FINAL REPORT OF
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PRESENTED TO THE
UNIVERSITY OF HAWAI'I MARINE OPTION PROGRAM

Marine Education
Assisting in preparation of a presentation for the
First International Information Technology in Education
Convention 1993
held in Singapore 4-8 May 1993

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PROJECT ADVISOR
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Director Marine Option Program
University of Hawai'i

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INTRODUCTION

On 4-6 May 1993, Dr. Sherwood Maynard, Director of the Marine Option Program at the University of Hawai‘i attended the First International Information Technology in Education Convention 1993 in the Republic of Singapore. Leading up to this event, were several weeks of preparation for his talk entitled Technology in Support of Ocean Education by the University of Hawai‘i Marine Option Program. The intent of this presentation was to educate the public about some of the newer and more-advanced resources available that are conducive to the learning process, both inside and outside of the traditional classroom setting. By working on this project, I believe I met my goals of learning more about the Marine Option Program and the components and people that keep it running smoothly. I think Dr. Maynard and I both benefited because his work load was reduced, and my knowledge of community education was increased. I would hope that the audience benefited by hearing a lecture that was easily comprehensible, audible, visually stimulating and well-prepared.

MATERIALS AND METHODS

Dr. Maynard decided that he would like his presentation to be in the form of a slide show, with title slides summarizing the main points, and picture slides to illustrate. Since I was quite unfamiliar with many of the words that he was using, I did some reading on the program and talked to some other Marine Option Program students. Dr. Maynard wrote an outline and started writing a written copy of his presentation, while I started taking pictures. I learned to use a Canon 35 mm SLR camera and a Nikon 35 mm SLR camera with a tripod, but not without some difficulty. The learning process was gradual, and was based on a lot of trial-and-error, rather than the traditional listen-to-a-lecture-and-memorize-the-steps-to-go-through approach. The Canon camera is fully automatic, so it takes little on the part of the operator to use it correctly. The only problem with that piece of equipment was that the lens was not able to take close-up pictures for the title/logo slides. To eliminate that problem, the Nikon camera (which was equipped with a macro-lens) was utilized. Since this camera is a little more sophisticated, the first major catastrophe occurred when I forgot that there was a light meter and the camera needed to be adjusted accordingly. This error resulted in a whole roll of film coming out too dark. I used the light meter on the second roll, but for some yet-unknown reason, that
(and a roll that Dr. Maynard took) came out too light. The last roll of film I took, I decided to do outdoors, to ensure effective lighting. This worked for a while, but then the sun started moving and dark shadows were being cast on all of my subjects. Since I could not find a spot that was shadow-free, I resolved this problem by mounting my subjects vertically on a wall, and aiming the camera directly at them, rather than from overhead.

The next difficulty was finding a map of the Hawaiian islands that had the ten University of Hawai'i campuses labelled on it. Since there did not seem to be any good ones available, I decided to make my own. The first map I made could not be used because the labels were hand-drawn rather than typed. The second map I made looked fine, but when the camera was focused on it, the labels were unreadable because the font was too small. This problem, though, was easily overcome, by making new labels. I mounted my map vertically on a wall outside so that the lighting was sufficient and I would have no trouble with mid-day shadows. However, in the middle of shooting, my final problem arose when a big gust of wind came by, blowing my map into a mud puddle. Since the map was ruined, I ended up using a plain black-and-white map, that had been used in previous years. I guess God had it planned that I would not get to use my own hand-made map.

After we had a good collection of picture slides, we sat down and sorted through them, along with other slides that had been taken in past years. It was necessary for me to fly to the Big Island, so that I could use a slide-maker at UH Hilo, which was also a new technique for me. I used Ektachrome 100 slide film, and an IBM PC compatible computer (80386, 25 mHz), VGA color monitor, HP IIC Scanner, and a Polaroid CI-3000 slide maker as my hardware, and Harvard Graphics for Windows, Version 1.0 by Software Publishing Company Corporation, Photofinish 1.0 by Z-Soft Corporation, and DeskScan II by Hewlett-Packard as my software programs. This task entailed choosing fonts and screen colors that were appropriate and then typing in the text. I arranged the text in an appealing manner and also scanned in any logos/pictures that were necessary. After all that was done, the computer was connected to a camera with film, and pictures of all the frames that I had just prepared were shot. All this was done under the close supervision of John Coney, the MOP Staff Coordinator at the UH Hilo campus. The film was then sent in to be processed.

