

**ANCHORAGE SCHOOL DISTRICT**

**INSTRUCTIONAL TECHNOLOGY PLAN**

**A WORKING DOCUMENT**

**November 1998**

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## **Anchorage School District**

### **1998-99 Anchorage School District**

#### **Mission and Goals**

##### **Mission**

*It is the mission of the Anchorage School District to educate students for success in life.*

##### **Goals**

Increase academic excellence by emphasizing student achievement, developing respect for diversity, maintaining quality staff recruitment and training, and maximizing opportunities for lifelong learning.

Establish a supportive learning environment by providing safe and caring schools which are barrier free, by promoting health and wellness, and by collaborating with other community agencies where appropriate.

Ensure public accountability by continuing standardized testing and other performance assessment, through the wise use of financial resources, through construction and maintenance of school facilities, and effective communication to internal and external audiences.

We, the Anchorage School Board, Superintendent and Staff commit that:

... all students will acquire basic skills and strategies to read independently by the end of third grade.

... all students will show measurable success and increased achievement at each successive grade level in math, reading, and writing conventions including spelling.

... student performance standards will be adopted in the areas of reading, mathematics, and language arts.

We, the Anchorage School Board, Superintendent and Staff will focus on:

... preparing students to pass the state required high school graduation examination.

... increasing student achievement in spelling by three percentile points as measured by the national standardized test at each grade level while maintaining or improving in all other areas.

... increasing parental and community awareness of the critical role families play in the academic success of the student.

... creating positive community relations and understanding of issues critical to the Anchorage School District by establishing coalitions with parents, business leaders and political leaders at all levels.

Adopted by the Anchorage School Board September 14, 1998.

### **Executive Summary**

The Anchorage School District, in order to prepare students for success in the Twenty-First Century, is dedicated to the effective use of current technologies for teaching and learning. This involves a need to provide for all students and staff:

- powerful technology tools for learning and instruction in all curricular areas;
- integration of technology and content standards at all grade levels;
- network connectivity to resources in and beyond the District;
- training and support in the use of current technologies and teaching strategies;
- on-going assessment and updating of technology to enhance learning.

### **Powerful technology tools for learning and instruction in all curricular areas.**

In a world where technology is the primary tool for communication, collaboration, and production, one of the basic skills that students need is that of using computers effectively. As learners in the classroom, students must have both instruction and hands-on experience in using computers to access and understand information, to diagnose and solve problems, and to collaborate and communicate with various audiences. As they are working to learn these skills, they are also learning to work in a world where technology is an increasingly a more prevalent and powerful tool. Whether it be language arts, science, math, social studies, health and physical education, cultural arts, or any other curriculum area in the District, technology has the power to enrich learning while engaging and empowering classroom learners to be life-long learners.

### **Integration of technology and content standards at all grade levels.**

The Anchorage School District, in alignment with local, state, and national standards related to curriculum, has developed teacher and student competencies in the area of technology. These competencies serve as a framework for integrating technology and curriculum at all grade levels.

### **Network connectivity to resources in and beyond the District.**

By the end of the 1999-2000 school year, all schools in the District will be connected to the District network, providing access to District resources as well as to the Internet resources for information and communication. This connectivity will be increasingly valuable as classrooms acquire, primarily through leasing, the current technologies which enable full utilization of these resources, and as teachers and students have the training, experience, and expertise to use the resources in efficient and effective ways to increase learning.

### **Training and support in the use of current technologies and teaching strategies.**

In anticipation of total connectivity for classrooms, the Anchorage School District has already embarked on widespread staff training in the use of technology and its integration

into curriculum. This effort, along with increased technical support for technology, must be augmented as current technologies are more prevalent in classrooms.

### **On-going assessment and updating of technology to enhance learning.**

The Technology Plan for the Anchorage School District is a working document, always subject to review by staff and community members. This review includes an assessment of the following:

- integration of technology into the curriculum to meet standards;
- instructional support and training;
- technical support;
- network status and needs;
- hardware and software standards;
- implementation of the Technology Plan.

It is the intent that the review process will occur on a regular basis. Periodic updating ensures that as technologies and the world change, students will continue to have the necessary tools and experiences to prepare them for success in the Twenty-First Century.

