfortable with technology. Second, information from the Internet is newer than anything written in a textbook or encyclopedia, but must be verified for accuracy and accountability. Third, teachers who have learned how to use multimedia and technology in general are thought of as being up to date. Students of today prefer to be entertained while they learn.

Disadvantages of using technology in teaching: First, many teachers at all levels of education are not familiar with technology in general and are hesitant to become involved. Some even prefer not to change how they teach at all. Second, schools purchase computers and forget training, which will play a significant role in teachers being willing to use technology and ultimately the success of the investment. Third, another common practice that leads to a disadvantage in using technology is that as the equipment ages, parts need replacement or whole systems need replacement. Being able to keep the hardware and software up to date is not inexpensive. Schools that have a standard replacement policy seem to function very well. One example would be for each year, a select number of items are to be replaced.

Anything else about using technology in teaching: First, institutions of higher education must be the leaders in technology use. At present, they are not even capable followers. An example is the use of overhead transparencies, many of which are nothing more than a glorified typewritten paper document.

Second, institutions also are not prone to offering short-term workshops for their faculty to learn specific software. If a workshop is offered, the attendance is very poor (if any even show up), and the instructors continue to complain about not receiving training. Mandatory workshops are not effective. Unwilling participants make unwilling students. Third, the fight between platforms (Macintosh vs. PC) should not be an issue. While very specific software will only run on a PC, almost all common software is available for both platforms. Finally, higher education must lead in providing tools for our future teachers. In education, we just provide them with theoretical information, which may or may not still be true. Why do we not require all incoming freshmen to purchase a laptop computer with a wireless card installed and a printer? This should be a part of their tuition and fees. Software must be provided, such as Microsoft Office and any special software needed, on a course-by-course basis. Those students going into the teaching profession should be encouraged to purchase multimedia projectors and any other related equipment and material that will make their teaching experience more positive.

Faculty Teaching Experiences with Educational Technology

For university faculty members, computer technologies are not only a stimulus toward course instruction, but also a major factor in redesigning instruction to identify, develop, nurture, and evaluate effective ways of teaching. Nine voices or cases described in this section are examples in which the power of new media and technologies are utilized. Most of them mention some form of facilitating, enhancing, and stimulating learning as a motivation for adopting computer technologies in higher education courses.

Voice 1: PowerPoint Slides for Images in Psychology

Kyle D. Smith, Professor of Psychology (e-mail: ksmith@uog9.uog.edu), taught at Marmara University in Istanbul and at the University of Washington-Bothell before accepting a tenure-track appointment at UOG. Research interests include intimacy in close relationships, the self-concept, and moral concepts.

What is your teaching philosophy linked with technology?

KDS: Images should reinforce, not replace, concepts in lecture. I search the Internet for memorable public domain images that illustrate important concepts in my lectures, in PowerPoint slides. I also use Google for news stories that will illustrate important concepts, and the American Psychological Association's (APA) electronic newsletter, and an electronic search utility available to APA members to update my lectures with the most current information. I use PowerPoint to present memorable *images* that illustrate important concepts in the lecture. I do not, however, put most of the lecture itself in writing on the slides, (only the major terms and points). I want the students listening to the ideas I am presenting, not scurrying to *copy down line after line from the slides* without digesting the ideas. Striking images illustrating the concepts keep students engaged in the presentation and help them to remember the concepts. PowerPoint slides can overwhelm students with information if they are used simply for rapid-fire presentation of bulleted sentences. In that case, the students are writing so fast they have no chance to absorb what they are writing. This is why I limit the amount of text in my slides. They are mostly for images.

Impact of the PowerPoint slides

KDS: I have worked over the past several semesters to prepare hundreds of PowerPoint slides for each of the classes I teach. My emphasis is on memorable images more than text: students can quickly become overwhelmed with rapid-fire text outlines on slides. My goal is to link what I am presenting orally, and the exercise materials students work with at their seats, with striking photos illustrating the concepts (e.g., residents of Kobe, Japan helping one another in the aftermath of the 1995 earthquake to illustrate cultural collectivism in action), and photos of actual serial killers (e.g., Ted Bundy; Andrew Cunanan) to illustrate the point that psychopathic persons often do not appear physically unusual in any way). I use just enough text to spell out key technical terms and label the images with references to the concepts they illustrate, leaving my lectures to convey most of the verbal content. Students indicate that they not only enjoy these presentations, but also find that the images help them to remember the concepts.

*Voice 2: Digital Classroom for Foreign Language Courses**

Poong-ja Toyoko Kang, Associate Professor of Japanese (e-mail: toyokokang@guam.net), has been teaching Japanese at UOG since 1993, with the specialized fields, such as natural language processing, psycholinguistics, sociolinguistics, second language teaching and learning.

Teaching philosophy linked with technology

PTK: In some areas technology can out perform humans in teaching, such as with exercises involving repetition. Consequently, language teaching and technology can form effective partnerships. I have explained in my paper why a foreign language instructor requires a digital language lab for the development of student reading and writing skills and I have further described how a language teacher with the basic knowledge of computer literacy can establish a digital classroom with minimal funding.

Developing a Digital Classroom by T. Kang

Why do we need a digital classroom? In foreign language learning, the development of reading and writing skills is an important target, and the Internet provides a rich source of authentic reading materials for students. To acquire high proficiency of reading skills in a foreign language like Japanese, students need to learn Chinese characters called *kanji*. To read Japanese newspapers, one needs to know about 3,000 kanji characters. To improve Japanese reading skills, one has to develop a high speed of visual sentence processing that calls for a high frequency of exposure to authentic reading materials. The Internet provides us with this kind of environment. For *kanji* vocabulary development, flash cards using a slide show of MS PowerPoint provide *kanji* vocabulary exposure to our students at a rapid pace.

How can we start a digital classroom? If your university has a computer lab in place, then the language instructor can utilize this facility, possibly supplementing equipment such as renting a digital projector if not provided by the computer lab. Our language lab is complete with the basics. Internet access, MS Office 2000, East Asian language operation systems, and Global IME are installed in every computer with Pentium III in the lab. MS Office 2000 has not only Word, but also PowerPoint. Global IME has a Japanese language operating system in its package. There are two ways to obtain instructional materials for a digital classroom: make use of the Internet, or simply purchase proper CD-ROMs. In both cases, teachers must invest time to research and examine appropriate materials for their classes. The other alternative is for instructors to create computer-assisted instructional materials for their specific curricula. I do not recommend that beginners create their own instructional computer assisted materials unless a teacher is willingly to devote substantial time becoming familiar with and learning how to use the appropriate software. However, strongly recommended is for instructors to master MS PowerPoint for classroom presentations, because it is a highly effective, simple program that is easy to learn.

How and what can we utilize on the Internet? The following was the procedure that I used for locating appropriate instructional materials online: I went to the URL www.yahoo.com/, then started from Social Science, and reached Web directory through the procedure, as illustrated [in Example 2].

I browsed the Web links provided in the directories to correspond with the objectives of my classes.

What on the Internet can be utilized? The following is effective for reading: Web sites for short stories, novels, and newspapers. As for writing, Web pages for chatting are excellent because they are challenging for the learners, because this activity requires spontaneous writing skills in a target language, and reading quickly what the other participants have written. Writing e-mail in a target language to the rest of the classmates on a regular basis can be employed, which promotes writing practice.

How can we create computer-operated instructional materials? I have made two types of instructional materials, taking advantage of powerful computer functions. One is extremely simple and the other is *kanji* flash cards, briefly mentioned above. The simpler instructional materials that I made involved typing texts and editing them before class or during the class. When I found a student having difficulty interpreting the whole intonation phrase, I cut the phrase into smaller phonological phrasal units on my computer screen. Through the projector, my students can see that and can then learn how to interpret by understanding a smaller meaning set. This kind of practice seems

Example 2. Steps to develop online materials

Social Sciences → Linguistics and Human Languages → Languages → Specific Language Japanese → Web Directory to ease the students reading Japanese during the class, especially for those who have lower reading comprehension skills. Besides, here we can see a computer function far superiorly than an overhead projector in terms of instructional efficacy, and in terms of flexibility as an instructional instrument. Using MS PowerPoint, I was able to innovate my *kanji* flash cards. Before using PowerPoint, I used slides and a slide projector, having made over 700 slides, which was costly and very time consuming. Using PowerPoint, I developed *kanji* flash cards at a considerable savings of both time devoted and expense. Besides, with a computer, I can change colors for the characters or background of a slide freely to make those slides more fun to watch for the students. Flash cards utilizing PowerPoint achieve the tasks amazingly well.

What are concerns and suggestions in a digital classroom? The following concerns must be anticipated: (1) Equipment failure happens unexpectedly; (2) not all of the students are well oriented to a computer; and (3) sometimes the Web sites in the instructional plan on that very day cannot be connected for some reasons. To avoid these problems, a instructor should (1) come to the classroom early enough to set up necessary equipment and check them before the class starts, (2) not plan to teach a lot for one class hour, and (3) prepare alternative instructional plans suitable for either a digital classroom setting or a traditional classroom setting.

Voice 3: Multimedia Instruction and Course Design

Brian L. Millhoff, Associate Professor of Instructional Media (E-mail: bmillhoff@uog9.uog.edu), has worked for 40 years as an instructional media professional, including teaching at UOG.

Teaching philosophy linked with technology

BLM: A high percentage of what we teach in schools is outdated before we teach it. Our role as instructors is, therefore, to stimulate students to search out information, data, and understandings. Students then must be able to manipulate this material creatively to establish their own understanding of that knowledge. One of the best ways for students to do this is to create presentations that can be shared, evaluated, and integrated into their own learning. The use of technology also involves a lot of additional technical and life skills necessary to prepare good presentations and success in life after school.

Important aspects of the course design

BLM: Designing a course using new technologies is promoting the emerging values and behaviors of the 21st century. Based on my experiences of developing a multimedia course, I can say the following:

- **Teacher/student behavior:** learning is a lifelong pursuit and thus the curriculum must be relevant to real life. The role of the instructor needs to change from *the fact-giver*, *rule-maker*, and *result-evaluator* to *the facilitator* of information obtaining, knowledge exploration, and self-assessment. In this new role, we need to teach students to use the new *global-electronic tools* that offer access to information beyond the scope of any instructor. As faculty members, we need to transition from instructors to mentors.
- **Group member behavior:** We need to acknowledge and prepare students for their participation in and the operation of group learning. Group participation requires the recognition and acceptance of the interdependence of individuals, systems, and goal achievement.
- **Human interaction:** I believe that the application of technology will actually increase human interaction and that this interaction needs new guidelines for achieving group creativity. Underlying the new art of communication is consultation, the positive sharing and integration of ideas.

Based on the "emerging values and behaviors" I described, my courses are designed to integrate academic disciplines while developing individual student skills in a small group participation and interaction. The course content reflected the elements of communication theory, learning theory, instructional design, graphics and image design, human interface design, algorithm development, digitized audio and video, and computer-based multimedia production.

Technology applications that students need in the media class

BLM: Students demonstrate the use of the new technologies such as telecommunications, assistive technology, computers, and multimedia as educational tools. We are becoming an increasingly sophisticated technological society in how we communicate, how we participate in entertainment activities, and how we interact in the marketplace. Computers, e-mail, cellular phones, camcorders, cameras, scanners, stereos, CD players, and video games are just some of the things that we purchase on a regular basis. Students are becoming used to this pervasiveness of media and technology and expect them both in school and at home. Research has proven the value of media and technology in education as efficient and preferred methods of communication, entertainment, and learning by children. Teachers should have a command of design capabilities and use of media and technology as part of their repertoire of teaching methods. A specific course is currently required involving technology because of the sophistication and rapid change concerning media and the need to incorporate such methods into our educational systems. Finally, regarding class attendance, I emphasize that excused absences are those due to illness, family or personal emergency, or arranged in advance with the instructor. Students must come to class on time. Late entry disturbs the students who are there on time trying to learn and it obviously disrupts the instructor's delivery, demonstration, or assistance to other students.

Voice 4: Using a Course Web Page in Biology

Christopher S. Lobban, Professor of Biology (e-mail: clobban@uog9.uog.edu), has been at UOG since 1988. Author of several science books, and editor of Micronesica (www.uog.edu/up/micronesica/). Program Director for the UOG Research Initiative in Scientific Excellence (RISE) and the Minority Science and Engineering Improvement Program (MSEIP) (http://www.uog.edu/cas/rise/)

Teaching philosophy linked with technology

CSL: In trying to come around to learner-centered teaching, the challenge is to see technology in terms of how it helps the students learn rather than how it helps me teach. So far the technology has been basically a multimedia blackboard resource. A multimedia blackboard technology offers students a variety of visual and textual materials that complement the textbooks. In particular, this is helpful where textbooks are either too encyclopedic or out of date, and some are both! By using a computer/projector combination, I can show the illustrations as they appear in the book, rather than making quick sketches on the board that are poorly rendered by students into their notes, and then half-recalled on a test. I can also create more complex original diagrams, including simple animations. Although I project little text, it is useful for showing passages of interest (e.g., in BI/PY394 Writing for Science and the GRE, I used text slides to build outlines, highlight text features and so on).

Courses utilizing technology

CSL: I have Web pages for all my classes (i.e., BI100: Environmental, BI302: Plant Diversity, and BI474: Marine Botany, and BI503: Scientific Writing). These are pretty much static resources with schedule updates. I also use the Web for microscopy training, as there is a big site with virtual microscopes. With permission of the developer, I assembled PowerPoint presentations, using wireless connections, to show how the virtual microscope works in class. With our recent MSEIP grant, we have purchased laptop computers for Internet access in the bio labs so that students can also access images of organisms for comparison with the creatures they find in the local samples. By going back and forth between live specimens and images to try to identify them, students learn to observe more closely.

Technology used to teach courses

CSL: For BI100 I always have the computer and projector to show diagrams and Web pages. I am increasingly getting the movies on DVD so I do not also have to pack a VCR. A lot of setup is required in a classroom that does not have projectors or TVs installed. For other courses, I sometimes take the computer to show Web pages or PowerPoint presentations. We also recently acquired a net-workable ELMO projector that can display pages or three-dimensional objects. One of the components of the MSEIP grant is a pair of photomicroscopes so that students can document their samples and help build a local database on biodiversity.

From Lobban's biodiversity Web site

The biodiversity site uses interactive Web features in the keys to identifying stages. The goal of having students key out specimens is to train them to recognize and specify the characteristics (criteria) by which they recognize the specimen—as opposed to "I think this is a moss because it looks like a moss." This helps them move toward the use of criteria in choosing between alternatives (see Perry's level of development, Figure 2). The picture (Figure 3) shows a pop-up window that illustrates a technical term (here, crustose).

Figure 2. Perry's level of development

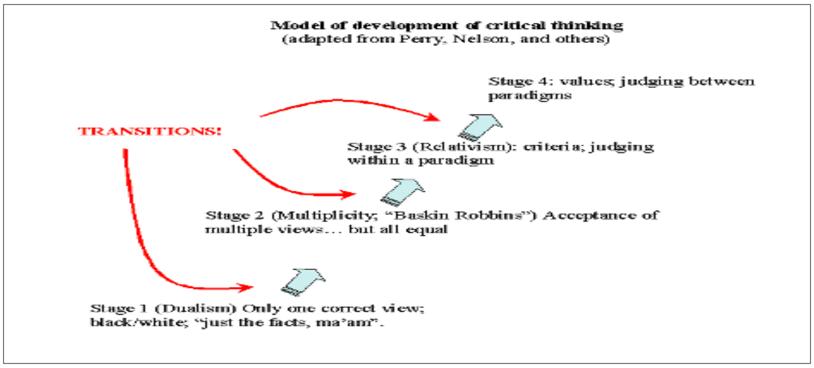
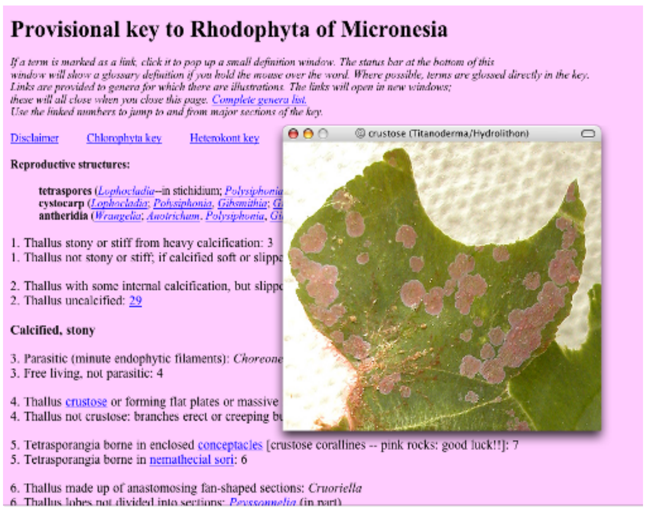


Figure 3. An example of a pop-up window that illustrates technical terms



Voice 5; Library Orientation and Online Skills

Mark C. Goniwiecha, Professor of Library Science (e-mail: goniwiec@uog9.uog.edu), has been a reference librarian at UOG since 1988. He also worked in high schools and colleges in Alaska.

Bibliographic instruction

MCG: Technology is a method or strategy for arriving at the content. Bibliographic instruction or library skills are components of all courses. In English classes, for instance, we teach students how to make use of the library: (1) Library orientation and physical tour; (2) using the Online Catalog Easy Access Network (OCEAN), including how to find books; (3) finding and using reference books; (4) finding periodical articles, including articles in our online full text subscription databases; (5) using the NEW YORK TIMES INDEX; and 6) Web and Internet search engines. The Internet, Web, and e-mail are integral to and incorporated in the lessons and assignments. Sample searches using OCEAN, searches using EBSCO, NewsBank, ProQuest Social Sciences Index, ABI/INFORM, and Readers Guide Abstracts are conducted using a variety of topics of probable interest to freshmen composition students.

At UOG, where our students come from more than 50 different countries and speak more than 50 native languages, we are in a situation that truly lends itself to the multicultural, multiethnic, interracial ideal learning program. We also learned from our students that e-mail is more important than we realized previously. We discovered this when they explained that some assignments require them interacting in an e-mail listserv in which they might read the observations of their peers and enter their own comments. Also, some professors now ask their students to pick up assignments via a Web site.

OCEAN online catalog

MCG: OCEAN, the University of Guam's Online Public Access (OPAC), is a library automation system that allows searching for bibliographic records by any combination of author, title, subject, keyword, date, or format. OCEAN has currently migrated to a Windows-based format called iPac, laying a foundation for library networking and resource sharing among the Micronesian islands. OCEAN has become an important node to link the Micronesian islands with library and information resources. However, the disadvantage at UOG is the frequency of electrical power outages because of typhoons, earthquakes, and brown tree snakes, which are factors beyond our control.

Voice 6: CD-ROMs and Teacher Education Courses

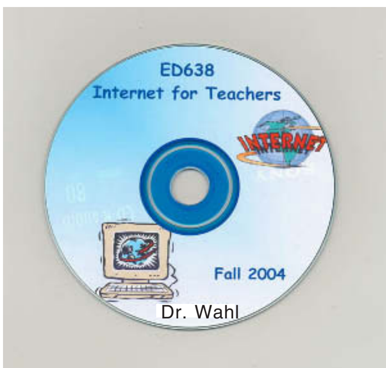
Naomi M. Wahl, Assistant Professor of Instructional Technology (e-mail: nmwahl@yahoo.com), teaches the course of computers in education at UOG. She also taught at Guam Community College, and has been a business and educational technology consultant for 10 years in Asia and the Pacific Rim.

Teaching philosophy linked with technology

NMW: My basic belief is that technology is a tool. The use of technology needs to be matched to the learning and teaching tasks. Technology only assists students and teachers to accomplish the educational objective. Technology may be integrated with a variety of curricula in a way that the technology is seamless or in the background and the learning content is in the foreground. When technology is used as a tool to facilitate teaching and learning, it may be appropriately used at any age level with any subject area. Teacher educators are constantly facing many challenges, such as preparing high quality teachers, maintaining up to date and research-based information programs, and preparing enough teachers to meet the significant shortages that currently exist in certain areas.

Nothing has been removed from the curriculum. Instead, elements have been added. One of the best examples is the addition of computer literacy (Bromley & Apple, 1998, p. 139) for teacher education. At the beginning of the class, I give each of my students a CD that contains all the course materials (such as

Example 3. CD syllabus



course syllabus, meeting calendar, assignments, reading requirements, term projects, and exam information). In my CD syllabus, with a click, students can read National Education Technology Standards for Teachers (NETS•T) (see Appendix F), and rubrics of the UOG's School of Education standards, for example.

Example 4. Teaching with the Internet syllabus

Wahl's course syllabus

ED 638: Teaching With The Internet Syllabus
Fall 2004 Semester

Text:
Instructor developed handouts, online articles and tutorials, and journal articles

Course Description:
Bring the world into your classroom! Enliven and enrich your lessons with field trips from around the world without leaving your school. Access on-line museums and digital libraries containing a wealth of information that you and your students can use in the classroom. Collaborate with colleagues and students across town or across the world. The Internet is the driving force that opens up the new world of information and communication. This course introduces teachers to the basic concepts of the Internet and how it can be used to enhance learning. Through extensive hands-on activities, teachers will acquire the knowledge and skills necessary to use various Internet tools and resources. The primary purpose of the course is to explore and utilize Internet resources to develop lessons that integrate cyberspace information. Participants will design, develop, and present Internet lesson plans; explore Internet projects; visit lesson plan sites that display practical Internet application; and create a Web page. The concept of interconnectivity and the global classroom are variables affecting education and educators. A challenge for today's educators is to incorporate the Internet into their curricula.

Course Objectives:
Students will acquire the National Technology Standards for Teachers (Nets• T) as they achieve the following objectives. Students will become knowledgeable scholars, effective communicators, and reflective decision makers as they:

- Learn Internet basics
- Evaluate, select, and cite information found on the Web
- Search the Internet for valuable teaching and learning resources
- Create an Acceptable Use Policy (AUP) for their classroom
- Build teacher/ student connections
- Integrate the Internet into the curriculum (Internetize Lesson Plans)
- Design effective Internet-based activities (lesson plans, virtual field trips and WebQuests)
- Match and evaluate student, objective, method, media, and materials.
- Read and discuss current articles relating to teaching, learning, and technology.
- Discuss pedagogical issues of teacher and student use of the Internet
- Present and share lesson plans, virtual field trips, WebQuest
- Design a Web Page
- Create an electronic portfolio

Example 4. (cont.)

Course Requirements:

Attendance and Participation: Attendance will be taken for face-to-face large group meetings and participation will be required for on-line activities.

Readings/Abstracts: Read eight (8) journal articles and write a short critique of each article. Your readings must be on current or future trends or issues relating to multimedia/computer use in education. Readings must be current (not more than 3 years old).

Projects: The projects are to be curriculum oriented and show your knowledge of using the Internet as a teacher resource and as a student resource. Ideas may be obtained from the articles you read and from the resources provided by the instructor. You are expected to complete the following projects.

Two (2) lesson plans, which include activities, integrated from the Internet that you the teacher use in a classroom setting. The lesson plans are to be conducted with your class and shared with the large group. One must incorporate a virtual field trip.

Legal, Moral, and Ethical Issues: Students will research and discuss the legal, moral, and ethical issues. Students will create and share an Acceptable Use Policy (AUP) for their classroom.

A WebQuest that integrates the Internet with the teacher lesson plans that involve students using the Internet as a resource. The WebQuests are to be conducted with your students and shared with the large group.

A Web Page designed by the students for use as a classroom Web page. The major effort will be spent in learning and developing good design techniques.

Electronic Portfolio (Final): The students will use common tools that are cross platform and the portfolios will closely resemble the traditional 3-ring binder. The students will use digital cameras, scanners, word processing software, presentation software, and perhaps spreadsheet software. The electronic portfolio will showcase the student's achievements and growth capabilities.

Tentative Schedule:

Week One (August 21, 2004)
Introductions
Inventory Skills
Course Objectives
E-mail Basics
Word Tips

Week Two (August 28, 2004)
Assignment 1, Information Sheet (A1IS.doc) due August 27
Course CD
Assignment 2, Internet Basics (A2IB.doc) due September 10, 2003
Critique #1 (ISRC.doc) due September 3, 2004

Week Three (September 4, 2004)
Large Group Discussion Critique #1 September 4.
Internet Basics Check
Assignment 3, Internetized Lesson Plan One (A3LP.doc) due September 25.
Assignment 3, Internetized Lesson Plan Two (A3LP.doc) due October 2.

Week Four (September 11, 2004)
Assignment 2, Internet Basics (A2IB.doc) due September 10.
Check Assignment 3, Internetized Lesson Plan (A3LP.doc)
Group Technology Tools Skill Acquisition

Week Five (September 18, 2004)
Critique #2 (ISRC.doc) due September 17.
Large Group Discussion Critique #2 September 18.
Group Technology Tools Skill Acquisition

Week Six (September 25, 2004)
Critique #3 (ISRC.doc) due September 24.
Present Assignment 3, Lesson One, Internetized Lesson Plans (A3LP.doc) due September 25.

Example 4. (cont.)

Week Seven (October 2, 2004)
Present Assignment 3, Lesson Two, Internetized Lesson Plans (A3LP.doc) due October 2.
Assignment 4, Acceptable Use Policies (A4AUP.doc) due October 9.
Wahl's Course Syllabus (Continued)

Week Eight (October 9, 2004)
Critique #4 (ISRC.doc) due October 8.
Large Group Discussion Critiques #3 and #4 October 9.
Share Assignment 4, Acceptable Use Policies (AUP) (A4AUP.doc) due October 9.
Assignment 5, Webquest (A5WB.doc) due November 6.

Week Nine (October 16, 2004)
Check Assignment 5, Webquest (A5WB.doc) due November 6.
Group Technology Tools Skill Acquisition

Week Ten (October 23, 2004)
Critique #5 (ISRC.doc) due October 22.
Large Group Discussion Critique #5 October 23.
Check Assignment 5, Webquest (A5WB.doc) due November 6.

Week Eleven (October 30, 2004)
Check Assignment 5, Webquest (A5WB.doc) due November 6.
Assignment 6, Web Page Design (A6WP.doc) due November 27.
Group Technology Tools Skill Acquisition

Week Twelve (November 6, 2004)
Critique #6 (ISRC.doc) due November 5.
Present Assignment 5, Webquest (A5WB.doc) due November 6.

Week Thirteen (November 13, 2004)
Large Group Critique #6 Discussion November 13.
Check Assignment 6, Web Page Design (A6WP.doc) due November 27.

Week Fourteen (November 20, 2004)
Critique #7 (ISRC.doc) due November 19.
Large Group Critique #7 Discussion November 20.
Check Assignment 6, Web Page Design (A6WP.doc) due November 27.

Week Fifteen (November 27, 2004)
Present Assignment 6, Web Page Design (A6WP.doc) due November 27.

Week Sixteen (December 4, 2004)
Critique #8 (ISRC.doc) due December 3.
Large Group Critique #8 Discussion December 4.
Check Electronic Portfolio, Final (EP.doc) due December 11.

Week Seventeen (December 11, 2004
Present Electronic Portfolios (EP.doc) due December 1

Requirement:	**Weight**
Attendance and Participation	10%
Readings and Critiques	10%
Internet Basics	10%
Lesson Plans	20%
AUP	10%
WebQuest	15%
Web Page Design	10%

Example 4. (cont.)

Grade Equivalents:

A	Excellent, outstanding, near perfect work
B	Good, above average, conscientious work
C	Average, ordinary work—meets minimum requirements
D	Weak, sloppy, careless work—below minimum requirements (2)
F	Unacceptable work

Due dates and deadlines are final. Late abstracts, projects, presentations, and units will not be accepted without prior consent of instructor and only for extreme emergencies. Instructor will determine if circumstances warrant late assignments and if grade will be lowered. Absence from class does not excuse you from meeting deadlines.

Voice 7: Original Web Newsletters in Economics

Rosanne M. Jones, Associate Professor of Economics (e-mail: rmjones@uog9.uog.edu), is teaching Economics and Policy Planning at UOG. Her research interests include institutional economics in international contexts. She is Guam's editor of Pacific Health Dialogue.

Teaching philosophy linked with technology

RMJ: The emergence of the so-called, "New Economy" requires that students understand and use economic principles in a technology-driven future. My former students tell me that their favorite economic idea—one that changes their lives—is the concept of opportunity cost. As part of my course introduction, I remind students that they are incurring a cost for attending class. One of their first assignments is to identify the direct costs of the course (tuition, books, supplies) and then factor in the value of their time, the opportunity cost of what else they could be doing. They run the numbers to calculate the full cost of the course. I tell them that in order to demonstrate good economic thinking, they must demand (from me as their professor and from themselves as learners) an equal or greater return on their investment; otherwise they have wasted their time and money. This sets a tone of expected outcome, productivity, and efficiency—all a part of our technology-thinking economy.

The idea of "use learning now." Some of this Return On Investment (ROI) will come to them later, such as the benefits of education compared to the quality of one's life. This has tended to be the standard by which education has been held—the long-term gains. What a technology-driven economy requires is that we also think and produce in the present—the short-run benefits of education. The full advantage of this kind of thinking is often missed. In the short run, education has principally focused on academic applications: the production of homework assignments, examinations, and research papers as proxies for the future. The idea, "You will remember this experience and use it someday." The short term shifts this thinking to "use it now." The idea of "use learning now" is what happened for a student who decided to check eBay (an online auction) as a result of my lectures on the emerging electronic marketplace. He said that he had heard of it before, but decided to give it a try, because of my lecture and one lecture prior about opportunity cost. Inspired by the idea of how to earn back the costs for this course, he sold products from his home and made more than the cost of the class. This demonstrates his economic thinking—the power of learning with technology—that is academically and economically productive.

Technology-based economy. The field of economics is also benefiting from this new thinking. As part of an assignment, a student presented an article published recently in the *Economist*. The article was about the translation of knowledge into economically relevant skills. The point of the essay is that measuring the economic potential of a country simply by its citizens' educational levels has lost its meaning. Macroeconomic measures of citizens' educational levels do not translate well into viable measures of productivity, especially as nations move forward with technology. It is not good enough to know that the majority of a nation's citizens have completed high school or postsecondary degree programs. It is more a matter of what can be produced from the benefits of education. Unleashing the power of knowledge requires that it be transformed into economically productive skills. In other words, what can knowledge produce? This may be the new standard that drives education in a technology-based economy. I believe that technology will assist in bridging the gap between learning and economic productivity in ways that change long-term forecasts into present realities. At the end of the semester, a student announced that she had managed to save $1,300, something that she had never been able to do before this course in economics. The application of economic principles to the reality of one's life makes a difference, particularly in regions that have not had the opportunity to use economic thinking for their own gain.

Using technology in teaching

RMJ: My Web site is very much a first effort, a base from which I can share course information and things that I am thinking. In this way, I am more available to them, not just in terms of physical presence, rather available, intellectually. They are now able to be a part of what I am thinking. This has been the best part of the Web site, as it invites students to see their professor as a learner, too. The idea of posting developing ideas and inviting comment or other research to challenge ideas benefits us all. Learning via this technology is improved, for it is more than a one-way exchange. The idea of information transfer is far more engaging using Internet technology. While it is rewarding, it is not easy. The challenges of designing and maintaining a Web site are daunting, especially in an environment with few resources and little support. One wonders whether it is worth the trouble, especially in the early beginning when many hours are spent acquiring the skills, the software, hardware, and the network access needed to deliver this new academic tool. Before I created the Web site, I developed a newsletter that I distributed on the first day of class. This was a first effort, perhaps a prerequisite experience that lead to publishing the Web site. I needed something familiar, the production of ideas on paper. From that experience of using software to design and publish a newsletter, the next step of making the newsletter accessible via a Web site became an easier concept and one that appeared to be more doable as a result of this experience.

The Web site has changed in this semester. At first it was a medium to disseminate my course syllabus and newsletter. Later, I was able to post other resources for students to help them, such as interactive study guides, especially important for the study of economics in which students are learning to interpret graphs and data. These concepts benefited, in ways far better than can be realized in classroom lectures, from computer models that students can manipulate.. As students became more sophisticated in their understanding of economics, I was able also to expand the readings and sources of articles and books. I posted copies of my current articles written for the *Marianas Business Journal* as a way to invite comment, but later realized that the community of interest in economics is beyond my class lectures. As the semester has ended, students have asked how they can stay in touch. This will lead to another change in the Web site, one that will be more community-engaging. This will be a necessary service, as the community is often looking for ideas and current thinking on economic issues.

A limitation to technology is the match of resources on the other side. I spent much of my own time and resources building the Web site, but I have no control over the technical quality of student access. Many here still do not have Internet access at home, and if they do, they have only dial-up modem service. Much of what I am now publishing, especially the interactive graphs, are download-intensive and need high-speed access. Students report that it takes too long to download certain study guides, and some applications never seem to start. The limits of technology are certain realities in poorer economies. And for many students, they are at a disadvantage for not having access to the technology support they need. Computer labs may have been a solution, but as user demands for technology change to more real-time, new support will be required beyond traditional academic venues.

I update the Web site regularly to keep up with where we are in the course, and I do so knowing that some students will be left behind, as they have limits to access and the usual technology glitches. I also want to make it more personal and will publish a list of my favorite books in economics and let them know what I am reading now. There is much to do, and I am pleased that students are using the Web site and giving me suggestions. With their advice, I will be adding pages and links, and a live tutorial session as exam preparation. My longer-term goal is to have the site be a resource for students to follow them through their academic careers and professions. For these reasons, naming the Web site was a challenge. While it began as a way to communicate to students taking a course, Principles of Economics, it grew beyond this. I am now preparing to use it for another course next semester on microeconomic theory. Links to the community also require that it have broader appeal. For now I have settled on the name, econ@UOG, for it will be about all that is taking place in the field of economics at UOG.

Voice 8: Computers and Music Education

Randall D. Johnson, Professor of Music (E-mail: rjohnson@netpci.com), has been teaching at UOG for 14 years. He has been performing, teaching, writing, and arranging music for over 20 years.

Teaching philosophy linked with technology

RDJ: I am curious about what can be done with music and the computer and have, thus, worked with many programs. I write music on a score writing software called Finale and record directly to the computer Using Sonar. I work a great deal with MIDI (musical instrument digital interface), MP3, WAV,[1] and various other music files. I spend a great deal of time maintaining computers for the students to use for ear training and for listening to examples of performance material at the computer. Again, for those that use the material, it seems to help. However, I would love to throw it all away and go back a hundred years to where all music was acoustic. But that isn't going to happen, so I do my best to stay current with a very rapidly changing field.

Technology is not a remedy for lack of motivation. I find some students expecting the technology to do all the work and can turn on electronic equipment but don't know how to turn on their brains. Thus, I occasionally expect the technology to help more than it actually does in many cases.

Technology used to prepare courses

RDJ: I make and use MIDI files, WAV files, CDs, and DVDs for use in class and for use on students' computers. I communicate with most of my students via e-mail. I write and arrange music at the computer I have ear training exercises and rhythm exercises on several computers that keep track of student achievement. It is easy to buy a computer program that will help students. What I need to better plan is how to get them to use it. For those students who actually use the technology, they can improve their abilities in music rapidly.

Voice 9. E-Mail and Student Teacher Communication

Mary Jane Miller, Assistant Professor of Educational Foundations (e-mail: mjmiller@guam.uog.edu), currently teaches at UOG, has been a science coordinator, a curriculum supervisor, and an English as a Second Language (ESL) specialist in public and private school and colleges in several geographic locations.

Teaching philosophy linked with technology

MJM: As instructors of future teachers, it is essential for us to utilize the theories, methods, and techniques ourselves that we are telling our students they need to use. The old adage, "Do as I say, not as I do," has no place in the academic preparation of teacher candidates. I prefer a quote by Ralph Waldo Emerson: "What you do is so loud that I cannot hear what you say." With this basic premise in mind, it is easy to relate it to all aspects of academic preparation, particularly to technology. Research indicates that the professions most of our elementary students will work in as adults have not yet even been invented. How then can we prepare our teacher candidates to equip their students for a future that is not yet even known? The best solution seems to lie in enhancing the students' ability to communicate, to locate information when needed, and to learn and adapt in response to demand. There is no place where these needs are better met than through the use of technology. Technology is not only an important aspect of personal life, but it also is an integral part of academic life in general, and teacher education in particular.

E-mail is a vital communication tool

MJM: I use the Internet almost daily to keep current on advances in academia as related to my field and to search for additional information that will enhance my classes. E-mail is also a vital tool for communication between student and professor. I state both Internet research requirements and the use of e-mail communication in the syllabi for my courses. As a supervisor for student teachers, I have found e-mail a useful tool for communicating with both the student teachers and with their cooperating teachers. We have established Wednesdays and weekends as a time when all of us will read and reply to e-mail. Because I check and reply to e-mail daily, the student teachers have found this a very positive and effective means of communication. The following are examples of e-mail conversation between us.

Example 1:

Student B: We do Direct Instruction (DI) the majority of the time, so for your observation of my instruction, it is difficult to schedule a range of subjects. What do you suggest?

Miller: We all have the same questions, because DI really does take a lot of the academic day. I will plan my next observation on a Friday, which is when you have more free time and can schedule a Social Studies class.