The slidemaking process was fairly easy and rather enjoyable, but we seemed to have a problem with time—there just wasn’t enough of it. Although we had planned for me to have approximately 6 hours
of work time, there were several delays. First, John had forgotten to pick me up from the airport, so we lost about an hour there. Second, it took time to have the procedure explained to me and then for me to grasp the concept. Third, halfway through the program, the computer decided that the disk was too full and refused to continue until John had removed several pre-existing files to make room for the new ones. Since I had a plane to catch (it was the last flight out so it would not have been wise to miss it), I ended up leaving and having John finish up the photographing of the frames. We communicated by means of the fax machine and E-mail (he sent the finished product over to us on the fax machine, we communicated our changes through E-mail, and then he sent the film in to be processed).

A few days before the conference, Dr. Maynard and I sat down with all of our slides and picked out the best and put them in the appropriate order. This was our last meeting, one of several that had taken place during the past couple weeks, as each step was complete and progress and problems were noted.

RESULTS

The result of all our hard work, was a slide show with 98 slides (see Appendix II for list of slides). Dr. Maynard had also prepared a written summary of the talk, which will be published in the minutes of the meeting (see Appendix I) and can be read by those who were unable to attend the convention.

EVALUATION OF LEARNING

Throughout the project, I gained some insight into myself. Although working with Dr. Maynard was a pleasant experience, I prefer to work alone, with little or no supervision, and old-fashioned equipment. I guess this is because some of the newer technology can be very confusing and frustrating, especially to first-time users, and using manual equipment eliminates some of this tension by not having to deal with machine malfunctions or incorrect procedures. Take for example, E-mail. At one point in the project I tried to send an E-mail message to John Coney at UH Hilo. Unfortunately, I did not specify UHMMOP as the destination in the address and UHMMOP as the origin, so a different John and Joy at UH received my message, but John Coney did not.

I would like to acknowledge John Coney at UH Hilo for all his time and help on the Big Island. Without him, I never would have
finished in time. I would also like to thank Dr. Maynard and the Marine Option Program for the use of their equipment and for paying my airfare to the Big Island.

Helping Dr. Maynard was a valuable experience. Not only did I learn a lot about how the Marine Option Program is run, its certificate requirements, its extra-curricular activities and the equipment that is used in the learning processes, but I also learned how to prepare information so that it is easily understood by others. I learned that visual aids must be appealing to the eye, with soothing colors, large fonts (especially if it is to be viewed from a distance) and must not be too light or too dark in color. I also learned about planning/time management and how to prepare the components of a proposal in the correct form, along with a Curriculum Vitae. Since I normally work on projects alone, I got the experience of working in close collaboration with a partner and scheduling around our other commitments. All in all, I learned how to use a new computer program, was able to use the scanner and send an E-mail message, observed a PEACESAT and HITS conference in session and was opened up to the new technologies and aspects of marine life.
BIBLIOGRAPHY


APPENDIX I — Written presentation

$\text{TECHNOLOGY IN SUPPORT OF OCEAN EDUCATION}$

BY THE UNIVERSITY OF HAWAII MARINE OPTION PROGRAM

by

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Abstract

The Marine Option Program (MOP) serves undergraduate and graduate students (tertiary) throughout the ten-campus University of Hawaii system which delivers programs on six islands. MOP enrolls students in all disciplines who have an interest in investigating the ocean, with emphasis on the natural sciences, marine affairs and policy, maritime archaeology and history, and marine mapping-charting-geodesy. The program promotes experiential learning opportunities throughout the Pacific region, often by placing students in internships, research projects, or employment which provide fundamental complements to traditional classroom learning and frequently permit access to technologies not readily available on campus. Especially for undergraduates, MOP-maintained equipment (e.g. computers, video cameras and editors, field sampling equipment) allows convenient, frequent use and familiarization which have many applications in coursework, research, and independent studies.