### **Cost of Recommendations.**

This plan contains specific recommendations addressing critical needs identified in the planning process. These needs are:

- Leasing of computers to update technology and avoid future obsolescence;
- Expansion of Building Technology Coordinators to middle schools, elementary schools, and alternative schools and programs;
- Provision of additional personnel required for network and microcomputer systems support.

The net increase to the operational budget for the first year is \$1,468,000 and \$1,226,000 for the second year. The net increase to the operational budget would be \$2,694,000 annually. This will be an on-going cost.

## **I. Technology Goals and Objectives**

The Anchorage School District must prepare students to be successful in the Twenty-First Century. Technology plays an essential role in this preparation, helping students learn necessary skills for today's constantly changing workplace. The planned use of technology and its positive impact on students is therefore an important concern to the Anchorage community.

Current research shows that technology can play a key role in supporting students in the acquisition of these necessary skills. Anchorage School District staff must be prepared to integrate technology into all educational areas in order to meet the diverse needs of students.

Specific student and teacher goals and competencies have been identified and are summarized in this plan. The full set of student and teacher goals and competencies will be submitted to the School Board for formal approval.

### **A. Student Goals**

The Anchorage School District student technology standards are divided into three broad skill areas: Basic Operations and Concepts, Tools for Communication and Research, and Social, Ethical, and Human Issues. The indicators at each level are to be introduced, reinforced, and finally mastered. They represent essential, realistic, and attainable goals for lifelong learning and productivity. It should be noted that all the indicators are introduced prior to grade nine. A technologically fluent student, when entering ninth grade, should be prepared to apply technology skills in academic, social and work environments.

The following profiles provide an overview of what a technologically fluent student should be capable of by the end of a specific grade level. Each area is divided into four grade level groups: K-3, 4-6, 7-8 and 9-12.

#### **1. Basic Operations and Concepts**

(Troubleshooting and Maintenance, Hardware Operations, Operating Systems, Productivity Tools and Applications and Networking)

Performance Indicators for K-3

Prior to completion of Grade 3, students in the Anchorage School District will:

- demonstrate responsible and effective use of input/output devices (keyboard, mouse, disk drive, monitor, and printer);
- use word processing programs to communicate thoughts, ideas, concepts, and stories;
- use graphics programs to communicate and illustrate thoughts, ideas, concepts, and stories;
- use multimedia resources to communicate thoughts, ideas, concepts, and stories through text and graphics;
- communicate about technology using developmentally appropriate and accurate terminology.

#### Performance Indicators for Grades 4-6

Prior to completion of Grade 6, students in the Anchorage School District will:

- solve basic computer hardware and software problems;
- identify the basic components and use of a variety of computer and peripheral devices to input text, data, audio, and visual information;
- demonstrate proficient file management skills;
- select and use productivity software, telecommunications, multiple active applications, and network systems to facilitate collaborative projects, and to effectively present information to an audience;
- identify terms and functions associated with word processing, graphics, databases, spreadsheets, and telecommunications.

#### Performance Indicators for Grades 7-8

Prior to completion of Grade 8, students in the Anchorage School District will:

- identify software and hardware problems; perform basic troubleshooting, and maintenance procedures;
- successfully install software, understand basic networking and access file servers;

- operate and understand terms related to a multimedia computer system and multimedia presentations;
- integrate word processing, databases and spreadsheets to present information in a variety of formats.

### Performance Indicators for Grades 9-12

Prior to completion of Grade 12, students in the Anchorage School District will:

- use a variety of computers with basic operating proficiency;
- identify, select, connect, and use various computer hardware and peripherals understand the roles and uses of operating systems and system software in computing;
- select and use a variety of commercial software in various content areas;
- routinely transfer, share, print, upload, download, and convert files across a network in a variety of formats.

## **2. Tools for Communication and Research**

(Electronic Mail, Internet, Research, Networking, Presentation and Multimedia Tools)

### Performance Indicators for K-3

Prior to completion of Grade 3, students in the Anchorage School District will:

- use telecommunications resources to communicate with others;
- use telecommunication resources to gather information from WWW or other electronic networks using web browsers and search engines.