Example 2:

I also use e-mail for the greetings to student teachers, for example: "Another week is underway and the time is passing very quickly. The end of the semester will be here before we know it. Student teaching is a great opportunity for you as future teachers, and for me to visit the community to meet and observe DI in action among working professionals. It is great to see the good work you are all doing and the progress evident in your teaching professionalism. Clearly we all benefit. As the time diminishes I want to encourage you not to wait until the last minute to make sure all your student teaching requirements are being met.

First, you should be having ongoing conferences and evaluations by your cooperating teacher that document your progress in achieving all the benchmarks. Second, you should have many of the needed artifacts in your showcase portfolio with an accompanying reflection for each (three items for each benchmark). Third, keep up with your daily journals. Don't be sitting up on a Sunday night trying to think of what you would have written the previous Tuesday if you had gotten around to it. It is *much* easier to keep up with it daily. And I hope you are maintaining the same level of success in your classrooms."

Summary of the Voices

The main point of each case can be described as follows:

- **Voice 1:** PowerPoint is effective in presenting memorable images that illustrate important concepts in the lecture.
- **Voice 2:** Flash cards with PowerPoint achieve tasks amazingly well in the language course.
- **Voice 3:** Technology has been basically a multimedia blackboard.
- **Voice 4:** A multimedia blackboard technology offers students a variety of visual and textual materials that complement the textbooks.
- **Voice 5:** To know how to make use of the library online materials is essential for all courses.
- **Voice 6:** Technology needs to be matched to the learning and teaching task. Technology only assists students and teachers to accomplish the educational objective.
- **Voice 7:** A professor's original newsletter with course perspectives on the Web motivates students).
- **Voice 8:** Students who use technology discover that they can improve their abilities in music rapidly.
- **Voice 9:** E-mail is vital for the internship students in education. Indeed, e-mail is a useful teaching tool as stated in Synopsis 4.

Synopsis 4 E-mail

Lawrence, G. (2002). The use of e-mail as a tool to enhance second language education programs. The Canadian Modern Language Review, 58(3), 465-472.

Teachers can use e-mail to create motivating, engaging, and dynamic second language learning environments that simultaneously address linguistic and cultural learning objectives. Of all Internet tools, e-mail is one of the most accessible, commonly used, and is relatively simple to orchestrate within the classroom context. E-mail exchanges create a versatile, student-centered forum promoting second language production that can be orchestrated to target a range of linguistic and cultural learning objectives. One Canadian teacher I observed used a student-designed online newsletter to prompt interaction between secondary core French students and students in two other French-speaking nations. The newsletter featured a variety of sections such as editorials, sports, student articles, and links to partnered schools. Teachers can have students participate in international discussion lists on a range of topics and learning a second language. When conducting projects using e-mail exchanges, it is important to discuss and agree on terms of participation and curriculum integration with the partner teacher, so that both groups of students are participating and being evaluated on similar terms. As with any new approach, effectively using e-mail within second language classrooms will take time and practice. It is wise to start with small, focused projects integrated into the curriculum to familiarize students and teachers with the medium before moving on to more complex and varied tasks. E-mail is a versatile teaching tool that can make learning a second language meaningfully alive and real.

Voice 10: Japan

Kuniko Mochimaru (e-mail: mochimaru@rivo.medinatti.net) has been teaching in the School of Business, Josai University, Japan, since 1996, with a focus on multinational corporation theory, and globalizing organizations.

How technology is integrated into teaching and how these experiences impacted instruction?

KM: I obtain the most current information relating to companies and societies that I use for my class from the Internet. I print out the data and information, and paste them on several sheets in order to present them to the class. I usually use four to five sheets with the data on both sides of the paper. I do not use a PC to get information during the undergraduate class, as the slow speed of technology failure will possibly waste class time. As the class size is large with more than 200 students, keeping on schedule and maintaining a pace is important. I use e-mail as a communication tool with both my graduate and undergraduate students who are enrolled in my seminars. Each student is asked to prepare a PowerPoint slide show for the area that he or she is responsible for, which offers explanations and promotes discussions. All students are required to complete assignments specific to gathering appropriate data and information. Organized in teams, students in seminars will prepare PowerPoint slide shows on their assigned country, focusing on information relating to trade and direct investments.

IT is particularly useful for professors for gathering updated information and preparing lectures to make course materials interesting and meaningful.As this is an era where companies and organizations welcome young employees with IT capability, it is important that students have opportunities to become familiar with technology at college. The IT capability of the students entering universities depends on the IT environment at home and at their high schools. There are also cases where they have their own computers at home and then bring them when they attend universities away from home. Currently Japanese children start learning IT at elementary school age; consequently, upcoming university students will have more IT knowledge and capability. It is very important for professors to remain informed and to keep up with the advancement of technology.

Summary

The purpose of education in teaching is self-development of the teacher, and the ultimate goal of education is to enhance the student's understanding and learning. In this chapter, keeping in mind that technology plays an ever-increasing and necessary role in higher learning, we explored faculty technology experiences and applications (their thoughts, desires, and struggles about enhancing the teaching-learning process in higher education courses). Based on the responses of the survey questionnaire distributed and based on interviews, it is clear that faculty members in Guam are increasingly posting course syllabi and teaching materials online, providing citations to digitized resources on the Web, and communicating with their students through e-mail. Some faculty members prepare customized CD-ROMs, but most common usages of technology include PowerPoint presentations, multimedia visualizations, Web searches, and lecture notes online. It is clear in contemporary times that professors and students must master sophisticated *information age learning media* or *tool software* (such as graphics, database, spreadsheet, multimedia, and the Internet) and must become accountable for demonstrating learning more directly than did students of the past. Higher education faculty members should promote meaningful e-learning through such integrated teaching in order for students to more readily relate to their existing knowledge schemes. Definitely, the integration of technology and e-learning tools and techniques into traditional teaching methods must be the key to the success of any institution of higher education.

Endnote

* This is a short version of the paper published in the 10th Pacific Island Association of Libraries and Archives Conference proceedings (2004). Used with permission.

1 Musical instrument digital interface (MIDI) is a method for instruments, often electric pianos, to communicate with computers. MP3 is a popular method to compress recorded music. WAV files are the Windows-based method of storing recorded sound. These files are very large and are often compressed as MP3 files.

Education Essay

Source: Inoue, Y. (2003, Spring). Some thoughts on human learning. APA Perspective, 10.

Some Thoughts on Human Learning

I believe that learning is not so much a gradual revelation of truth as a self-reinforcing process that deepens and embroiders knowledge. Kolb's experiential learning model (1984) and the cognitive approach to learning theorize that students actively discover knowledge, gain insights into learning problems, organize and process information, and direct their own learning.

Although Kolb's model originated in the business world, it can be applied to all kinds of learning disciplines. Beginning with the assumption that learning occurs through the uniting of two dimensions (the absorption of information and the processing of information), Kolb has conceived learning as a four-stage cycle: (1) Concrete experience (engaging in new experiences—*feeling*); (2) reflective observation (perspective experiences—*watching* and *listening*); (3) abstract conceptualization (creating concepts to integrate observations into theories—*thinking*); and (4) active experimentation (utilizing theories to make decisions and solve problems—*doing*). Kolb's model can be extrapolated to broader applications in the field of education, including how students learn, how teachers teach, and how teachers and students interact.

Despite the applicability of such broadly based theories, however, it is important for college teachers to recognize individual differences in their students. In particular, it is important to recognize the differences in individual *thinking styles*—otherwise teachers can confuse a student's thinking style with the quality of a student's ability to think. It might, therefore, be useful at the beginning of a semester for teachers to conduct a learning-style inventory for each student. This can be used to divide students into group activities or projects based on the types of learning styles (i.e., *diverger*, *assimilator*, *converger*, and *accommodator*). It is well known that most students know very little about how learning is influenced by their own individual role-actions and capabilities.

Today, educational technology has a vital role in expanding human capacities for learning and for enhancing human reasoning abilities. One of the central metaphors of the information age is to posit the human mind as a computer. Just as the human mind has functions that receive data, store them in memory, and retrieve them as needed, so a computer has functions that accept data, process them, and display information. A computer can certainly handle enormous amounts of data quickly and accurately. Nevertheless, a computer operates under the control of software, and people programmed the software. Computers are certainly adept at the tasks they perform, but only insofar as those tasks do not require insight or intuition. The human capacity for insight, intuition, and individual differences in learning styles demonstrate how truly remarkable the human capacity for learning really is!

Chapter V

Teaching with Educational Technology: A Profile of the Pacific

The 21st century brings the Pacific islands unwelcome currents. Global economic integration will strip Pacific islands of trade preferences. Radical weather change, reef damage, and sea level rise will push natural resources toward extinction. To buck the tide, we do not need business-as-usual leaders. We need mould-breaking, heroic leadership. Education is key. We had better start teaching our kids political science from the cradle. In the next century, social ills rooted in economic injustice and flourishing in ethnic and religious strife will continue to generate desperation in the world's poverty pockets. Instead of stirring clouds of human rights allegations, we must learn to live with the migrants and refugees fleeing to our shores. Television, the great leveller, homogenises cultural values in every corner of the world. Indigenous language erodes. Island cultures are swamped. The heroic leader will need a worldly education and a "bend-your-back for others" apprenticeship in traditional island service. (Bruce, 1998, p. 126)

Micronesia refers to a geographic area encompassing an enormous expanse of the tropical western Pacific Ocean. The following areas are particularly challenged by political, economic, cultural, and linguistic diversity: the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia (Chuuk, Kosrae, Pohnpei, and Yap), the Republic of the Marshall Islands, and the Republic of Palau. Computers and the Internet have changed the way people interact with each other in their professional and personal lives, but access to the Internet is not homogenous in every country or every region in the world (Perez-Paredes & Cantos-Gomez, 2002). This chapter is about teaching with technology throughout Micronesia, with a special focus on community colleges in this region. This chapter also touches upon the library. Information is the key to power, but knowing how to get information is powerful. Librarians have an impact on individual learning by providing organized interfaces to information resources. This is particularly true in Micronesia, which is geographically remote from the U.S. mainland.

- Community Colleges and Educational Technology
- Faculty Technology Experiences Throughout Micronesia
- Library, Learning, and Educational Technology

Community Colleges and Educational Technology

Vocational education, in Rosenfeld's (2001) review, was a separate track in the secondary school curriculum, beginning in the 1960s and continuing through the 1970s. In the 1980s, the community college's mission again expanded to meet the demands of small- and mid-sized enterprises for the new technical and organizational skills associated with the adoption of new technologies. The next transition in community colleges, which began in the 1990s and is ongoing, reflects an information-based economy and the ubiquity of the Internet.

Successful college will be regionally committed and globally connected, possess a store of technical expertise and knowledge, adapt quickly to *change, and successfully bridge the gap between civic and economic responsibilities as well as individual and industry interests…. Ultimately, the best community colleges will find a niche in which they can truly excel, identify gaps to fill in the regional economy, and help citizens with special needs climb career ladders.* (p. 7)

Guam Community College (GCC)

GCC, located in Mangilao on a 22-acre site, is a multi-faced public vocational educational institution created by Public Law 14-77 in 1977 to strengthen and consolidate vocational education in Guam. GCC operates secondary and postsecondary vocational programs, adult and continuing education, community education, and specialized training, offering over 50 job-related courses of study, in addition to preparing students to transfer to four-year universities with advanced standing in professional and technical degree programs. GCC offers a variety of community service and special programs to prepare students for college experiences, including ESL, Adult Basic Education, General Education Development (GED) preparation and testing, and an adult high school diploma program, with the following philosophies of the College: (1) Quality teaching, (2) affirmative action for nontraditional students, (3) responsiveness to the educational and cultural needs of the community, and (4) adult basic education. Particularly, GCC offers associate of science degrees in accounting, architectural engineering technology, automotive technology, civil engineering technology, computer science, criminal justice, early childhood education, electronics engineering technology, fire science technology, food and beverage management, hospitality management, marketing, medical assisting, office technology, sign language interpreting, supervision and management, travel agency management, and visual communications; and Associate of Arts degrees in education, electronics engineering technology (Guam Community College Catalog 2003-04).

An Interview

The following is a summary from an interview with a retired GCC administrator (October 2004):

This College, being the legislative-designated vocational school in Guam, has had an uphill battle for funding. To make matters even more difficult for GCC, they funded and supported vocational programs in all public high schools, even though not all vocational programs were available at all schools. Programs like Computer Science and Business have been technologically advanced for a number of years. A major problem facing all *instructional entities is the replacement of outdated equipment and the challenge of keeping the equipment operating. Within many of the vocational programs, technology has been or is becoming very important. The area of auto mechanics now has sophisticated engine analyzers and most new autos have computers in their ignition systems. To train competent and certifiable mechanics, students must be proficient in using the equipment. If GCC can't afford to purchase this equipment, then its resulting mechanics will be nothing more than parts changers. Within the electronics program, constant changes in technology are a real problem. An example is the use of a standard textbook. By the time a text is written and published, advances have made most of the information obsolete. Programs like welding, cosmetology and graphics are all faced with the same problems. Advances outpace the existing status.*

Identity Crisis

The *Chronicle of Higher Education* (Evelyn, 2004) has a featured article on community colleges entitled "Two-year Colleges Face an Identity Crisis." According to this article:

Most two-year institutions started out as junior colleges, borne out of high schools, and providing the first two years of a bachelor's degree. In the 1970s and 1980s, many institutions added occupational and technical programs and became comprehensive community colleges. The last couple of decades saw the growth of corporate training, welfare-to-work, GED, and remedial programs. Today, community colleges are seeing enrollment explosions they can barely contain, fueled largely by high-school graduates who can't get into four-year institutions. (p. B3)

American community colleges have played a central role in job training and access to higher education, but their public image suffers and, in the next five years, without significant additional financial support, that role will be eroded as community colleges seek to meet other demands as well. The only knowledge gap is what degree that erosion will take place (Levine, 2004). Critics even would say that community colleges have mismanaged their mission by trying to be all things to all people all the time (McPhail, 2004). It is time for community colleges to determine which missions are most suitable for each college to serve and survive. Community college students are more diverse than those in other public educational institutions: 58% of students are female, and the average age of a student is 29 years old (Rosenfeld, 2001).

Faculty Technology Experiences Throughout Micronesia

In addition to the UOG (http://www.uog.edu/), and the GCC (http://www.guamcc.edu/), there are four other junior colleges in Micronesia: Palau Community College in Palau (http://www.palau.edu/), Northern Marianas College in Saipan (http: www.nmc.net.edu/), Community College of Micronesia in Pohnpei (http://www.comsfm.fm/), and CMI (College of the Marshall Islands) (http://www.cmiedu.net/).

Bruce (1998) describes the major future trends and challenges to island security in six areas (pp. 127-128): (1) *Economy* (Global economic integration will reduce trade barriers and strip Pacific islands of trade preferences.); (2) *environment* (Nature will suffer under pressure from worldwide development—radical weather change, reef damage, and the threat of sea-level rise.); (3) *population* (The gulf between the world's haves and have-nots will widen as migrants and refugees leave.); (4) *energy* (Oil will no longer be the source of energy security. Pacific islands will make a virtue of necessity by turning to renewable energy sources.); (5) *security* (The world will suffer a chronic low-level "security fever." Supplies and trade sometimes disrupted tourism.); and (6) *communication* (Satellite networks will bring television's *megaculture* to every corner of the world, swamping island cultures and eroding indigenous languages.) Bruce (1998) continues as follows:

...island education will be revolutionized by access to a global network of information in island classrooms and libraries. As instantaneous global telecommunications overthrow the ancient tyrannies of time and space, Pacific islands will become home to free-floating information workers who live in electronic cottages. (p. 128)

Palau Community College in Palau (PCC)

PCC is located in Koror, the capital of Palau, which is located about 500 miles east of Manila, about 800 miles southwest of Guam, and 10,000 miles west of Washington, D.C. That makes PCC the most distant and remote member of the U.S. family of colleges and universities. PCC was founded in 1969 as a two-year postsecondary vocational/technical institution, which was known at that time as Micronesian Occupational Center. In 1978, this Center officially became the Micronesian Occupational College, a distinct and complementary part of the College of Micronesia. In 1987, a treaty among the Republic of Marshall Islands, the Federated States of Micronesia, and Republic of Palau regarding the College of Micronesia was executed establishing complete autonomy of each college in the College of Micronesia. PCC consists of the School of Arts and Sciences (agricultural science, and environmental/marine science), the School of Business (accounting, administration, tourism, and management), and the School of Technical Education (e.g., electrical technology, construction technology, and general electronics technology). One of PCC's goals is about technology: by the year 2007, PCC (1) Will provide convenient access to computer networks for all faculty, students, and staff; (2) will have the tools to capitalize upon the campus computer network; and (3) will have added to its curriculum, offering programs in support of hardware, software, and network technology (Palau Community College Catalog 2000-04).

Voice 1: Technology Experiences

Marianne Temaungil, Palau Community College, (e-mail: marianne@palau.edu)

I am teaching a composition course online. Teaching courses online gives students the freedom to decide when to spend time on the courses. This I believe is a good way for students to learn self-discipline and to work independently, to learn to solve problems that arise, and to learn to use technology to acquire knowledge. Students need to have good computer skills or a willingness to learn them, good time management skills, access to a computer, and an understanding of how online courses work. They need an e-mail account that they can easily access and knowledge of how to send and receive attachments. We provide one lab that is connected to the Internet and a computer lab assistant in the online lab to assist students. We also provide an orientation on the first day of instruction.

To prepare courses, I search the Web for material, and use the computer to create tests and exercises. To teach, I use e-mail to correspond with students online and also to send attachments. My course is on a Web site. For my traditional classroom courses, I use the computer to look for materials and to create tests and assignments. To evaluate or assess student performance, I use Microsoft® Word and the comment function to give feedback and use e-mail. The advantage of using technology in teaching might be the freedom of time to do work for the course. Because there is no set time to be in a classroom, those who choose to work or need to be elsewhere at a specific time can still take the course. The disadvantage is that when there are problems with the Internet or e-mail accounts, or when students find it hard to find a computer to use, it is for students to submit work on time. Also, some students lack time management skills or don't understand how an online course works, so these students often do not do well or they withdraw.

I enjoy teaching online courses, although the amount of time it takes to teach this way is much more than if I were to teach in a regular classroom. I spend evenings and weekends checking e-mail to keep up with the work. It is time consuming to have assignments come in at different times and having to respond one by one to students. Students sometimes do not understand that I will assist them only through e-mail, and that can be also frustrating. One goal of this online course, however, is to have students learn how an online course works in case they will need to take online courses outside of Palau in the future.

Northern Marianas College in Saipan (NMC)

NMC is located in Saipan, the capital island of the Commonwealth of the Northern Mariana Islands (CNMI). NMC was established in 1981, offering training programs for government employees other than teachers. The Accrediting Commission for Community and Junior Colleges, Western Association of Schools and Colleges accepted NMC for candidacy in 1983. The Mission is to provide the CNMI with the best possible postsecondary and continuing adult education. CNMI offers the following programs: business, hospitality, computer technology, education, law enforcement administration, criminal justice, nursing, workforce development, and marine technology. CNMI has two more campus locations in Tinian and Rota. In CNMI, the instructional technology component consists of three programs: Distance Education, Media Services, and Music Production. The Distance Education program started in 1997, providing an interactive video instructional link between the main campus on Saipan and the Tinian campus. CNMI hopes to better meet the educational needs of a wide range of nontraditional learners in the workforce and in the more remote communities of the CNMI. The Media Services program provides many types of services to the college community, including video production for classroom instruction and video recordings of oral histories. The Media Services program interacts closely with Distance Education by producing educational videos for the DE TV channels. The Music Production program is responsible for the acquisition of locally produced music, in particular for gathering historical music and setting it down in proper musical form. (Northern Mariana's College Catalog 2003-2004)

Voice 2: Technology Experiences

Stephen Ewen, Northern Marianas College, (e-mail: StephenE@nmcnet.edu)

As an instructor and program coordinator of Adult Basic Education, I teach Pre-GED-level Writing, Literature, Social Studies, Consumer Economics, and Introduction to Computers. My students use a computer program called Learning 100, which improves reading and writing skills. In Pre-GED-level Writing, Literature, and Social Studies, each student must log between 10 and 15 hours on the Learning 100 software (a geography program that teaches students to identify political boundaries) in the college computer lab during the term. Students use a whirlwind of computer applications ranging from office applications to multimedia. In Introduction to Computers, students will: (1) Have basic computer literacy; (2) know how computers can potentially enrich their daily lives; (3) have a larger vocabularies, including computer jargon ; (4) have improved writing skills; (5) have new life skills and an expanded world; (6) have new employment skills; (7) have new skills useful for further study in college, vocational, or technical school; (8) see how technologies bring cultural changes, and why peoples from Pacific, Asian, and other cultures should think critically before adopting these changes; (9) consider entering the computer field as a career, or be able to work with computer professionals, no matter which employment field they choose; and (10) have the skills needed to become lifelong, self-directed computer learners and users, capable of doing anything with computers they set their minds to. Finally, it is well known that lectures alone produce the lowest student outcomes. Outcomes increase with use of multimedia. It seems like a free ride and a show sometimes. I struggle with the balance between whetting appetites just enough to get students to read, and teaching them with multimedia.

Community College of Micronesia in Pohnpei (CCM)

CCM began as the Micronesian Teacher Education Center in 1963 to educate elementary teachers employed by the Trust Territory of the Pacific Islands. The University of Hawaii, in cooperation with the Trust Territory Government administered the program until 1969, the year that the school became an in-service training institute that awarded high school credits. The school then switched its emphasis from in-service to preservice teacher training and awarded college credits. Associate of arts degrees are offered in liberal arts, Micronesian studies, and teacher preparation; and associate of applied science degrees are offered in building technology, electronics technology, and telecommunications. CCM currently offers some courses through the Web. CCM is planning to offer other programs by way of videoconferencing and other forms of conventional communication techniques. The Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT) and Single Side Band (SSB) radio communication systems are managed by the Media and Instructional Technology Center and serve as links for direct communication to other parts of Micronesia and the world. Student access stations are available in three computer labs, the Learning Resource Center, and the residence halls (College of Micronesia-FSM Catalog, 2003-2005).

CMI, Marshall Islands

CMI is an autonomous community college with two-year and three-year programs and it primarily serves students from within the Micronesian region. CMI as an institution can trace its origins to several earlier programs. The oldest was the School of Nursing established by the Trust Territory of the Pacific islands. Begun on Moen Island in Chuuk in 1953, it was later moved to Pohnpei, then to Palau, then to Saipan in the Northern Marianas, and finally, in 1986, to Majuro. This School of Nursing was affiliated in 1972 with the University of Guam to confer the associate of science degrees in nursing. By 1987, all three programs (Nursing, Education, and Land-Grant Extension) were housed together in Majuro on the present campus; in 1989, they were combined to constitute the College of Micronesia-Majuro, which became independent in 1993, as the CMI. Programs of studies consist of Liberal Arts and Science, Education and Marshallese Studies, Nursing and Allied Health, Business and Computer Science, and Vocational and Occupational Education (College of the Marshall Island Catalog, 2002-2004).

Voice 3; Technology Experiences

Mary Van Auken, College of the Marshall Island, (e-mail: mamavan@yahoo.com)

With a focus on English Composition instruction, Speech, and Literature, I encourage word processing for composition, and I introduce presentation programs and materials such as PowerPoint, video, audio, overhead projection in speech. The English composition courses are first and second semester freshman expository writing and beginning research courses. By the second semester course, students have taken a basic word processing course and are expected to hand in all final drafts in printed form. I like to have all preliminary work and editing done on disk, so that the student isn't making new mistakes as he or she corrects the old ones. To prepare for courses, I word process all syllabi, handouts, tests, and lecture notes. I also create a database for each class and keep attendance and grade records in that way. I do research online for materials to use in class, but that is not always possible because of the expense of the Internet service and the limited availability of PEACESAT. To teach courses, the only technology I use directly for instruction is the occasional use of overhead projection. To evaluate or assess student performance, I use the formula functions in Microsoft® Excel software to calculate grades and calculate norms of performance by each group. Probably the most important advantage is in efficiency. A second advantage is the ability to incorporate graphic examples in handouts and presentations. It adds a lot to a lecture, especially when students are not dealing in their first language. The Internet allows even the most remote student to find out about the world. There are no real disadvantages except availability. It is important to remember that technology is a teaching tool, not a teacher, but it can aid learning and fair grading tremendously.

Regarding multicultural education and technology, I would say that we have to remember that technology is a tool, not a teacher. Any concern we have with multicultural education can also be a technology concern. One problem is access to useful, global information for students in developing countries, and the concern associated with that is that someone can be misusing the tool and biasing the information. Technology is a great tool for making information more accessible and for teaching more efficiently. There still needs to be a good human teacher in the mix somewhere. I think that if we remember that the goal is student learning and not jazzy technological displays that students can't really use, we will improve as teachers because we can deliver the material more effectively. The material still needs to be of good quality and pedagogically sound. The most important technology is that which the student can use, not just technology we, as teachers, use to show and tell. I hope to see more students in the islands have opportunities to use existing technology, even if it is just the school radiophone. The only real philosophical issue that I feel strongly about is that technology is a tool, not a teacher. It is so important that we do not back off from what we know to be necessary because of some sort of technological issue. My multicultural experience includes teaching in Japan, China, and Saudi Arabia, as well as Guam and the Marshall Islands.

Voice 4: Technology Experiences

Tim Owens, CMI, (e-mail: timothyowens@yahoo.com)

As the chairman of the Business Studies and Computer Sciences (BSCS) Department for the CMI, I am proud to say that my department is leading the way with technology in the classroom. We are utilizing an open source software named Moodle (Modular Object-Oriented Dynamic Learning Environment) that allows us to deliver course materials and resources to students from anywhere on our network at CMI. Moodle is a software package for producing internet-based courses and Web sites. This software is provided freely as open source. This means that although Moodle is copyrighted, you have additional freedoms. You are allowed to copy, use, and modify Moodle provided that you agree to offer the source to others, to maintain the original license and copyrights, and to apply this same license to any derivative work. Moodle will operate on any computer that can run PHP (personal home page), and can support many types of database (particularly My SQL [My Structured Query Language]).

The word Moodle is most useful to programmers and education theorists. It's also a verb that describes the process of lazily meandering through something, doing things as they occur to a person to do them, an enjoyable tinkering that often leads to insight and creativity. As such, it applies both to the way Moodle was developed, and to the way a student or teacher might approach studying or teaching an online course. Anyone who uses Moodle is a Moodler. At the Business Studies and Computers Sciences Department of the CMI, we have begun to Moodle. The department has utilized the technology to develop the following courses: Business Communication, Business Mathematics, Introduction to Computers, Small Business Management, Spreadsheets, and Word Processing. In addition, Moodle has been piloted for use in teaching the freshman and sophomore classes enrolled at CMI's Upward Bound Program (a component of the TRIO Program). Moodle was chosen because of its many features, which include: (1) Emphasis on strong security throughout (forms are all checked, data are validated, and cookies are disabled); (2) administrative involvement is reduced, while retaining security; (3) a full-time teacher has complete control over all the settings for a course, including restricting other teachers; (4) flexible array of course activities (forums, journals, quizzes, resources, choices, surveys, assignments, chats, and workshops); (5) all grades for forums, journals, quizzes, and assignments can be viewed on one page (and downloaded as a spreadsheet file); (6) students can upload their assignments (any file format) to the server and they are time stamped; (7) quizzes are automatically graded and can be regarded if questions are modified; (8) at the teacher's option, quizzes can be attempted multiple times and can show feedback and correct answers; and (9) the resource module supports display of any electronic content (Microsoft® Word, Microsoft® PowerPoint, Flash, Video, and Sounds). In the classes that use Moodle, students must submit all assignments electronically to the instructor. A side benefit of this is that the students do not need to purchase compact disks or floppy disks, which also eliminates the possibilities of spreading a virus. An interesting feature of this system is that I don't have to record attendance, as the computer tracks attendance by their login or activity. I can validate and document that a student has read items posted on the Intranet Web site such as the course syllabus or learning outcomes. Students may participate in class by submitting assignments from other parts of the network during the class period. Students appreciate that as assignments or tests are graded, the results are automatically sent to the student for their view only and subsequently to the teacher's grade book, which is downloadable to Microsoft® Excel.

The BSCS Department anticipates having eight courses online by 2005. After we have mastered this technology on CMI's (Uliga campus) Intranet, we will deploy modems that will enable students to access the course materials from sites off campus. Initially, the plans were to allow students residing on the CMI Arrak Campus, approximately nine miles away, to dial in to their courses. After one year of field-testing this, we will utilize this concept on the Internet. I am hopeful that we will be able to deliver course instruction to Marshallese located throughout America. There are large pockets of Marshallese located in Costa Mesa, California, and Springdale, Arkansas. The National Telecommunications Authority is currently in the process in setting Internet access on the Marshall Islands subdistrict centers of Wotje Atoll and Jaluit Atoll. Of particular significance is that two public high schools are located on these atolls and our courses can enhance the learning experience for the students at these schools. Because of my Peace Corps background in the outer islands of the Marshalls, I am excited to be a part of the process of improving education for Marshallese. Admittedly, I have a vested interest in the success of the project. By improving education, I am creating a better world for my daughters and grandson.

Library, Learning, and Educational Technology

Claiming that because of the increasing importance of information literacy, library instruction has become a vital facet of most college and university library programs. Ashmore (2002) has noted that librarians and library staff are finding themselves teaching and training now more than ever based on the notion that mastering technology involves not only knowing how to use it, but how to make it useful for others. Typical librarians' responsibilities include: (1) Engaging in reference/public service for use of print materials, and for use of hardware and software; (2) assisting classroom or group instruction for teaching hardware/software; (3) teaching and training existing library staff in new service/hardware/software; and (4) training others to train.

Ferro (2004) reports the Region V Department of Science and Technology (DOST V) in the Republic of the Philippines maintains a library promoting science, technology, and education services. The vision of the DOST V Library is that of a knowledge-based center for science and technology information. Diffusing information on science and technology region-wide through networking with national science and technology organizations, libraries, and archives is the mission of the library; and the objectives of the library are (p. 39): (1) To promote people's reading and learning habits; (2) to provide direction, leadership, and coordination in science and technology information dissemination; (3) to reach out to as many institutions of learning, researchers, traders and business entrepreneurs; and (4) to provide equally client-directed services to teaching, learning, extension, research, and development.

Two Papers on Technology, Learning, and the Library

As Schmidt and Gribb (1999) put it, "The 1990s have presented many challenges for universities in terms of increased cost, ever-changing IT that continues to become more sophisticated, a changing population, new pedagogic directions, and a new role for the university in lifelong learning" (p. 4). The following two papers discuss the roles of the library and librarian in a knowledge-based society.

Paper 1. Libraries Lead to Lifelong Learning[1]

Steven Lin, Library Director, American Samoa Community College, American Samoa

It is generally assumed that learning is the most precious and enduring gift that a person can ever receive during a lifetime. Confucius said, "There is still much to learn after one has grown old" (Waley, 1989). Plato later argued that truth comes from goodness, just as light comes from the sun, and that goodness is knowledge. Knowledge, in turn, is acquired through learning. In the process of learning, besides the teachers' instruction in the classroom, students have to access the library for their information needs. In this sense, the librarian (1) selects, acquires, and organizes new materials; (2) assists readers in identifying, locating, and using the collection; (3) and instructs readers in intellectual and professional growth.

As an information center to a community-based education, the library is a key access point for the information literacy and lifelong learning. A summary of two symposia on information literacy sponsored by the Commission on Higher Education, Middle States Association of Colleges and Schools, the National Forum on Information Literacy, and the Association of College and Research Libraries noted that there is a need for campus-wide commitment to improve learning experiences. In addition, the summary presented several approaches that can help establish commitment and then translate it into reality (Information Literacy, 1995). These approaches are

- demonstrating the importance of information literacy and lifelong learning;
- ensuring a shared vision and mission among administrators;
- facilitating professional development; and
- restructuring a curriculum that emphasizes information literacy and lifelong learning.

The Role of the Library

The library provides information services to the community and plays a role as an integral part of the community-learning environment. In a time of information growth, rapid social change, and technology advancement, the library should shift from collecting resources to developing a community of lifelong learners. In a paper presented to develop the national information literacy standards for student learning, Marcoux (1999) promoted a set of standards to help students become lifelong learners, think critically and ethically, and develop social responsibility. On the other hand, public libraries have long been supporting lifelong learning through the acquisition and organization of materials, reference and information services, programming, and outreach. Because most lifelong learners are not library research experts, there is need for consistent and constructive guidance to make research enjoyable, engaging, enriching, and even meaningful. Eventually, lifelong learners as library users should learn to move naturally into task definition, information seeking, and the use of information.

As an Information Center: The library serves as an information center for community lifelong learners. The University of Queensland, Australia, has established an appropriate library and information service to support effective learning environment for lifelong learning. Four strategies for the role of the library in active support of teaching learning at the University of Queensland include: (1) Thoughtful and innovative design, maintenance, and use of effective virtual and physical facilities; (2) development of Web-based interactive information skills program; and (3) creation of the University of Queensland Cybrary (Schmidt & Cribb, 1999).

As a Specialized Library: Because the library supports lifelong learning of students on campus differently from the library services, the library collection should reflect the specific information needs of lifelong learners. A National Survey of State Directors of Adult Education (Rudd, Zahner, & Banh, 1999) found that the most frequently listed barriers to addressing health in programs of adult basic education were lack of curriculum and resources, students' low listening levels, and low ability to read health materials. One of the library's roles is thus to focus on helping adults to improve their reading. The open community colleges in Taiwan use the facilities of high schools, offering courses for lifelong learners such as flower arrangement, calligraphy, sewing, cooking, primary health care, adult literacy, nursing, creative writing, gardening, folk dancing, folk song singing, plumbing, carpentry, and painting. The high school library collection must focus on the above subjects for the information needs of lifelong learners.

The Role of the Librarian

In the 1998 International Association of Technological University Libraries (IATUL) Conference in Pretoria, South Africa, Robert Newton and others presented a paper about the role of the librarian to support lifelong learning (Newton, Marcella, MacLennan, & Middleton, 1998). They stated that librarians have an impact on lifelong learning by providing organized interfaces to information resources. This is true especially in the area of information skills training, in which the librarian must contribute actively by developing these resources and by ensuring that the lifelong learners are made aware of their critical importance to learning. To provide effective services for older learners, Van Fleet (1995) states that the librarian should have a three-tiered knowledge base: core knowledge of library and information science; knowledge of public library service; and knowledge for specialized library service to older adults.

As an Information Professional: The role of the librarian as an information professional requires that librarians increase their specialized knowledge and use of new technology to provide accurate and updated information services. At Robert Gordon University in Scotland, some World Wide Web-based research and development projects were completed with implications for information professionals. These projects were: (1) NetLearn, a project that developed a directory of Web-based materials to support teaching and learning Internet skills; (2) REMOTE, a project that developed a directory of Web-based teaching and learning materials on research methods, a library of in-house materials, and an interface allowing incorporation of these materials in higher education programs; and (3) Information skills, a scheme that developed a Web-based directory to support distance learners.

As a Teacher: The role for librarians as teachers expects them to be aware of new knowledge and technology that apply to the library information service and document delivery service. Librarians should keep abreast of changes in the philosophies of teaching and learning, particularly in the environment in which teaching and learning take place. Librarians must function both as individual teachers and as members of a team engaged in the following skills: information, professional, technical,personal, interpersonal, and team. The knowledge base and technical skills provide a new mental model for librarians. Librarians are expected to be motivated by deeply held values and beliefs regarding the development of a shared vision of developing a love of lifelong learning and the skills to make that possible.

As a Lifelong Learner: In the information and high-tech age, librarians are expected to participate in professional continuing education, workshops, symposiums, training, seminars, or professional conferences. Furthermore, librarians should constantly show interest in the current library and information profession trends and keep an eye on the new development of diversified information products and services.

Conclusion

The library plays an important role in the lifelong learning environment, and lifelong learners rely heavily on the library to provide information services to meet their cultural, informational, educational, and recreational needs. The approach to planning lifelong learning should be multidisciplinary, stress continuity, underscore interrelatedness of all segments of the community, and emphasize access to information services to learners. Library administrators are expected to seek support from government agencies, private organizations, professional associations, and foundations to maintain an information infrastructure that is available to community lifelong learners, thus preventing a social division between information *haves* and *have-nots*.

Paper 2: Library Services to Support the Curriculum in Education

Christine B. Matson, Curriculum Resource Center Librarian, Northern Marianas College, Saipan

How can academic librarians in curriculum resource centers support the curriculum at their institutions? This paper will address this question using the Curriculum Resource Center (CRC) at Northern Marianas College (NMC) as an example of the ways in which librarians can support the curriculum. Moreover, the same basic principles are applicable to school librarians as well. NMC is the only institution of higher education in the United States Commonwealth of the Northern Mariana Islands (CNMI). Its main campus is on the island of Saipan with branch campuses on the islands of Rota and Tinian. The CRC is on the Saipan campus, and serves as a teacher resource center for the School of Education (SOE) and school library for the College Lab School (prekindergarten to 6th grade).

The CRC collection concentrates on children's literature and teacher activity materials, and the collection in the Olympio T. Borja Memorial Library, the main library at NMC, contains titles that focus on educational philosophy and theory. The philosophy of the NMC SOE supports the integration of themes across the curriculum (Kovalik, 1997). Other important components of the NMC SOE philosophy and curriculum include, but are not limited to, "a commitment to cultural diversity . . . purposeful learning . . . cooperative group learning . . . writing across the curriculum . . . portfolio assessment . . . field experience . . . [and] continuing professional development" (Northern Marianas college catalog, 2001-2002, pp. 9-10). Similarly, the SOE advocates the importance of multiple intelligences (Gardner, 1993). , "Information and material in SOE courses is therefore presented and examined from a variety of perspectives to include all types of learners" (Northern Marianas college catalog, 2001-2002, p. 10).