Real-time systemwide program coordination requires combined communications systems of electronic mail, facsimile, interactive television and telephones. Outreach and service programs also rely on most of these systems plus PEACEsat, and, when communicating with some developing countries, telex and cable communications may be necessary backups. MOP awards academic certificates which recognize a specialization in marine study integrated with an element of practical experience. This structure provides a strong complement to degree programs and allows for flexibility and innovation in designing appropriate curricula to prepare students for rapidly changing and increasingly cross-disciplinary fields of investigation or job markets.

Introduction

Educating the next generation of ocean scientists, resource managers, policy makers, business people and educators requires diverse and creative integration of technology into the curriculum. The University of Hawaii Marine Option program is an innovative experiential education program which involves students in learning to acquire information and to analyze information by using and by observing first hand a variety of technologies (Maynard 1984).
University of Hawaii

The University of Hawaii (UH) is a ten-campus system (Table 1, Figure 1). The flagship campus, the University of Hawaii at Manoa (UHM) is a major research and teaching university offering baccalaureate, masters and doctorate degrees as well as supporting schools of law, public health and medicine. The University of Hawaii at Hilo (UH) offers complete baccalaureate programs. The University of Hawaii at West Oahu (UHWO) offers third and fourth year coursework towards baccalaureate degrees in selected areas. The UH Community College system consists of seven campuses on four islands—on Oahu: Kapiolani CC, Honolulu CC, Leeward CC and Windward CC; Kauai: Kauai CC; Maui: Maui CC; Hawaii (the Big Island): Hawaii CC. Systemwide nearly 50,000 students are regularly enrolled.

Table 1. Fall 1992 regular program enrollment at the University of Hawaii.

<table>
<thead>
<tr>
<th>Campus</th>
<th>No. Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH at Manoa</td>
<td>19,865</td>
</tr>
<tr>
<td>UH at Hilo</td>
<td>2,966</td>
</tr>
<tr>
<td>UH at West Oahu</td>
<td>692</td>
</tr>
<tr>
<td>UH Community Colleges</td>
<td></td>
</tr>
<tr>
<td>Hawaii CC</td>
<td>2,207</td>
</tr>
<tr>
<td>Honolulu CC</td>
<td>4,774</td>
</tr>
<tr>
<td>Kapiolani CC</td>
<td>7,132</td>
</tr>
<tr>
<td>Kauai CC</td>
<td>1,580</td>
</tr>
<tr>
<td>Leeward CC</td>
<td>6,135</td>
</tr>
<tr>
<td>Maui CC</td>
<td>2,713</td>
</tr>
<tr>
<td>Windward CC</td>
<td>1,787</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>49,851</strong></td>
</tr>
</tbody>
</table>

Because the ocean is a unique working environment, one that most people are not easily "at home" in, education and training for marine careers are incomplete without a significant experiential component. The UH Marine Option Program (MOP) provides this complement through faculty, staff and facilities at four campuses (UH Manoa, UH Hilo, Maui CC, Windward CC). UH also serves Hawaii CC students, UHM also serves UH West Oahu, Kapiolani CC, Honolulu CC and Leeward CC.

Experiential Education

Experiential education involves a wide variety of activities: placing students in jobs, internships and research projects; offering classes and workshops which include substantial hands-on components, sponsoring site visits to ocean-related agencies and businesses; organizing field trips to exceptional coastal areas, sanctuaries, and dive sites; and by making marine technology accessible through program-owned facilities and equipment. The value of experiential education extends beyond familiarization with ocean hardware and personnel—it also helps students develop transferable skills such as time management, teamwork, proposal writing, technical report preparation, library research, interviewing, problem solving with the scientific method, communication skills, resume designing, budget preparation, analyzing data, delegating responsibilities, project organizing, and integrating knowledge and skills from a cluster of disciplines (Breen and Whitaker 1983).

