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Report From Alaska

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Foreward

I experience every day what may be to many teachers a dream of Utopia! Imagine going to class every day and never becoming stressed by your students' behavior. How many teachers must dream about a classroom that never gets unruly, is never too noisy, is never disrupted by fire alarms or other such distractions! I teach classes where I seldom, if ever, even see any of my students face-to-face. I teach students spread not only across the thousands of miles of Alaskan expanse, but some of whom are around the globe on travels. I teach through words on paper, words on electronic mail, and words on the telephone. I teach middle- and high-school mathematics and science classes at the Alaska state correspondence school.

Distance Learning

Formal "distance learning" has been a way of life for many of Alaska's youth since the inception over 50 years ago of a state school providing correspondence education. As a teacher in this school for the past half-dozen years, I have learned first-hand the advantages and disadvantages of this mode of education. I also have gained direct insight into the value of modern technology in distance learning.

In order to address modern technology as applied to distance learning, it is important to understand the current *modus operandi* of the school where I teach, Centralized Correspondence School (CCS). CCS is a public school operated by the State of Alaska and is open to all Alaska residents for grades K-12. The school is fully accredited at all grade levels, has a full-time enrollment of over 1,000 students, and employs 23 full-time teachers, a counselor, and principal. There is an extensive library which can electronically access all other municipal, university, and state libraries in Alaska. The school operates under the direction of a superintendent and the state school board.

The primary communication method with students is still through written documents and letters via U.S. mail. Also, there is a toll-free telephone number, which students are encouraged to use. As more students acquire computers and modems, however, telecommunication is a rapidly growing means of providing completed student work as well as a communicative device for teachers and students. Although only by prearrangement does e-mail provide interactive communications, the rapidity of response and informality of tone encourages use. CCS has a small number of laptops with internal modems, plus a few dozen modems, which are provided to students on a loan basis if needed. User IDs are purchased annually from the University of Alaska network and provided to students.

Distance Learners

First, I address various aspects of telecommunication as an educational tool for individuals engaged in distance learning, for conventional classrooms, and for individual students in any educational setting.

All students at CCS are, by definition, distance learners. Not surprisingly, telecommunication is a particularly active tool for many of the high school students at CCS. Students are encouraged to telecommunicate with their teachers and their peers. In order to introduce students to telecommunicating, a one-semester course is offered in electronic mail. In general, CCS students feel less intimidated about sending a quick letter by e-mail to a teacher than they do about picking up the phone and calling. Furthermore, e-mail is used at the convenience of the student, and not constrained by the availability of the teacher at the school. Similarly, teachers can read and respond to e-mail at their convenience. For most subject areas, e-mail provides faster turn-around from the teacher than regular mail. The ability to quickly provide answers to students' questions, to return a student's corrected assignment, and to apply word-processed corrections and comments on student submissions are all advantages inherent in e-mail.

Of course another advantage of telecommunication is that it encourages—early on—computer literacy

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in students: keyboarding, word-processing, and so forth. In our increasingly technological society, early computer literacy clearly represents a long-term advantage for the student.

The reader may well envision the advantages of telecommunication to students living in remote regions. However, about half of the students at CCS are urban, and there is little difference in the employment of e-mail except that the remote student often may need to start up a generator to power the computer. Obviously, e-mail is of little value to the student in a typical school for communicating with a teacher who is seen on a nearly daily basis. This is not to say that e-mail is exclusively of educational value for distance education. Indeed, as other essayists in this volume have testified, telecommunication is a rapidly growing method of inter-communication among schools. Telecommunication provides easy and rapid access to databases for academic purposes. It is an effective way to link classrooms of all types and grades to collaborate on projects of numerous academic disciplines. Collaboration on projects not only provides a realistic model of modern research methods, but tends to motivate and energize the students involved.

Although e-mail as presently employed by CCS is certainly of value, it does not provide the range of options found in some commercial systems. One commercial system has interesting student forums and provides access to a variety of information in various subject areas through an easy-to-use database and encyclopedia reference system. The primary limitation of providing such access to students, of course, is funding. However, with the mercurial growth and improvements taking place in these technologies, and the competitive access-time charges being constantly lower, this negative aspect is becoming of less importance.

The Use of Modern Technology

The students at CCS who have access to e-mail have an advantage over typical classroom students regarding use and employment of telecommunication to assist in their learning process. For those who live in isolation, whether due to physical location or social isolation, e-mail serves a purpose beyond its value as a means of communicating with a teacher or a vehicle through which to conduct research or submit lessons. It becomes a social tie and results in friendships developed at both the peer level as well as between students and teachers.

E-mail lends itself readily to the composition of thoughtful responses, rather than single, quick responses. As a result, its very nature fosters expression and thoughtful reflection rather than rote learning. Communicating thought obviously encourages cogitation and reasoning, both hallmarks of a truly educated person in any field.