Accordingly, the CRC collection at NMC provides students and faculty access to materials that support the philosophy of the SOE and illustrate best practices. Additionally, the collection contains materials representative of a broad cross-section of teaching philosophies to provide the appropriate breadth to the collection. Bibliographic instruction in the CRC also supports the curriculum and philosophy of the SOE. For example, the CRC librarian instructs students in how to select materials integrated across the curriculum. The librarian also creates library displays that feature thematic planning resources integrated across the curriculum. Therefore, in consultation with an education instructor, the CRC librarian might select a theme such as rain forests or dinosaurs and preselect titles that integrate the theme into language arts, mathematics, science, art, etc. for use in a bibliographic instruction session. Likewise, the CRC librarian has also demonstrated ways in which materials in the CRC can be adapted to a variety of learning styles.

In accord with the philosophy of the SOE, the Children's Literature Collection and teacher activity materials in the CRC emphasize a multicultural approach. The collection development plan also has the goal of representing the ethnic diversity found in the CNMI as well as providing culturally relevant materials. Collection development presents a challenge due to the scarcity of culturally relevant titles in the areas of children's literature and teacher activity materials. For this reason, titles that relate to Hawaii or similar environments can be of use, but there are a limited number of these titles available, as well. To address this challenge, the CRC collection contains resource materials on Micronesia that faculty and students use to create culturally relevant classroom materials. The collection also features themes such as the ocean, bats, and coral reefs that are especially applicable to the CNMI.

The NMC SOE emphasizes field experience for its students. Teacher activity materials, such as thematic units on wide variety of topics, provide education students with the tools to successfully participate in these field experiences (Northern Marianas college catalog, 2001-2002). Moreover, items that encompass a variety of learning modalities are selected for inclusion in the collection. For this reason, the CRC collection includes posters, manipulative kits, puzzles, cassette, videotapes, and traditional print resources. The wide range of formats appeal to a number of different learning styles, in accord with the theory of multiple intelligences. Moreover, the CRC offers students a work area with the supplies and equipment necessary to create visual aids, manipulatives, and computer presentations for use in education classes and fieldwork. The CRC, therefore, contains computer workstations, both black and white and color printers, a scanner, a laminating machine, binding machines, digital and video cameras, as well as standard audio-visual equipment. The computer workstations provide Internet and desktop access to select NMC subscription databases.

NMC education courses require the students to build up a portfolio of materials that the students use in practicums and in student teaching. In addition to traditional research papers, the curriculum requires students to create such diverse materials as Web pages, posters, manipulatives, puppets, books, and classroom displays. Therefore, the CRC supports the curriculum by providing access not only to information resources, but also to supplies, equipment and a work area.

In order to further support the curriculum, the CRC librarian consults regularly with SOE faculty and attends SOE faculty meetings. Not only do the meetings provide for good communication within the SOE, but they also create an opportunity for the librarian to keep abreast of changes in the curriculum, and keep current with the research interests and other concerns of faculty and administrators. This information assists in planning for future collection development. Attendance at the meetings also allows the librarian the occasion to learn about the budget and advocate for present and future needs (Hartzell, 1994, p. 158). The meetings also give the faculty and administration an opportunity to provide input into hours of operation, relevant policies, and to make requests for services that will meet the needs of faculty or students (Hartzell, 1994, p. 159).

In addition to SOE meetings, the CRC librarian also attends selected meetings with the College Lab School teachers and principal. For the 2000-2001 school years, the teachers and administrators at the College Lab School, in collaboration with other faculty in the SOE, selected the theme of *water* to integrate across the curriculum. The CRC librarian and the teachers at the College Lab School collaborated in the selection of titles to support the curriculum for the 2000-2001 school years. In this regard, Farmer (1995, p. 67) stated: "partnership in planning units is a first start in curriculum-related library leadership." Meetings between the College Lab School teachers, principal, and the CRC librarian were an integral part of this collaboration. Meetings in which participants discussed the curriculum, reviewed available resources and identified needed resources helped to ensure that sufficient materials on the topic would be available when the academic year began. Because NMC is located a great distance from the United States mainland, early planning is especially critical due to the additional time required for items to arrive in Saipan. In regard to a librarian's active participation in meetings with teachers, Hartzell (1994, p. 158) stated that this will enhance visibility and familiarity, promote the perception of expertise, allow promotion of your resources, improve communication, increase sensitivity to the needs of others, and invoke reciprocity. These factors serve to strengthen the overall library program.

Additionally, in order to further support the curriculum for the year-long theme, the CRC librarian selected supplementary titles across the curriculum, as the goal was to integrate the *water* theme into language arts, mathematics, science, social studies, art, physical education, and so forth. The CRC librarian also identified additional titles already in the collection that supported this theme.

Another specific example of the collaboration between the college lab school and the CRC occurred when the CRC librarian met with a lab school teacher to share CRC resources that described the early migration of people to the Marianas, a component of the *water* theme selected by the lab school teacher.

A second goal of the meeting was to discuss the best way to integrate this aspect of the *water* theme with the acquisition of information literacy skills. The American Association of School Librarians (AASL) set out the nine national standards for the acquisition of information literacy skills in *Information power: Building partnerships for learning* (AASL, 1998, pp. 9-42).

The information literacy objectives for the instant lesson were for students to identify potential sources of information, and also for the students to demonstrate the ability to distinguish fiction books from nonfiction books. The librarian asked the students, "Where can we find out how people first came to the Mariana Islands? The students brainstormed and came up with many sources including computers, books, legends, and people with knowledge of the subject, such as the *manamko*, a Chamorro term for the elder population. The librarian wrote the students' responses on the board to illustrate the wide range of information resources that are available. The response of books was further divided into types of books. The librarian preselected a variety of books on the topic for the students. The students were then tasked with dividing the preselected books into fiction and nonfiction. This lesson served as an initial review of basic information-seeking strategies at the beginning of the school year.

E-mail is another means of facilitating good communication between the CRC librarian and the SOE. Some ways in which e-mail is useful include: information about titles that support faculty research or interest, notices about newly available items, delivery of requested journal articles, solicitation of requests for titles, reminders about the availability of library tours and bibliographic instruction, and scheduling class visits.

As discussed above, one key to supporting the curriculum is collaboration with faculty. Likewise, collaboration with the administration is also vital. The administration ultimately provides the financial resources, permitting the CRC to successfully support the curriculum at the SOE. Collaboration and consultation with other NMC librarians is similarly necessary for the CRC to carry out its mission. Other important factors in supporting the curriculum include a finely tuned collection development plan and bibliographic instruction. Nonetheless, both of these factors ultimately depend on collaboration between the teaching faculty and the academic librarian.

Summary

Community colleges throughout Micronesia were the focus of this chapter. Micronesian faculty members are consistently experiencing educational technology integration by more teaching courses online, for example. Online learning is geographically beneficial. In addition, online learning is "a good way for students to learn self-discipline and to work independently, to learn to solve problems that arise, and to learn to use technology to acquire knowledge" (*voice* from Temaungil). "As an information center to a community-based education, the library is a key access point for information literacy and lifelong learning…. Quality of life depends on quality libraries," as stated in Lin's (2004) paper. Matson discussed how librarians can support the curriculum in education and suggested that collaboration between the teaching faculty and academic librarians is key to the enhancement of curriculums and instruction. Matson's concept regarding academic collaboration and extended knowledge may be an empowering method for the Pacific community, greatly impacting the quality of life. The literature in this area claims, the following notion by Schmidt and Gribb (1999): "Librarians must also reinvent themselves and become involved actively in teaching how to find, use, and evaluate information as part of a lifelong learning continuum" (p. 5). This is a useful notion in the digital age.

Endnote

[1] Pacific Island Association of Libraries and Archives has published this paper in the proceedings of the 10th PIALA conference in 2004. Used with permission.

[2] Pacific Island Association of Libraries and Archives has published this paper in the proceedings of the 10th PIALA conference in 2004. Used with permission.

Education Essay

Source: Inoue, Y. (2004-2005, Winter). Academic experiences and critical thinking. APA Perspective, 5.

Academic Experiences and Critical Thinking: A Connection

One of the aims of education, especially at the college level, is to foster students' ability to *think critically*, to reason, and to use judgment effectively in decision-making (McMillan, 1987). Guiding students toward becoming *critical thinkers* has always been a primary goal of the university experience

(Gwartney, 2003); thus, critical thinking is an important learning outcome for college students, even though it seems that they are encouraged to learn or memorize what is written in textbooks. To better understand students' points of view of academic experiences and critical thinking, I conducted the focus group discussion at the University of Guam. Twenty undergraduate students participated in the sessions of the focus groups, and the following is part of the discussion summary:

- General education courses, which help students develop and enhance their critical thinking skills, include Fundamentals of Communication, Political Science, Philosophy, and Sociology.
- Curricula should focus on theory into practice and minds-on exercises as well as hands-on exercises. All are regarded as very important.
- Culturally pluralistic curricula help to instill confidence with their own self-identity among students whose racial, ethnic, or language heritages differ from that of the Anglo-European population.
- Research-based assignments (such as focused essays, case studies, assessment and evaluation, or analysis papers) are types of homework that enhance critical thinking.
- The quality of group projects depends on the individuals involved. Group projects offer students opportunities to become team players; however, it is best not to always include the same members in order to provide various perspectives and to enhance critical thinking.
- Good classroom lectures get students involved in the topic, and good teaching helps students think critically, providing knowledge that is useful in real world situations.

In particular, group discussions or collaborative learning activities, as the participants pointed out, promote critical thinking skills. In addition to discussing the topic, students learn how to engage in discussion with a variety of people. Davis (1993) recommends providing students with opportunities for group assignments in which three to five students complete collaborative research efforts or two to three students in class work together to solve a particular problem or answer a specific question. The participants also expressed that the advance in technology on campus put an increased emphasis on group work and the need to be able to think critically, solve problems, and make decisions as a group. As Halpern (1999) put it, "The changing nature of technology has not only provided us with more and better ways to teach in general, but it has also increased the need for the skills of critical thinking" (p.71).

Taking this focus group discussion into account, future studies could focus on the courses (fundamentals of communication and political science, for example) that the participants identified that were most beneficial in the development of their critical thinking skills. This would, in turn, help students to fully understand the essential elements in cultivating critical thinking abilities.

Chapter VI

Technology Competency and Associated Challenges

Bill Gates stated in a speech, "In all areas of the curriculum, teachers must teach an information-based inquiry process to meet the demands of the Information Age. This is the challenge for the world's most important profession. Meeting this challenge will be impossible unless educators are willing to join the revolution and embrace the new technology tools available."…. Every educator looks at the integration of technology—and its challenges —from a different perspective. Technology coordinators view the problems of insufficient hardware, software, and training as major obstacles. Teachers consider the lack of time to develop technology-based lesson a concern. Administrators identify teachers' lack of experience using technology in instruction as yet another challenge. Teachers and administrators, however, can and are beginning to overcome these barriers with effective leadership, proper training, planning, and a commitment to enhancing teaching and learning using technologies. (Shelly, Cashman, Gunter, & Gunter, 2004, pp. 6.10-6.11)

Implementing the use of Web-based technologies in teaching and learning requires fundamental changes in many areas of an institution. Areas that incorporate a range of challenges involving faculty reluctant to take the plunge into incorporating technology in teaching and research endeavors, as well as how various institutions regard and reward scholarly work involving technology (Lamboy & Bucker, 2003).

Faculty members' knowledge and skills in using technology are very important; however, it may be that poor experiences with technology create skepticism and mistrust in technology. This chapter discusses methods for launching timid faculty into the digital age by exploring examples such as mentorship and institutional support programs that educate and introduce paradigm shifts linked to the rapid technological changes in today's academia. Based on the notion that any successful technological integration into the curriculum and instruction is not possible if the faculty members are reluctant to participate, this chapter discusses the following:

- Faculty Reluctance with Technology Integration
- A Case Study Involving Higher Education
- Educating Hesitant Faculty

Faculty Reluctance with Technology Integration

The Problems Defined

Faculty reluctance, it appears, is often related to actual fear of technology, in addition to the research that suggests that the promotion and tenure review process often does not consider technical contributions as scholarship. Technical pockets of reluctance can be enabled by institutional attitudes, workload allocations, the time required to develop technical initiatives, and the promotion and tenure review climates. The responsibility for change rests with the entire set of stakeholders (those developing and implementing institutional missions and policies) and classrooms where ultimately no hiding place from technology will remain, and students who will no longer tolerate a technological mismatch within the teaching and learning environment. IT has made swift changes in the past thirty years that have made a dramatic and noticeable impact on business, industry, and education through the use of computers and related technologies. Employment opportunities in the next century will, for the most part, demand some computer application literacy. Applicants without an acceptable level of computer literacy will be disadvantaged (Fary cited in Dusick & Yildirim, 2000).

Institutions of higher education and the faculty workforce associated have not been without impact of this rapid and dramatic change. With the proliferation of the new technologies, many professors are undertaking what they perceive to be innovations in their teaching by incorporating differing uses of technology into their instruction (McAlpine & Gandell, 2003). Technology and the Internet force universities to change how they deal with the growing technical needs of these organizations. This is particularly evident now, as students entering college may be better equipped technologically than are their faculty (Lamboy & Bucker, 2003). Beyond budgetary and infrastructure deficiencies relating to digital information access, an additional obstacle exists in terms of maximizing technical academic capabilities. Too often pockets of technically reluctant faculty attempt to hide from the ground swell of the digital current that is engulfing higher education. By dragging their feet for a variety of reasons, it has become apparent that the ripple effect of their reluctance impedes and conflicts with the direction that information access is taking today. Within the context of DE and the academic cultural environment of higher education, technology appears to have altered professional relationships.

Traditionally, institutions of higher learning have been authority- and knowledge-centered: academia is a controlled hierarchical system for delivering knowledge from authorities to students. The provision of DE foreshadows a fundamental shift to a more lateral structure (Cravener, 1998). Innovative and far-reaching views on the proposed development and integration of instructional use of technology relating to learning and teaching are repeatedly featured throughout the profession. In preparation for this technical transformation, the Faculty of Education (FED) of the University of Macau, conducted research relating to program concepts and skills required to develop and sustain instructional technology delivery in China. The FED has offered a declaration in the form of a key mission to be realized in the future years, involving all students and staff, that all teachers preparing for the information age should be conversant with knowledge and applications of IT in the classroom teaching and learning (Kwok-cheung, 1998). According to Kwok-cheung, by taking the lead in developing instructional technology, the purposes of the Macau University technology initiative were: (1) To establish an affective understanding of computers; (2) to understand applications of computers in daily lives and the importance of computers in modern society; and (3) to encourage interests and consciousness in the use of computers. Therefore, the FED concluded the immediate necessity to develop texts and teachers' guides to support these instructional initiatives.

An Investigation of Faculty Technology Skills

Lamboy and Bucker (2003) describe some interesting findings related to faculty computer skills in their paper *An Investigation of Faculty Technology Skills in a Puerto Rican University*. The purpose of this study was to evaluate full-time faculty technical expertise and computer competence in order to approach the implementation of Web-based opportunities for instruction. This private nonprofit university offers academic programs in liberal arts, education, business administration, science and tourism, leading to baccalaureate and associate degrees, as well as masters' degrees in human resources, administration and supervision in education, marketing, criminal justice and management. The student body includes recent high school graduates as well as adults who are returning to school for professional development. This university recently completed a licensing review and was recognized favorably in three areas: (1) Professors, when exploring new initiatives, enjoy support for the Chancellor; (2) as the administration supports new approaches and techniques, the faculty is exploring new methodologies for instruction; and (3) an exceptionally broad range of services are available for the student body, including professional counseling, tutoring, educational services, and mentoring. Further, a preliminary investigation on the University study relating to attitudes on faculty technical competence provides valid points for review, such as:

- Technology is evasive for changing the process of education and the role of the faculty.
- DE has become a point of discussion with the majority of colleges and universities.
- The issue of quality and its distinction between traditional on-campus and DE is a concern, as is addressing cost and student diversity? Administra-

tors have high expectations from investments in technology and Internet services.

- Higher education IT initiatives suggest that many institutions provide Web access undergraduate catalogs and applications as well as library-based reserve materials, in addition to courses offered via the Internet.
- The Internet is a viable partner with instructional methods by accommodating the academic profiles of a diverse student population.
- Educational technology is forcing the traditional teaching approach towards addressing new skills that are becoming essential for both faculty and student survival.
- Maintaining a current level of technical competence is often a major source of stress for faculty.

The Internet and future visions of education technology applications are applauded and promoted to enhance the delivery of teaching methods and to facilitate streamline routine instructional preparation and administrative tasks. This advancement arouses concerns. "A substantial number of an institution's faculty members must have an understanding of and some experience with integrating elements of a computer-based instruction into existing courses" (Twigg, 2000, p. 15). Twigg continues by stating that institutions and faculty may have enthusiasm for initiating new technologies, but to justify the investment and to maintain quality of instruction the IT expertise must be in place. In addition to promoting new technologies and providing appropriate expertise, institutions must also allow for and value the time required to develop and deliver technical instructional applications. Rajagopal and Bojin (2003) discuss the establishment of the Institute for Learning Technologies (ILT) provided by Robert McClintock (2001), which indicates that the integrations of IT often have a variety of outcomes. It appears that academicians, often expected to incorporate IT consistently while carrying heavy workloads, are challenged to find the time to master and implement new technologies.

Research, teaching, and service are the mantra for achieving promotion and tenure, but faculty at most traditional U.S. universities find that research is critical while other factors play a supporting role" (Schell, 2004). Institutions of higher education face a challenging debate involving pressure to allocate funding for the development and integration of IT, in order to attract students and new faculty, while appreciating the daunting task for existing faculty to keep pace and develop new teaching practices (Lamboy & Bucker, 2003). Considering that the promotion and tenure process is a series of decisions that involves faculty colleagues, academic administration, and the top university administrator, this process may be foiled at any phase. As Schell (2004) explains:

> *The chief academic officer may be a proponent of online classes, but someone earlier in the decision process, such as a department chair, may feel that the development of online course materials is of little value. If the department chair finds the faculty member's record insufficient to be passed along for promotion and tenure, then the chief academic officer will not have an opportunity to champion the faculty member's case.* (p. 53)

The time demanded in developing new educational technical materials might not necessarily be fruitful when faculty are being considered for promotion and tenure under traditional procedures:

> *The lack of a significant relationship between research commitment and computer adoption for instruction weakens the frequent argument that the low value given to teaching in promotion and tenure decisions may be responsible for faculty not wanting to involve themselves in integrating computers into their teaching.* (Hirschbuhl & Faseyitan, 1994, p. 65)

Hirschbuhl et al. designed a survey to explore the attitudes and fears of faculty adoption of computer technology and determined that asking the correct questions is essential. The question is not "Why aren't computers widely used for instruction?" The question is "What kind of instructors use computers for instruction?" (Hirschbuhl & Faseyitan, 1994, p. 64). The survey intended to ultimately support efforts to build higher education faculty and researchers' confidence and address fears of technology consisted of the following questions:

1. To what extent is faculty using computers in their instructional activities?
2. Do the personal attributes of discipline, rank, research commitment, and gender relate to faculty's level of adoption of computers for instruction?
3. Do organizational factors such as instructional policy, incentives, technical support, and staff development affect faculty adoption of computers in their instructional activities?

4. Do attitudinal factors such as computer self-efficacy, computer utility beliefs, and general attitudes toward computers affect the adoption of computers for instruction?

The findings of the study revealed that a consistent correlation associated with faculty that readily incorporated technology in their institutions related to whether the faculty's discipline was quantitative in nature and more adaptive to technology. Otherwise, a more deliberate initiative to incorporate computers and technology was evident. Another issue surfaced concerning motivations and incentives for developing commuter competence. Institutional and technical support for technology development did not necessarily promote technical competence. However, a valid point was raised that perhaps institutional support did not necessarily motivate development, but instead maintained technical levels of faculty computing. Evidence from the study indicates that faculty who were aware of technical training that was offered had, in fact, participated in these development opportunities. An unexpected finding of the survey indicated a weak correlation between institutional incentives and the incorporation of computing practices, which may not speak well of the incentive schemes themselves (Hirschbuhl & Faseyitan, 1994).

As established, the promotion and tenure review process is a series of decisions made by a series of individuals engulfed in institutional missions and philosophies. How institutions and individuals who comprise promotion and tenure committees consider technology and scholarly achievements leaves room for speculations and uncertainty among nontenured faculty in traditional institutions of higher education. One such individual, Randy Bass, Assistant Professor of English at Georgetown University, who explored and integrated technology with teaching, knew that many tenure—and promotion committees would look askance at the kinds of choices he had made—both because he had spent so much time on new technology and because he had focused on teaching instead of traditional research (Guernsey, 1999). Professor Bass favorably convinced the committee that his technology portfolio that provides hyperlinks to the online elements of his introductory course on American literary traditions was a legitimate academic accomplishment and he was awarded tenure as a result. Professor Bass maintains that his current focus is to encourage other tenure track colleagues, as well as administrators, to now appreciate how teaching with technology is and should be evaluated as a scholarly endeavor (Guernsey, 1999). In this regard, the education of the institution in terms of remaining sensitive to the relationship between the faculty professional advancement process and supporting academic technical initiatives is essential. Gary Bradshaw, tenured Associate Professor of Psychology at Mississippi State University, was warned by colleagues about his ePsych, an online resource for psychology students, which eventually employed eight students and staff and was awarded $400,000 in grants from the National Science Foundation. Twice he was turned down for a promotion to full professor, where the underlining message resonated that ePsych was not a research project, but was considered more akin to service work. "As candidates for jobs and promotions stock their portfolios with Internet-related accomplishments, many evaluation committees are skeptical" (Guernsey, 1997, A 21). Across the country it is heard from faculty that the tenure and promotion process often fails to recognize and appreciate teaching with technology, while many institutions are excited and eager for faculty to use and develop online course materials. "But that might be changing, as a growing number of institutions are working to include digital creations in the tenure folders that form the core of candidates' professional portfolios" (Young, 2002, p. 26). This consists of a paradigm shift in terms of the acceptable format of scholarly work presented for promotion and tenure committee review. This shift would include the "four reasons selected most frequently for creating technology-based projects are (1) instructional impact, (2) professional recognition, and (3) motivation for end user" (Seminoff & Wepner, 1997, p. 67).

Identifying the problems relating to specific areas of faculty's technical incompetence and reluctance to become involved with technology-based projects are numerous. The literature indicates that institutional and personal attitudes, lack of ability and training, areas of discipline, time and workload allocation, lack of appropriate consideration given to teaching with technology during professional evaluation for promotion or tenure are all viable rationale to support technically recalcitrant academic faculty. The problem for many faculty members becomes quite basic:

> *Most of us find it uncomfortable—all right, downright painful—to be in a situation in which we don't really understand what we're expected to be doing. In fact, a power scenario in which our students know more about technology than we do is downright unthinkable.* (Lynch, Altschuler, & McClure, 2002, p. B16)

A Case Study Involving Higher Education

Universities in general, including UOG, are experiencing a climate of extreme change. Faced with continual budget constraints, UOG is competing for increased student enrollment, while charged with educating a more diverse student body (see Chapter IV). To facilitate and to respond to this process, UOG is currently designing a campus-wide technology plan to link its University mission with future academic and institutional technological applications. The plan outline, developed with cross-program input as well as administrative initiatives, is targeted to elevate all technology-based capabilities, was introduced to the UOG community during the Spring 2004 semester. This draft of the *Information Technology & Infrastructure Master Plan,* the first of its kind for UOG, melded the university's strategic plan for enhancement with infrastructure support and costs, including the sustainability of technology projections. Critical needs involving the Internet connectivity, access, and bandwidth; wireless services; Web-based services; and all faculty having access to graphic Internet access were addressed. Of significance was the portion dedicated to policies, procedures, and plans focused on a partnership, creating a model for independent technical applications for academics and business applications. The action plan identifies outcomes such as centers of excellence, the establishment of DE programs, technology-enabled faculty and students, all with the objective of enhanced student learning.

Faculty Voices (Faculty Technology Survey)

To best understand the level of inclination to apply technology to course preparation and delivery at UOG, a Faculty Technology Survey was compiled (see Appendix G) and distributed. The following represents the questions asked of UOG faculty and key responses:

1. *Indicate the areas of technology with which you have become familiar.*
   - ❑ *E-mail*
   - ❑ *Internet searching*

- ❑ *Word-processing*
- ❑ *Spreadsheets*
- ❑ *Microsoft® PowerPoint*
- ❑ *Web Design or Instruction*
- ❑ *Digital Projector*
- ❑ *DE*
- ❑ *Retrieving Electronic Journal Articles*
- ❑ *Listserv or Discussion Groups*

In addition to this list, some faculty indicated experience in digital media production, off-line editing, telecommunications, sort systems, and CD-ROMs. The areas of listserv, discussion groups, Web design, and DE were the areas of least familiarity.

2. *How have you acquired your technology skills, through courses, colleagues, or by your own devices?*

- Through my own initiative. I connect with colleagues, attend short training sessions, or request help from someone knowledgeable in the area.
- Through my own devices, online courses, and “trial by fire”.
- Through colleagues and my own devices.
- Through degree programs, certificate programs, informal education, self-teaching and conferences.
- Have been acquired through trial and error. Most programs today have a “help” menu that usually provides answers. Additional “tricky” skills were acquired through colleagues.
- The best recommendation I find is to force you to stay current by frequent upgrades of technology and software—otherwise you land in the dark ages.

3. *If you have experienced apprehension regarding technology, explain in what area and how you have approached the challenge.*

- No apprehension, but plenty of frustration with new applications; it's all part of learning to live with it, but it does get better when you do it.
- Web site design—I tried learning a program by trial and error, but it did not go well. I plan to take a course in Web design.
- No apprehension except for sorting out the chaotic nature of the UOG IT infrastructure and its network capacity.
- I just screw up and learn from my mistakes or run to a patient, good-natured technician.
- I don't have much time to keep up and it takes a lot of effort to acquire resources in this environment.

4. *What type of support would you like to see at UOG in remaining current with the new technology?*

- A financial commitment for DE.
- For administration to understand how the masses are doing. One service that universities provided for faculty and students in the early days was a technical advice/consulting center. A walk-in takes a number and lines up for help with a problem. We could use such a service at UOG.
- Continue offering faculty and staff courses on various software programs yearly.
- Easier access for assistance. Along with fixing a problem, offer suggestions as to how to avoid or fix the problem in the future.
- First, plentiful equipment and second, a staff of patient personnel to guide us through problems and to help with design situations.
- A dedicated full-time multimedia staff, i.e. graphic artist, photographer/videographer, audio and visual faculty, instructional designer/developer, text editor for instructional materials development.
- Ongoing training in all technologies listed in Q1, so that technology may be used appropriately.
- Provide more computer labs equipped with more advanced technology.

- A team of experts: designers and tech support personnel to support faculty

Instructional Media Workshops

As stated in Chapter IV, the UOG Instructional Media department provides support to students and faculty with media production design and equipment resources. A workshop titled Photoshop and Digital Photography is being offered through the UOG Professional Development and Life Long Learning (PDLLL) program. Future planned workshops include Web Design with Macromedia's Dreamweaver, Digital Video Editing with Adobe Premier, Creating DVDs, CD-ROMs and Audio CDs with Audio Editing. Previous workshops provided are listed in the following:

- 1995 — Using Microsoft Windows 95
- 1995 — Using E-mail to Assistance Students
- 1995 — Publishing on the World Wide Web
- 1995 — Designing Web Resources
- 1995 — Distance Learning: Course Design and Media Selection
- 1995 — Instructional Media Faculty Workshops
- 1995 — Course Development Using New Technologies
- 1995 — Student Media Projects: Creating Knowledge
- 1997 — Instructional Design for Distance Education Classes
- 1999 — Faculty Development Workshops: Using the Web as an Instruc tional Tool
- 2000 — Faculty Development Workshops: Using the Web as an Instruc tional Tool
- 2001 — Designing Media for Learning
- 2001 — New Media Equipment for Teaching
- 2001 — Preparing PowerPoint Presentations with Impact
- 2001 — The Power of Adobe Acrobat Documents & Using the Handheld Palm Pilot
- 2001 — Designing Web Material for Your Course

- 2001 — Graphics and Motion Materials for the Web
- 2002 — 8-Session Faculty Seminar for the Development of Media-Enhanced Courses
- 2003 — Creating Enriched Environments for Learning Presentations at CAS Research Conference

In addition, UOG is increasingly supporting and providing faculty members with educational technology seminars or workshops (see Appendix H).

Educating Hesitant Faculty

"It's not about budgets. It's not even about network overload. When it comes to applying digital technology in the classroom, the biggest obstacle for higher education has nothing to do with resources or wiring. It's about faculty members" (Lynch, Altschuler, & McClure, 2002, p. B15). Kenneth Green, Campus Computing Project's director, has discovered that one-third of college instructors still do not even utilize e-mail to communicate with students, nor do thy use easy-to-use software or Web pages prepared to support instruction. According to a study conducted by the University of California at Los Angeles, Higher Education Research Institute, technology inflicts pressure on faculty and "raises all kinds of troublesome issues, most obviously the plain and annoying fact that it takes a lot of time and effort to figure out how to use it. It's a professional pain in the neck in a hundred different ways" (Lynch, et al., p. B15). As technology is incorporated into academics and the level of expertise to use these technologies for teaching and learning is addressed, plans must acknowledge a disparity in the knowledge levels of our faculty and their willingness to embrace and use new technology (Cummings & Buzzard, 2002). Progress of any value is inherently accompanied by challenges. These technology challenges that dovetail from a range of vantage points dealing with budgets, infrastructure, equipment, installation and utilization, become ineffectual without training for productive outcomes. Technology by its own definition represents change, and for any change to be successful, a well-planned, supportive climate is optimal.

Technology Support and Collegiality

According to Haynes et al. (2004), at the University of Brighton, a study was conducted to assess the technical ability of the faculty at this institution with the prime intention of providing support for new online instruction. The survey, which covered the areas of word-processing and file management, presentation, spreadsheets, databases and the Internet, revealed that more than 50% of staff was unable to use software that had been predetermined as a basic level of IT competence. The results indicated that word-processing and Internet searching skills were the most proficient, while lower scores for presentations and spreadsheets were well below the basic level. Of interest, however, is that over 85% of staff had access to a computer and staff associated with science-based disciplines scored in the higher range. At Brighton, the technical stars among the faculty were encouraged to participate in implementing discussions and simulations as a pilot IT project to inspire and ignite technical interest in colleagues. This initiative contrasted from another school representing a technically challenged pocket in which staff was trained to master internal e-mail, which had evolved as the primary method of communication within the institution. The Brighton survey established the disparity of knowledge, but discovered that because the learning technology support staff, currently professionally networked colleagues responsible for the competence-based evaluation, ultimately provided positive outcomes with training opportunities. As a result, many staff members have responded to training opportunities and chosen to improve their IT skills.

Research on effective professional development in education suggests that participants should be part of a collegial network, have opportunities for both observation and practice, and connect instructional approaches with assessment (Lieberman, 1995). Such an atmosphere of collegiality was in the forefront during a professional development plan titled *Plan for Learning and Teaching with Educational Technology* (PLATE), which focused on eleven teacher training faculty at Washington State University, Vancouver. Two faculty leaders guided this group for the duration of one academic year by working in concert with faculty participants regarding their development and delivery of all technical initiatives. The Faculty Development Leaders (FDL), often referred to as "angels," devoted up to 20 hours a week in this mentoring initiative, all with the objective of developing and reinforcing emerging technology over a substantial timeframe. Two key reasons to the positive approach of the faculty towards PLATE development were the support granted to the faculty in the form of an individualized support person, and their own varied interests in incorporating technology into their practice (Slavit, Sawyer & Curley, 2003).

With the professional development stage set, the PLATE model outlined four components: (1) A "wish list" of teaching with technology initiatives you would like to enact in your teacher education courses; (2) a list of teaching with technology initiatives for the coming academic year you plan to enact; (3) a list of resources that relate to aspects 1 and 2; (4) a running summary of how you are enacting these goals into your actual practice; and (5) reflections on how this is affecting your overall instructional approach, processes, or outcomes (Slavit, Sawyer & Curley, 2003). These aspects proved to be one key to the success of the program, indicating technical investments that the faculty stipulated initially at the start of the academic year and the ongoing summary of the electronic tools being incorporated into instruction. The individual mapping and guidance from this mentoring program demonstrates how effective personal and expert support, partnered with commitment of the participants, provides a platform for facilitating, encouraging, and enhancing technical competence.

"Change should be introduced and implemented within a supportive environment" (McNaught, 2003, p. 29). Within this context, the Royal Melbourne Institute of Technology (RMIT) University in Australia introduced an effective scheme to address change by offering institution-wide mentoring. Including 140 university faculty, this initiative to be conducted over a two-year timeframe, focused on policies and support to conduct online teaching and learning. The policy aspect reviewed issues such as intuitional policies in place, intellectual property, organizational direction of change, and grant schemes. For the area of support, a substantial range of issues were considered "including IT, library and administrative infrastructure, professional development for staff, student support, educational and instructional design support for academic staff, funding and grant schemes, and IT literacy" (McNaught, 2003, p. 29). Established was a Learning Technology Mentor (LTM) program that harnessed the technologically literate faculty, and established an in-house culture of support. The program specifically allocated one day per week to teach the university's new online education system, to design online instruction within the faculty's program, and to promote support for similar initiatives among colleagues within their disciplines. The LTM program claimed success in the following areas: basic faculty computing skills improved, online programs were developed for disciplines, collaborative efforts developed, time was allocated for development, teaching substance was advanced, promotion was enhanced, change occurred through out the University system, academic programs were enhanced, and personal satisfaction was derived (McNaught, 2003). That is,

> *As academic institutions are moving rapidly toward the use of the Internet to offer courses and programs, as well as to develop virtual universities, instructors must be trained and supported as they move into this arena.* (Palloff & Pratt, 1999, p. xvii)

Classic education theory and practice suggests that classroom learning would begin best by building on prior knowledge. This process referred to as scaffolding is to begin where the student needs to begin, on familiar territory, and then slowly to build layer upon layer of experience and instruction until the student is comfortable stepping out into new territory (Winograd, 2000). This traditional approach is appropriate when considering teaching strategies for reluctant students, often daunted by the challenges involved in catching up on the playing field of technical literacy. The ultimate goal is for faculty to take responsibility for their own development with technical skills, building and maintaining current levels of computer literacy to create and sustain effective standards for current academic practices.

In summary, the following represents key considerations when addressing and resolving the pervasive and daunting challenge of improving levels of faculty technical competence:

- Identify the problem of timid faculty relating to technology use.
- Link technology with the university's mission.
- Involve faculty in program modeling and the role of technology.
- Acknowledge different teaching and learning styles.
- Provide a University Technology Plan (UOG presented draft Spring, 2004.)
- Mandate standards with support.
- Provide training sessions.
- Reinforce basic computer and technical skills.
- Build on layers of prior knowledge.

- Provide print materials and self-paced online courses.
- Establish teams or groups in which individual progress is monitored.
- Follow up on technology applications and reinforce use and ability.
- Require that technology be incorporated into the syllabi.
- Establish a peer review system where technical accomplishments are valued for the promotion and tenure application.
- Devise ways for users to see the value.
- Provide continuous evaluation and modification.
- Add a technology component to the General Education Requirement Standards.
- Cease technology support for outdated equipment and software.

Philosophies and Plans for Faculty Professional Development

Administrators need to explore relevant ways to educate faculty about the online learning environment (Muirhead, 2001). In addition, it would be prudent for administrators, while considering the instructional ramifications of faculty technical competence, to be concerned with professional incentives, reward opportunities, scholarly contributions to the field, institutional support in terms of promotion and tenure, institutional levels of technical performance, and providing a supportive mentoring atmosphere. Bette Manchester, Director of Special Projects with the Maine Department of Education, related a balance between support and incentive for developing and maintaining technical skills as follows:

I do know that we need principals to build the expectation into an evaluation process. If someone is reluctant, we think it is fear, so there needs to be both pressure and support for helping folks move ahead. That is what has worked for us. (Personal communication, September 8, 2004)

Change must be managed effectively. "The culture of the organization needs to be able to embrace change while offering staff opportunities to manage their own levels of comfort with the change" (McNaught, 2003, p. 29). Within an academic environment, future plans must include the developing and maintaining of an electronic learning environment directed towards using technology in greater depth to realize new and innovative educational formats" (Brakels et al, 2002).