The Marine Option Program

To structure part of its program, MOP offers inter- and multi-disciplinary certificates (Table 2). Each requires ca. 20 credits of traditional classroom coursework drawn from the departments which represent the foundations of knowledge in each certificate's field. For example, Ocean Policy includes courses in Law, Geography, Economics, Political Science, Oceanography, and Civil Engineering. These are integrated through an Ocean Policy Seminar and
other cross-disciplinary OEST (Ocean, Earth Science and Technology) courses such as "Global Environmental Change" and "The Sea and Society". Each certificate also requires the student to acquire a skill or practical experience in working with the ocean. Usually, the project or internship is designed as the educational tool which integrates theory and practice.

Table 2. Academic Certificates awarded by the University of Hawaii Marine Option Program. (* = proposed).

<table>
<thead>
<tr>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine Option Program Certificate (Undergraduates from all majors)</td>
</tr>
<tr>
<td>Graduate Ocean Policy Certificate (Post-baccalaureate)</td>
</tr>
<tr>
<td>*Graduate Marine Mapping, Charting and Geodesy Certificate (Post-baccalaureate)</td>
</tr>
<tr>
<td>*Graduate Maritime Archaeology and History Certificate (Post-baccalaureate)</td>
</tr>
</tbody>
</table>

For experiential learning to be considered academic, it must consist of three components: planning, monitoring, and evaluation (Stanton and Ali 1982, Thiggarajan 1980, Zanville and Markwood 1982). Normally the planning phase includes writing a proposal, outlining the internship or research. The student sets out his or her learning objectives, describes the background and significance of the project (in part through literature review and interviews of experts), describes the methods and materials by which the learning
Objectives will be achieved (including a timetable, budget and resume), and proposes how the learning will be evaluated (Kirk-Kuwaye and Maynard 1991). The MOP faculty coordinator helps the student select an appropriate expert to mentor the project, and the three negotiate a learning contract. Once the project starts, the three meet periodically to monitor progress and redirect the project as needed (Jenks and Murphy 1980). Upon conclusion, the student submits a "final report" on project accomplishments and a self-evaluation of what was learned. The MOP Coordinator and Mentor review these and discuss their evaluations and insights with the student.

Ocean science and technology are rapidly developing fields which still do not have universally standardized curricula, especially at the undergraduate level (Rosenfeld 1988). Study in these fields is a powerful attractant and motivator for students. At the University of Hawaii, they come from over 60 fields of study to seek out experiential learning opportunities in MOP. Common denominators for the students include 1) an interest in the ocean and 2) the initiative to learn about the ocean above and beyond what is required as a bare minimum to earn their degrees. Most students select a cluster of courses which directly relates to their major. Thus an education major may become a teaching assistant for a marine education program (Maynard et al. 1988); an anthropology major may investigate the construction and practices of traditional aquaculture technologies (Choy et al. 1981); a zoology major may experiment with techniques of small-scale aquaculture production (Szyper and Maynard 1988); or a geography major may team up with fellow students on a baseline survey to investigate environmental impacts of the ocean recreation and tourism industry (Harr et al.). However, it is also legitimate for a student to explore an area of marine interest not related to his or her major—a student of French literature may be interested in marine mammal behavior (Syracuse 1981).

Through MOP projects and workshops, students may access a rich smorgasbord of technologies, including computers, video, photo, electronics, oceanographic sampling equipment and more. When MOP provides computers and software in study centers, students acquire skills in word processing, desktop publishing, creation of Hypercard and CD-ROM modules, statistical analysis, creation of audio-visual materials, spreadsheet and database construction, and use of electronic mail. When placed with faculty research projects, with government agencies, or with industry, students may access state-of-the-art technologies which are not usually available through their classes except as readings assignments (e.g. fiber optics, robotics, super computers, satellite oceanography, geographic information systems, etc.).