Future methods of employing technology in support of distance education, as well as ordinary education, will relegate our current methods to museum status. As personal computers and support technology become increasingly advanced, computers will become the primary means of academic research knowledge base. Graphical transmissions will support visuals as well as permit on-line interchange of mathematical scribblings. Such visual interconnectivity portends to truly provide direct interaction between teacher and a distant student, and provide visual support for written research by all students.

Even at the current level of common technology, an educational system such as CCS could better serve a variety of students nationally. This is certainly not to claim that distance education is inherently superior to direct classroom contact. It is, however, a method of education that is virtually non-existent in most areas of the U.S. The demographics of our student body and their academic success reveals considerable potential on a national basis.

For example, there are many people who, for religious or other reasons, choose not to enroll their children in the conventional school (public *or* private). Provision of accredited home schools through an institution such as CCS provides quality education to these children without infringing on parental rights to homeschool their children. Further, there are gifted students whose aptitude exceeds the capabilities of the school. This is often the case, at least in Alaska, in advanced mathematics and science.

There also are many children who have debilitating diseases, who are struggling with substance abuse, who are incarcerated, or who are pregnant. And there are the dropouts. CCS has provided education to scores of such students until they either graduated from CCS or returned to their local school. Again, the flexible time schedule allows individual educational plans for students whose current circumstances cannot be accommodated by the conventional school environment.

A Telecommunications-Based Project

I close with an example of a recent multi-school project that depended heavily on telecommunication.

In June 1992, I had just completed overseeing an endeavor that I believed was my most successful project. Eight Alaskan high schools, separated by thousands of miles, had collaborated to build a single underwater vehicle capable of maneuvering to the bottom of Prince William Sound and retrieving

samples. Most of the students were rural ninth graders. The collaboration had taken place principally via telecommunication, and secondarily by telephone, fax, and mail.

My initial objective was not so ambitious. I had suggested that these students build a vehicle capable of submersing and retrieving a 1-kilogram object at a depth of 2 meters. The *students* escalated the objective. (I guess I should be thankful they weren't familiar with the Mariana Trench!) In any event, the objective was to provide students with the opportunity to learn through project science. This opportunity was indeed seized by the students as they diligently pursued the science involved and the many logistical considerations in their efforts to control buoyancy, provide propulsion and three dimensional maneuverability, and capture samples.

The overall project included three professional scientists/engineers as "mentors." These persons were specifically selected because of their minority status (Eskimo) and because two of the three are women. One is a civil engineer and is employed in the design and construction of rural airfields in Alaska. Another is a professor of electrical engineering at the University of Alaska at Fairbanks. The third mentor, and only male, has his doctorate in geology and does consulting work in the town where he grew up and was educated: Barrow, Alaska. Thus, the students, and in particular the minority and women students, have role models to whom they can relate.

The process of this project, as with all project science, fostered inquisitiveness as the students sought the answers to their questions in library and laboratory, as well as from one another, teachers, and mentors. All students first had to identify the principal components of a remotely controlled underwater vehicle, and then design a complete vehicle in collaboration with their fellow students at the local school site. Some schools used computers to enhance design techniques. These designs were crude by technical standards and in many cases unrealistic. The technical applicability or correctness is immaterial, of course, because it is the process that is important, and it is the process that, for the students, has produced a plethora of questions and ideas.

By means of a teleconference with participating students and teachers, each site was assigned a component of the vehicle to design and build. Each site was provided copies of all designs of the entire vehicle from all other sites. Thus, students at each site also could consider ideas from other sites as they set out to design their assigned component. The enthusiasm at all sites was palpable and infectious.

Although we had hoped that this project would culminate successfully in the retrieval of samples from the bottom of Prince William Sound before the end of the 1991-1992 school year, as the year passed teachers and students alike realized that it would probably take longer, as indeed it has. What has made this particular project exciting was the obvious necessity for collaboration in the design and construction of the assorted parts, as well as the discovery learning experienced. Clearly, the designers of the propulsion system and the designers of the buoyancy control system had to collaborate closely with all others in order to know what the total mass of the vehicle would be. Unquestionably, students, teachers, and mentors alike experienced discovery science at every turn. There was a great deal of learning and understanding that took place through the combination of library and laboratory.

In any event, the purpose of this project was not simply to increase scores on some science test. Rather, the purpose was to effect student learning and to stimulate interest and understanding of what science is all about. Further, rather than a competitive environment, a collaborative one was created for the educational benefit of all concerned.

Some might argue that this project is limited to physics or physical science classes. In fact, the classes involved included biology and marine science. Removal from the confines of strict curriculum content provided an opportunity for students to learn through the sheer exhilaration of discovery. This experience doubtless will whet their appetites for learning in general and for science in particular.