Institutions with vision must consider faculty development as an intricate aspect of new policies and plans, an emphasis that offers vitality that will rise and meet the institution's academic mission. "After all, faculty growth and development are the core values and stated goals of most faculty development centers" (Sorcinelli, 1999, p. 61). The responsibility for technical advancement is a unilateral challenge and does not stop at the top. Certainly administrations lead the way by establishing the institutional mission, providing IT infrastructure and the climate for faculty to develop and maintain IT teaching and learning perspectives. This links to faculty responsibility where some agree that:

> *the activity of teaching and learning is formulated within the professional domain rather than the management domain, and subject content is seen as the central feature in teaching practice. Those who hope to use IT to fundamentally reexamine their teaching philosophy and practice are in a minority, but that minority provides an important cascading of ideas about new practices and innovations, and over time, these get picked up by others and contextualized to the professional learning environment.* (Haynes et al., 2004, p. 161)

Academic technological criteria and implementation responsibilities belong to all the stakeholders, both reluctant and hesitant to the innovative adopters of technology. The course has been set. Institutions must make clear in order to elevate technology-based projects to a respectable form of scholarship across institutions. There needs to be a greater understanding of the kinds of technology-based projects that institutions can and will support (Seminoff & Wepner, 1997)—plans and projects where technology is defined and where changes may occur. Meanwhile, the clear reality remains that faculty must be concerned about the mismatch between student expectations and faculty's technical competence. "Sooner or later, the Internet will be such a critical piece of education that no faculty member interested in continuing his career will be able to ignore it" (Sederberg, 2003, p. 37). Institutions and associated faculty would be wise to adhere to the guidelines and applications stated by Ehrmann (1998) in *The Flashlight Project: Tools for Monitoring the Progress of our Hopes and Fears About Technology in Education.* The revolution in education that is actually emerging is based on uses of technology that are similar for on-campus and off-campus students; basically (Ehrmann, 1998): (1) Helping a wider range of students and faculty reach a wider range of intellectual tools and resources; (2) helping students learn real-world skills that are partly dependent on technology use (e.g., statistical ways of thinking that are more visual and more recursive than possible with paper-and-pencil techniques); (3) ways of thinking about photography and graphic design that make use of computer-based image processing and printing; (4) helping to widen access to education (e.g., to students whose time on campus is limited, students with disabilities); and (5) increasing the ability of an institution to compete for students (used in ways that can improve faculty-student interaction, student-student interaction, active learning, time on task, and other practices that research shows are correlated with improved learning outcomes.)

Summary

To address options for developing IT skills, this chapter has identified successful examples and suggests that institutions of higher learning must plan for flexible programs for training and mentorship to encourage and support reluctant and apprehensive faculty. In addition, an administrative shift in attitude must partner with training by considering workload allocation for the development of technical endeavors and address how the institution and the promotion and tenure process evaluates technology-based projects. This chapter has explained reasons for technical apprehension among faculty and offers institutional approaches to developing and sustaining appropriate levels of technical expertise to remain current. “As with any notable issue in higher education, we need to use different criteria for exploring our individual needs and biases so that we can speak with a collective voice that contributes to a paradigm shift to new forms of scholarship” (Seminoff et al., 1997, p. 74). Acknowledging and raising the IT presence within an academic institutional profile is such a notable issue, one that links to institutional missions and speaks to the mantra of faculty in higher education: research, teaching, and service.

Education Essay

Source: Inoue, Y. (2005, Spring-Summer). The Professor Reminiscence. APA Perspective, 7.

The Professor Reminiscence

On that particular Sunday, the retired professor looked unusually depressed. "Yesterday I attended the funeral of a good friend. So many around me are passing away," she said wistfully. In her 70s, she was well known for her pioneering work on gender equity and women's issues in Japan. She still remained active and edited several women's journals at that time. Once a month, the professor would invite a few guests to her home to listen to a lecture expressing her thoughts and ideas and much that she had learned in her long career. Usually, about ten people attended and many were established professionals. Tomoko (Note: she is currently a professor of economics in Japan) and I were the only college students invited to attend the lectures, so both of us never missed this monthly visit.

The professor's humble house was located in a prefecture quite distant from where I lived, and it took a full four hours to get there and back by train, yet it was always a worthwhile experience. The professor had written numerous books, and many of them were used as college textbooks. She had devoted her whole life to her academic work as scholar, faculty, researcher, author, editor, and mentor, but she had never made time for marriage or children. She published a tremendous amount of work, and told us quite honestly that she had received much criticism regarding her research and publications, as well. As the professor talked about women's issues, she spoke softly, yet articulately. The passion of her beliefs and the wisdom from her long experience was clear in every word.

When the professor gave a lecture on marriage, one of the participants said to her, "I hope I am not impolite to ask, but why have you never married?" Without pausing to think, the professor replied, "Once I almost married." And then she stopped talking as if she had touched upon a matter of which she should not have spoken. She looked down at her hands resting quietly in her lap and appeared to be lost for a while in thoughts of a long ago time. After a long silence, she forced a small laugh. "I am married to my work," she said in a voice that tried to be light. Nevertheless, her eyes were not laughing at all. On the contrary, in her eyes, I could see a deep desolate sea reflecting her inner loneliness. I had never suspected such sorrow.

Over the years, I have often thought of this professor with fondness and admiration. I cherish all the wisdom and knowledge she shared with us, her monthly lecture guests. However, more than anything, I remember her eyes on that one afternoon. Married, it is unlikely she would have had such academic success, but I wonder if she would have been happier. When I expressed my own loneliness in the following *tanka* poem, I thought about nothing but the professor's loneliness, of the deep sorrow I saw in her eyes once when I was young.

Loneliness
Is extremely fearful
Solely because
There is a moment
When I may kill myself

Section IV

Internet Technologies and Distance Learning

Chapter VII

Second Language Acquisition and Online Learning

In responding to the need for quality EFL (English as a Foreign Language) teacher education, my university also offers English majors an EFL teacher education course, which can be counted toward teacher accreditation program credits. The EFL methodology course includes lectures and activities to familiarize students with theoretical bases of EFL instruction and hands-on classroom practices. One special component of the course is the incorporation of cross-cultural e-mail correspondence, allowing prospective teachers to communicate with fellow pre-service bilingual/ESL teachers in the United States. The cross-cultural component of the course is an attempt to foster the prospective teachers' reflectivity through social/interpersonal interactions with a distant group of colleagues made possible by Internet technology. (Liaw, 2003a, pp. 1-2)

The demand for DE is growing rapidly; students learn and grow as a result of all kinds of experiences in and out of the classroom, and online schools are an important step toward an educational system that encourages lifelong learning (Beekman, 2005). With the emergence of new technologies that facilitate two-way communication (such as teleconferencing and Web-based, computer-mediated communication), the image of the "independent distant learner" is rapidly changing (Berge, 2004). Currently California is the only state that allows graduates of online law schools to take the bar exam without either prior experience practicing law or passing another state's bar exam; in addition, the Texas state legislature is also considering a bill that would allow graduates of online law schools who meet a reasonable set of standards to take the Texas bar exam (Foster, 2005).

Administrators, faculty, and students are experiencing a shift in education protocol that balances the challenges of educational opportunities in remote regions with electronic academic materials to support programs. Technology is clearly a partner with education involving the development of distance deduction programs that diminish geographical distances and provide otherwise institutional opportunities, such as TESOL (Teaching English to Speakers of Other Languages) and health care programs. Institutions of higher education in geographically remote areas are discovering that electronic materials often levels the learning field by providing more equitable opportunities for instruction and academic resources. This chapter will focus on the following:

- An Overview of Technology for Second Language Acquisition
- Distance Learning Initiatives in Micronesia
    - Case 1: Online Agricultural Education
    - Case 2: TESOL and Distance Education
    - Case 3: PEACESAT and Health Care Education

An Overview of Technology for Second Language Acquisition

Historically, individual teachers began to use computers, and the computer was seen as a subject in the school's curriculum during the period 1980-1985. From

1985 until 1995, schools began to make budgetary allocations for computers, but neglected to include adequate funding for computer maintenance and teacher training. Stressing the concept that computer use was based upon the notion of future job market opportunities (1985-1995), their access was seen as an important tool for both learning and student productivity. From 1995 to the present, instructional designers and producers have mass-produced software for educational purposes (*History of Educational Technology*, 2004). It is now possible to use artificial intelligence (AI) techniques for conducting limited translations from one language to another. Voice programs are used for teaching proper pronunciation, multimedia can help in memorizing vocabulary, and e-mail can enhance studies in a group when learners are in different locations. Hypermedia applications have the ability to link the text and graphic allowing users to navigate nonsequentially through many information sources.

Finally, virtual reality (VR), which was "widely used by scientific researchers and computer gamers" (Beekman, 2005, p. 53), may play a major role in the future of education. Biocca (1992) compares the introduction of virtual reality to that of television in 1941. In teaching the process of editing skills with computers for the ESL students, using computers moves students from passive to active mode, that is, they learn by doing, liberated from the passive role of receiving instructor error correction revealing how each sentence they have produced falls short of the target language norms (High, Hoyer, & Wakefield, 2002). This section is, therefore, a brief discussion of various technologies for second language (L2) acquisition, followed by concerns in applying educational technology.

Television, Videotape, and Tape Recorder: Compared with computers and the Internet, certainly traditional technologies such as radio and television, lack the ability to allow the learners to interact with the instructor, with other learners, or with the content in a dynamic fashion. Yet, television, for better or worse, is a powerful medium for the transmission of information. Although the focus of language teaching practices is shifting from the printed word and knowledge of the language system to the use and communicative value of the spoken language in everyday settings, it seems that television is barely recognized as a source of L2 learning. Televisions, videotapes, and tape recorders, in effect, have been used for several decades as a supplement to classroom teaching or for self-directed learning in L2 acquisition; these technologies are relatively inexpensive and require few technical skills.

VCRs and microcomputers are the foundation for numerous technological approaches to L2 learning. There are also closed-captioned videos, optical-disc technologies such as CD-ROMs for microcomputers, and interactive videodisc systems that combine the microcomputer with pictures of software programs. Feature films on video are easily available and are a contextually rich source of authentic material in the foreign language classroom. Television programs serve as more stimulating materials for L2 learners than do commercially produced classroom series because the familiarity of the television program establishes a familiar context in which to practice grammar and vocabulary (Mason, 1997). The introduction of satellite television enabled different instructional activities to be broadcast worldwide, allowing students to receive lessons from native English speaking teachers, no matter where the students live. In their paper on using digital video-teaching segments in the FL/ESL methods course, Dhonau and McAlpine (2002) emphasize the ease of creating videos with a digital MiniDV or digital camcorder. To enhance their teaching skills, students can watch peers' and professors' videos housed on the Web page at any time. Bell (2003) describes TV news in the EFL/ESL classroom as follows:

If we add the availability in Japan of twenty-four hour world news networks such as CNN, BBC World, Bloomberg, etc., terrestrial bilingual news broadcasts (Japanese news dubbed into English), and the growing accessibility of TV news on the Internet, the availability of TV news in English is truly all-encompassing. TV news programming in English is not only a vast and growing language-learning resource that provides meaningful opportunities for nonreciprocal listening, but a vital and immediate alternative source of information. (p. 1)

Bell (2003) further identifies three categories for assessing the pedagogical value of TV news: (1) Background knowledge required by viewers to fully understand a news item; (2) viewer familiarity with the discourse structure and genre of TV news and in particular cultural contexts; and (3) the linguistic difficulties of processing combinations of visual and auditory messages. Bell concludes that audiovisual texts with greater iconic juxtaposition are likely to be more comprehensible for second language learners.

Computer Conferencing

Computer conferencing (CC) is a computer-mediated communication medium in which individuals or groups are able to interact with each other through electronic media without the constraint of having to meet at a specific place and time. CC is viewed as a special case of e-mail in which the major objective in L2 acquisition is the creation of discussion opportunities between individuals or groups in different locations. Online education is a new domain of learning, and overcomes many of the constraints of time and place that restrict access of the instruction in traditional educational settings. Serving as an aid to instruction, CC not only promotes learner independence, but it also encourages learners to work together. The newest technological innovations, such as desktop video teleconferencing, may provide outstanding opportunities to improve computer conferencing in L2 learning. Bures, Abrami, and Amundsen's (2000) study indicated that students who believe that CC will help them learn the course material are more likely to be active online. The study also indicated the significant relationships between CC success expectations and attitudes toward computers.

E-Mail

Perhaps the most common means of communicating in academia today is by using e-mail; thus e-mail is the most commonly used Internet application. Today's e-mail software can handle text in a wide variety of languages, can transmit diacritics, and can include word processed files as attachments; the software also allows us to send sound and images as attachments that enhance the context of the written communication (LeLoup & Ponterio, 2000). E-mail can lead to extensive communication among the members of a group or a class, as well as between a teacher and a student and also among teachers. It can be successfully integrated into the L2 learning program almost immediately because computer use has become widespread in most academic programs (Ganderton, 1997).

Emphasizing that e-mail can replace letters, phone calls, and face-to-face meetings, making organizations more productive and efficient, Beekman (2005, pp. 293-294) identifies the following advantages of online communication: (1) E-mail is fast (a typical e-mail message takes no more than a few seconds from the time it is sent until it reaches its destination), does not depend on location, facilitates group communication; (2) e-mail messages are digital data that can be edited and combined with other computer generated documents; and (3) online communication is less intrusive than the telephone, enables decisions to evolve over time, and makes long-distance meetings possible.

In a case study in Hong Kong by Greenfield (2003), secondary ESL students and an 11th-grade English class in Iowa had a collaborative e-mail exchange based on an instructional model (cooperative learning, communicative language learning, process writing, project-based learning, and an integrated approach). The majority of Hong Kong participants said that they gained general confidence in English and computer skills, and also felt that they made significant progress in writing and thinking, which supports Kroonenberg's (1994-1995) notion that thinking and writing are interdependent processes. Liaw's (2003a) case study was a cross-cultural e-mail project implemented to provide EFL student teachers in Taiwan with the opportunities to interact with bilingual/ESL preservice teachers in the U.S. The Taiwanese participants obtained valuable information focused on pedagogical and language learning issues from their U.S. partners. The interactive nature of asynchronous correspondence provided an environment for meaningful, long-distance, two-way communication where learning was supported.

Multimedia and Hypermedia

Ongoing advances in multimedia (combination of text, graphics, animation, video, music, voice, and sound effects to communicate) and hypermedia technologies are resulting in the emergence of interactive multimedia education in which students can interact one-on-one with the communication media. Thousands of education multimedia programs are available on CD-ROM and DVD-ROM. Hypermedia applications have the ability to link text and graphics, allowing users to navigate nonsequentially through many information sources. For instance, computer-based multimedia tools are used heavily in the production of TV programs such as *Sesame Street* (Beekman, 2005). A number of studies (Felix, 1998; Jones, 2003; Reder, Harris, & Setzler, 2003; Yoshii & Flaitz, 2002) indicate that multimedia are potential for L2 acquisition, in particular, for teaching the four principal language skills (listening, reading, writing, and speaking). The major advantage of multimedia is its richness. Multimedia-based technology, with its capacity for rich imaging, has potential for actively engaging students and helping them to transfer what is learned in the classroom to communication in the real world. Computerized multimedia is changing the role of multimedia from a passive presentation instrument to an active and interactive role where the learner can create, not just view information. This capability provides a major contribution to L2 learning by allowing students to determine the boundaries of what they learn, to select the most appropriate instruction media, and to learn at their own paces. Such capabilities help in stimulating interest, generating questions, and motivating investigation.

Jones (2003), in a research study, investigated under what conditions multimedia annotations could support listening comprehension in a second language using four treatments: the aural text (1) with no annotation, (2) with only verbal annotations, (3) with only visual annotations, and (4) with both visual and verbal annotations. As a result, students remembered word translations and recalled passages best when they had selected both verbal and visual annotations while listening. This supports a generative theory of multimedia learning that suggests that the availability and the choice of visual and verbal annotations in listening comprehension activities enhance students' abilities to comprehend the material presented and to acquire vocabulary. Similarly, a study by Yoshii and Flaitz (2002) utilized three types of instruments for vocabulary retention assessment: (1) Picture recognition, (2), word recognition, and (3) definition supply tests. The results of their study indicated that the combination group (annotations with text and picture) outperformed the text-only and picture-only groups on the immediate tests.

Reder, Harris, and Setzler (2003) describe a multimedia learner corpus called "the Multimedia Adult ESL Learner Corpus," or MAELC as a Lab School environment: http://www.labschool.pdx.edu, which is jointly operated by the Applied Linguistics Department at Portland State University and Portland Community College. MAELC is innovative because it (1) Focuses on the early stage of adult second language acquisition; (2) is highly extensive and searchable in terms of both transcribed language and coded pedagogical activities; and (3) with associate software, it maintains persistent links between transcriptions and original audio-video recording. Specifically, "With software developed to attach transcriptions and classroom activity codes to the digital media corpus, users can readily search for and play back video-audio clips that illustrate particular points of SLA or L2 pedagogy" (p. 547).

Computer-Assisted Language Learning (CALL)

CALL is one example of innovations in instructional resources; there is a considerable amount of research on the use of CALL for language learning (Collentine, 1998; Gardiner, 1998; Heift & Schulze, 2003; Morrison, 2002; Nachmias & Segev, 2003; Stern, 2001; Yang & Akahori, 1998). Enhancing a good command of English is a difficult and time-consuming task for nonnative speakers. ESL software focuses on vocabulary (or on grammar drill and practice), but CALL software aims at enhancing the study of grammar and is useful for individual students because of this capability. Even the use of standard word processing software (Microsoft® Word or WordPerfect®) is beneficial for enhancing grammar and composition. Word processors have grammar checkers that enable active rather than passive responses to grammatical problem solving and potentially provides students opportunities to commit a number of correctable language errors. In a research study by Egbert, Paulus, and Nakamachi (2002), ESL and FL teachers participated in the CALL course, in which e-mail, reviewing software, developing computer-enhanced lessons, and using content-based software were covered. When asked what motivated the participants to use CALL activities, participants responded that they use CALL to keep up with current instructional innovations and to have students develop their language skills through means beyond those offered in a traditional classroom.

Virtual Reality

One of the major sub-fields of CALL is simulation, which can be interactive, using three-dimensional (3D) graphics and sensors as it is done in VR. Since the 1960s, researchers have experimented with VR, which is a computer-generated interactive artificial world that "creates the illusion that the user is immersed in a world inside the computer—an environment that contains both screens and the controls to change those scenes" (Beekman, 2005, p. 148), combining virtual worlds with networking, placing multiple participants in a virtual space. Learners can be placed in foreign countries via VR and are forced to have a conversation in a foreign language. VR can be potential for such L2 learning areas as memorization of words, illustration of idioms, and motivating students to speak in English while being placed in the English-speaking scenario, for example.

Machine Translation (MT)

MT is a computer system attempting automatic natural language translation (Lewis, 1997). Today, for example, "the IBM WebSphere Translation Server for Multiplatforms is a machine translation service available commercially for translating Web documents in a number of languages, such as English, French, Italian, Spanish, Chinese, Japanese, and Korean"(Chowdhury, 2002). MT is one of the most promising computerized tools for L2 learning. Using MT, students can accelerate the learning process because they can check the accuracy of their translations. MT programs provide both online dictionaries and automatic translations of individual words and sentences. To translate from one language to another, it is necessary to combine two technologies. First, artificial intelligence (AI) is used so that the computer can understand the meaning of individual words entered by typing or handwriting; second, a technology called Natural Language Processing (NLP) enables the computer to understand the meaning of sentences and paragraphs. MT is the origin of NLP research, and applications of NLP include such fields as machine translation, natural language text processing and summarization, user interfaces, multimedia and cross-language information retrieval, speech recognition, artificial intelligence, and expert systems (Chowdhury, 2002). Aljlayl, Frieder, and Grossman's (2002) research demonstrates the potential Arabic-English and English-Arabic CLIR (cross-language information retrieval), and they found that the query expansion after translation via PRF (pseudo-relevant feedback) is consistently more effective for both MT and MRD (machine-readable dictionaries) approaches.

The Internet

One of the significant innovations in IT has been the creation and ongoing development of the Internet. The Internet increases communication flexibility while reducing cost by permitting the exchange of large amounts of data instantaneously regardless of geographic distance (McNeal, Tolbert, Mossberger, & Dotterweich, 2003). Internet applications (electronic mail, online journals, the World Wide Web, and remote access to libraries and databases) are widely used to get the wealth of information and resources for language teaching and learning. Specifically, as Morrison (2002) states: (1)

Online language tutorials, exercises, and tests are available to anyone who has access to the Web; this accessibility makes Web-based language-learning activities quite attractive to both teachers and learners, encouraging students who are less likely to participate in a class activity or discussion; and (2) teachers can create their own interactive language learning activities on the Web, which allows them to tailor the activities to suit their own courses and students. Online newspapers provide authentic materials for language learners. What an excellent resource for learning French or Spanish by having access to daily online newspapers from those countries (Byerly & Brodle, 2002). With the Internet, ESL teachers can also find details about the most advanced research and the most advanced methodologies used in schools or universities in the world for their professional development; and lessons and exercises designed by experts can be made available at little cost to teachers and schools in the world. In summary, "The potential of the Internet is to provide access for anyone to anything from anywhere at anytime… use of the Internet means access to a world of information" (Wall & Sarver, 2003, pp. 277-278).

Concerns in Applying Educational Technology

In education systems, human minds, textbooks, and pencils have been emphasized as the major tools of information processing. Education systems of the 21st century must become responsive to changing social needs and become more efficient and effective in L2 acquisition. As discussed above, while there are exciting applications, there will be a gap between the applications and the widespread adoptions of new technologies in educational settings. Figure 1 presents a list of the main issues that instructional designers, administrators, and educators must address in order to reduce the gap.

To minimize the gap described above, Tenorio's (2003) following suggestions are useful: (1) All schools should have access to the Web and should be provided with multimedia; (2) all teachers should have their own PCs and should be able to use the Internet in the classrooms; and (3) both teachers and learners should know how to use new technologies and multimedia properly" (p. 216). Technologies are excellent tools to facilitate teaching and learning but, "If new technologies can speed up the process, we will have to pledge our firm commitment to their universalization (Tenorio, 2003, p. 217).

Figure 1. The gap between availability and adoption of technology

Availability and potential of educational technology	
GAP	How much does it cost? How to measure the real benefits? How can it be used? How can it be integrated into the curricula? Can two or more technologies be integrated? Where can relevant information be found? Is there enough technical support? Is there enough administrative support? What is the forthcoming technological development? How quick is the potential obsolescence? How much time is needed to invest? What is done in other places? How does it impact the students? How does it impact the profession? What will happen if teachers do not adopt it?
Adoption and implementation of educational technology	

Besides, it is obvious that extensive research is required to reduce the gap. Such research could range from the development of implementation methodologies (how to compute the cost-benefit ratio of a technology or how to evaluate its success, for example) to the guidelines on how to answer the issues or concerns, finding information or integrating the technology into the L2 learning program or course. Despite the issues of its design, evaluation, integration into the curriculum or the program, as well as the impact on education systems, the future of educational technology for L2 learning seems promising.

Nevertheless, as Evans (2004) put it:

In fact-to-face teaching, the educator is able to directly mediate learning and gauge the level of the learners' English proficiency. Tele-teaching (using television) makes this virtually impossible, as learners are invisible and thus immediate intervention in learning or estimations of proficiency are much more difficult to achieve. (p. 7)

Finally, there is still much to be learned about how the Internet and computer technology can contribute *support* for oral face-to-face transmission, as long as there is at least equal attention to preventing them becoming a *substitute* for it (Cazden, 2002).

Distance Learning Initiatives in Micronesia

It is a very interesting time to be involved in higher education, and the following two trends are very apparent to all of us involved in the learning process (Roberts, 2004):

First, the vast increase over recent years in the use of Web-based materials to support courses. Where these materials supplement existing lectures and tutorials, the term "blended learning" has recently come into fashion. Where the materials stand alone, so that they are sufficient to enable external students to learn efficiently, the course may truly be termed online. Second, the increased realization amongst many educators that interaction is a key component of the learning process for many learners…there would seem to be a strong correlation between interaction and learning…. The benefits of collaborative learning within a computer-supported environment can be at least as great as those within a classroom or lecture hall. (p. 4)

Case 1. Online Agricultural Education

As stated in the ADAP Project (2004), through a partnership with PEACESAT, a pioneering Pacific-wide satellite and ground-station network, ADAP estab-

Table 1. Five Pacific land grant institutions (adapted from ADAP Project, 2004, pp. 5-6)

College of Micronesia Land Grant partners	University of Guam	Northern Marianas College	Palau Community College	College of Micronesia-FSM	College of the Marshall Islands	American Samoa Community College	University of Hawaii
Population of state/ territory/ island	16,394	78,252	20,610	115,000	56,429	57,291	1,244,898
Name of land grant College	College of Natural and Applied Sciences	Cooperative Research, Extension & Education Service	Cooperation Research & Extension	Cooperative Research & Extension	Cooperative Research & extension	Community & Natural Resources	College of Tropical Agricultural and Human Resources
Founding of college/ university	1952	1981	1974	1974	1974	1970	1907
Founding of land grant	1972	1987	1982	1982	1982	1980	1907
Number of students on campus	2,800	1,350	1,326	2,303	900	431	18,686
Number of students in land grant program/ college	30	15	14	5	12	21	674

lished group conference calls for the first time—a "coconut wireless" among partner institutions. A base station at each American Pacific Land-Grant school, with ADAP as the common link allowed the five Land-Grants (see Table 1) to exchange and share information. ADAP has kept pace with the latest in telecommunications; that is, all offices are equipped with speedy computers, instantaneous communication available on e-mail via the Internet, and high-speed video conferences connecting the Pacific islands with the mainland U.S. and foreign countries with just a phone call. ADAP projects have benefited from the greater communication efficiently and effectiveness and thus have enabled the Land-Grants to better serve their clients.

Definition of Land-Grant Institutions

A land-grant college or university is an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The original mission of these institutions, as set forth in the first Morrill Act, was to teach agriculture, military tactics, and the mechanical arts as well as classical studies so that members of the working classes could obtain a liberal, practical education. The Morrill Act (Land-Grant Act) signed into law by President Lincoln in 1862, gave each state a grant of federal land within its borders for the establishment of a public institution to fulfill the act's provisions. At times, money was appropriated through legislation such as the second Morrill Act. A key component of the land-grant system is the agricultural experiment station program created by the Hatch Act of 1887. This act authorizes direct payment of federal grant funds to each state. The amount of this appropriation varies and is determined through a formula based on the number of small farmers there. Each state must match a major portion of these federal funds. The United States Department of Agriculture (USDA) administers land-grant funds and the coordination of land-grant activities on the national level. Many of these institutions are among the ranks of the most distinguished public research institutions, and all share the same tripartite mission of Teaching, Research and Extension (Dave's garden.com: http://davesgarden.com/terms/go/1086).

Open and Distance Learning

A way of providing learning opportunities that are characterized by the separation of teacher and learner in time or place, or both time and place; learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic; two-way communications that allow learners and tutors to interact; the possibility of occasional face-to-face meetings; and a specialized division of labor in the production and delivery of courses (The Commonwealth of Learning at http://www.col.org/images/menu/commonwealth.gif/). For more open and distance learning terms, see Appendix I.

University Challenge Grant Program

The grant proposal for DE focused on devising innovative solutions for providing baccalaureate level degree training to the more than 150 uncertified and undertrained vocational agriculture teachers working at schools on remote Pacific islands. This DE project was carried out as a regional initiative involving PCC and UOG. Florida A&M University also collaborated in carrying out the project and served as the third strategic partner. Lucyann Kerry, a project director of the Challenge Grant project, believes that technology is important to increase access to education. Kerry also believes that technology provides an opportunity to raise the standard of living while producing strong Micronesian communities comprised of individuals who have each found a way to maximize their potential. Kerry's following report describes in detail how this particular DE program had been designed, implemented, and evaluated.

Report. Online Students in Micronesia[1]

"USDA Higher Education Challenge Grant, Promoting Agriculture Education in the Western Pacific" LucyAnn Kerry, Project Director (e-mail: KERRYLS@guam. uog.edu/www.agpowermicro.org)

The problem posed in developing online courses of instruction in the western Pacific is how to design an effective instructional process resulting in successful learning, considering the multicultural and multilingual student population, and integrating and adapting the English and scientific language knowledge that is inherently nonreferential and atypical to the direct life experiences of the students. This paper provides information about the experience gained while addressing this problem of design midway through the work of this three-year grant-funded project, Promoting Agriculture Education in the western Pacific, a USDA Higher Education Challenge Grant. It further provides a qualitative assessment of the response to the design problem with the implemented solutions and whether there are preliminary indications of achieving learning success midway in this work in progress. The mission of the grant was to promote food production and marketing by promoting agriculture education to a target population of agriculture teachers who are working towards a bachelor's degree in Secondary Education with a specialization in Agriculture offered through UOG. The lead for the formative educational work under the project is being conducted through Cooperative Extension Service, CNAS at UOG in partnerships with PCC, the College of Micronesia-Federated States of Micronesia, the Departments and Ministries of Education of the Republic of Palau, and the Micronesian states of Yap, Chuuk, Pohnpei and Kosrae, as well as Florida A& M University.

Although this delivery was viewed as the primary mode for expanding access and resources of formal degree program education in agriculture to a diverse and geographically dispersed population of adult learners, there exists a primary challenge with this selection for delivery as one of overcoming limited Internet and telecommunications infrastructure throughout the region. Development of an online course does not equate with the entire instructional process, which involves many other factors for adult learners. In this case, this process also indicates that it is crucial for the potential adult learner in the higher education system to receive the support to identify, recruit, admit, introduce, integrate, and sustain until program completion. . The challenge of designing and developing instruction in this regional context consists of numerous smaller and multifaceted challenges. The first year of the grant work involved planning. The second year can be characterized as a transitional stage of shifting to implementation and piloting of the initial design. The third year is an expansion year of revisions.

In this paper, for this transitional stage of the developmental work, success in the student's learning process is defined as either observable or documented: (1) Student performance of stated learning objectives, structured coursework outcomes; and (2) student capacity to externalize, articulate, or communicate learning needs for their own student-centered instructional management of the coursework. The assessment of work will focus on various components of the transitional stage. Once such component will be the first online course (AG101: Introduction to Agriculture) offered by UOG; this took place as an initial offering to a small local Guam population and the Pilot Group of Micronesian Students during June and July 2003. This paper relates the challenges of the instructional development by identifying needs and issues of the instructional process paired with responses during the grant's progressive work plan.

The Regional Context

Micronesia is a tropical geographic region in the western Pacific made up of scattered volcanic and coral reef island groups. The region consists of about 17 ethnic and cultural groups and approximately 20 language groups. High transportation and shipping costs continue to isolate the region, (although there is some tourism developed especially for diving) traditional cultures continue as the fabric of the way of life. Much of the population continues to live in village-based communities on a barter and subsistence economy. In comparison to a more individual-centered society of North America, cooperative models of social action and interaction, an obligation system of exchange, family responsibilities, alliances or lineage may be more predominant for proscribing the individual's role in society and shaping the day-to-day activities of life. The gateway to the region is the U.S. Territory of Guam with a population base of about 160,000. The population of the area of Micronesia represented through the partnerships roughly totals the same number of inhabitants. Although Guam is the most urbanized area with the most developed technology and communications infrastructure, its development is in strong contrast to the overall region. It has limited infrastructure capability, limited access to educational resources, overpopulation, lack of job opportunity generating out of migration and displacement, and an overdependence on imported food and other material goods that drain cash fluidity within the communities. Two massive typhoons devastated Guam in 2002, producing massive damage to property and knocking out service. An already declining economy, impacted by the threat of terrorism, SARS, disasters from extreme weather, and territorial government, Guam's fiscal mismanagement compounds the ability to organize and manage work as effectively as compared to the North American model.

The Digital Divide

The term "digital divide" represents an imbalance in the information network capacity in the Pacific region. There is a disproportionate ability and inability to provide access to electronic IT services and telecommunications infrastructure, thus creating limited bandwidth for communications. This emerges as a real example of the *haves* and the *have nots* in the Information Age, with an extreme contrast reflected by the peripheral geography of Japan to the Micronesian islands. The extreme low-end contrast is the island state of Chuuk, with roughly 60 phone calls representing the total bandwidth for the main island, and computer connections running as dial-ups along with phone service through a high-rate, state-sanctioned, monopolized telecommunications operation. This situation can be further aggravated with loss of electricity due to poor infrastructure, non-existent infrastructure on outer islands, climate disasters, or the inability of cashless individuals, organizations, and governments to pay for the electricity. A critical technology challenge is to provide an electronic, formatted, instructional process that can function with this digital divide between the source of instruction, which in this initial case is from the island of Guam to the island student learner populations in Palau, Yap, Chuuk, Pohnpei and Kosrae.

Note that other forms of communication exist in the region and were reviewed for use in a strategic shift from sole reliance on Web-based computer delivery emphasis to a multiformatted contingency platform that includes: (1) Satellite communications for interactive sessions; (2) correspondence course workbooks for groups and individuals as extension to populations without electricity or internet; (3) CDs for populations without Internet; and (4) the inclusion of mail, DHL or fax as additional use choices to be made from the different islands in the region. Note also that there are two significant communications needs: (1) Rhe needs for instructional communication for course delivery and instructor-student, student-student interaction for teaching and learning; and (2) the needs for logistical communication, that is, how to send homework, how to return completed exams.

Two substantially different historical models of communication clearly exist in this region based on the inequity of development. Most of the strategic design for the plan of work is based entirely on a modern communications model. In contrast, an older model of communications also predominates in the region. This is the pre-1800 transportation model of communication (i.e., hand carrying a message on an airplane or boat) in contrast to the post-1800 transmission model of communication based on technologies of electricity, electromagnetism, and light which need either physical wires in place or wireless transmit/receive equipment capability and the ability to maintain and repair the technology.

Target Population

The target population initially was conceived as being near bachelor's degree completion. As a result, agriculture teachers at the local island high schools needed to raise their teaching qualifications. The representative minimal regional qualification for hiring for a department of education contract teacher is, in effect, a high school diploma. Many achieve their degree qualifications as retirement approaches. Initial site visits and discussions within the region with educators and administrators at the partner institutions indicated that potential targeted learners might be ESL students, have family responsibilities influencing their learning commitments, have limited access to networked computers, and may be returning students. Maintaining the students' attention was a perceived challenge. The students' motivational factors that would play a role in their participation in the instructional process were nebulous during the initial design stage. There was a commitment on the part of the education departments as both partners and employers to raise the qualification standards of agriculture teachers. While the initial design phase was undertaken, it was established that recruitment would become a responsibility of the partnerships institutions. Because of regional distance and the weak communications infrastructure of the targeted potential participants, the separation made it difficult for their involvement until the actual stage of piloting the course took place during a summer program at UOG. This became the interface event that involved the participants in the instructional process, integrating them into the grant's programmatic work and obtaining necessary information on their needs. This engagement personalized the instructional relationship and process between the instructor and students.

Initial Strategy and Revised Strategy

The initial strategy for selection of the DE delivery and online course instructional design was based on strong preferences from the grant initiators for network and formatting technology. Instructional design was perceived as equating with the transfer of content to a technology communications format. Although there was some precedent for DE course delivery through extension and other colleges, this initial emphasis occurred because the professional field of DE and instructional design was underdeveloped in the regional institutions. This strategy was revised to an actual instructional design approach for development of the online courses with the establishment of an ad hoc team bringing expertise and relevant experience to produce the actual design work. The team was produced through external contracting to meet the needs of the project, with the WASC accreditation guidelines for DE as an additional resource.

The Design Team

Designing and student identification paralleled each other. As no formal design team had been planned, an ad hoc design team could still be identified from key roles and contributions being made, as the project director and author of this article coordinated the work. Based on the contracted needs for development of the online courses, site visits, meetings, and discussions, this team is defined as the grant project director, the lead instructor for the pilot course, the content specialists that also include research scientists and other course instructors at the colleges, the regional network technology specialist, the Web design contract firm, and the instructional design support contractor.

The Emerging Instructional Design

Previous work at the College of Agriculture and Life Sciences had developed a preliminary online computer delivery platform called PROA, which was being developed for the project. It serves to meet the comparable function of licensed curriculum computer programs such as Blackboard or WebCT. A key design challenge was the complexity, massiveness and fragmentation of the work in this environment. The wish that it could all happen all at once was proving to be unmanageable. To make the design work, the key response to this highly matrixed environment of different characteristics per island and unpredictable factors was to define the initial goal of work as a pilot launch with the Introduction to Agriculture (AG101) online course as a model for the remaining online courses. Based on past experience from extension delivery and existing regional knowledge, the instructional process and the online course designs were generated. The design work was organized around three structures: (1) The platform Web page learning space also known as the *shell*; (2) internal structure of the course in the *shell* as an outlined sequence of events; and (3) content structure within an event (event of instruction being the presentation of a reading assignment or an e-mail discussion thread). For the course Introduction to Agriculture (AG101), key components used in the instructional design process are listed below (identification and structuring of critical course content, action, and interaction into small amounts that are manageable for instructor and students—mini-lectures, different types of smaller units, concrete assignments):

- Because the delivery mode relies on a transfer and emphasis of the instruction through text files, the preparation of textual elements was produced emphasizing clarity and flow. It was written with short sentences and grammar structures and more commonly used English words.
- The inclusion (even in some small initial way) of local plants, animals or other relevant reference points in the course content as a regional adaptation of North American content
- Self-tests for immediate feedback on performance of learning without the need for direct and immediate feedback from the instructor
- Vocabulary building self-tests to reinforce learning both science and the English language
- Clear instructions for doing progressive, sequenced learning, structured interaction with the instructor via e-mail, and attachments of work
- Identification and recruitment with initial admissions and placement testing at the community college level occurred as the course was being designed.
- Meeting requirements outlined by the Higher Education Guidelines for DE to meet WASC Accreditation standards and for meeting instructional quality standards of North America (i.e., building in advisement structures and access to library resources).
- Online labs were to be developed either during the summer program and then integrated later, as they were proving to be a major work component.
- Course assistants were being identified and recruited as student and instructor logistical, training, communications, and instructional support on the partner islands.