**Video and Photo Technologies**

Videos are used extensively as self-directed training tools. Each year MOP sponsors a Quantitative Underwater Ecological Surveying Techniques Workshop (QUEST), a two-week long, three credit course conducted at UHH after the conclusion of Spring Semester (Maynard and Saint 1985, Russell in press). To be admitted, students must learn the field identification of 100 species of fishes, 30 algae, 20 corals, and about 30 other invertebrates. Students must be able to accurately recognize key organisms if they are to collect reliable baseline survey data. Learning includes non-credit lectures, often by a senior student, illustrated with slides and video, followed by self-paced study and review of the videos. This preparation then culminates in a series of dives to practice the identification under actual conditions. Many of the training videos were produced by students. The existence of this library allows students to prepare and review at times most convenient to their varied schedules.
A similarly structured workshop is offered in Marine Archaeological Surveying Techniques (MAST, Russell 1992). Students learn a variety of techniques using surveyors' transits, a global positioning system, towed and hand-held underwater metal detectors, three-dimensional computer-assisted mapping, and video and still photography documentation.

In addition to learning from videos, we give students opportunities to learn by making videos. Cameras and editing equipment accompanied by limited training enable students to design educational packages based on their unique experiences, such as a kayak trip through the Aleutian Islands or a dive on an active underwater lava flow, or on a timely topic of personal interest, such as the problem of marine debris or the occurrence of tumors in sea turtles. By researching, scripting, shooting and editing an entire video production, the student can become immersed in some aspect of ocean science and technology, developing a thorough understanding for it. Other students can then benefit by viewing the finished product.

Similarly, still photography can be used as a data acquisition tool on underwater surveys to record species present, to characterize the site, or to document the activity as illustrations for an article or oral presentation. A number of students have produced slide shows with scripts to explain a research method, to orient a group to a field trip site, to introduce a newcomer to proper operation of a piece of equipment. Some students who have developed photography and video skills in the program have gone on to become photo-journalists.

Students may also learn use of ocean sampling equipment—from high technology sea-going or satellite-borne oceanographic sensors to the more simple environmental monitoring equipment carried in hand.

Thus, experiential education provides: application of theory and concepts, problem solving in real-world situations, testing for a career or academic major, tools to conduct future research, professional contacts, motivation and reinforcement for classroom learning, and a suite of transferable skills.

Program Administration

A number of challenges exist in running the Marine Option Program as a statewide entity: physical separation of six islands and ten campuses, limited financial resources and facilities, part-time faculty and staff, the reliance on student help and volunteers, and the commonly held prejudice that experiential education is extracurricular, not central to the university's education mission—true learning only takes place in the classroom (Kendall et al. 1986). Communicating among the campuses in real time is difficult. Intercampus mail is slow, faculty are only assigned to MOP part time and are often in class, most students are in morning or early afternoon classes and only available for MOP programs during evening and weekend hours (when many also work), most faculty do not have secretaries to take messages, it is costly for everyone to fly to the same island to physically sit down at the same table to discuss the program. Some technological solutions alleviate these problems. Electronic mail has been a boon. It reduces telephone tag and enables daily communications among all program components. Telephone answering machines also help in this respect. Fax machines come into play when standard documents and signatures are required.

The Hawaii Interactive Television System (HITS) has added flexibility to meetings of statewide personnel. Meetings are essential from time to time, because discussions requiring active participation and dialogue are often
necessary to plan a systemwide project, coordinate efforts or work out a problem. Meetings are expensive in time and money if everyone concerned must fly to the same island. Different campuses on different islands can be brought together via HITS; unfortunately this system does not interface with a similar system set up for state government agencies. When students from the various campuses are being oriented to conduct a baseline survey, HITS can transmit lectures, maps, data sheets, photos, videos, and questions-and-answers among all the parties involved. Participants can familiarize themselves with each other "face-to-face". These sessions can be taped, and copies can be reviewed later by those whose schedules did not permit attendance.