The Pilot Students and the Instructional Process

A major question for designing the instructional process is: Who is the student? The design should support learning and promote achievement of the learning objectives. An online course presents the instructional challenge of learning subject area, technology, the online format structure, the English language, the scientific language, the culture of American higher education both as student and teacher, all involving an initial learning curve. The grant design team did not have detailed student information about: (1) English proficiencies, (2) educational background, (3) cultural and individual expectations of instruction, (4) cultural and individual learning style preferences, and (5) computer experience.

The process for identifying the participating students was a key role of the partnership institutions. At the beginning of the second year, work action under memoranda of understanding agreements for this responsibility began. By 2003, the Department of Education of Yap State was identifying the first potential group of students. The grant office coordinated this activity with the partner, PCC, whose director of continuing education provided the first institutional services for admissions to PCC under the sponsorship of the grant. These services included on-site admissions application support, financial aid application support, and conducting PCC's placement admissions tests. Most teachers taking the placement tests showed developmental needs in English, math, and science. From subsequent testing using the college admissions placement tests from PCC and the UOG, the test results consistently show that the majority of identified candidates who are required to take the tests have these developmental needs.

The selection process by partners throughout the region had produced 40 potential candidates for the grant's online courses. A small cohort group of 13 individuals had been identified and recruited for initial participation in the piloting of the online course Introduction to Agriculture (AG101) and for participation in the summer program at UOG. Traveling from their localities for the beginning of the summer program, this initial group of potential online students represented the grant's region with individuals from Palau (2), Yap (1), Chuuk (3), Pohnpei (5), and Kosrae (2). At least seven different language groups were represented out of the 13. Only one participant was female, and they ranged in age from their early 20s to 50 years of age. Only two had ever lived outside the region, in Hawaii. Two had completed a bachelor's degree in arts at UOG and were returning for a second major in either secondary education or agriculture. Six had associate's degrees; one had never attended college. Six were actually teachers engaged in teaching activities on their islands. Three were undergraduate students near completion of associate degrees at the College of Micronesia-FSM on Pohnpei. One member of this group was Chuukese, and the other two were from outer island populations.

As a regional/SE Asia cultural group identifier: all members of the group used betel nut during the program sessions. This was the first time there was direct face-to-face interaction among participants and with the development team. The program initiated a dynamic of getting to know each other, which was needed in order to accomplish the work of the grant. The interaction that took place during this summer program gained useful knowledge, and expanded the mutual understanding among all involved. As a result of the program, all participants gained admission to the university, and nine registered for the Introduction to Agriculture (AG101) online course. Although they all qualify for Pell Grant financial aid, challenges persist (i.e., the completion of the aid forms, late form submissions, lack of a standard of progress that reflects the regional reality, and institutional confusion regarding financial aid).

Piloting the Design

Introducing the course to the learners during the summer program became the phase of piloting the design. It was an opportunity to observe and assess the effectiveness of the design. Interviews were conducted, one-on-one, between the project director and each student during the first week of the two-week program. At the end of the program, several feedback processes were used, including a survey form and group regional planning sessions by the participants that produced written responses. After the first session of orientation to the grant and the summer program, the students were given initial training sessions to introduce them to the online course. This immediately produced a surprise response because approximately 25% of the participants had never touched or used a computer. There also was a range of skill level with more computer literate students wanting to move ahead in the training while the trainer and the training assistants demonstrated basic tools and procedures, such as how to use a mouse. This lack of use of computers was also reflective of the generational age range, the younger students being more computer literate, and those above the age of 30 had limited or no computer skills.

The first training session was an introduction to the online course as an overview of the structured Web space. The second training session focused on the individual lecture/lesson that emulated a classroom meeting between instructor and student. The third training session involved procedures for (1) Communicating with the instructor (though some participants had never used e-mail, they were all expected to e-mail their instructor); and (2) attaching a document to the e-mail (this last procedure had to be modified and broken down into smaller achievable steps as some participants needed to learn basic word processing, how to generate a document and careful tasking support through the different steps of document attachment. A short session was generated by the trainer to provide an introduction or refresher course on the mini-topic "What is a computer," covering the basic functions and uses. Training assistants needed more formalized "train the trainer," as they did not always know how to respond to many of the unexpected training needs of the participants.

Findings

All students participated fully in the training and were able to achieve the presented online course learning goals during the face-to-face course orientation. This occurred despite the range of incoming computer competency levels. They attentively followed the structured work of the online course. Even in moments of confusion or lack of comprehension, they were committed to the experience and continued to participate as best they could in following directions, emulating, or modeling behavior. The group was involved in asking and receiving instructional help from the instructor, trainer, or student.

English language skills varied in the areas of speaking, hearing, reading, or writing. The online environment simplified this process because only reading and writing skills were required. The textbook-based reading and homework assignments provided a literacy reference tool for vocabulary, grammar, and sentence structure. The two-week program essentially worked as an immersion language experience because speaking and listening skills for English language improved, especially with quiet students who often received help from others in their own languages. There had been no prior briefing from the regional partners regarding the major lack of experience with the use of computers with such a large percentage of the pilot population. This initial lack of experience may impact on sustained involvement of the population in the long-term instructional use of the online course. However, this barrier or learning curve was taken on by those participants as a concentrated effort to learn as much as possible in the short period of time in the summer program. Lack of access to computer resources at the dormitory where the group was staying while at UOG was cited as a shortcoming in feedback form responses generated at the end of the summer program. The intensive aspect may be an indicator of a more favorable instructional design work structure for the online course performance in the local setting. Rather than individual work occurring over longer periods of time and subject to unpredictable or unplanned pressures of other group needs including village, community, work or family responsibilities, it may be more favorable to generate group work structures that are concentrated, using the group responsibilities to integrate the individual into the learning engagement process rather than pulling them away from it.

After initial computer training and online course orientation, students were cued to begin the actual instructional work of the course online. All students were observed as engaged in the course events of instruction during coursework time in the computer classroom. Almost 100% related in their end of program surveys that their experience was good to excellent in the training and in the use of the online course. Comfort level responses were monitored throughout the use of the online course by asking participants how they felt and watching them perform the course instructional procedures. In the setting of the summer program, group work, peer teaching, and course assistant support was observed in response to the instructional challenge presented to the pilot group students to accomplish the initial online learning goals. Most students, either individually or in teams, accomplished the stated learning performance goals of (1) establishing communication with their online instructors; (2) completing at least one homework assignment; and (3) attaching it as a document for e-mail delivery.

The program atmosphere, with its face-to-face meetings, supported open dialogue, questions, answers, and discussion. The opening grant orientation was structured to produce a high level of comfort and acceptance in a new and possibly challenging situation. Various exercises were used to elicit responses and produce interaction, moving participants through one-on-one, small group, or larger group interactions. Throughout the program, if individuals did not have direct questions, they had a group or island leader who emerged to articulate specific needs. Grant staff was involved in an ongoing support relationship with participants by living in the dormitory with them. After-hour and weekend activities were provided as much as possible, although it became apparent that we were understaffed to meet all the needs that were presented during the summer program, especially in the areas of application form completion, advisement, and individual academic counseling. Face-to-face instruction was also being conducted in the lab classroom between the online instructor and the students. The instructor was actively engaged with the students in enrichment activities, in addition to direct instruction during the two weeks. Traditional teaching styles were still predominant, with the instructor talking and writing on the blackboard or presenting content with PowerPoint slides.

In summary, there was observed achievement and accomplishment with the use of the online course in the three areas of the instructional process by participants either as individuals or as an individual group member who could indicate successful learning taking place: (1) Student participatory engagement in the events of instruction, observed in direct training and use of the online course events; (2) student performance of stated learning objectives, assignments or other defined, structured coursework outcomes; and (3) student capacity to externalize, articulate, or communicate learning needs for their own student-centered instructional management of the coursework (thoughtful questions were asked as students planned their local procedures such as coordinating with a local course assistant about how to return work, how to get an exam, and what kind of schedule to follow). Students had become comfortable working at their own paces and levels in a cooperative, yet structured environment where they could focus intensely on the learning process online. They were able to do this with adequate technology & equipment resources and adequate instructional support from different sources. Group cohesion with articulate leaders emerged. They were learning productively in some degree of cognitive change, even if this change was qualitatively represented as a small or detailed change.

By the end of the summer program, the students had valued their opportunity to meet other people from different islands in the region. After returning to their localities, the barrier of underdeveloped English language skills will continue for many of the students. Concerns existed for necessary access and distribution of computers, microscopes, textbooks, and other basic instructional materials. With the use of an intensive front-end platform, students were given a strong start for engagement in the learning process for their first university course under the sponsorship of the grant. The initial design of the course did produce some degree of effectiveness with the pilot group in the framework of the summer program. The design and delivery of the online course can now provide the opportunity for learning within challenging DE dynamics of the regional context. The design of the instructional process is more than just producing online courses. Promoting achievement of success in learning also requires creativity, flexibility, and responsiveness to student needs. All of the partner institutions have become stronger because of the project. Their contributions of time and effort reflect a commitment to support sustainability. There is a strong hope that, even with limited resources, future planning for DE by the regional partners can be produced from the piloting experience.

An Interview with LucyAnn Kerry: November 5, 2004

What are the challenges of the DE students in the region?

LK: *Adult learners in the region may lack English and technical skills, in addition to access to technology. These areas represent the greatest challenges of the program, because our students must:*

- *understand the content of the courses offered in English,*
- *demonstrate a level of computer competency, and*
- *have access to technology.*

What are the cultural aspects of Micronesia that impact DE?

LK: *Micronesian cultures are distinct. Still maintained is an oral tradition, rather than a contemporary literate method for documentation. Micronesian cultures are based on an obligation system, where family members face extended familial responsibilities based on feudal, hierarchical, tribal, and clan systems. Devoting time for family obligations is more important than spending time for DE.*

Briefly define technology in DE.

LK: *Technology is a means for overcoming geographical distances. Yet technology creates obstacles by creating an impersonal psychological environment, or worse yet, when it does not function as planned.*

Case 2. TESOL and DE

The question was asked in the keynote speech at the World Summit on the Information Society (WSIS), in reference to the Pacific Island countries and territories, as to "whether the vast Pacific Ocean separates each one of us, or it connects?" (Kakazu, 2003, www.oaamensore.org). As the far-reaching arm of advancing technologies extends to the Pacific islands, educators and students involved in higher education watch as geographical distances diminish as educational opportunities flourish. Opportunities advanced by technology hurdle a range of multicultural and political differences, and address the concept of global English. As DE comes of age, so does progress for electronic resources to provide research support for faculty and students. Digital applications and delivery for instruction, partnered with electronic library and academic digital materials, create a positive, interdependent relationship that ignores geographic distances and opens a new door for the future of higher education.

Teaching English to Speakers of Other Languages (TESOL)

The 2004 TESOL Convention in California provided a profound TESOL Vision Statement. This statement, from a global perspective, stressed the value of effective communication among diverse cultural settings for peaceful coexistence and for the resolution of serious problems facing the world today (www.tesol.org). Knowledgeable individuals from international, national, and local settings are positioned to impact human communications. The constant flow of information from country to country and continent to continent in our world creates the need for institutions that encourage and support the development of language and intercultural communication skills (TESOL's Vision Statement, 2004). Within the Asia Pacific/Micronesian region, comprised of a rich and unique representation of linguistic and cultural diversity, establishing and promoting a TESOL program by an institution of higher learning is a natural. Strategically situated in Micronesia, in the midst of the western Pacific basin, UOG offers a Masters of Education – TESOL degree that is designed to provide three objectives: (1) to train classroom professionals, (2) to provide a theoretical base for enrichment and preparation for doctoral level studies, and (3) to support teachers as trainers (*UOG Graduate Bulletin,* 2002-2003). This program is in unison with UOG's strategic initiatives that include the "Enhancement of Student Success," while remaining responsive to the island's and student's needs (*UOG Annual Report*, 2003). The UOG TESOL graduate level degree program consists of a total of 36 credit hours and is taught by a faculty with concentrations in bilingual education, applied English, and evaluation of international education programs. Student prerequisites include being a native speaker of English or receiving a score of 550 on the TOEFL; a bachelor's degree with a major in English, education, a foreign language, or related field; a teaching certificate for those interested in teaching at the elementary or secondary level; and the following undergraduate coursework: LN300 Introduction to Linguistics and LN385 Structure of the English language.

- The nine credits of core courses help to create both a TESOL philosophical platform and to provide fundamental research tools. They include ED600 Issues and Philosophies in Culturally Diverse Schools or ED669 Culture and Its Influence on Education, ED601 Research Methods, ED602 Qualitative Inquiry in Education or ED603 Quantitative Analysis.
- Appreciating that educational technologies offer an unrivaled range of student-centered language learning, three credits are called for among ED634 Instructional Interactive Multimedia, ED636 Utilizing Media Resources in Instruction, ED637 Integrating Technology in the Curriculum, and ED638 Teaching with the Internet.
- Students are encouraged to consider coursework in language and literacy as an area relevant to second language instruction and development when meeting the six-credit elective obligation.
- The Area of Specialization (15 credits) course offerings include ED481G Second Language Teaching Methodology, LN400G/ED660 Applied Linguistics, ED661 Second Language Curriculum Theory and Development, LN/ED662 Second Language Testing and Evaluation and ED692 Practicum: TESOL.
- The thesis or special project carries six credits, and the program concludes with a comprehensive written exam. (UOG Graduate Bulletin 2002-03)

TESOL and Technology

As Howard Newby stresses in his article titled *Higher Education in the Twenty-First Century—Some Possible Futures in Terms of Global Research*, "the growth of information and communication technologies (ICT) have allowed for fast, cheap, and user-friendly means of communication impacting most academics (Newby, 1999). Considering this prediction, Jacquelyn Milman, second language professor and the TESOL program advisor at UOG, was awarded a five-year Career Ladder Grant, funded by the U.S. Department of Education. The purpose of the grant is to develop DE courses leading to a certification or degree in English as a Second Language/ Bilingual Education. As a result of the Career Ladder Grant, the following TESOL courses have been developed in a CD-ROM format and mounted on a Web board for implementation and participation by students within the region:

ED280 Introduction to Bilingual/Biculturalism, ED480 Second Language Curriculum and Materials Development, ED481 Second Language Teaching methodology, ED660 Applied Linguistics, ED661 Second Language Curriculum Theory and Development, ED664 Seminar in Bilingual Education, ED668 Teaching content to L2 Students, ED669 Culture and Its Influence on Education, and LN300 Introduction to Linguistics (*UOG Annual Report*, 2003). Recognizing the potential of independent study though technology, Milman has continued her research with Anna Marie Blas Arceo from the Micronesian Language Institute by developing a "Basic Chamoru" language self-study program consisting of a book and six CD-ROMs. Sponsored by a grant from the Guam Council on the Arts and Humanities Agency, the project focuses on a natural context of Chamoru, the indigenous language in Guam and Saipan. According to Milman, the outcome of the self-study is for students to have acquired approximately a 500-word vocabulary and a basic familiarization and speaking ability in basic Chamoru via technology (Cepeda, 2004).

Building beyond the concept of educational technology assisting classroom instruction and enhancing curriculum resources, UOG is forging forward with the development and delivery of several TESOL graduate level courses and forming a tight partnership with campus and regional IT. The advantages are clear in terms of student access within a geographically extended region as well as convenience in scheduling and time constraints for students. Nunan (2003a) from the University of Hong Kong discusses the emergence of MA-TESOL graduate online courses and how this institution offers an academic program to students who ordinarily do not have easy access. While pointing out the rewards, Nunan (2003a) identifies the following challenges that instructors face when offering online courses: (1) getting the right fit between technology and students, (2) finding ways of creating a learner-centered climate, (3) encouraging reticent students to participate, and (4) dealing with the technology challenges.

Relating to Nunan's top challenge, getting the right fit between technology and students, the UOG TESOL online courses meet initially on campus at a computer lab where an orientation is offered. The Web address is provided and students venture to the site for a cyber tour and familiarization by reviewing the syllabus and login procedures. CD-ROMS of the course are available to students, as well. This is a comforting precautionary measure for students in case of technology failures or disruptive natural disasters like typhoons that periodically frequent the western Pacific and play havoc with the delivery of utility services. Students at this point scale possible initial hurdles of apprehension with technology and its implementation regarding assignment delivery and course participation and have the opportunity to ask questions, assisting with the partnership between students and technology.

Global English

With the evolving mission of higher education and the trend to change traditional delivery of classroom materials through technology, a variety of considerations follow. A philosophical issue at this point is worthy of discussion in regard to geographies and the concept of English emerging as a global language. Although Micronesia represents a wide range of diverse politics and island cultures, it remains under the protectorate arm of the U.S. Geographically, Micronesia straddles the western Pacific region, forming a bridge between east and west. Nunan (2003b) writes of a case study, *The Impact of English as a Global Language on Educational Policies and Practices in the Asia-Pacific Region*, in which he looks at Mainland China, Hong Kong, Japan, Korea, Malaysia, Taiwan, Vietnam, and how English impacts educational policies and practices with in the Asia-Pacific region. The realities of global English are examined within a portion of the Asia-Pacific region from an international perspective in terms of cultural diversity and education policies. This study contrasts with the challenges of English as a Second Language instruction within Micronesia, still considered Asia Pacific, also comprised of many multilingual communities, but are considered domestic under the U.S. flag. Global English becomes a complex issue in this regard.

English Language Institute

In addition to a formal academic TESOL program, UOG is pleased to offer English as a Second Language at the English Language Institute (ELI). Since 1979, students attend daily classes to enhance writing skills, oral conversation, listening skills, reading comprehension, and study skills. This concentrated language program helps students to become more self-assured when using English, all with a focus on the development of quality language proficiency and cultural understanding. The faculty at ELI has extensive international teaching experience and training. Chosen to profile in terms of teaching philosophy from a multicultural perspective while incorporating educational technology is Olympia Terral. She is a TESOL Specialist, the UOG SOE ELI Coordinator, and the project coordinator for the Career Ladder grant. Terral has taught ESL to students of all ages in Guam and Taiwan, where she spent five years studying Mandarin and martial arts. Her interests include the relationship between language death and biodiversity, literacy, integrating art in language arts programs, and poetry.

An Interview with an English Language Coordinator

The following is an interview conversation conducted with the intention of gaining insight into the challenges and achievements of English language instruction within the Asia Pacific region and its relationship to technology:

Explain the mission of ELI

OT: From my experience, they went from being academic to being more conversational, and now they're going back to focusing on a more academic program. Actually, they're trying to have both: academics for people who want to go to the UOG or the GCC so that they can bring their English up to a level where they can attend lectures, take notes, participate in classroom discussions, and then also have more fun conversationally. Also, ELI is bringing students to UOG for two-, three-, or ten-week sets for a more conversational focus to polish and hone their English skills. So this makes sense because we're geographically so close to Asia.

What is your philosophy of teaching in general?

OT: Depending on the situation that I'm in, I would use any means necessary to get there. I want people to get engaged with language. Students get engaged and then they learn. Often I use children's literature. I recall using a Mexican folktale called the *Witch's Face*, which brings in witches, superstitions, and beauty. The theme is how we judge people by how they look. It's just an incredible story, very short, but it brings in so much while including how to put words together, basically grammar and sentence structure. So that's my philosophy of teaching.

How have you applied technology to TESOL instruction?

OT: I've been working with Milman on taking courses in her TESOL program and converting them to a distance education format. Specifically, that means taking content and putting it in a form where it can be on the Web or be burned to a CD-ROM for people who aren't able to get online for whatever reason. They can have all the information right on the CD-ROMs, and they can put it in their computers, and their Web browsers will read it. So they don't need any special software as long as they have a Web browser like Internet Explorer of Netscape that will open the files on the CD.

How do you use technology in terms of course preparation?

OT: Because my courses are taught through distance education, I use Dreamweaver to prepare content for delivery via the Internet or CD-ROMs.

Explain the nature of the courses in which technology is utilized in your courses.

OT: The basis of my courses is to introduce the student to types of bilingualism and to relate the effects of language on culture.

What technology applications are required of your students?

OT: The ability to communicate with the professor and other students via the Web board or e-mail. Also required is the posting of assignments, which of itself, requires a level of word processing skills.

In what way do you use technology to evaluate or assess student performance?

OT: Web boards track students' use of the forms and the number of times that they logon for participation. Students are required to respond to other students and to lead and join topic discussions.

How do you feel that the TESOL program has benefited Guam and our local community?

OT: Teachers who are taking courses in the TESOL Program will be able to work in a more fruitful manner with the students who are second-language learners. There are misconceptions about people who are second-language speakers; sometimes they are misdiagnosed as being in special education classes. When I was student teaching at Southern High School in Guam, there was one bright young man in the ninth grade who was originally from Chuuk, but basically had grown up here in Guam. For some reason he had been placed in special education classes. He was very bright and I was able to transfer him to ESL classes where he belonged. So teachers who are trained to work with ESL students, I mean, it's rather intuitive but some people have these misconceptions about appropriate student placement.

Do you think that TESOL courses should be part of the teaching training curriculum at UOG and a Department of Education Teaching Certification requirement?

OT: A course designed not specifically for the student who is seeking ESL certification, but for a teacher in either the elementary or secondary area who wants to effectively reach and help their students. When I had my own business and had Chinese clients in Mainland China, I helped one client to petition for his family to come to Guam and because I spoke Mandarin, I accompanied their children on their first day of elementary school. The children were terrified and tearful. Having arrived from China with no knowledge of English… it would have been so much more helpful if their teachers had received some training in ESL. Although extreme, this situation is not that unique in our mobile and global society.

Speak of the ELI student population

OT: The ELI students are primarily Japanese, Korean, and Taiwanese. But our mission also is to reach out to the people of the islands. I mean, initially the purpose was to engage people in the islands who are teaching second language students and need to know English. Also, English was important because of the political connections with the U.S. and with the world.

Identify challenges that you have experienced with English Second Language instruction

OT: The first thing that comes to my mind is the political aspect of bilingualism in the United States. When I first was hired under my grant, it was with OBEMLA (the Office of Bilingual Education and Minority Languages). Now when President Bush came in, it became OELA (the Office of English Language

Acquisition), which shifted emphasis away from supporting minority languages and away from bilingualism into, “everybody’s got to get the English down.” Another challenge is articulation issues. Since 2000, the UOG Administration has worked very hard to resolve this reality that academic credit in the past has not been easily articulated between regional community colleges and UOG, and even on the island with GCC. The fact that the University of Hawaii would often accept regional credits and UOG would not glaringly pointed out the problem. This is a huge challenge. A distance education teacher is actually a little more difficult than being face-to-face in an actual classroom, I think. What makes DE particularly challenging is that instructors don’t have the advantage of visual cues that they get in a physical setting. Are the students actually getting it? Are they lost? When face-to-face, a teacher can read students as they are speaking, but through DE, the teacher is responding to a Web board or e-mail messages that the students have written. One advantage is for the shy student. I have had students who would not say a word in the class, but when they are writing and not in front of other people, they will open up and expand. It is just them, the computer, and the keyboard; somehow, they are no longer shy.

Summary of the Interview

Olympia Terrel is passionate about students becoming engaged in the learning process. She is creative and incorporates the arts and literature into the curriculum to gain the interest of students, with the objective of partnering language and culture. One of her accomplishments has been incorporating technology by being instrumental in migrating TESOL graduate level courses to CD-ROM format to accommodate DE learners. Through a Web board platform, students in Guam and throughout the Micronesian Islands are able to take instruction in TESOL and ultimately earn a master’s degree or certification recognized by the Guam Department of Education. Challenges with technical support for Web-based instruction and utilizing technology for instruction in general from an institutional perspective remain, involving course delivery, faculty technical ability, and student access and computing skills. Of note is the absence of cultural and personal nuances when conducting coursework online, allowing technology (while effective in delivery of course materials) to eliminate the nonverbal messages evident in a physical classroom. With TESOL experience in Taiwan and Guam, it is apparent that administrators involved in establishing teacher education programs and teacher certification criteria would be wise to mandate teaching ESL as a certification and/or degree requirement. This, in Terrel's view, would greatly assist students trying to assimilate into a multicultural climate and would prepare teachers to be more sensitive to students' needs and avoid misconceptions.

Case 3. PEACESAT and Health Care Education

In the early 1970s, PEACESAT began a successful project in the Pacific region for tele-education and tele-health applications (Iida, 2003). While leveraging technology, cultural understanding, and accommodating the mission of higher education, the UOG College of Nursing met the challenge of expert regional health care training by writing a Title III grant via tele-health applications. With PEACESAT for technical support, the intention of this project DEEN (Distance Education Enhancing Nursing) was to offer an academic program to nurses and other health care providers in the Commonwealth of the Northern Marianas, Republic of Palau, Republic of the Marshall Islands and the Federated States of Micronesia. Its mission was to (1) offer nursing education to the culturally and academically diverse population of the region, (2) increase the body of nursing knowledge through research and creative endeavors, and (3) serve the culturally diverse peoples and health care providers of the region (Fochtman, Allen, & Gurusamy, 1997, p. 203).

The one-year pilot for DEEN involved establishing a site coordinator, who established the specific needs of the students, became a marketing representative, technical coordinator, and cheerleader for reluctant participants. One detail mentioned in the Fochtman publication is that computer equipment was delivered the day before classes were to start in Palau. At the first session, with the intention of addressing technical trepidation and raising comfort levels, each student was asked to type in their name, place of work, and phone number. It was revealed that only one student had been familiar with a keyboard. And so it began with discussions in original languages first and then the faculty would approach course content in English. The average grade was a B. The final evaluation stated that the greatest advantage was the convenience of taking courses on the home island and the disadvantages involved limitation in the technology (Fochtman et al., 1997).

Features of DE

As technology plays an ever-increasing and necessary role in the economic health and well-being of our lives, the prospects that some individuals will be left behind in the digital information age has serious implications (CTPC, 2004). Institutions of higher education that service potentially undeserving communities such as the Pacific region must remain vigilant to provide equitable opportunities to advance and capture current technology. Beyond acquiring computers and establishing technical infrastructure, a voice must be heard to impact policy at the highest level. As an advocate for future technical applications, this voice must have the ability to identify and appreciate the advantages of how technology will benefit the teaching and learning process, as well as to identify the obstacles and downsides. No problem can be resolved until the perimeters have been defined.

In summary, the following begins to identify recognized features of DE within a remote island community:

- Advantages
  - Reaches students in various geographic locations
  - Expands educational opportunities
  - Opportunity to reinforce technology skills
  - Each student receives individualized attention
  - Because the discussions are text based, grammar can be stressed
  - Shy students may be more apt to participate in discussions
- Challenges
  - Politics
  - Articulation
  - When students do not have access to the World Wide Web or have lost access due to power outages caused by typhoons, which are prevalent in the Pacific
  - Telecommunication services can be very expensive in island communities
  - Very often DE students are L2 English speakers. DE is usually text based. Consequently, the oral component is lacking
  - More technical support is needed from academic institutions

- More training in technology is necessary for both professors/instructors and students in terms of learning how to use computer-based instruction
- Proctors are required for exams that are not "take home" tests

Summary

This chapter has emphasized that technologies today have begun to globalize educational opportunities and accommodating multicultural diversity, especially in the areas of language literacy and training.. In addition, a regional project titled the University Challenge Grant Program, which was described in detail involving a DE program, focusing on baccalaureate degrees. The students consisted of more than 150 uncertified and undertrained vocational agriculture teachers working at schools on remote Pacific islands. Administrators, faculty, and students are experiencing a shift in education protocol, which balances the challenges of educational opportunities in remote regions with electronic academic materials to support programs. Kerry's report is very important because it shares the firsthand experience of designing, implementing, and evaluating the open and DE courses offered to support rural development in the western Pacific. Kerry has particularly pointed out that a disproportionate ability and inability to provide varying degrees of access to electronic IT services, as well as the varying degrees of telecommunications infrastructure, compounds the challenges. This emerges as a real example of the *haves* and the *have nots* in this information age. Technology is clearly a partner with education involving the development of DE programs that diminish geographical distances and provide otherwise instructional opportunities, such as TESOL and health care programs. Finally, institutions of higher education in geographically remote areas are discovering that electronic materials often level the learning field by providing more equitable opportunities for instruction and academic resources.

Endnote

[1] This unpublished manuscript was shortened and used with permission.

Education Essay

Source: Inoue, Y. (2002, Spring). A teacher's reflection. APA Perspective, 3 (p. 5).

A Teacher's Reflections

Teachers are regarded as professionals because of how they think and behave (McNergney & Herbert, 1998). Teaching is a complex and ongoing activity. Therefore, teachers' willingness, desire, and energy are the essential ingredients to continuous growth and development in their teaching career. Why are some teachers better at teaching? I ask myself this intriguing question. Searching for the answer, I reviewed my college teaching based on three categories: knowledge and skills; attitudes and behavior; and leadership and management.

Knowledge and skills: My teaching is based on lecturing (i.e., delivering a classroom presentation rather than a formal speech) and places greater emphasis on the importance of the interaction of the instructor and students. I basically use three teaching methods: (1) Active teaching by demonstrating skills and conducting participatory class activities; (2) student-centered teaching by focusing on active learning and cooperative learning; and (3) teaching for mastery by providing maximum opportunities for students to practice the material and to apply it.

Attitudes and behavior: It is generally believed that not only pedagogical content knowledge but also the attitudes and behavior of the teacher are very important aspects of daily instruction. I keep five points in mind: (1) Strict but fair in teaching and grading; (2) maintain friendliness but keep a professional distance from students; (3) try to be a good listener as well as a good speaker; (4) evaluate students based on multiple assessment tools; and (5) help students to become decent and productive citizens. One of the student's comments that gives me an enormous amount of energy to pursue my teaching career is that I bring a refreshing vitality to each class and teach with an exuberant spirit, delighting in my students' responses. Most importantly, the purpose of education in teaching is the self-development of the teacher, and the ultimate goal of education is to enhance the students' development and learning.

Leadership and management: It is a well known fact that classroom management is a requirement of effective teaching. I try to use time efficiently as well as effectively to cover all the learning activities for each class meeting. On the first day of class, I clarify that the goal of my course is to develop an atmosphere of cooperation and not competition, and that the grading scale is not based on a curve so that one student's grade does not influence another student's grade. I also emphasize professional demeanor, which includes being prepared for the class, engaging in class discussions, listening attentively to the instructor and classmates, and respecting viewpoints that may differ decidedly from a student's own.

Finally, as Parker Palmer has said, "Real learning does not happen until students are brought into the relationship with the teacher, with each other, and with the subject." I try to create a sense of community in the classroom. In striving to be a facilitator rather than a teacher, I ask basic questions to stimulate discussion on basic concepts that allow the students to achieve competency in the content area. When I recognize the students' competence and experience, I especially welcome and encourage their participation. The classroom is often viewed as a theater and the teacher as a performance artist. If I can get the students' attention and create interest and excitement, I strongly believe that they will learn the content.

Section V

Educational Computing in the Asia-Pacific Region

Chapter VIII

Academic Online Resources and Global Implications

The question of finding the right information is perhaps even more important, and it requires a new organizing principle of information for the digital age…. The problem that people are running into with digitized information is that the amount of information is growing exponentially. The number of Web sites has grown from 5,000 to 50 million over the last 10 years or so, and the information they contain is very dynamic. At the same time, search engines are becoming more powerful and people are creating more sophisticated, semantically based retrieval mechanisms. All of that will, in fact, improve the quality of search and finding information. However, there is a different dimension, that of video and audio information, which cannot be routinely indexed and searched at present. (Goodman, 2001, pp. 13-14)

This chapter discusses scholarly electronic databases and specific gateways to U.S. government information available on the Web. These Web sites represent a sampling of resources either initiated by academic interests or by sources for the dissemination of public information that benefits those involved in higher education in all capacities throughout the Pacific region based on the following:

- Digital Collections of Educational Resources
- Online Educational Resources for the Pacific Region

Digital Collections of Educational Resources

ICT have brought adult learning and professional development into the center of the global education agenda (Pye, 1999). As technical advancements in higher education from a global perspective emerge, virtual resources to support digital programs and curriculums must be addressed. Curriculum designers consider what relevant materials are available in electronic format to reach students requiring online research support. E-resources can and do enable innovations in teaching (Henderson & MacEwan, 1997). From a collection development perspective, librarians select resources in an electronic format to cover a broad sweep of general materials such as encyclopedias. At the Pennsylvania State University library, the electronic version of the popular Encyclopedia Britannica was acquired, and data collected revealed that within a six-month period, this acquisition was searched over 140,000 times by Penn State users (Henderson & MacEwan, 1997).

Subject-specific electronic databases are interesting and gratifying for courses that require a more refined and specific scope of resources. One such resource that focuses on the humanities is JSTOR, which provides a wide and scholarly range of disciplines and is provided to students and faculty at UOG. With over 900 participating institutions in 84 countries, this electronic journal database provides scholars with a run of journals from first issue, many dating from the early 1800s. As a not-for-profit organization with a mission to archive important scholarly research into the future (JSTOR, 2004, www.jstor.org), this high quality database is particularly valued for institutions of higher education in more remote areas in which academic resources are scarce.

JSTOR's discipline-specific collections offer an electronic path to collection development and provide academic resources for specialized research.

The following represent digital collections provided to library patrons at UOG:

- **Business:** The 46 titles in the Business Collection are drawn from Arts and Sciences I, II, and IV. The collection brings together core titles in economics and finance, including many publications from the leading scholarly societies, with a range of critical research journals in accounting, labor relations, marketing, management, operations research, and risk assessment.
- **Ecology and Botany:** The Ecology and Botany Collection contains 29 titles in two important fields within the life sciences. Founded with the assistance of the Ecological Society of America, it contains this society's premier research journals alongside a range of titles broadly focused on ecosystems. Topics covered by the ecology journals are wide-ranging, from biodiversity and climate change to conservation and experimental biology. The botany titles—including the oldest botanical journal in the Americas—encompass a range of subjects such as plant biology, systematic botany, and taxonomy. Six of the Ecology and Botany titles are also available in the Arts and Sciences I Collection.
- **General Science:** The General Science Collection contains seven titles. These titles include several of the most important historical scientific journals published: Science, PNAS, and the publications of the Royal Society of London. The material included in this archive reaches back to the 17th century and in total coversmore than 800 journal years. There is no overlap with any Arts and Sciences collection.
- **Language and Literature:** The 57 titles in the Language and Literature Collection span the literary cultures of many different countries and contain articles in several languages (e.g., Arabic, Italian, and German). Developed with the help of the Modern Language Association, this collection includes PMLA and a range of core journals in the diverse fields of literary criticism that have emerged in the last 30 years. This collection includes 13 journals from the Arts and Sciences I collection and 44 journals from the Arts and Sciences III Collection.
- **Mathematics and Statistics:** JSTOR's Mathematics and Statistics Collection unites 30 titles in the mathematical and statistical sciences. Journals in this collection overlap with the Arts and Sciences I and II

collections, as well as with the Business and General Science collections (JSTOR, 2004).

One regional resource of note, dedicated to providing academic support for the Pacific to promote educational excellence for all ages is the Pacific Resources for Education and Learning (PREL, 2004). Situated in Hawaii, PREL's main focus is education with service centers in American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia (Chuuk, Korsrae, Phonpei, and Yap), Guam, Marshall Islands, and Palau. In order to best extend resources through out this vast region, PREL has established the Pacific Resources Online (PRO), a Web site developed by the Pacific Regional Technology Education Consortium, a collection of education links to external Web sites for topics recommended by the Pacific Curriculum and Instruction Council. This searchable Web site displays twenty links from each topic, to the best Web sites originating in the Pacific region, the continental United States, and worldwide. The search topics to be selected from a menu include arts and humanities, assessment and accountability, career guidance, culture and diversity, DE, educational technology, family and community, geography, health and safety, history and social sciences, math and science, physical education and sports, planning and evaluation, policy, professional development, reading and language, school leadership, school reform, self esteem and character education. When the term "distance education" was selected, the search results were as follows:

- **DE Clearinghouse**

  [http://www.uwex.edu/disted/home.html/]

  Part of the University of Wisconsin's Extension program, the DEClearinghouse brings together DE information and resources from around the world. It includes an introduction to distance learning as well as today's headlines, research, case studies, and guidelines.
- **Distance Educator**

  [http://www.distance-educator.com/]

  Founded by Farhad Saba, Distance-Educator.com provides distance learning resources categorized into classifications for learners, teachers, evaluators, policymakers, parents, and software providers, among others. Also, there is up-to-date information on distance learning news and trends, and a free daily e-mail newsletter on distance learning news. Topic: DE. Country: All regions.

- **Distance Learning Exchange (DLE)**

  [http://www.dle.state.pa.us/]

  DLE is an Internet directory of distance learning events developed by the Pennsylvania Department of Education. The directory has several search options to look for free or fee-charged activities related to distance learning satellite teleconferences, videoconferencing courses, electronic field trips and Web quests. DLE enables schools to find distance learning partners throughout the world and brings together those offering activities with those seeking distance learning projects or events. Topic: DE. Country: All regions.