International Outreach

MOP has also established international outreach programs in marine education. Through the United Nations Educational, Scientific and Cultural Organization (UNESCO, Maynard and Harger 1992); the Pacific Congress on Marine Science and Technology International (PACON International, Maynard 1991), the U.S. National Science Foundation (Maynard 1987) and the Pacific Island Network (PIN, Kumabe et al. 1992), MOP personnel have contributed their expertise to the development and delivery of marine education in the region. Communication here is even more daunting than for the in-state programs and is often complicated by the vagaries of the communications infrastructure of developing countries. Although Hawaii is physically isolated from the rest of the world (with modern transportation, it is no longer an essential refueling stop), we are in a convenient time zone for communicating with a substantial part of the world. As we start a business day, New York and Washington D.C. still have half a day remaining; by mid-day in Hawaii, Tokyo is starting its day; by the end of business in Hawaii, Karachi is waking up. As we deal with countries to the west, we do have to keep track of which side of the International Dateline we are dealing with. Mail, especially surface mail between Hawaii and the Indo-Pacific can take up to six months to travel. Some can be lost or censored. Air mail and express couriers are expensive. Again technology provides some help. The advent and increasing availability of facsimile machines has revolutionized communications throughout the region. Electronic mail is still not particularly well established in the developing countries, but when it arrives and becomes reliable, communications will become more versatile and economical. PEACE SAT, the Pan-Pacific Education and Communication Experiment by Satellite, has been a particularly effective telecommunication system for regular conferencing in support of education programs in the island Pacific (Cooperman et al. 1991). The satellite's "footprint" spans from Thailand to North America and from the Arctic to Antarctic with over 60 stations in service. The voice conferences, classes and programs can be supplemented with facsimile, one way digitized video and database services, bringing real-time communication to distance educators in the region. Low cost and easy maintenance make this a realistic tool for developing countries.

Conclusion

In conclusion, MOP is a wide-ranging program attempting to provide experiential ocean education in the Pacific Basin, particularly at the tertiary level in Hawaii. Information technology—including acquisition, processing and communication is critical to the preparation of tomorrow's ocean leaders—scientists, policy makers, resources managers, journalists, teachers. The certificate approach to marine education allows multi-disciplinary, rapid response, cost effective programs which provide students ready access to the latest technologies and emerging fields of study.
Acknowledgments

The author is grateful to the following for their special assistance:

Dr. Lorenz Magaard, Associate Dean, UH School of Ocean and Earth Science and Technology, for his encouragement and supporting travel funds.

Ms. Joy Schmalzle, Manoa MOP student, for providing audio-visual materials and contributing to the organization of the paper and presentation.

The MOP Co-ordinators for supplying slides from their respective collections: Mr. Steve Russell (Manoa), Dr. David Krupp (Windward), Mr. John Pye (Maui) and particularly Mr. John Coney (Hilo) who also assisted Ms. Schmalzle in preparing titling graphics.

Mr. Jeff Kuwabara and Mr. Chad Yoshinaga for making a special dive to take photos of scientific diving equipment in use.

Ms. Grace Lee, MOP Secretary, for maintaining her calm perseverance while pulling together all the loose ends of the above actions.

Literature Cited


APPENDIX II - List of Slides

Legend:
+ title
* logo
* picture

1 (T) TECHNOLOGY IN SUPPORT OF OCEAN EDUCATION BY THE UNIVERSITY OF HAWAII MARINE OPTION PROGRAM by Sherwood Maynard and Joy Schmalzle

2 (*) University of Hawaii Logo
3 (*) Map-10 campuses, 6 islands
4 (*) Waikiki--> UHM
5 (*) UHM logo
6 (*) SOEST logo
7 (*) MOP logo
8 (*) MOP-4 campuses
9 (*) Map
10(T) Experiential Education Includes:
   Job Placements, Internships, Research Projects, Hands-on Classes, Workshops, Site Visits, Access to In-house technology
11(T) Experiential Education Provides:
12(*) Dolphin Language
13(*) Scanning Electron Microscope
14(*) SEM Photo
15(*) Concrete Canoe
16(*) Art Education
17(*) Field Trips-Navatek
18(*) Desalination
19(*) "Abalone Aquaculture
20(*) "Wastewater Treatment
21(*) Symposia by Students
22(*) Workshop-Computers
23(*) Surfer-Bathymetry
24(*) Coral Identification
25(*) MOP Facilities
26(*) MOP-Sponsored Projects: Water Quality
Transferable Skills Include:

Report Preparation

MOP Certificates:
Marine Option Program Certificate (Undergraduate)
Graduate Marine Mapping, Charting and Geodesy Certificate
Graduate Maritime Archaeology and History Certificate
Graduate Ocean Policy Certificate

Sample Certificate

Curriculum Design:
Marine Content, Multi-Disciplinary Courses, Experiential Component, Integration of Information and Skills

Certificate Requirements:
15-20 Credits of Courses, Practical Experience

Aquarium
Whale Migration
Oceanarium
Components of Academic Experiential Learning:
Planning, Monitoring, Evaluation

Student Common Denominators:
Interest In Ocean, Interest in Learning Experientially, Initiative To Do More Than Bare Minimum

Student Diversity-list of various majors
Student Access to Information Technology:
Computers, Videos, Still Photography, Newsletter, E-mail, Field Sampling Equipment

Computers in Information Technology Education:
Word Processing, Data Analysis, Marine Software, Desk-Top Publishing, CD ROM, Research and Development

Word Processing
QUEST
Desk-Top Publishing---> Seawords
Seawords Newsletter
Marine Software-Tides
Satellite Oceanography
NOSC
Kaimalino
Videos in Information Technology Education:
Learning from Videotapes, Producing Videotapes

QUEST gear
Fish for ID
52(*) Video for ID
53(*) Laying Transect Line
54(*) Underwater Video
55(*) Video Editing/Production
56(T) Still Photography In Information Technology Education:
   Illustrate Reports, Produce Educational Modules
57(*) Still Photography Equipment
58(*) NIKONOS Underwater Camera
59(*) NIKONOS on Tripod
60(*) Spinoff --> Photo Art and Journalism
61(T) Field Sampling Equipment:
   State-Of-The-Art Oceanography, Simple Environmental
   Monitoring, SCUBA Baseline Studies: Ecology, Archaeology
62(*) Underwater Archaeology Surveying
63(*) Underwater Metal Detector
64(*) Meteorology Balloon
65(*) Midwater Animals
66(*) Current Meters
67(*) Radio Tracking Seabirds
68(*) Oil Pollution Skimmers
69(*) Research Submersibles
70(*) Classic Water Sampling
71(T) Experiential Education Provides:
   Application of Theory and Concepts, Problem Solving in Real-
   World Situations, Testing for Career/Academic Major, Tools to
   Conduct Research, Professional Contacts, Classroom Motivation/
   Reinforcement, Transferable Skills
72(T) Challenges to Program Administration:
   Separate Islands, Part-Time Staff, Ten Campuses, Slow Mail
73(*) Map
74(T) Technological Solutions:
   Electronic Mail, Telephones With Answering Machines,
   Facsimile Machines, Interactive Television
75(*) E-Mail
76(*) Answering Machine
77(*) Fax Machine
78(*) HITS
79(T) Hawaii Interactive Television:
   Meetings with Personnel on Different Islands, Meetings with
   Personnel on Different Campuses, Sessions Can Be Taped, Tapes
   Can Be Transferred, Saves Time, Saves Money, Permits Personal
   Communication
80(*) Transmission Controls
Monitors and Camera
Room Agency
Overhead
International Outreach Programs:
  Pacific Island Network, PACON International, UNESCO
UNESCO ROSTSEA Logo
Workshops-Computers
PACON Logo
Tokyo
PIN Logo
Remote Developed Countries
Challenges of International Outreach:
  Physical Isolation, Time Zone and Dateline Differences,
  Language Differences, Slow Mail, Censored Mail
Pacific Map
PEACESAT
Satellite Dishes
PEACESAT Meeting
Conclusions:
  Information Technology is an Education Cornerstone
  Individual Students
  Program Administrators
Conclusions:
  Knowledge and Technologies
  Cross-Disciplinary
  Cutting Edge
  Can Be Rapidly Organized
  Can Be Made Accessible to Students
Sunset