- **Distance Learning Resource Network (DLRN)**

  [http://www.dlrn.org/index.html/]

  DLRN is the dissemination organization for the U.S. Department of Education Star Schools program, which is a major federal effort to expand DE. The site contains links to online newsletters and journals, a library, and a searchable database for DE. Topic: DE. Country: All regions.

- **Distance Learning on the Net by Glenn Hoyle**

  [http://www.hoyle.com/]

  This site is an excellent place to begin research on DE. It provides valuable resources, links, and basic background information. Topic: DE. Country: All regions.

- **Resources for DE**

  [http://Webster.commnet.edu/HP/pages/darling/distance.htm/]

  This listing, maintained by Professor Charles Darling of Capital Community College in Hartford, CT, provides links to newsgroups, journals, and other useful e-resources for distance learning. Topic: DE. Country: All regions.

- **Teaching and Learning on the Web**

  [http://www.mcli.dist.maricopa.edu/tl/index.html/]

  This searchable collection of online courses ranges from those delivered entirely via the Web to others that offer specific activities or class materials. Topic: DE. Country: All regions.

- **National Education Association's Higher Education Distance Education Resources**

  [http://www.nea.org/he/abouthe/distance.html/]

  The resources found here include practical, ready-to-use ideas submitted to the National Education Association (NEA) by educators, as well as recommended links. Topic: DE. Country: All regions.

- **TEAMS Distance Learning**

  [http://teams.lacoe.edu/]

  TEAMS is a national distance learning consortium that uses distributed learning technologies to bring learning opportunities to K-8 students, teachers, and parents across the United States through Web-based online and multimedia instruction. Created by the Los Angeles County Office of Education, the site not only provides links to K-12 online educational resources, but also offers professional development and teacher's guides. Topic: DE. Country: All regions.

- **U.S. Distance Learning Association Journal**

  [http://www.usdla.org/html/journal/OCT02_Issue/index.html/]

  This is a peer-reviewed journal of the United States Distance Learning Association, whose mission is to promote and provide up-to-date information on DE. Back issues are available to 1998. Topic: DE. Country: All regions.

Additional Resources for DE

- **The e-Academy**

  [http://www.k12.hi.us/~atr/e_academy/e_academy.htm/]

  The e-Academy creates magnet schools and training centers, providing students with challenging course offerings in math, science, and advanced technology. Industry professionals collaborating with the University of Hawaii and businesses will also train teachers. Made possible by a Hawaii Department of Education and U.S. Department of Education Technology Innovation Challenge Grant, the project aims to promote equity and diversity by encouraging groups with the greatest needs to participate. Topic: DE. Country: Pacific Region.

- **Pan-Pacific Distance Learning Association (PPDLA)**

  [http://ksdl.ksbe.edu/PPDLA/]

  PPDLA aims to provide regional leadership information, case studies, and publications to help promote successful distance learning programs. Based in Honolulu, PPDLA's primary geographical focus is on Hawaii and the Pan-Pacific region. A calendar of events for the region and helpful e-resources are found on the site. Topic: DE. Country: Pacific Region.

- **Pacific Telecommunications Council (PTC)**

  [http://www.ptc.org/index.html/]

  Founded in 1980, PTC is an international, nonprofit, nongovernmental membership organization. Its mission is to promote the development of telecommunications and related industries in the Pacific region. PTC creates opportunities for networking and the sharing of information through its annual conference held each year in Honolulu attracting thousands of attendees and participants from across the Pacific. Topic: DE. Country: Pacific Region.

- **PEACESAT**

  [http://www.peacesat.hawaii.edu/]

  PEACESAT is a public service satellite telecommunications network that links educational institutions, regional organizations, and governments with a mission to develop and promote telecommunications and IT in the Pacific region. In addition to providing data, voice, and video services, PEACESAT offers conferences, trainings, and links to selected papers and reports. Topic: DE. Country: Pacific Region.

The potential benefits of electronic reference materials to support higher education are increasingly more available. "Electronic versions of reference products have been part of the online library mix for a number of years, but the pace of conversion to online reference tools is quickening" (Webster, 2003, p. 24). The prevalence of specific databases focused on academic and scholarly clientele, accessible by remote areas such as the Asian Pacific region is "reaping the benefits of information and communication technologies" (Rao, 2003, p. 48). In addition to scholarly resources provided by an academic environment, "the U.S. Federal Government has been a major publisher on the Internet" (Notess, 2003, p. 256), and provides subject-specific gateways to government information on the Web.

Online Educational Resources for the Pacific Region

The following Web sites represent a sampling of resources either initiated by academic interests or a source for the dissemination of public information, and benefit those involved in education in all capacities throughout the Pacific region.

PREL and EBSCOhost

PREL's (Figure 1) business is education, and they have provided EBSCOhost (Figure 2), an online electronic database of full-text journals with thousands of titles, as a gift to the Pacific region. EBSCOhost supports a range of academic areas and provides an invaluable resource to scholars of all ages (PREL, 2004).

Micronesian Seminar

An additional, innovative online resource for Pacific researchers (Figure 3) is the treasured Micronesian Seminar (MicSem) — founded in 1972 as a research-pastoral institute and founded by the Catholic Church. With the prime

Figure 1. Home page of PREL

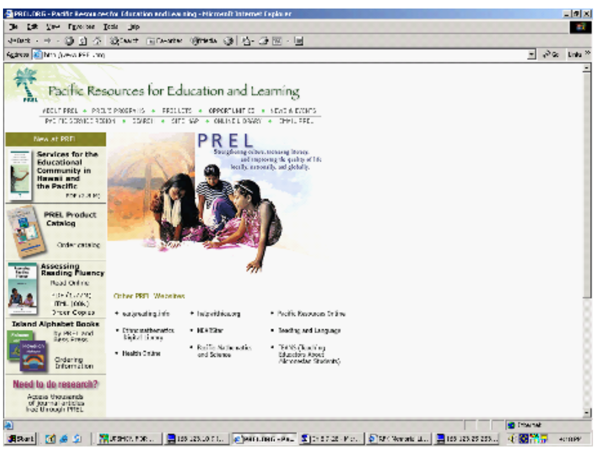


Figure 2. EBSCOhost academic search premiers

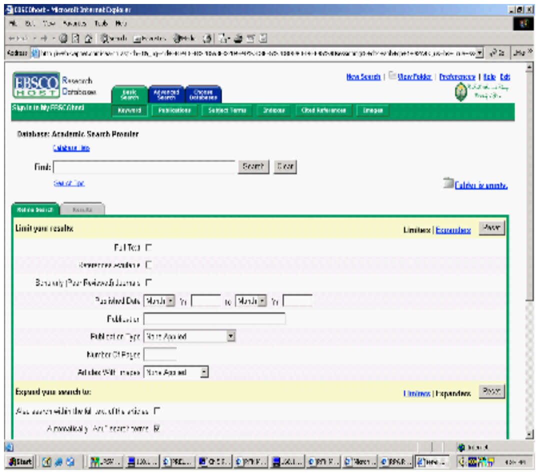
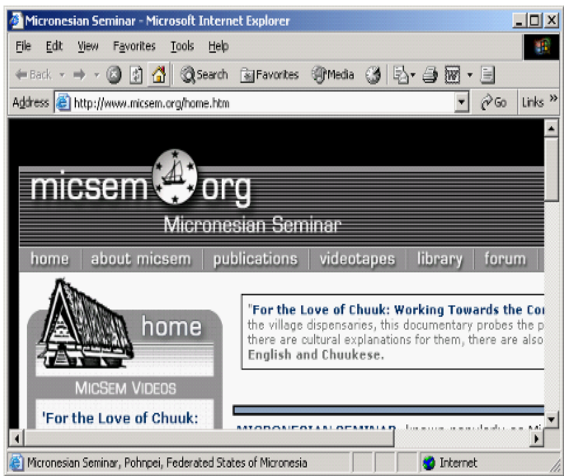


Figure 3. Home page of MICSEM (Micronesian seminar)



focus of educating Micronesians for the past 30 years, founder and director Jesuit Francis Hezel has long been concerned about how change and modernity have impacted cultural survival (Micronesian Seminar, 2004). Through the Internet, MicSem provides a vast array of social, historical, and community educational materials from a searchable Web page, all with the goal of offering an archived resource reflecting life in the islands and the impact of change (Micronesian Seminar, 2004).

Pacific Island Internet Resources

Pacific Islands Internet Resources (Figure 4), compiled by Michael R. Ogden, is a site that is dedicated to assembling Web sites relating to the Pacific Islands. Providing a map with clickable locations, the site includes conferences, seminars, workshop updates, and information from a national and international perspective. It is a self-proclaimed bonanza of resources and information relating to societies across the Pacific.

The Pacific Studies WWW Virtual Library

The Australian National University sponsors the Pacific Studies WWW Virtual Library (Figure 5) with links to the Pacific Studies WWW Monitor and the Asian Studies WWW Virtual Library. Established in 1995, this site includes information on Asian studies, Asia-Pacific conferences, Pacific manuscripts, Pacific history journal bibliography database, online maps and atlases, all with a focus on Pacific e-resources.

Figure 4. Home page of Pacific Islands Internet resources

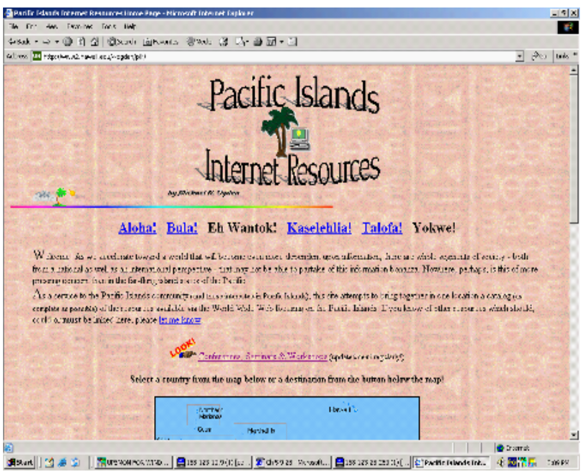


Figure 5. Home page for Pacific studies WWW virtual library

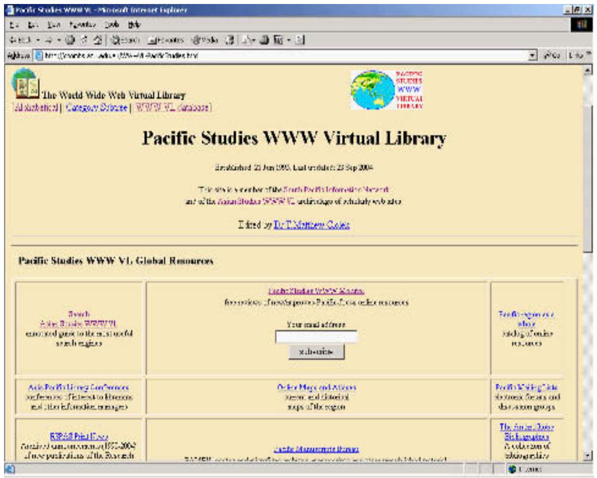
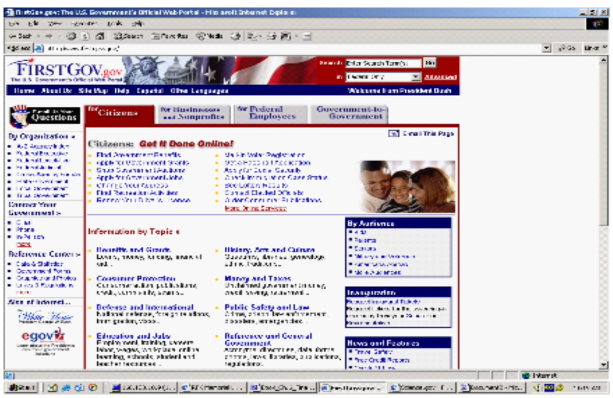


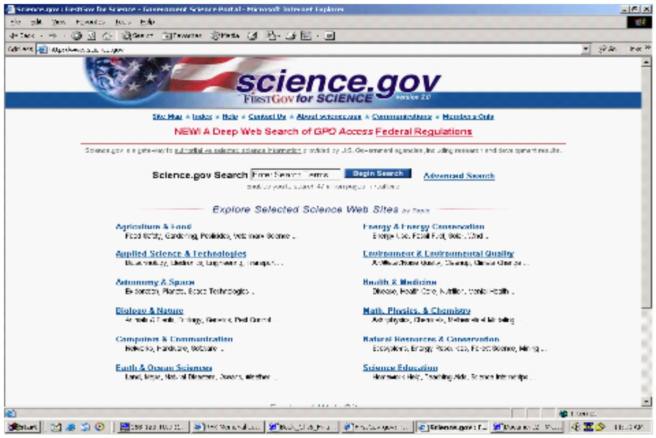
Figure 6. Home page FirstGov.gov, the U.S. government's official Web portal



FirstGov and FirstGov for Science

"There is no better example of e-government than FirstGov (Figure 6), because the 'e' also means effective, efficient, and excellent government" (McGinnis, 2003, p. 54). This award-winning gateway, with 150 million Web pages,

Figure 7. Home page for Science.gov, a scientific and technical database within 12 federal agencies



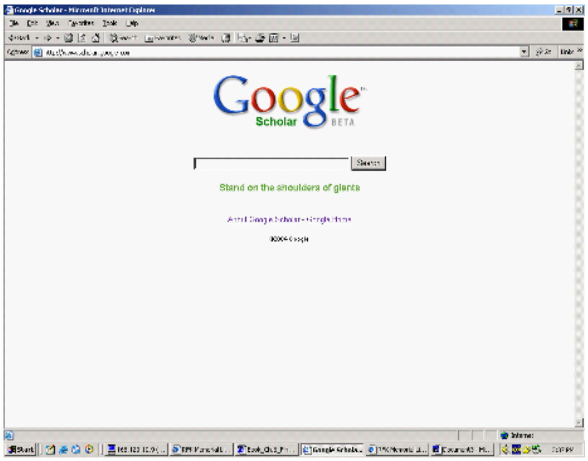
provides individuals with current facts and assistance relating to government information and services. Beyond its impressive scope, FirstGov remains on the cutting edge of e-government information access. FirstGov for Science (Figure 7) is committed to serving the science-inquisitive citizen, offering an extensive resource to researchers and to the business community.

Google Scholar

Google Scholar (Figure 8) is a valued database dedicated to scholarly literature, specifically peer-reviewed papers, theses, books, abstracts, and technical reports based on a range of established research from academic publishers, professional societies, preprint repositories, and universities.

Librarians have been committed to providing and developing online reference services to library patrons interested in digital access to information; historically these services have been primarily in English. Now because libraries provide for more multicultural communities, interest in a bilingual virtual reference service is emerging. A bilingual service primarily in English and French has been developed in New Brunswick, Canada. The issues and challenges relating to software, staffing, finding quality resources, translating, collaborating, and

Figure 8. Home page for Google Scholar



marketing serve as a model for virtual reference services focused on offering a variety of languages to the world of library access (Pascal, 2004).

Future Trends

"The global spread of ICT and the English language are now providing the conditions for the development of a truly global market in teaching and learning" (Newby, 1999, p. 107). The growing market for DE has been calculated at $300 million globally and expanding, based on an economy rooted in information access. There are examples of higher education in the U.S. where institutions (such as the University of Phoenix, owned by Apollo communications Inc.) provide a high level of academic courses with over 50 support centers in major cities, resulting in posted profits of $12.7 Million. Students enrolled in these DE programs access their course materials over the Internet. Other DE initiatives involve consortiums of public universities that pool resources and cover vast distances, reducing the cost of developing courses, like at the Western Governors University. This effort in the midwest and northern Rockies region beyond academics have banded together for marketing and technical distribution as well (Newby, 1999).

Plans to mirror these partnerships with an "international cyber university" have been discussed by a consortium of 15 colleges situated in the Asia Pacific region. The details of this initiative were recently discussed at a joint meeting between government and academic institution personnel at Ewha University, Seoul, South Korea. With the intention of delivering courses over the Internet and teleconferencing, the challenges of technical hurdles and language obstacles were discussed for this virtual campus with representatives from Japan's Keio University, Yokohama; Chulalongkorn National Khon Kaen University, Thailand; Vietnam National University; and the Hanoi University of Technology. Working towards a pilot version of the Cyber University with an enormous geographic range by next year, the consortium focused on a variety of challenges such as:

- Jointly awarding degrees from all institutions
- Providing students with access to the compatible hardware and bandwidth access
- Assuring that the correct fonts and characters were installed on computer systems to avoid Web browsers from crashing
- Opening the possibility of American universities joining the consortium in time

Pedro Loureiro, a historian from Pomana College, maintains that between 30-40% of American academic institutions are not on par technically with Asian counterparts. This is a factor that American educators must consider when reaching to Asia for academic technical partnership (Cohen, 2002).

Summary

ICT have brought adult learning and professional development into the center of the "global education" agenda. As technical advancements in higher education from a global perspective emerge, an area that is addressed in this chapter includes virtual resources to support digital programs and curriculums. Curriculum designers must consider what relevant materials are available in electronic format to reach students requiring online research support. E-resources can and do enable innovations in teaching (Henderson & MacEwan, 1997). From a collection development perspective, librarians select resources in an electronic format to cover a broad sweep of general materials, as well as subject-specific databases. The potential benefits of electronic reference materials to support higher education are increasingly more available. ”Electronic versions of reference products have been part of the online library mix for a number of years, but the pace of conversion to online reference tools is quickening” (Webster, 2003, p. 24). The prevalence of specific databases focused on academic and scholarly clientele, accessible by remote areas such as the Asian Pacific region is “reaping the benefits of information and communication technologies” (Rao, 2003, p. 48).

The quality and quantity of government information available to the public online is a national treasure. The range and depth of this resource is beyond imagination. The good news is that educators, especially those located in remote areas, now have extraordinary opportunities that are seemingly unlimited in the area of current and relevant resources. This chapter has profiled academic seminars organized to enhance curiosity and to inspire those dedicated to Internet technology by exploring the wealth of education materials through the U.S. government. Clearly, U.S. government e-resources are one solution to counter the current national epidemic of slashed education budgets, and to addressing the information challenges of geographically remote educational institutions.

Education Essay

Source: Inoue, Y. (2004, Fall). Poetry and educational research. APA Perspective, 7.

Poetry and Educational Research

As a researcher and as a poet, I have read Melisa Cahnmann's article, *The Craft, Practice, and Possibility of Poetry in Educational Research* (2003), with interest. The author explores a poetic approach to inquiry among teaching and learning communities, and particularly discusses the use of poetry for educating graduate students in educational research. I have been writing *tanka* poetry for many years, and my third collection of *tanka* has been published in 2003. I think that *tanka* is a violet in the garden of Japanese literature—not gorgeous like a rose and not striking like a sunflower, but the flower is always lovely. When I joined the University of Guam, I expressed my feelings in a *tanka* poem as follows:

holding a heavy
travelling bag packed only
with my new hope
I stand still, looking at my new
post, the island of Guam

I teach graduate courses in educational research, so poetry is not my subject area, but I have invested much passion and commitment to poetry. Occasionally I teach *tanka* in the University graduate course in education as a language and literacy special topic seminar. This course introduces students to the world of English-language *tanka*, which is a new creation of an ancient style of Japanese poetry that speaks to the modern soul. I enjoy this teaching opportunity to share my knowledge and my passion. Most of my students in this course are schoolteachers. The following are some of their comments on this course and on *tanka* poetry:

- I find that within the five lines, the authors are able to relate an even greater message and create a larger picture, allowing the reader insight without saying too much.
- Tanka is very freeing because it allows me to express my deepest thoughts in a very creative manner.
- As a teacher of second-graders, I found it a good idea to introduce it to them. What a great opportunity to introduce a tanka writing activity to accentuate the school curriculum!
- This class has fulfilled my expectation for helping me develop a real appreciation for poetry along with a knowledge base that gives me more confidence to teach poetry in general.
- Writing tanka poetry gives me a chance to release feelings, although it is challenging to be precise in expressing myself in as few words as possible.

Comments such as these and many others of a similar nature indicate clearly that my students would like to have this type of course made available more often. Cahnmann's main discussion is about poetry and qualitative research as a possibility. She starts from the powerful statement: "writing is a vital element of any research inquiry" (p. 29);.then she discusses the notion that "poetry is a risky business." Finally, she recommends as follows: "we might decide to read more poetry, take a creative writing class, and take more risks in our field notes and articles…to communicate findings in multidimensional, penetrating, and more accessible ways" (p. 35). "Poetry is a risky business," says Cahnmann. Exactly so! And, to me, poetry is a serious business.

Chapter IX

An E-Learning Journey: Opportunities and Challenges for the 21st Century

A day in the life of a student in the year 2010*: A student enters a learning center building and goes directly to her personal information panel. After checking in, the student is prompted to attach her electronic notebooks to upload homework from the prior day and transmit any communications from her parents. This information is sent to her is age-appropriate and is processed based on the type/assessment criteria. The assessed work is uploaded to her file, which she can access when she attends the class that deals with the information. This information is used as a personal baseline for the day's individually designed learning activities. She also may upload her work electronically via the Internet to receive constructive feedback in a timely manner to make decisions on the process and progress of her work.* (Smith & Shelley, 2002, p. 21)

The trend of higher education in the 21st century will continue to experience enormous growth in the area of ICT. Undercoffer (2000) states in his article titled *Trends and Megatrends:* "Those of us in the business of professional education, however, must make predictions on a regular basis. Our task of preparing students for careers several years out has become increasingly complex as the rate of change has accelerated" (p. 27). In order to keep pace with this change, policymakers have opportunities and obligations to move forward with a new direction for teaching and learning in the 21st century; all educational stakeholders must collaborate in creating a new vision for education"(Maurizio & Wilson, 2004). With attention concentrated on future priorities and initiatives,

Whether we are looking at education in 2020 or integrating technology throughout all of the curriculum and instruction by the end of 2006, we all hold the common vision that each student and educator at every level of schooling needs anytime, anywhere access to appropriate technology. (Fletcher, 2004, p. 6)

Technology, particularly e-learning, is an integral part of today's education. Focusing on future possibilities and directions of educational technology in general, this chapter discusses challenges and opportunities of technology in the Asia-Pacific region in particular, based on the following:

- Education in the Digital Age
- 21st Century Teaching and Learning
- Diversity, Bilingualism, and Technology
- Opportunities and Challenges for Change

Education in the Digital Age

E-learning is understood as a wide set of applications and processes involving Web-based learning, computer-based learning, virtual classrooms, and digital collaboration, in addition to the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive

TV, and CD-ROM (ASTD, 2001). It does appear that e-learning is one of the promising ways of teaching, learning, and thinking. The popularity and advantages of e-learning stems from (1) 24/7 (24 hours a day, 7 days a week) accessibility, (2) anytime-anywhere instruction, (3) ease of updating information, and (4) self-paced learning (Tan & Hung, 2002). Based on the growing body of research and experience in Web-based instruction, the designs for online courses, for instance, have become more sophisticated as described as follows (Gayeski & Brown, 2004):

- The first generation of online teaching is characterized by a straightforward information distribution approach based on a traditional subject matter delivery approach.
- The second generation builds on the first by adding an interactive facility through discussion boards and conferencing software based on peer-to-peer communication and collaboration.
- The third generation builds on the first two, but incorporates the active utilization of the contemporary and ongoing workplace experiences. (pp. 40-41)

Collaborative learning systems are auto-generative; that is, instead of being entirely *canned*, much of the information is created in real-time by the instructor and learners are continuously updated (Gayeski & Brown, 2004). Technology increases the potential for students to have a variety of learning environments, from *simulated role-playing* to *problem solving* to *interactive dialogue*. The various software programs have the ability to respond to a range of learning styles and varying degrees of student sophistication while allowing students to learn at their own paces (Marcy, 2004). The following are some of the observations and forecasts related to technology-enhanced teaching and learning:

Observations and Forecasts on Educational Technology

- The writing-across-the-curriculum movement and the integration of IT into the college classroom are two innovations. When used in conjunction with each other, these innovations can radically change the milieu of the college classroom (Knowlton, 2002).

- The growth and development of academic courses utilizing Internet-based technologies is due to many factors, both technological and pedagogical (Bennett & Bennett, 2003).
- Both instructors and learners need to acquire a new type of literacy—the ability to create, structure, locate, search, and retrieve materials in multimedia and digital forms (Wang, 2003).
- Technology enables students to organize information in the prewriting stage, and word processing programs aid students in the drafting, revising, editing, and publishing stages (Valmont, 2003).
- IT, which will have a major impact on classroom design over the next decade, has set the stage for the migration of the expository lecture *from the classroom to the network* (Graetz & Goliber, 2002).
- Given the very rapid developments in other hand-held consumer technology such as palm-tops, mobile phones, and digital cameras, it is clear that we are only at the beginning of seeing the full power of hand-held technology in an educational setting (Oldknow, 2001).
- Cognitive science theories and related instructional techniques are very closely aligned with technology education and its traditional emphasis on experiential learning (Brown, 2001).
- The diffusion of constructivism into the introductory IT course has benefited the students in enhancing their positive IT attitudes (Wong, Habibah, Ahmad, Kamariah, & Tang, 2003).
- By preparing their students to participate in a technology-based economy, schools play a vital role in closing the gap between the *haves* and the *have nots* (Offir, Barth, Lev, & Shteinbok, 2003).
- Using the Internet allows access to a world of information, and it is important that students with disabilities have the same access to the Internet as other students (Wall & Sarver, 2003).
- In academic and work settings, two major trends have occurred in the past decade: the use of software tools to support work and provide instruction; and the movement away from individual work and study towards *teamwork* and *collaborative learning* (Gayeski & Brown, 2004).
- Technology clearly has the ability to confuse, intimidate, and frustrate learners (King, 2002).

- Technology started changing our lives so quickly that we almost did not notice the consequences of such a radically different way of dealing with reality (Tenorio, 2003).
- A museum Web site should not try to recreate the traditional museum experience because its Web site is a different medium with its own strengths and limitations (Cennamo & Eriksson, 2001).
- Distance learning programs must not only utilize cutting-edge technology, but also encourage the development of innovative methods to address the needs of special populations (Lagier, 2003).
- With online courses, faculty members can spend more time planning, facilitating learning, and developing higher order thinking skills and can spend less time presenting content (Gillespie, 1998).
- E-mail is faster and cheaper than traditional forms of communications, such as telex, fax, phone or postal mail; it also facilitates distance learning (Soong, Chan, Chua, & Loh, 2001).
- Through videoconferencing, we discuss pedagogical strategies and tools, give workshops and conference presentations, and coauthor articles (Weis, Benmayor, O'Leary, & Eynon, 2002).

The future of educational software could help convince professionals that technology offers them something they cannot live without, and the following are the examples that contribute to this campaign (Roblyer, Vye, & Wilson, 2002):

- Internet delivery or enhancements (Educators hope that the ubiquity of Internet connections will signal not only increased access to high-quality learning software, but also decreased cost.)
- Emphasis on visual and three-dimensional problem-solving environment (VR environments may become the future of simulations, allowing students to work with increasingly realistic representations of places and systems they could not possibly access in real life.)

- Visualization and modeling software (Visualization is an underlying concept in technology-based learning in mathematics and science concept areas. Animated and video displays that model complex phenomena have the potential to help make abstract concepts more readily understandable.)
- More apparent relative advantage (More software is being designed with an eye to persuading educators and trainers that using the product is worth it to them.)

21st Century Teaching and Learning

There are two important questions that higher education must address while creating its future: (1) How to respond to dramatic changes in the profile of the student body; and (2) how to educate effectively the diverse student body. New institutional structures need to have much greater flexibility and efficiency (Marcy, 2004, p. 211). Faculty will become designers of learning environments. In Marcy's words:

Faculty members will no longer be the sole conveyers of course content, as the environments in which students learn will expand. This will place added importance on the faculty's role in assuring the intellectual rigor of academic outcomes and in tying out-of-classroom experiences to intellectual constructs. It is important for faculty to spend less time in the current activities of lecture and test so that they will have time for the new work needed in mentoring and in developing and assessing quality learning environments. The ideal of the complete scholar will remain a reasonable expectation for faculty; yet, our understanding of the nature of teaching has begun to change. (p. 215)

Experts predict that most of the jobs that will exist in ten years do not exist today and that most of those new jobs will require education past the high school level (Beekman, 2005). With this rapidly changing market, according to Beekman, it is unreasonable to assume that workers can be trained once for lifelong jobs. Instead of holding a single job for 40 years, today's high school or college graduate is likely to change jobs several times. Those people who do keep the same jobs will have to deal with unprecedented change. Therefore, in the information age, "Learning must be a *lifelong process*. To prepare students for a lifetime of learning, schools must teach students more than facts; they must make sure students learn how to think and learn" (Beekman, 2004, p. 399), and the student-centered learning can be encouraged.

The student-centered learning environment shifts the instructor's role from the source of all knowledge to a guide in the learning environment where they learn and work together (Wong, Habibah, Ahmad, Kamariah, &Tang, 2003). Chute, Thompson, and Hancock (1999) summarizes a comparison of 20^{th} and 21^{st} century workplace learning environments as presented in Example 1.

Specifically, in Chute, Thompson, and Hancock's (1999) words:

> *Increasingly, learning activities can be customized and individually paced to serve a variety of learner needs. In this environment, the learner can be less of a listener and more of a collaborator in the learning experience. Technologies that support collaborative work by geographically separated participants will allow team learning, with the learners and instructors sharing responsibility for structuring and maintaining the learning process. As learners gain more experience and confidence in this type of learning environment, the instructor can increasingly fill the role of "guide on the side" rather than "sage on the stage."* (p. 207)

The study based on the data from preservice teachers (N = 102) has revealed that IT training is essential because it reduces the differences among participants with differing levels of competency with regard to attitudes. The magnitude of their strong dislike toward IT was greatly reduced after the IT training in the areas of word processing, spreadsheet use, database management, presentation software use, Web browsing, and telecommunication use (Wong et al., 2003).

Example 1. 20^{th} century learning vs. 21^{st} century learning

Twentieth century learning (instructor-centered)	*Twenty-first century learning (learner-centered)*
• Lecture	• Facilitation
• Individual learning	• Team learning
• Student as listener	• Student as collaborator
• Instructor as source	• Instructor as guide
• Stable content	• Dynamic content
• Homogeneity	• Diversity
• Evaluation and testing	• Performance

The increasing importance of the new information and communications technology in all aspects of university activity (teaching, training, learning, research, and service to society) leads to a need for a fundamental rethinking of the educational process, the role of individualized and interactive learning, face-to-face contacts, and teamwork (Ginkel, 2003). At the same time, face-to-face relationships are still vital but there is a new challenge to provide a rich range of opportunities that facilitate open-ended learning and thinking processes. Ginkel describes the university of the 21st century in the following terms:

During the 1990s, a typical theme of a conference on the role of the university was "the university of tomorrow." Now, however, tomorrow has arrived, and universities are undergoing very powerful stimuli to transform themselves. The principal driving forces are the development of knowledge societies and economies, the all-pervasiveness of the information technologies, globalization, and the debate on public or private education. These forces generate myriad responses that, while defying the elaboration of blueprints, call for constant change and diversity. (p. 83)

In the past decade since the release of the first Web browser (navigable windows into the Web), IT has implemented itself into virtually every corner of higher education: colleges use databases, networks, and a dizzying array of software to maintain academic and financial records, recruit new students, communicate with current students; enable professors to collaborate on research, disseminate library materials, and teach, whether in a classroom or as distance education (Ten challenges, 2004). The ten challenges that will face academe in the next decade include: (1) Collaboration (faculty and staff instant messages, concurrently view and revise papers for publication, share instrument data, and hold videoconferences); and (2) wireless networks (As colleges extend their wireless coverage, more students carry laptops, and any question that crosses a student's mind or any conversation that could be helped by having more information produces the response.)

Technology has become ubiquitous as a tool for teachers and students, especially in such areas as organization, note-taking, writing, academic productivity, access to reference and general educational materials, and cognitive assistance (Behrmann & Jerome, 2002). Reigeluth (2002) believes that teaching methods might shift from decontexualized learning to authentic tasks,

Table 1. Principles for a learning-focused paradigm of education (Reigeluth, 2002, p. 10)

Mastery learning	Each student should continue to work on a skill.
Continuous progress	Each student should move on to another skill or topic as soon as one is mastered.
Personal learning plan	Each student should have his or her own plan that specifies what to learn, in what order, and through what methods.
Authenticity	Each student should learn tasks or topics that are relevant to his or her life and should teach them in as authentic a context as possible.
Performance-based assessment	Each student should be assessed through means that are as typical of real-world requirements as possible.
Peer-assisted learning	Each student should have ample opportunities to learn collaboratively with peers.
Self-directed learning	Each student should be given gradually increasing responsibility for managing his or her own learning, as the ability to do so is developed.
Teacher as coach	Each teacher should coach students to become better self-directed learners while helping them to acquire domain-specific skills and topics.
Meaningful content	Each student should focus his or her learning on skills and topics that will be most useful personally, including higher-order thinking skills and meaning making.

Table 2. Learning-centered teaching: Five key changes to practice (adapted from Weimer, 2002, learner-centered teaching)

Area	Currently	The change	Example	Implication
1. The balance of power	Faculty make the key decisions about learning for students.	In ethically responsible ways, faculty share decision-making about learning with students.	Assignment choices and policy setting.	Teachers control less, but students are involved more.
2. The function of content	Faculty cover content with the goal of build strong knowledge functions.	Content should be used to build a knowledge base and to develop learning skills and learner self-awareness	Approaches that do not separate learning strategies from content –end of class summaries, exam review sessions.	Teachers cover less, but student learn more.
3. The role of the teacher	Most instructional practice still features teacher action.	Instructional practice still features teacher action.	Approaches that overcome the propensity to tell— not *going over* the syllabus, how-to study advice.	Facilitative roles are more difficult and no less central in student learning experiences.
4. The responsibility for learning	Faculty "force" learning on reluctant participants.	With students, faculty create environments that motivate students to accept responsibility for learning.	Activities to create constructive classroom climates and let there be logical consequences.	As students grow more autonomous, they need teaches less.
5. The process and purpose of evaluation	Evaluation activities are grade-oriented and completed exclusively by teaches.	Evaluation activities should also be used to promote learning and to develop self-and peer assessment skills.	Ways to use self-and peer assessment – participation.	Accurate self- and peer assessment results in fewer arguments over grades.

proposing the principles that characterize the new paradigm of education (see Table 1).

A book titled *Learner-Centered Teaching* by Weimer (2002) applies to the college and university classroom. This book offers the five key concepts to practice in higher education (see Table 2), focusing on the teaching and learning curriculum objectives rather than the content-delivery-based focus such as Weimer's own teaching experiences described in the following paragraph:

As I thought about the beginning communication course I was to teach, it seemed to me that what prevented students from doing well was a lack of confidence. They needed to find their way past self-doubt, awkwardness, and the fear of failure or a place where they could ask a question in class, make a contribution in a group, and speak coherently in front of peers. It came to me that I might address the problem by making the students feel more in control…. I tried this approach…students were committed to the class; they appeared genuinely interested in the content. They asked more questions, sustained discussion longer…. It was not instructional nirvana, but it was a decided improvement, and I was motivated to continue refining this approach. (pp. 1-3)

We should recognize that neither IT nor educational settings are the direct cause of the changes we are experiencing; nevertheless (Castells, 1999):

Without new information and communication technologies, none of what is changing our lives would be possible. In the 1990s, the entire planet is organized around telecommunicated networks of computers at the heart of information systems and communication processes…. Technology per sedoes not solve social problems. But the availability and use of information and communication technologies are a prerequisite for economic and social development in our world…. In sum,globalization is a new historical reality. (pp. 1-5)

It may be that information and knowledge have always been essential factors in power and production. To invest in education is a productive investment; an educated labor force is a source of productivity. An educated populace is a vital resource for national growth and development in a global economy, and an important mission of higher education is to assist students in participating in the global economy (Cobb, 1999). Bill Gates put it: "In all areas of the curriculum, teachers must teach an information-based inquiry process to meet the demands of the information age. Meeting this challenge will be impossible unless educators are willing to join the revolution and embrace the new technology tools available."

Higher education must be the leader in the use of new technologies. The modern mission of higher education increasingly focuses on effective teaching and learning related to occupational training for students, in addition to the intellectual development of the students. Higher education faculties are responsible for preparing tomorrow's teachers, as well.

Diversity, Bilingualism, and Technology

The following are some perspectives concerning diversity, bilingualism, and technology:

- **Libraries:** Based on the notion that libraries are all about *choice*s, Parry (2002) provides a discussion as to (1) The role of audiovisual materials in increasing circulation and library visits, (2) the effect of format proliferation in radically changing the depth and diversity of a collection, and (3) what public libraries can do to meet the challenges of offering format choice while maintaining quality of the collection.
- **University Deans:** Universities expect deans to lead their colleges based on six strategies: (1) Create a diverse culture, (2) know the legal environment, (3) become technologically connected, (4) strategically manage and secure financial resources, (5) seek and maintain professional and personal balance, and (6) nurture the integrity of the college (Wolverton, Gmelch, Montez, & Nies, 2001).
- **Counseling:** The profile of the typical community college student is different from that of the student of 40 years ago, and community colleges should recruit bilingual and bicultural counselors (Ryan, 2002).*Effective instruction*: From the notion that all teachers can participate successfully in educational reform, it is natural for Calderon (1997) to believe that effective instruction in bilingual and multicultural schools requires that teachers combine a sophisticated knowledge of subject matter with a wide repertoire of state-of-the-art knowledge about learning theory, pedagogy, technology, and assessment.
- **Content Integration:** The goal of content integration is to expand the curriculum by incorporating contributions of diverse cultures into traditional disciplines of study through technology: e-mail and multimedia technologies promote communication and interactions between diverse groups with the purpose of helping students learn more about content they study in subject areas (Marshall, 2001).

- **Mentoring:** New forms of work, technology, and learning are influencing the practice of mentoring. Organizational trends such as downsizing, restructuring, teamwork, increased diversity, and individual responsibility for career development are contributing to a resurgent interest in mentoring in the 1990s; telementoring through the Internet is emerging as a way to pair teachers and learners with subject matter experts who can provide guidance and feedback on learning projects (Kerka, 1998).
- **Digital Divide:** Computers and the Internet are becoming increasingly important for full participation in life and are revolutionizing the ways people learn, communicate, and earn a living. Thus the digital divide (the separation between those with access to new technologies and those without) is seen as one of the leading equity issues in the United States (Lonergan, 2000).

Diversity and Educational Technology

- **Electronic Admission Process:** Students can use technology to receive advisement, register for classes, explore potential careers, and prepare assignments for classes. Hirt, Nurray, and McBee (2000) examined outcomes associated with the use of technology in the admissions process and found: (1) Women did not use technology to the same extent as men, and (2) the minority students were less likely to apply for admission electronically. The use of electronic admission systems could lead to a decrease in the number of female and minority applicants. The increased use of technology in the admission process, a seemingly positive objective with respect to technology, had unanticipated negative consequences for the university's goal of increasing diversity among students.
- **Diversity in Sciences:** From the perspective that technology is increasingly being driven by advances in the understanding of the life sciences rather than the physical sciences, Campbell (2002) urges that higher education, particularly in the sciences, is facing challenging questions as the various disciplines unfold, pointing out that one crucial issue is the inadequate success in developing the full potential of students in the sciences from all economic and ethnic backgrounds, that is, developing a more diverse cadre of students and to bring them into the natural sciences, mathematics, and engineering professions.

- **Technologies to Promote Equality and Cultural Diversity:** According to Merryfield (2000), one of the critical failures of social studies teacher educators in the late 20th century has been the inability to prepare teachers who teach for educational equality, cultural diversity, and global interconnectedness. Merryfield focuses on the use of electronic pedagogy and its application within graduate courses in social studies and global education. Teachers in Merryfield's article have perceived the initial online postings of bios and threaded discussions as more purposeful than an oral class discussion because of the deliberate nature of reading and writing messages, even though teachers have to work on the online assignments late at night or very early in the morning. Online discourse is substantively different from face-to-face, especially on sensitive and controversial topics. Finally, "We need studies designed by researchers in both technology and multicultural and global education across many contexts to understand how electronic technologies can improve these aspects of social studies teaching and learning" (p. 520).
- **Evaluation of Web Forum:** Soest, Canon, and Grant (2000) discuss challenges that educators face in attempting to develop culturally competent social workers that understand the dynamics of oppression and embrace a commitment to promoting social justice. According to the authors, what students liked about the Web forum include: anonymity (because they feel safe); expression of sensitive issues (but discussions are open and frank); and time factor (provides an extended period of time for discussion). What students disliked about the forum include: negative nature of student comments (which are judgmental and disrespectful); patterns of participation (only a few people post regularly); and technical issues (setting up e-mail accounts, slow download times, and Internet phobia).
- **Limitations of Online Courses:** Marra and Jonassen (2001) examined the effects of distance learning pedagogy that emphasizes alternative forms of knowledge representation, and the use of distributed tools on student outcomes. The data from student performance in the K-12 education online program revealed that learning outcomes are limited by the lack of pedagogical influences in the course delivery. This is because online courses do not support the use of alternative forms of knowledge representation by learners, authentic forms of assessment, and the use of distributed tools to scaffold different forms of reasoning. The range of student learning outcomes is restricted to reproductive learning.

- **Diversity Module:** Gabbard, L'Esperance, Perez, and Atkinson (2002) share the experience of the development of the Diversity Module for online delivery utilizing the Blackboard distance learning platform for teacher preparation. Blackboard allows instructors to place online students into small groups' discussion boards. Knowledge is improved when the learner takes control of his or her thinking processes and skills. Curriculum, instruction, and assessment should be aligned to enhance the teaching of thinking. Diversity Module of the specific features of Blackboard enhances the advantages of lateral entry programs. The first series of questions asks these lateral entry teachers to reflect on their own beliefs about students: What do I believe I know about my students' experiential backgrounds? How are these beliefs reflected in my teaching practices? And, do I hold different beliefs for students from various ethnic backgrounds and social strata?

IT and Education in the Asia-Pacific Region

Educational Technology (2003), the magazine for managers of change in education, has focused on online learning and IT in the Asia-Pacific region. This issue covers the following countries:

- **Singapore:** According to Hung, Tan, and Chen (2003), technology integration efforts in Singapore schools and at the National Institute of Education (NIE) with the Ministry of Education, launched the IT Master Plan in 1997. Master Plan I focused on building up the physical and technological infrastructure in the schools; fostering teacher development in the use of IT; building up of content and learning resources; encouraging innovation, research, and development; infusing curriculum and assessment issues in and through IT; and establishing international relations and linkages with regard to IT. Master Plan II should be more specifically focused on learning processes and Web-based online learning.
- **Japan:** Fujitani, Bhattacharya, and Akahori (2003) report that Japan's Ministry of Education is now carrying out a project called "E-Japan Strategies," with the emphasis on educational use of ICT in schools. The Ministry has set a target of installing Internet connections in all classrooms by 2005-2006, and this new curriculum puts emphasis on utilizing ICT as a means, and its aim is that children are to be equipped to catch up with

the latest knowledge and skills. In particular, the subject area of IT will focus not only on computer-literacy skills, but also on knowledge and morals in the era of the information age, along with judgment of values.

- **China:** According to Zhiting, Xiaoqing, and Qiyun (2003), the Ministry of Education (MOE) of China launched a national initiative, "The National Program for Invigorating Education Towards the 21st Century," in 1998 for the ICT applications. Online higher education programs are offered at three levels: undergraduate degrees, master's degrees, and special training diplomas. Two distance lecturing models are adopted in online higher education: (1) a model in which an instructor gives a presentation on campus and is delivered to remote learning sites through a digital satellite or an interactive video conferencing system; and (2) a model in which presentations are prerecorded on CD-ROMs and then mailed to the remote learning sites or learners. The distance education includes online course resource construction for higher education, adult education, and basic education (e.g., English language).
- **Hong Kong:** According to Lee and Lam (2003), the government adopted a comprehensive four-pronged IT implementation strategy in 1998: (1) Access and connectivity (to provide financial support to schools for setting up a connectivity infrastructure); (2) teacher ennoblement (to set teacher IT competence); (3) curriculum and resource support (to develop software to facilitate IT usage in teaching and learning); and (4) community-wide culture (to involve stakeholders in helping implement IT in education). The IT development should now be directed toward online learning. WebQuest (http: edWeb.sdsu.edu) and ThinkQuest (http://www.thinkquest.org) are examples of the type of teaching formulated. This learning characterizes the paradigm shift from teacher-centered to student-centered.
- **Australia:** As noted by Taylor (2003), to increase the accessibility of high-quality education in cost-effective ways, many Australian universities are linking the introduction of ICT to the notion of *student-centeredness* and referring to the emergent and convergent educational practices as *flexible learning,* characterized as follows: (1) Decreasing reliance on face-to-face teaching; (2) increasing reliance on student self-management and independence; and (3) increasing reliance on ICT, particularly the use of the Internet, in teaching and learning. The empirical research on the convergence of two technologies (the traditional technology of the university campus; and the emergent technology of online, flexible learning)

conducted at the Logan Campus of Griffith University. The results showed that 66% of the students (N = 463) believe that the flexible learning approaches (with the Internet) are more effective than traditional teaching methods. The results are consistent with those of prior studies, yet this is only one case study.

- **Taiwan:** According to Liaw (2003b), in Taiwan, the most popular educational Internet program, TANet (Taiwan Academic Network), was established to support an IT infrastructure for all schools and research organizations. TANet not only provides collaborative opportunities for research, but also shares network resources for teaching and learning, applying for the following perspectives: *courseware-oriented direction* (courseware refers to tools that support instructional design, delivery, and management of online courses); *theory-oriented direction* (online learners can learn actively by constructing new knowledge based on prior knowledge); *instruction-oriented direction* (to create a successful learning environment for students); and *community-oriented direction* (this multiuser network provides enormous potential for collaborative learning). Since Taiwan's educational culture is different from that of the western world, it is crucial to develop an indigenous learning theory for Taiwan's online learners.
- **South Korea:** According to Jung (2003), in the 1990s, South Korea focused on an "Edutopia" (an education welfare state), a society of open and lifelong education to allow each and every individual equal access to education at any time and place. An important initiative by the government for the adult learning system was the creation in 1997 of a Cyber Teacher Training Center for in-service teacher training. In 1998, the government established the two-year Virtual University Trial Project to create a cost-effective virtual education system without diminishing quality. More than 100 conventional higher education institutions have introduced Internet-based virtual courses into their curriculums, (e.g., Ewha Woman's University has offered virtual education programs.) Flexible, effective, and efficient distance education for adult learners should be developed through ICT, which is changing the nature of learning.
- **New Zealand:** According to Kinshuk (2003), Massey University has multiple campuses situated in different parts of New Zealand, with about 60% of its students off campus and 40% studying on campus or internally. The university has purchased a site license for the WebCT learning management system, which remains its primary system. Embracing online

> learning at all levels, the University has entered into the process of becoming a global provider of education, enhancing the learning experience of on-campus and off-campus students alike.

In summary, the government of Singapore has invested to establish IT infrastructures and resources in schools in such areas as cyber conferencing, e-learning service providers, and wireless technology. Japan's Ministry of Education is now carrying out a project, "E-Japan Strategies," with the emphasis on ICT in schools. The Ministry of Education of China launched a national initiative, "The National Program for Invigorating Education Towards the 21st Century." In Hong Kong, the government adopted a comprehensive four-pronged IT implementation strategy. Many Australian universities are linking the introduction of ICT to the notion of student-centeredness and referring to the emergent and convergent educational practices as "flexible learning." In Taiwan, the most popular educational Internet program, TANet (Taiwan Academic Network), was established to support an IT infrastructure for all schools. South Korea has focused on the fulfillment of the public need for higher education and lifelong learning. Finally, Massey University in New Zealand has entered into the process of becoming a global provider of education, enhancing the learning experience of on-campus and distance learning students alike.

In addition, as noted by Ziguras (2001), educational commentators in South East Asia are increasingly promoting the use of educational technology as a way of enhancing the creativity and inventiveness of students. In Singapore and Malaysia, these qualities are seen as essential to future national economic development. In these countries, there is a clear vision of an emergent form of educational delivery that is challenging existing educational traditions. The Singaporean and Malaysian governments see educational technologies as a means to encourage greater self-direction and creativity on the part of students. Ziguras points out, however, that the rapid growth of technology has led to renewed concerns about cultural impacts: the implicit social values of the exporting countries will inform curriculum, and the social and cultural context in which students live will be largely ignored. Ziguras believes that if education is conceived as a way of changing students, then educators should accept that they cannot be culturally benign, but invariably promote certain ways of being over others, and that educators need to be aware of their role in social change and be able to justify to themselves the role they play.

Opportunities and Challenges for Change

Marketing and Articulation

The information marketplace will change the role of schools, universities, and the educational community: one of the more obvious effects will be the simultaneous expansion of the student market for schools and the school market for students (Dertouzos, 1997). Michael Dertouzos, as the Director of the Massachusetts Institute of Technology (MIT) Laboratory for Computer Science, continues this discussion in his book titled *What Will Be: How the New World of Information Will Change Our Lives,* where the competition for students through distance education opportunities face both the expansion of the student population and a range of training programs offered best suited for specific interests. Labeled as a remarkable predictor of technological trends in the Foreward of this publication by Bill Gates: "*What Will Be* is an engaging and visionary guide to the future, filled with insights on how information technology will transform our lives and our world in the new century" (p. xxiii). Predictions include that students of the future from across the globe will enjoy hands-on experiences with technology while mastering content areas, all while growing more comfortable with the experience of distance education. Distance education, simply defined, is a process for education in which the teacher and learner are not in the same geographical area at the same time. Therefore, distance education systems must deploy educational technologies capable of surmounting the barriers of time and location (Major & Levenburg, 1999).

From an historical perspective, distance education is not a new idea and includes a range of interpretations. It has been understood that the interpretation of distance education includes nearly any course that makes even a passing use of the Internet, as well as those in which every aspect of the course is only accessible electronically (Mason & Weller, 2000). Reaching out to new markets and geographic territories has been achieved for many years through distant extension sites, televised courses, paper-and-pencil correspondence courses, computer-based programs, and two-way interactive satellite broadcasts. Using the Internet to deliver education at a distance, however, still is new and creating serious interest among even the most traditional institutions of higher education (Sevier, 2003). The increasing opportunities for the development and the potential to capitalize on the delivery of instruction via technology is knocking on the doors of even the most traditional of institutions. We acknowledged that Internet delivery of online courses is not for all instructors or students depending on their teaching and learning styles; however, due to its flexibility of delivery partnered with the concept of traditional classroom interaction, it has become a highly regarded method for instruction within the profession. Beyond the academic advantages "for most colleges and universities, which must increasingly compete for students, this option offers the institution a method of casting a wider net with which to reach prospective students" (Sevier, 2003, p. 20).

As forecasted, it is an exciting time for pioneers in the distance learning market. It appears that the most successful programs, ones that market, recruit, and maintain their enrollment levels, have established ties with the mission of the sponsoring institution. These ties often represent a serious investment in faculty training and technical infrastructure. "Rising enrollments have made distance education a viable industry for colleges and companies as administrators and faculty members have learned what works online and what doesn't, both in marketing and teaching" (Carnevale & Olsen, 2003, p. A31). The statistics tell the story in terms of rising enrollments and the expansion of distance education as a viable business option for colleges and universities. To illustrate this point, in Carnevale and Olsen's words:

> *Virginia Tech enrolled 1,054 students in for-credit online courses in the fall of 1998, for example, but that number grew to 2,557 in 2002. Monroe Community College, in Rochester, N.Y., re-enrolled 277 students in distance education in 1998, and in 2002 it had 1,723. Capella University, a privately held company, has had three consecutive quarters of profitability and has seen its enrollment in its online-only degree programs nearly double, from 3,730 in 2001 to 6,578 in 2002.* (p. A32)

Successful marketing strategies exist that focus on potential students, and also fuel burgeoning distance education programs and the impressive figures that herald these accomplishments. Effective future marketing planners for the Asia-Pacific region would be wise to address university administration, faculty, and student input to face new competition for programs by addressing faculty concerns in terms of their roles and learning outcomes. Students' time and financial demands, in addition to the opportunities to study along with classmates and instructors from various locations domestically and internationally, are serious considerations and viable promotional factors, all while administrators are challenged with budgets and anticipate generated tuition fees (Bridges & Cadwallader, 2001). These concerns regarding devising methods for capturing and sustaining distance education enrollment are not exclusive to the more traditional and well established institutions of higher education. Smaller and more regional institutions that perhaps do not enjoy the benefits of dependable funding sources or endowments and must keep a closer eye on tuition levels are well advised to turn to electronic delivery of instruction as a lucrative aspect of financial support (Selingo, 1998).Opportunities and motivations abound. The U.S. Army developed an enticing model in the late '90s when their recruitment goals fell short by 8%. In order to stop this downward trend, and being aware of the advantages of distance education, opportunities for its 165,000 new soldiers were initiated to earn two-year associate's degrees from an accredited institution during their first four-year commitment to the Army (tuition free). In addition, time and access to computers were to be arranged to support the Army's initiative to allow for active duty Army personnel to learn while they earn, an enticement for advanced opportunities. This successful proposal to boost recruitment was modeled after an existing partnership among the armed forces and selected institutions of higher learning that offer associate's and bachelor's degree programs, with 75% of the tuition paid for students at military instillations though out the world (All they can be*,* 1999). The inspiration from the model provided by the U.S. Army is effective from several perspectives. From a marketing aspect, the offer to provide higher education opportunities to first-time soldiers is a win-win situation. The recruit who is interested in perks beyond the traditional opportunities provided by the military can identify the clear advantages of this program, while the U.S. Army boosts and sustains recruitment figures resulting in a benefit for all involved. The program offers the established features of distance education in terms of location, flexibility and mobility, which are both characteristics of military life, while the service member can take advantage of college-level instruction from a range of accredited and well respected institutions. The last and valued feature of this program, which remains a model, is articulation. Arrangements have been made for credits to be transferable among all the participating colleges, eliminating an often-discouraging dilemma of accruing academic credits while undertaking a profession based on a geographically mobile lifestyle. The U.S. Army has cleverly addressed the competition for job placement with the civilian job market while capturing the interests of a population comprised of recruits, who ultimately become distance education students.

Table 3. Pacific island population 2004 (Source: Pacific Island Populations 2004, SPC)

Region/country or territory	Last census	Population as counted at last census	Mid-year population estimate 2004	Estimated annual pop. Growth rate 2004-2015 (%)	Population doubling time (in years)
MELANESIA			**7444100**		
Fiji Islands	1996	775077	836000	0.7	106
New Caledonia	1996	196836	236900	1.9	37
Papua New Guinea	2000	5190786	5695300	2.2	32
Solomon Islands	1999	409042	460100	2.3	30
Vanuatu	1999	186678	215800	2.7	26
MICRONESIA			**536100**		
Federated States of Micronesia	2000	107008	112700	1.2	57
Guam	2000	154805	166100	1.4	50
Kiribati	2000	84,494	93,100	2.3	31
Marshall Islands	1999	50,840	55,400	1.6	44
Nauru	2002	10,065	10,100	1.0	69
Northern Mariana Islands	2000	69,221	78,000	3.1	22
Palau	2000	19,129	20,700	2.0	35
POLYNESIA			**635700.00**		
American Samoa	2000	57,291	62,600	2.0	34
Cook Islands	2001	18,027	14,000	-1.3	n.a.
French Polynesia	2002	244830	250,500	1.8	37
Niue	2001	1,788	1,600	-3.8	n.a.
Pitcairn Islands		52			
Samoa	2001	176710.00	182,700	0.9	77
Tokelau	2001	1,537	1,500	0.0	n.a.
Tonga	1996	97,784	98,300	-0.3	n.a.
Tuvalu	2002	9,561	9,600	0.4	173
Wallis and Futuna	2003	14,944	14,900	0.5	139
TOTAL			**8615900.00**		

The future will see, as Dertouzos (1997) predicted, the continued simultaneous expansion of students seeking degree programs and the higher education market-soliciting students. The marketplace for students is prime within the Pacific region, which is proportionate to the growing number of residents as evidenced by the "Pacific Islands Population 2004" (see Table 3), developed by the Secretariat of the Pacific Community (SPC) (2004). This cross-tabulation, based on the latest available analysis of the national census from Melanesia, Micronesia, and Polynesia, considers birth and death records exclusively. The collection of migration records through immigration arrivals and departures are difficult to establish throughout the region; Therefore, the figures represented do not reflect this portion of the communities. Included are population projections for 2004 and 2015. All projections and estimates, except for the Fiji Islands, French Polynesia, and Guam, are SPC estimates. All of the island nations considered indicate a population growth with estimated population growth to continue this pattern.

For, the concept of rationality when designing and delivering higher education learning opportunities, within the Asia-Pacific region, planners with vision must discuss the interrelationships between the phenomenon called articulation of curricula and transfer of credits (Kintzer, 1999). According to Kintzer, *Articulation* is "the totality of the processes and relationships involved in the movement of students vertically and laterally throughout formal and informal education systems" (p. 148). Regionally, the focus must remain learner-centered, in which politicians and educators, involving public and private stakeholders, resolve the transfer of credits with articulation agreements and link curriculums and learning environments. Mutual coarticulations reflect collaborative educational planning, a natural partner for learning technologies and distance education. This has been accomplished. One example for comparison purposes, located in the Highlands and Islands of Scotland, where degree programs were developed for students distributed and scattered over a large rural area. Supported by the changing capabilities of technology, this concept was to alter the concept of a one-college setting. Known as the University of the Highlands and Islands (UHI) Millennium Institute, the focus was the formation of a project to bring together a network of 15 institutions, colleges of further education, and various research establishments from Shetland in the north, to Perth in the south, an area of 39,058 km (the size of Belgium), but with only 455,490 inhabitants, the second lowest population density in Europe (Rennie, 2003).

Through online learning, the emphasis was to bring consistent, quality degree programs accessible electronically where not previously available. Beyond course design and delivery aspects, influential thinkers such as the leaders with the UHI project must address issues such as the public vs. private ownership when considering collaborative initiatives. "Among the Pacific Rim economies, Hong Kong, Singapore, and Malaysia are the countries where the most prestigious colleges and universities are publicly supported" (Kintzer, 1999, p. 152). It appears that the governments responsible for higher education, unlike the U.S., are able to create and change program policies with a unilateral approach. Policies and fundamental changes are in the hands of leaders in which institutional decisions and academic action will occur. It is essential that veterans and emerging leaders be prepared for these new roles, not only by relying on instinct derived from past experience, but also from new insights acquired through greater attention to leadership as a discrete area of study and practice for the important work ahead (Beaudoin, 2003). In this information-rich environment that we will continue to enjoy, the choices relating to higher education will continue to expand for students situated in geographically remote areas.

Electronic Academic Resources

The ICT "have drastically changed the status of distance education within the academic world" (Guri-Rosenblit, 2001, p. 487). As computers enable new fields of research between hitherto distant faculty and as results can be shared instantly, electronic journals accommodate the immediacy of a new research milieu and diminish the financial concerns of print communication (Henderson & MacEwan, 1997). As a fundamental aspect of either traditional or electronic higher education instruction, the expectation is that academic resources for research would be accessible for faculty and students. "Increased access to technology has altered the way that students study, while the variety of electronic information resources has widened the potential resource base for all students" (Buchanan, Luck, & Jones, 2002, p. 144). Comprehensive electronic resources are now recognized as valuable educational tools by research and academic institutions. It is further acknowledged: "a chief benefit of online learning is the ability of students to access course materials at their convenience" (Hamilton-Pennell, 2002, p. 32). Technology and instructional delivery initiatives in the future must acknowledge that electronic academic resources that support higher education research and instruction will continue to be a major asset in terms of timely and current access to information.

Of significance, however, is that decision makers involved in distance education technology would be wise to consider and integrate electronic resources in the initial stages of curriculum and program design. It is important to look toward research support materials as a worthy element in the initial phase of course planning. This would then ensure that appropriate curriculum resources are available to distance education learners as our technology-rich world links academic support for the future benefit of all involved, regarding a traditional and evolving Web-based learning environment.

Global English

As Nunan (2002) put it, "It is now commonplace to hear of English as a global language. This is so not only in educational contexts, but the popular media as well" (p. 1). Nunan, whose observations and conclusions on the concept of global English focus primarily on the geographical areas of the Chinese Mainland, Hong Kong, and Taiwan, maintains that the demand for English language instruction has "exploded" and parallels an "economic globalization." The English language now penetrates business, the Internet, science, entertainment, and sports. It also appears that the majority of scholarly papers published appear in English, with this number increasing annually. Governments have answered to this demand by offering English instruction to young students at the lower grade level. With adequate teacher training for English language instruction in developing countries as a concern, Nunan designed a survey that was distributed to the following countries in the Asia-Pacific region: China, Hong Kong, Malaysia, Japan, Taiwan, and Korea. The following questions were included (Nunan, 2002, p. 3):

- At what age and grade level is English introduced as a compulsory subject?
- Are there any plans to lower the age at which English is taught as a compulsory subject?
- Has the emergence of English as a global language influenced language planning and policy-making?
- What are the principals underpinning the English language curriculum?
- To what extent does the curriculum rhetoric match the practical realities of the classroom?
- What is the impact of English as a global language on educational practices and medium of instruction?
- Has the instruction of English had an impact, or is it likely to have an impact in the future, on first language/indigenous language development?
- To what extent is English used as a medium of instruction for other subjects?

The results of the survey indicated that the English language remains a major component of government rhetoric. However, inadequate English skills and teacher preparation need to be significantly improved. In the three countries surveyed, the English language proficiency of many teachers is not sufficient to provide learners with the rich input needed for successful foreign language acquisition.

"Consistent with the value applied linguists place on World Englishes, English is taught and learned in many countries because it is an—and arguably the—international language" (Matsuda, 2003, p. 719). Consequently, a variety of English exists beyond the American or British version, involving a wide range of cultures and demographics impacted by history and politics as well, all opening to students opportunities that otherwise would not have existed. Considering the diversity of Australian, Singaporean, Indian, Jamaican, South African, Canadian, Irish, versions of English to name a few, the objective is not to homogenize and alter the language, but to empower their ownership. "World Englishes does not mean removing native varieties from English classes or replacing them with less-perfect ones; rather, they add to the current repertoire and thus enrich the curriculum" (Matsuda, 2003, p. 726). It has been established that students learn and comprehend more easily from familiar versions of language; therefore, to enforce instruction, "teachers can introduce different varieties of English through e-mail exchanges, projects that require students to visit Web sites in various Englishes, or by showing movies and videos clips of World Englishes speakers" (Matsuda, 2003, p. 723).

Nunan (2002) explains, in *The Impact of English as a Global Language on Educational Policies and Practices in the Asia-Pacific Region,* that challenges include framing education policies that impact teachers and students with regard to English as a global language: "In the countries surveyed, the English language proficiency of many teachers is not sufficient to provide learners with the rich input needed for successful foreign language acquisition" (p. 607). Future educational policies must address adequate training for TESOL and the impact of English on non-native speakers. This training would expose teachers to current technologies available, such as multimedia authoring and the power of the digital classroom in the field of English language instruction. This teacher-training program would emphasize remaining sensitive to incorporating global Englishes and the sociolinguistic aspect of language instruction and the impact of English on nonnative speakers. Global English instruction and technology are natural partners for the next millennium.

Unifying Technical Infrastructure

"A new *international cyberuniversity* is under discussion by a consortium of colleges spread across 15 countries in Asia and the Pacific region" (Cohen, 2002, A42). Degrees will be awarded jointly and most instruction will be conducted in English, with pockets of Chinese and other languages. Considering the vast geographical area involved in this distance education initiative, the challenges reach across international delineations to issues of technology and linguistics. The potential compatibility of Web browsers in relationship to the array of fonts and characters not properly installed raise concerns of computer crashes and system failures. Because of the technical accomplishments of Asian universities, those involved believe that ultimately U.S. colleges and universities with a focus on distance learning will look to the east and become involved in the venture (Cohen, 2002). This cyberuniversity is a natural progression feeding into the explosion of Asian students representing, as some suggest, the largest market for higher education. Cohen, in his article titled *Hong Kong's Boom in Distance Education May be a Sign of What's to Come in Asia,* explains:

> *The trend in Hong Kong and the rest of Asia is strongly upward. Vividly diverse in terms of language and culture, Asia is home to the world's most rapidly expanding populations, many of them still rural. During this decade, they represent the world's biggest potential market of consumers for higher education. In Asia, the need for higher education, in one form or another, encompasses an estimated 500 million people at a time when personal wealth, mobility, migration, and Internet usage are also generally increasing.* (Cohen, 2000, p. A50)

The future holds no limits to technological challenges, including addressing compatibility of technology infrastructure involving an international perspective. Nationalities, governments, policies, languages, technology formats, fonts and characters, academic programs, articulation, instruction styles, and delivery are just a sampling of issues to be considered with distance education for the future. One step, one byte at a time, these challenges will be resolved to potentially offer compatible and collaborative educational programs for the rising population of willing students eager for educational opportunities within global reach through technology.

As a starting point for dialogue on digital equity, the CTPC began a baseline survey project in 1999 entitled *Promoting Information and Communications Technology Equity for Asian Pacific Americans* (CTPC, 2004). According to CTPC, the survey project had two objectives: to understand the use of technology in hard-to-reach, underserved Asian-American Pacific Island communities, and to establish baseline information for building sustainable leadership, infrastructure, and community capacity through the use of ICT. Considering all of the organizations surveyed, it was determined that computer functions were primarily utilized as individual information processing units, and not necessarily as networked, interactive sources for information sharing. The survey also indicated that nonexistent or inferior equipment and low levels of computing skills created low utilization among often-isolated populations. The CTPC, with their interests in digital equity and like forums, provides opportunities to focus on the challenges of unifying technical opportunities in terms of infrastructure, delivery, and linguistic variances. Future plans call for collaborative and creative ventures that unify national information infrastructures while remaining sensitive to individual governments, the missions of institutions of higher learning, cultural and linguistic factors, as well as building on prior investments in platforms for emerging technologies. The future of technology holds no boundaries.

Value and Benefits of Educational Technology

\There is no argument in the concept that "effective use of new technology can increase academic productivity and enhance educational quality in higher learning institutions" (Ma & Runyon, 2004, p. 367). Educational equality can be also increased through educational technology (Appendix J is a list of research summaries. Research studies included in the list are not particularly focused on the Asia-Pacific region). This book has focused on myriad impressive applications of educational technology, both experienced and anticipated. To identify the essence of the advent of effective IT in higher education, the term "communication" rises to the top. Involving communication, educational discourse includes establishing information networks across countries and their respective IT systems to provide enhanced educational opportunities, and to improve educational standards and the redesigning of educational systems (Selwyn & Brown, 2000). Consequently, the globalization of information access and opportunities for knowledge has changed the parameters in all phases of our lives, and has provided opportunities for more independent learning whether in a traditional or conventional higher education environment or linked to a virtual distance education program. The value and benefits of technology are clear, indeed.

Technological Predictions for the Magical Region

Within the Asia-Pacific region, if magic was a reality and visions were to be realized, the following predictions would become established future trends for technological development for the 21st century:

- **Technical Policy Forum:** A forum, perhaps titled the "United Nations of IT," will be established for the Asia Pacific region. Each nation or island government would be represented, providing a voice to share experiences, resources, and goals in a collaborative and unified manner. This body, representing collective stakeholders in e-capabilities for teaching and learning, would provide the opportunities for a broader lens in terms of planning and establishing policies for maximizing educational technology and its applications. This body would collaborate with organizations such as the ISTE, http://www.iste.org, a worldwide nonprofit organization dedicated to providing guidance and standards for linking technology with education.
- **Hardware:** The ideal would be for each student of higher education to be issued a personal handheld computer by his or her respective institution. With the ever-expanding capabilities of innovative software, these devices will assist with downloading teaching materials and accessing academic resources. The institutions will purchase the equipment in quantity, which will reduce procurement expenses that could be factored and absorbed by tuition and fees.
- **Software:** Language translation is a key element of the globalization process. Envisioned is software with the language translation ability to address the 26 various languages represented in the Asia Pacific region. A tool with an optical character recognition devices would facilitate in localizing the region, while remaining sensitive to fonts, alphabets, and even Asian language ideographs involved in the multiple languages.
- **Literacy:** The conceptualization of literacy in professional literature has changed over the years. In this regard, digital imagery is viewed as a future

tool for cultivating visual and verbal literacy by capturing visual representations of cultural traditions and artifacts to share, with the focus on expanding knowledge and understanding. Learning collectively, targeted cultures will enhance learning by combining literature with the visual and performing arts of a community to share with the world.

- **Culture:** The elders have traditionally passed Pacific history from one generation to the next through a method of storytelling, resulting in cultures based on oral traditions. This method of cultural preservation continues today. As envisioned for the 21st century for the Asia Pacific region, knowledge once safeguarded through oral tradition will continue to be documented, but now in a digital format. Beyond the spoken word, digital images have the capacity to capture the colorful personalities, which enhance the cultural preservation and share the knowledge with a global audience. Technology will have a greater impact in this diverse and culturally rich region. Because of the far-reaching impact of the Internet and Web-based resources, higher education opportunities will continue to expand and facilitate and fostering global citizens.
- **Open Courseware:** This wider net includes an innovative concept labeled "open courseware," which represents an academic windfall for remote areas such as the Asia-Pacific region. In this regard, Young has reported (2005) that several U.S. colleges have initiated open courseware projects in which extensive sets of course materials, such as syllabi, lecture notes, and quizzes, are published online and available to anyone to use freely. Currently the following eight colleges offer course materials online: Carnegie Mellon University (http://www.cmu.edu/oli); Foothill-DeAnza Community College District (http://sofia.fhda.edu); Harvard University (Law School's Berkman Center for Internet & Society); Johns Hopkins University (http://ocw.jhsph.edu); MIT (http://ocw.mit.edu); Tufts University (Law and Diplomacy; and Health Science Graduate Schools); University of Michigan at Ann Arbor (School of Information); and Utah State University (http://ocw.usu.edu). MIT, for example, has already published more than 900 of its 1,800 courses, and is being touted as a success, as it has drawn downloaders from around the world who are using the materials as models for their own teaching or to learn on their own. The main beneficiaries are in the developing world, where students cannot afford textbooks and universities are looking for help setting up courses. As Young emphasizes, it creates a collective body of high-quality

course materials, providing a model and extensive resource for all involved in higher education in areas such as the Asia-Pacific region.

Summary

This chapter has examined the opportunities and challenges of teaching involving educational technology, with a particular focus on the changing roles of higher education faculty and policymakers. This chapter has also reviewed a variety of delivery systems for technology and its applications, involving an international spectrum within the Asia-Pacific region. It has been established that computer-based environments provide a variety of ways to reach learners with different backgrounds, ages, and learning needs. In the digital age, learning will become a lifelong process, characterizing the paradigm shift from teacher-centered to student-centered learning environments particularly.

As discussed in this chapter, some of the significant technological opportunities and demanding challenges for the 21st century e-learning journey in the Asia-Pacific region are:

- **Marketing and Articulation** (When considering distance and opportunities for higher education, marketing and the articulation of academic programs through the region must be promoted.)
- **Application** (In order for technology to advance in terms of implementation, the institutions must demonstrate the benefits of utilizing technology for research, instruction, and learning.)
- **Electronic Resources** (Virtual libraries must be considered when developing digital programs.)
- **Global Language** (A unified, global English is one solution for offering an equitable platform for academic programs across vast and multicultural regions, while remaining sensitive to the various versions of English and offering adequate preparation of language instructors.)
- **Infrastructure** (Technical infrastructure relating to hardware and software must move toward a unified standard in order to address cross national, linguistic, and cultural boundaries.)

As the proliferation of technology and online applications for instruction within the realm of higher education soars, future demands will call for more advanced levels of digital literacy for all involved.

Administrators, faculty, and students will be required to develop and maintain critical skills to justify institutional investments in technology infrastructure and personnel. Evolving standards for IT competency levels will demand more sophisticated performance from all corners of higher education, while mandating a future academic learning revolution. This chapter has included future predictions in which technology would impact the Asia-Pacific region, involving methods for establishing collaborative policies, hardware and software applications, and areas in which literacy and cultural aspects of the Pacific communities will be enhanced. And finally, e-learning goes on.

Education Essay

Source: Inoue, Y. (2002, Summer-Fall). Why are some teachers better at teaching? APA Perspective, 7.

Why are some teachers better at teaching?

At the beginning of each semester, I ask all my students to fill in a student information form, in which they write their names, phone numbers, e-mail addresses, native languages, majors, and expectations for the course, as well as their future goals. I added one more inquires to the form: Why do you think some teachers do a better job at teaching than others do? Summing up the answers of students in the School of Education, better teachers:

- look at teaching as a vocation, not as an occupation;
- are passionate about their content areas;
- put more time into preparing for each class meeting;
- are practicing reflective teaching, evaluating their daily teaching;
- have a strong desire to foster the development of young people;
- communicate effectively with students;
- consider their teaching as an opportunity for a lifetime of growth;
- have developed better teaching styles and methods;
- love to teach and put their whole heart into it;
- make the subject matter interesting and meaningful;
- enjoy the interaction with students;
- were well trained and have good educational foundations;
- have more patience and tolerance than others do;
- have good classroom management skills and leadership;
- are consistent in attitudes and behavior;
- are not only good speakers, but also good listeners;
- have a profound teaching philosophy;
- enjoy learning as well as teaching;

- care about not only the outcome of, but also the learning process of the student;
- know how to discipline the students;
- do not neglect to make efforts for their continuous improvement in teaching;
- have a better insight into how to help students learn;
- have a combination of learned skills and innate talent to teach others;
- have self-satisfaction with the teaching profession;
- have greater interpersonal skills;
- teach not only by the book, but also teach from their own experience; and
- take time to know the students and genuinely care for them.

These comments remind me of the theorized notion that the key determinant of successful teaching is not always cognitive intelligence, but other important determining factors. These comments further remind me of the remark by Thomas Edison (1847-1931), who expressed the view: "Genius is one percent inspiration and 99% perspiration" (Genius Quotes, 2002). If Edison's analysis were applied to teaching, we might say: "Good teaching is one percent natural ability and ninety-nine percent hard work." There is no magic in successful teaching. Hard work and application to the task are essential.

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Appendix

Appendix A

Web Sites on Guam and Micronesia

Agricultural Development in the American Pacific (ADAP):

www2.ctahr.hawaii.edu/adap2/

The U.S Department of Agriculture Cooperative State Research, Education, and Extension Service founded this.

Agriculture Education in Micronesia:

http://www.agpowermicro.org/

This is a collaborative project with partnerships among the University of Guam, the Palau Community College, the College of Micronesia, and Florida A & M University.

American Memorial Park-Saipan, Northern Mariana Islands:

http://www.nps.gov/amme/main.htm/

American Memorial Park honors the American and Marianas people who gave their lives during World War II. Situated on 133 acres of land along the western side of Saipan, the National Park Service manages the park.

Asia-Pacific Programme of Educational Innovation for Development:

http://www.unescobkk.org/index.php?id=12

Scientific and technological literacy for all provides training seminars and workshops, as well as links to help network the development of technology in the Asian-Pacific region.

Digital Micronesia:

http://www.uog.edu/rfk/DigMicro/

This Web site consists of over 2000 digital images of the people and their daily lives in Micronesia. B. Millhoff, a developer and a photographer of this project, states that technology cannot as yet make time stand still, but can capture those aspects of this space and time that most assuredly will never return.

Distance Education in the Western Pacific:

http://www.demicro.org/

The Pan-Pacific Education and Communication Experiments by Satellite (PEACESAT) is a public service telecommunications program that supports distance education learning, training, and technology transfer throughout the Pacific basin.

Dive Into the Heart of Exotic Micronesia:

http://www.visit-fsm.org/

This provides the detailed information of the Federated States of Micronesia: Chuuk, Kosrae, Pohnpei, and Yap.

Festival of Pacific Arts:

http://www.festival-pacific-arts.org/

This Web site emphasizes that the Festival of Pacific Arts brings peoples of the Pacific together in a welcoming and social gathering to exchange cultures for mutual understanding and appreciation of other cultures.

Guam Humanities Council:

http://www.guamhumanitiescouncil.org/

Founded in 1990, the Council's mission is to foster critical thinking and an understanding and appreciation of the humanities as they relate to Guam's multiethnic composition, rich cultural heritage, and local and global issues confronting our people today.

Guampedia (The Encyclopedia of Guam):

http://www.guampedia.com/

The purpose of this encyclopedia is to provide accessible, accurate information about the rich heritage of Guam, its natural environment, history, religion, politics and others.

Isla Center for Arts:

http://www.uog.edu/isla/

Isla strives to bring outside art collections to the people of Guam, as well as to build its own Micronesian artifacts exhibit.

Micronesian Area Research Center (MARC), University of Guam:

http://www.uog.edu/marc/

For the Reference Collection, the Spanish Documents Collection, and the Manuscript Collection curators will continue to seek documents of historical significance for the region and organize them for use by the people of Guam, the region, and researchers worldwide.

Micronesian Diary:

http://www.intangible.org/Features/micronesia/text/Yap4.html

For the people of the Federated States of Micronesia, the need their heritage and culture to be documented and evaluated is urgent, given the change that is certain with advancements of development in the region.

Micronesia Music:

http://www.janeresture.com/micronesia_music/

This site tells that composers used mythology, magic, and rituals to compose the traditional music of Micronesia.

Micronesian Insects:

http://www.micronesianinsects.com/

This Web page is a comprehensive analysis and prioritization of invasive arthropod pests throughout the islands of Micronesia.

Ocean Life on Guam:

http://library.thinkquest.org/5112/

This Web site is about America's underwater paradise island, Guam (for example, awesome fish, breathtaking coral, and extraordinary creatures people do not see anywhere else).

Pacific Island Association of Libraries and Archives (PIALA):

http://www.uog.edu/rfk/piala/piala.html

This Web site emphasizes that there is hope that there will be more support for widespread resource sharing within the region because of the Pacific Islands' libraries' growing use of modalities for electronic document delivery. Pacific Resources for Education and Learning (PREL).

Star Schools:

http://www.prel.org/

PREL serves the educational community in the US-affiliated Pacific islands, the continental United States, and countries throughout the world. Its main office is located in Honolulu.

The Yap Art Studio & Gallery:

http://www.yapartstudioandgallery.com/

This Web site presents watercolor paintings, woodcarvings, hand-woven, and loomed products by the Micronesian artisans of all the islands of Yap State.

War in the Pacific:

http://www.nps.gov/wapa/

At War in the Pacific National Historical Park, the former battlefields, gun emplacements, trenches, and historic structures all serve as silent reminders of the bloody battles that ensued on the Island of Guam over 58 years ago.

Water and Environmental Research Center of the Western Pacific:

http://www.weriguam.org/home/

In 1991 this center became the first Regional Water Resources Research Institute in the Western Pacific, opening a broad new spectrum of research and services.

Yapese Carvers at Ethnic Art Institute of Micronesia:

http://www.tritonfilms.com/eaim.htm

This site focuses on revitalizing traditional cultures of Micronesia through the recreational, indigenous art forms. A photo gallery is included.

Appendix B

The Survey Instrument: Multicultural Education (1)

PART 1 - DIVERSITY and MULTICULTURALISM

Using the following scale to rate each statement, please circle the number that best describes your answers and answer every item because blank answers may invalidate the results.

1 = not important
2 = of little importance
3 = of moderate importance
4 = very important
5 = of utmost importance

1. How important is it for you to be friends with someone from a different culture on Guam or anywhere?
   1 2 3 4 5

2. How important is it for you to associate with people from the same cultural and ethnic backgrounds as your own?
   1 2 3 4 5

3. How important is it for you to become informed about cultural and ethnic differences?
   1 2 3 4 5

4. How important is it for you to be exposed to a culturally diversified environment?
   1 2 3 4 5

5. How important is it for you to employ Western pedagogy in your teaching?
   1 2 3 4 5

6. How important is it for you to provide an environment for the free and open expression of ideas and beliefs?
   1 2 3 4 5

7. How important is it for you to support the academic success of students from different cultural and ethnic backgrounds than your own?
   1 2 3 4 5

8. How important is it for you to integrate multicultural perspectives in your teaching?
   1 2 3 4 5

9. How important is it for you to collaborate on research and teaching with colleagues from the same cultural and ethnic backgrounds as your own?
   1 2 3 4 5

10. How important is it for you to respect and accommodate students' individual and culture-based learning styles?
    1 2 3 4 5

11. How important is it for you to take the time to learn about students' backgrounds and cultural characteristics?
    1 2 3 4 5

12. How important is it for you to use culturally relevant examples in teaching?
    1 2 3 4 5

13. How important is it for you to become a culturally sensitive teacher?
    1 2 3 4 5

14. How important is it for you to provide multicultural instructional materials?
    1 2 3 4 5

15. How important is it for you to eradicate prejudice in your personal life?
    1 2 3 4 5

16. How important is it for you to eradicate prejudice in your professional life?
    1 2 3 4 5

17. How important is it for you to encourage students to understand or be aware of other cultures?
    1 2 3 4 5

18. How important is it for you to challenge and avoid using stereotypes in teaching?
    1 2 3 4 5

19. Please indicate to what degree you agree or disagree with the following statement:
    Cultural and ethnic diversity are assets that enrich the learning process? (Circle one)

(1)	(2)	(3)	(4)	(5)
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

PART II - ABOUT YOURSELF (Circle only one per item)

20. You are: (1) Female (2) Male

21. Age in years:
    (1) 25 or less
    (2) 26 - 35
    (3) 36 - 45
    (4) 46 - 55
    (5) 56 - 65
    (6) 66 or over

22. Total years of your teaching (outside and within UOG, including all educational levels):
    (1) 5 or less
    (2) 6-10
    (3) 11-15
    (4) 16-20
    (5) 21 or over

23. What ethnic background do you identify with the most:
    (1) Chamorro
    (2) Filipino
    (3) Asian (Chinese, Korean, Japanese, Vietnamese, Thai, Indian and other)
    (4) Micronesian
    (5) Other Pacific Islander
    (6) "Stateside" Caucasian
    (7) "Stateside" Other
    (8) Other (please specify): ____________________________

24. Your highest academic degree:
    (1) Associate's
    (2) Bachelor's
    (3) Master's (or equivalent)
    (4) Doctorate (or professional degrees, e.g., law or medicine)
    (5) Other (specify): _____________________

THANK YOU VERY MUCH FOR YOUR TIME

Appendix C

The Survey Instrument: Multicultural Education (2)

PART 1 - DIVERSITY AND EDUCATION

Using the following scale to rate each statement, circle the number that best describes your answers, and please answer every item because blank answers may invalidate the results.

1 = Very seldom, 2 = Seldom, 3 = Sometimes, 4 = Frequently, 5 = Very frequently

1. How often do you accommodate different viewpoints of your students regardless of their cultural/ ethnic backgrounds? 1 2 3 4 5
2. How often do you utilize interdisciplinary approaches in teaching? 1 2 3 4 5
3. How often do you try to get every student involved in a class discussion? 1 2 3 4 5
4. How often do you have high expectations for your students regardless of their cultural/ethnic backgrounds? 1 2 3 4 5
5. How often do you accommodate different learning styles of your students regardless of their cultural/ ethnic backgrounds? 1 2 3 4 5
6. How often do you have a collaborative/collegial partnership with colleagues from the same cultural/ ethnic backgrounds in teaching? 1 2 3 4 5
7. How often do you use culturally relevant textbooks in teaching? 1 2 3 4 5
8. How often do you encourage students whose second language is English to express themselves in classroom settings? 1 2 3 4 5
9. How often do you integrate multicultural perspectives in teaching? 1 2 3 4 5
10. How often do you support the academic successes of your students regardless of their cultural/ethnic backgrounds? 1 2 3 4 5
11. How often do you engage in collaborative partnerships with colleagues from different cultural ethnic backgrounds in teaching? 1 2 3 4 5
12. How often do you listen to your students interactively and attentively regardless of their cultural/ethnic backgrounds? 1 2 3 4 5
13. How often do you provide your students with multicultural instructional materials (class exercises, using videos, films, etc.)? 1 2 3 4 5
14. How often do you devote your energies to developing and improving your knowledge of cultural diversity? 1 2 3 4 5
15. How often do you attempt to eradicate prejudices and stereotypes that your students may have? 1 2 3 4 5
16. How often do you accommodate cultural/ ethnic differences of your students in classroom settings? 1 2 3 4 5
17. How often do you incorporate those cultural/ ethnic differences in your teaching methodology? 1 2 3 4 5
18. Do you evaluate attitudes and behaviors of other cultural/ ethnic groups from your own cultural/ethnic standards? (Circle one)

(1)	(2)	(3)	(4)	(5)
Never	Seldom	Sometimes	Usually	Always

PART II – MULTICULTURALISM IN THE CLASSROOM

19. Using the following scale to rate each statement, indicate how many times you have done each of the following in the past year. (Circle only one per item)
    1 One to two (1-2) times
    2 Three to four (3-4) times
    3 Five to six (5-6) times
    4 Seven to eight (7-8) times
    5 Nine to ten (9-10) times
    6 Eleven (11) times or more

19-1.	Selection and use of appropriate textbooks	1	2	3	4	5	6
19-2.	Enhancing the syllabus to address diversity and multiculturalism	1	2	3	4	5	6
19-3.	Brainstorming approach with the students about their needs and wants	1	2	3	4	5	6
19-4.	Open discussion to allow students to share their own views and opinions	1	2	3	4	5	6
19-5.	Inviting guest lecturers to offer the students a different perspective	1	2	3	4	5	6
19-6.	Inviting your colleagues to observe your teaching and offer feedback	1	2	3	4	5	6

20. In what ways do you as a professor expand or enhance your knowledge and awareness about issues of multiculturalism and diversity? (Circle all numbers that apply)
    (1) Collaborating in teaching with colleagues from cultural backgrounds other than your own
    (2) Collaborating in research with colleagues from cultural backgrounds other than your own
    (3) Attending conferences and workshops on topics that may contribute to your knowledge of other cultures
    (4) Using other avenues (television, journals, books, etc.) in searching for knowledge and understanding
    (5) By visiting, traveling (that is, exposing yourself to other cultures in Micronesia, the Pacific and Asia)
    (6) By learning from people (outside of academia) from cultures and ethnicities other than your own
    (7) Other (please specify):____

PART III - ABOUT YOURSELF (Circle only one per item)

21. You are: (1) Female (2) Male

22. Age in years:
    (1) 25 or less
    (2) 26 - 35
    (3) 36 - 45
    (4) 46 - 55
    (5) 56 - 65
    (6) 66 or over

23. Total years of your teaching (outside and within UOG, including all educational levels):
    (1) 5 or less
    (2) 6-10
    (3) 11-15
    (4) 16-20
    (5) 21 or over

24. What ethnic background do you identify with the most?
    (1) Chamorro
    (2) Filipino
    (3) Asian (Chinese, Korean, Japanese, Vietnamese, Thai, Indian and other)
    (4) Micronesian
    (5) Other Pacific Islander
    (6) Caucasian
    (7) Other (please specify):____

25. Your highest academic degree:
    (1) Associate's
    (2) Bachelor's
    (3) Master's (or equivalent)
    (4) Doctorate (or professional degrees, e.g., law or medicine)
    (5) Other (specify): ______________________

THANK YOU VERY MUCH FOR YOUR TIME

Appendix D

Electronic Journals in Education

1. Educational Research

Action Research International [Australia], http://www.scu.edu.au/schools/gcm/ar/ari/arihome.html/

Education Next [USA], http://www.educationnext.org/

Education Review [USA], http://coe.asu.edu/edrev/

Educational Insights: Electronic Journal of Graduate Student Research [Canada], http://www.csci.educ.ubc.ca/publication/insights/

European Educational Researcher [UK], http://www.eera.ac.uk/publications/eer/

Florida Journal of Educational Research [USA], http://www.coedu.usf.edu/fjer/

Forum Qualitative Social Research: A multilingual online journal for qualitative research [Germany], http://www.qualitative-research.net/fqs/fqs-eng.htm/

International Review of Research in Open and Distance Learning [Canada], http://www.irrodl.org/

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Turkish Online Journal of Distance Education, The [Turkey], http://tojde.anadolu.edu.tr/

Weaver: A Forum for New Ideas in Educational Research [Australia], The, http://www.latrobe.edu.au/graded/weaverindex.html/

2. Higher Education

Advances in Physiology Education, http://advan.physiology.org/

Chronicle of Higher Education, http://chronicle.com/

College Quarterly: A Journal of Professional Development for College Educators, The [Canada], http://www.senecac.on.ca/quarterly/

Journal of College Biology Teaching [USA], http://papa.indstate.edu/amcbt/bioscene.html

National CROSSTALK, The National Center for Public Policy and Higher Education [USA], http://www.highereducation.org/index.shtml

UltiBASE Journal, The (university learning and teaching in Business, Art, Society and Education) [Australia], http://ultibase.rmit.edu.au/

3. Multicultural Education

Electronic Magazine of Multicultural Education [USA], http://www.eastern.edu/publications/emme/

International Education Electronic Journal [Australia], http://www.canberra.edu.au/uc/educ/crie/ieej_home.html/

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Contemporary Issues in Technology and Teacher Education [USA], http://www.citejournal.org/vol2/iss1/toc.cfm/

Issues in the Undergraduate Mathematics Preparation of School Teachers: The Journal [USA], http://www.k-12prep.math.ttu.edu/journal/journal.shtml

Journal of Industrial Teacher Education [USA], http://scholar.lib.vt.edu/ejournals/JITE/

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Electronic Journal for the Integration of Technology in Education [USA], http://ejite.isu.edu/

Electronic School, http://www.electronic-school.com/

From Now On: The Educational Technology Journal, http://www.fno.org/

IT Journal On-line, Instructional Technology Program, University of Virginia [USA], http://etext.virginia.edu/journals/itjournal/

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Journal of Instructional Science and Technology, http://www.usq.edu.au/electpub/e-jist/

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Journal of Technology, Learning, and Assessment [USA], http://www.bc.edu/research/intasc/jtla.html

Journal of Vocational and Technical Education [USA], http://scholar.lib.vt.edu/ejournals/JVTE/

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Language, Learning, and Technology [USA], http://llt.msu.edu/

Meridian: A Middle School Computer Technologies Journal [USA], http://www.ncsu.edu/meridian/

Technology Source, The [USA], http://ts.mivu.org/

Source: Retrieved January 2005 from http://www.washburn.edu/mabee/crc/edejournals.html/

Appendix E

The Survey Instrument: Technology Experiences (1)

Name ________________________
Title ________________________
Institution____________________
Unit _________________________
Discipline_____________________
Date _________________________

I. TEACHING CONTENT AREAS WITH TECHNOLOGY

Q1: Explain the nature of the courses where technology is used?

Q2: What technology applications are required of your students?

Q3: How is technology reflected in your syllabus?

II. TEACHING METHODS OR STRATEGIES USING TECHNOLOGY

Q4: In what way do you use technology to prepare courses?

Q5: In what way do you use technology to teach in the classroom?

Q6: In what way do you use technology to evaluate or assess student performance?

Q7: What are your concerns regarding multicultural education and technology?

Q8: Explain future applications and challenges of educational technology

Q9: What institutional support would you like to see offered?

III. ADVANTAGES AND DISADVANTAGES OF TECHNOLOGY

Q10: Based on your knowledge and experience, describe the advantages of using technology in teaching?

Q11: Based on your knowledge and experience, describe the disadvantages of using technology in teaching?

IV. Teaching philosophy linked with technology

V. About yourself (short biography)

THANK YOU VERY MUCH FOR YOUR TIME

Appendix F

National Education Technology Standards for Teachers (NETS•T)

The International Society for Technology in Education (ISTE) developed National Education Technology Standards for Teachers (NETS•T). These standards focus on pre-service teacher education, and define the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings.

The **six standard areas** with performance indicators are listed as follows:

I. **Technology Operations and Concepts**
   A. Demonstrate introductory knowledge, skills, and understanding of concepts related to technology.
   B. Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

II. **Planning and Designing Learning Environments and Experiences**
   A. Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.
   B. Apply current research on teaching and learning with technology when planning learning environments and experiences.
   C. Identify and locate technology resources and evaluate them for accuracy and suitability.
   D. Plan for the management of technology resources within the context of learning activities.
   E. Plan strategies to manage student learning in a technology-enhanced environment.

III. **Teaching, Learning, and the Curriculum**
   A. Facilitate technology-enhanced experiences that address content standards and student technology standards.
   B. Use technology to support learner-centered strategies that address the diverse needs of students.

C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

IV. **Assessment and Evaluation**

A. Apply technology in assessing student learning of subject matter using a variety of assessment techniques.

B. Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

C. Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

V. **Productivity and Professional Practice**

A. Use technology resources to engage in ongoing professional development and lifelong learning.

B. Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

C. Apply technology to increase productivity.

D. Use technology to communicate and collaborate with peers, parents, and the larger community to nurture student learning.

VI. Social Ethical, Legal and Human Issues

A. Model and teach legal and ethical practice related to technology use.

B. Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. Identify and use technology resources that affirm diversity.

D. Promote the safe and healthy use of technology resources.

E. Facilitate equitable access to technology resources for all students.

Performance Indicators:

1. Assess the availability of technology resources at the school site, plan activities that integrate available resources, and develop a method for obtaining the additional necessary software and hardware to support the specific learning needs of students in the classroom. (I, II, IV)

2. Make appropriate choices about technology systems resources and services that are aligned with district and state standards. (I, II)
3. Arrange equitable access to appropriate technology resources that enable students to engage successfully in learning activities across subject/content areas and grade levels. (II, III, VI)
4. Engage in ongoing planning of lesson sequences that enable students to engage successfully in learning activities across subject/content areas and grade levels. (II, III, VI)
5. Plan and implement technology-based learning activities that promote student engagement in analysis, synthesis, interpretation, and creation of original products. (II, III)
6. Plan for, implement, and evaluate the management of student use of technology resources as part of classroom operations and in specialized instructional situations. (I, II, III, IV)
7. Implement a variety of instructional technology strategies and grouping strategies (e.g., whole group, collaborative, individualized, and learner centered) that include appropriate embedded assessment for meeting the diverse needs of learners. (III, IV)
8. Facilitate student access to school and community resources that provide technological and discipline-specific expertise. (III)
9. Teach students methods and strategies to assess the validity and reliability of information gathered through technological means. (II, IV)
10. Recognize students' talents in the use of technology and provide them with opportunities to share their expertise with their teachers, peers, others. (II, III, V)
11. Guide students in applying self-and peer-assessment tools to critique student-created technology products and the process used to create those products. (IV)
12. Facilitate students' use of technology that addresses their social needs and cultural identity and promotes their interaction with the global community. (III, VI)
13. Use results from assessment measures (e.g., learner profiles, computer-based testing, electronic portfolios) to improve instructional planning, management, and implementation of learning strategies. (II, III)

14. Use technology tools to collect, analyze, interpret, represent, and communicate data (student performance and other information) for the purposes of instructional planning and school improvement. (IV)
15. Use technology resources to facilitate communications with parents or guardians of students. (V)
16. Identify capabilities and limitations of current and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (I, IV, V)
17. Participate in technology-based collaboration as part of continual and comprehensive professional growth to stay abreast of new and emerging technology resources that support enhanced learning for PK-12 students. (V)
18. Demonstrate and advocate for legal and ethical behaviors among students, colleagues, and community members regarding the use of technology and information. (V, VI)
19. Enforce classroom procedures that guide students' safe and healthy use of technology and that comply with legal and professional responsibilities for students needing assistive technologies. (VI)
20. Advocate for equal access to technology for all students in their schools, communities, and homes. (VI)
21. Implement procedures consistent with district and school policies that protect the privacy and security of student data and information. (VI)

Source: heep://cnets.iste.org/teachers/t_stands.html/

Appendix G

The Survey Instrument: Technology Experiences (2)

1. What has been your greatest challenge regarding technology and the academic environment at UOG?

2. Indicate below the areas of technology with which you have become familiar.

   a. E-mail
   b. Internet Searching
   c. Word-processing
   d. Spreadsheets
   e. Power Point
   f. Web Design or Instruction
   g. Digital Projector
   h. Distance Education
   i. Retrieving Electronic Journal Articles
   j. Listserv or Discussion Groups
   k. Other - Explain

3. How have you acquired your technology skills, through courses, colleagues or by your own devices? Explain.

4. What technology skills would you like to master in the future and for what applications?

5. If you have experienced apprehension regarding technology, explain in what area and how you have approached the challenge.

6. What type of support would you like to see in place at UOG to support faculty with remaining current with the ongoing development of new technology?

THANK YOU VERY MUCH FOR YOUR TIME

Appendix H

Educational Technology Workshops

WORKSHOP 1: Q-CATS Model for Assessing Distance Learning

The PHTN (Public Health Training Network) developed the Q-CATS tool to assist in determining if distance learning will benefit your organization as part of overall workforce development efforts. In the Q-CATS model, distance learning (1) takes training to the learner, (2) is planned learning, (3) can be synchronous or asynchronous, (4) should be interactive, and (5) often facilitated by some form of technology. The Q-CATS model consists of five (**Q**uality, **C**ourse, **A**udience, **T**echnology, and **S**upport system) analysis considerations before integrating distance learning, and each asks the following questions.

Quality Analysis:

- Are your learners at multiple sites? (Thus, is it necessary for them to travel to be trained?)
- How is training critical to your organization's mission?
- Are there a limited number of qualified teachers?
- Is there support from upper level management for making a change in how training is conducted?

Course Analysis:

- What courses are in high demand?
- Are there particular courses for which there are too few instructors?
- Which courses are most easily adaptable for distance delivery?
- Do you have the access or resources necessary to redesign or convert selected courses for distance learning?
- Are the faculty or subject matter experts willing and available to participate in a distance learning effort?

Audience Analysis:

- Where are your audiences? (Are they in multiple time zones?)
- What are the learner characteristics or demographics?
- What are the leading motivators for your audiences?
- What kind of experience does your audience have with technology?

Technology Analysis:

- To what types of technology do your learners have access?
- Will their technology work for distance learning?
- What will it cost (in case of renting, buying, borrowing, and sharing)?
- Can learners connect with each other and other faculty at a central point of contact?

Support System Analysis:

- How will learners register for your courses?
- What kind of accreditation is needed or desired?
- How will you ensure that your courses are accredited?
- How will faculty be prepared and supported?
- How will participants' learning be evaluated (e.g., grading, evaluation, and transcripts)?
- What kind of support will be available to learners (e.g., technical support, advance communication, and local facilitators)?
- How will your system be sustained?

In addition, the methods of gathering assessment data include interviews, surveys , observations , and focus groups.

- Interviews
  - Use when you need detailed information from a limited representative group.

    - Advantages: fluid and flexible, can talk about things that are not observable and have no documentation, and allow for additional questions.
    - Disadvantages: subjective, time-consuming, and consensus is needed.
- Surveys
    - Use when you need to gather information from a large group.
    - Advantages: good for validation, and easy to summarize and report.
- Observations
    - Use when you want to find out how people do a task. First, observe whole task; second, look at details; third, walk and talk; and fourth, consider doing the task yourself.
    - Advantages: you see how something is actually done, not how it is reported to you; and good for things that are difficult to describe verbally.
    - Disadvantage: time consuming.
- Focus groups
    - Use when you need to get consensus across a group and have limited time to do so.
    - Advantages: can quickly provide instant validation and consensus.
    - Disadvantages: Lose details and dominance of certain group members.

Source: Telecommunications and Distance Education Operation Learning Systems Institute (Public Health Training Network and the University of Guam), August 16-18, 2004.

WORKSHOP 2: The Benefits of Assistive Technology

Assistive technology, one of the ways to help adults with learning disabilities compensate for their difficulties in a variety of academic areas, was introduced as a component of rehabilitation during the late 1950s as a result of improved prosthetics developed for soldiers returning from war (Mull, 2003). According to the Institute,

- Visual impairments include low vision, color blindness, and blindness.
- A wide range of common illnesses and accidents can cause mobility impairments.
- Language impairments include conditions such as aphasia and delayed speech.
- Psychiatric impairments are broad and range from mild depression to chronic disorders.
- Health impairments are not likely to directly affect learning unless it is neurological in nature.

The types of assistive technology and disability categories the Institute includes:

- Alternative input devices, which include alternative keyboard, head pointer, and electronic pointing devices, allow individuals to control their computers through means other than a standard keyboard or pointing device. Target: mobility disabilities
- Keyboard filters, which include typing aids, such as word prediction utilities and add-on spelling checkers, enable users to quickly access the letters they need and to avoid inadvertently selecting keys they do not want. Target: learning disabilities
- Large-print word processors allow users to view everything in large text without added screen enlargement. Target: low vision? Reading comprehension programs focus on establishing or improving reading skills through ready-made activities, stories, exercises, or games. These programs can help users practice letter sound recognition and can increase their understanding of words by adding graphics, sounds, and possibility animation. Target: specific learning disabilities
- Screen readers: software programs that present graphics and text as speech; used to verbalize, or "speak" everything on the screen including names and descriptions of control buttons, menus, text, and punctuation. Target: blindness, learning disabilities

Source: Assistive Technology Seminar (The University of Texas – Pan American, and the University of Guam), August 26, 2004.

WORKSHOP 3: Online Courses and PROA Courseware Platform

Three models of distance education:

- Distributed classroom: technology-based classroom extended from one site to one or more distant sites (example: video-conference classes).
- Independent learning: (1) student-centered, (2) work on their own, self-paced, and follows guidelines of the course, (3) faculty facilitates with communication medium, answers questions, does evaluations (example: online course)? Open learning + class: students work both alone and as groups with class meetings, face-to-face, or with the use of technology (example: a telecourse with taped lectures).

Guidelines for developing distance learning:

- Distance learning activities are designated to fit the specific context for learning.
- Distance learning opportunities are effectively supported for learners through fully accessible modes of delivery and resources.
- Distance learning initiatives must have support in the forms of organizational commitment to quality and effectiveness in all aspects of the learning environment.
- Distance education programs organize learning around demonstrable learning outcomes, assist the learner to achieve those outcomes, and assess learner progress by reference to these outcomes.
- The provider has a plan and infrastructure for using technologies that support its learning goals and activities.

Factors that institutions can use for achieving successful distance education:

- Dedicated technology infrastructure.
- Selection of key delivery modes appropriate for the given environment.
- Key goal of learning.
- Dedicated/permanent administrative organization.

- Sustainable economic model.
- Use of distance education team, with professors and distance education professionals.
- Regular faculty training to teach distance education courses.

Source: Introduction to Online Education and UOG's PROA Platform, University of Guam, September 13, 2004.

Appendix I

Glossary of Open and Distance Learning Terms

Adult Education: Teaching and learning that emphasizes the principles of adult learning, often known as andragogy, as compared to pedagogy, or child-centered learning.

Assessment: The measurement of a learner's performance in terms of knowledge, skills and attitudes.

Behavioral Objectives: Learning objectives that indicate the expected changes of behavior in learners who complete a course of instruction.

Bulletin Board System: A small computer system that allows members to exchange messages, maintain discussion groups and download software.

CD-ROM (compact disc read only memory): A disc that can store a large amount of text, audio, video and graphic information; a computer needs a special drive and software to display these materials.

Constructivist: Frameworks for learning in which learners and teachers work together to construct meanings, rather than having teachers predetermine or prescribe these meanings in advance for the learner.

Continuing Education: Education that is usually not for credit, but can be delivered on campus or at a distance.

Curriculum: The total structure of knowledge and skills and educational experiences that make up any one educational system or its component parts.

Digital: Information stored in the form of 0s and 1s; digital information may include video, audio, graphics, and text.

Electronic Mail (e-mail): The exchange of information from one computer to another using software that is designed to store and forward messages received or sent.

Evaluation: A level of learning involving judging the value of the material with reference to a specific set of criteria.

Formative Assessment: The evaluation of learning that is carried out as the learning activities progress; contrast summative assessment, which takes place upon completion of the activities.

Formative Evaluation: The assessment of learning that occurs as a project or course is in progress with the aim of identifying problems and addressing them immediately; contrast summative evaluation.

Graphic Devices: Items in a text design that are used to emphasize a point, direct the readers' attention, highlight the relationship between ideas, or provide learners with cues as to the activity in which they should be engaged; for example, tables, charts, symbols, shading, borders, textures and different fonts.

Handbooks: The part of the learning materials package that provides information to learners about other materials (for example, video cassettes) that have been purchased or leased from another institution. These require some explanatory notes so that they fit into the context of the user institution.

Information Highway: A term developed as a way of describing the joining together of once-separate telephone and television technologies and computing systems into a single global network of networks.

Instructional Design: See instructional development.

Instructional Designer: The person on the course team who understands research in open and distance learning and adult pedagogy, is the collector of wisdom and successful techniques in open and distance learning, and is able to apply this knowledge to the course in question without clashing with the course writer or writers.

Instructional Development: Also known as instructional design; a process of designing instruction in a way that enables learners to learn effectively.

Interaction: Two-way communication between tutor and learner, between one or more learners, and between learners and the learning materials.

Interactive Radio Instruction (IRI): A system of educational radio broadcasts intended for reinforcing learning in classroom settings that contain instructions to teachers and learners for engaging in some activity related to the broadcast and to actively respond to what they are hearing.

Interactive Television: Television broadcasts that are combined with some form of telecommunications link to enable viewers to respond to what they are watching.

Internet: The worldwide collection of computer networks that use a common communications protocol and addressing scheme to share resources with one another; owned by no one, it is maintained collectively by the individual national, regional, commercial, and institutional networks that make up the Internet.

Knowledge: A level of learning activities that involves recalling previously learned material.

Learner-Centered Education: An educational philosophy in which the integrity and freedom of the individual is primary; therefore, the teaching and learning process provides flexible sequences of study, negotiated objectives and content, negotiated learning methods, negotiated methods of assessment, and a choice of support mechanisms.

Lifelong Learning: A philosophical concept in which learning is viewed as a long-term process beginning at birth and lasting throughout life; a conceptual framework within which the learning needs of people of all ages and educational and occupational levels may be met, regardless of their circumstances.

Listserv: An e-mail system that automatically sends messages to all subscribers on specific mailing lists.

Multimedia: Learning technologies that involve the whole range of audio, visual, text, and graphics media available, integrated into a package that has been effectively designed from an instructional point of view.

Norm-Referenced Assessment: Assessment of learning that is based on the learner's performance in a given area in relation to that of some norm or reference group.

Objective: In the context of teaching and learning, a specific statement about what the learner will be able to do when a learning activity is complete, the conditions under which learners will demonstrate their competence, and the way in which this competence will be measured.

Objective Assessment: Evaluation that is designed as far as possible to exclude the learner's subjectivity; grading is done by presenting a number of factual questions to be answered by one word or a check mark instead of using verbal expression and the organization of material, requiring a minimum of judgment on the part of the marker.

Open Access: A way of providing learning opportunities that implies a lack of formal entry requirements, prerequisite credentials, or an entrance examination.

Open and Distance Learning: A way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place; the use of a variety of media, including print and electronic; two-way communications that allow learners and tutors to interact; the possibility of occasional face-to-face meetings; and a specialized division of labor in the production and delivery of courses.

Open Learning: An educational philosophy that also emphasizes giving learners choices about media, places of study, paces of study, support mechanisms, entry points, and exit points.

Performance Indicators: Measurements for assessing the quantitative performance of a system.

Period of Account: The period of time over which costs are measured.

Quantitative Analysis: The process of identifying the discrete components of some phenomenon and the relationships between variables, emphasizing entities that can be counted or measured.

Technology-Based Education: In the context of teaching and learning, a system in which a media other than print has a major role.

Video Conference: A technological arrangement in which television monitors, cameras, and microphones are linked so that people in three or more sites can all see, hear, and speak to one another.

Videodisc: A disc on which video and audio signals are recorded for television use; a videodisc requires a video player compatible with the videodisc.

World Wide Web (www): A communication protocol for the Internet that deals with text, audio, video, animation, graphics, and color — anything that a computer program can produce.

Source: Adapted from ASTD. (2001). E-learning glossary. Retrieved from http://www.learning.circuits.org/glossary.html

Appendix J

Research Studies on Educational Technology

Publication	Inoue, Y. (2001). Methodological issues in the evaluation of intelligent tutoring systems. *Journal of Educational Technology Systems, 29*(3), 251–258.	Inoue, Y. (2000). University students' preference for learning by computer-assisted instruction (CAI). *Journal of Educational Technology Systems, 28*(3), 277–285.	Inoue, Y. (1999). University teachers' perceived usefulness of computer-assisted instruction (CAI). *Research in the Schools, 6*(1), 33–40.	Inoue, Y. (1999). Effects of virtual reality compared to video in a high school geography class. *Campus Wide Information Systems, 16*(3), 95–103.	Inoue, Y. (1997). Facilitators and inhibitors of computer-assisted instruction. *Journal of Educational Technology Systems, 25*(1), 37-55.
Objective	To examine the state of the art of ITS (intelligent tutoring systems) evaluations.	To examine whether or not gender differences are associated with academic status on preferences for learning by CAI.	To determine the process by which university teachers arrived at a positive perception of CAI.	This proposal addresses the effect of VR as compared to the effect of video support in the world geography class.	To identify and to prioritize determinants of the faculty's use of CAI.
Design and Instrument	Studies were reviewed in four evaluation methods: summative vs. formative; internal vs. external; quantitative vs. qualitative; and formal vs. informal.	A survey questionnaire was administered to students, who were asked whether or not they preferred taking courses using CAI or not using CAI.	A survey questionnaire was conducted to identity the relative importance of facilitators and inhibitors for the faculty's use of CAI.	In the experiment, a rotation of the treatment is going to be used ; each group will be using VR for two units and videotapes for two units.	A survey questionnaire was developed to identify and to prioritize the factors influencing the university faculty's use of CAI.
Sample	Leading researchers and scholars in the ITS field conducted ITS evaluation studies.	Seventy-six students (N = 76) at a university of the mid-south in the U.S. were randomly selected to answer the questionnaire.	Faculty of Singapore's two institutions of higher education. Of 118 of the random sample, 63 (53%) completed the survey.	The one high school world geography class (N= 36) is randomly divided into two groups (i.e., experimental group and control group).	A survey was distributed to the business and education faculty of a university in Singapore, with 53% (N=63) of responding.
Data Analysis	The critical component in ITS is its knowledge component that has not been evaluated adequately to verify the knowledge.	A two-factor random-effects ANOVA (analysis of variance) was used (the preference for CAI as the dependent variable and student gender and academic status as the independent variables).	Path analysis (causal model in which a series of independent variables is used to predict a series of dependent variables) was utilized to estimate the influence on the perception of CAI.	*t*-tests will be used to determine if significant differences exist in academic performance between VR use and video use. ANOVA will be used to test group differences as well as interactive effects.	*t*-tests (at the alpha level of .05) were used to check for significant differences for all individual factors between the two groups (business vs. education) in the two comparisons (male vs. female faculty).
Results	Summative evaluations were found to be more difficult to execute than formative evaluations because they would involve the comparison of ITS with human tutors rousing traditional teaching methods across the extensive problem domains.	Graduate students favor CAI more than undergraduate students do, probably because most of them have jobs and need to learn using CAI at a more convenient time and place. The result confirms the assumption that graduate students have more computer experiences.	"Knowledge of CAI" was found to be a dominant factor influencing the perceived usefulness of CAI among university teachers after all. That is, the higher the CAI knowledge level was, the higher the positive perception of CAI was.	VR has the potential to be an effective technology for helping students accelerate their learning and retention of information. 21st century students must master sophisticated information-age learning media, having access to powerful learning resources.	Major facilitators were "teachers' knowledge and skills in technology" and "availability of hardware and software," whereas "lack of teachers' time" and "lack of technical support" were the two most important inhibitors for the use of CAI for the faculty.

About the Authors

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