### Performance Indicators for Grades 4-6

Prior to completion of Grade 6, students in the Anchorage School District will:

- access the Internet independently using web browsers, search engines and favorites/bookmarks;

- use technology tools, software, and on-line resources to independently and collaboratively research, evaluate, organize, document, link, and convey information pertinent to academic and personal interests;

#### Performance Indicators for Grades 7-8

Prior to completion of Grade 8, students in the Anchorage School District will:

- select and apply appropriate hypermedia tools and technology resources to conduct research and present the data in appropriate form;
- collaborate with peers, experts and others via different types of computer media involving sophisticated problem solving;
- use hyperlinked multimedia tools to design, publish and present individual or group projects;
- research and evaluate the accuracy, bias, and appropriateness of information gathered from multiple resources and demonstrate the ability to access a wider range of information sources.

#### Performance Indicators for Grades 9-12

Prior to completion of Grade 12, students in the Anchorage School District will:

- select and use telecommunications tools to document work, conduct research, and publish class projects;
- select and apply productivity/multimedia tools to communicate ideas and research.

### **3. Social, Ethical, and Human Issues**

(Social Issues, Ethical Use, Human Concerns)

#### Performance Indicators for K-3

Prior to completion of Grade 3, students in the Anchorage School District will:

- discuss ways technologies affect our lives on individual, national, and global levels;

- demonstrate positive social and ethical behaviors when using technology.

#### Performance Indicators for Grades 4-6

Prior to completion of Grade 6, students in the Anchorage School District will:

- identify technology uses and skills required for various careers;
- model ethical behavior and acceptable practice in use of technology and technological resources;
- identify and use computers as tools for accessing current information, planning, and accomplishing tasks.

#### Performance Indicators for Grades 7-8

Prior to completion of Grade 8, students in the Anchorage School District will:

- understand the need to protect software and hardware from computer viruses and vandalism;
- demonstrate knowledge and understanding of equity, ethics, legal and human issues concerning the use of computers and technology.

#### Performance Indicators for Grades 9-12

Prior to completion of Grade 12, students in the Anchorage School District will:

- critically analyze and evaluate information resources;
- understand and adhere to the ethical and legal responsibilities of using and publishing information with technology;
- identify, analyze, and discuss the role of technology in society.

### **B. Teacher Goals**

All teachers possess skills in using technology as a tool for learning.

The following competencies are desired in classroom teachers; training opportunities to further develop these skills are provided through the ASD.

#### **1. Integration into Classroom Curriculum:**

- To integrate technology within the curriculum teachers must be a basic user of technology; identify the broad type or category of software/technology; identify, analyze and evaluate potential curricular uses of specific software/technology; match technology appropriately with instructional objectives; manage technology and resources effectively according to instructional setting. Teachers also need to have knowledge of State technology standards and apply those standards into the curriculum; and be familiar with the research base on effective uses of technology in the curriculum.

## **2. Basic Computer Operations and Troubleshooting:**

- Teachers should have basic literacy about how to set-up and use computer hardware and operating system. These skills include basic operations, saving, printing, simple maintenance and troubleshooting, recognizing and solving common problems and using software instructional manuals.

## **3. Using Basic Productivity Tool Software**

- **Word Processing:** Teachers should have skills in using technology to create, modify, edit, and print text documents such as letters, reports, forms, tests, outlines, memos, journals, lists, newsletters, announcements, and brochures. These skills include the ability to enter and format text, find and change text, use writing tools, add pictures and frames to text, and import and export text;
- **Database:** Teachers should have skills in using technology to create, modify, edit, and print database documents for managing and organizing information such as student records, inventories, and research data. These skills include the ability to enter information, sort, create various layouts, print reports, and conduct searches to find and work with the data;
- **Spreadsheet:** Teachers should have skills in using technology to create, modify, edit, and print spreadsheet documents such as budgets, grades, and schedules. These skills include the ability to organize numeric information, make calculations, create reports, and present information in various formats;
- **Graphics:** Teachers should have skills in using technology to create, modify, edit, and print graphic documents, both draw and paint files, for artwork, certificates, page layout, and illustrations. These skills include creating, selecting, moving, and modifying objects such as rectangles, circles and lines, as well as using tools for special effects.

## **4. Telecommunications -Networking**

... Teachers need to have basic familiarity with telecommunications and networking, be familiar with terminology, be aware of different software, be aware of different network protocols; use and share files over a network; use e-

mail; download/upload data; and use current software to navigate the WWW. Teachers also need knowledge of the telecommunications projects available for integration into the curriculum.

## **5. Multimedia**

... Teachers should become familiar with the unique terminology and be aware of different software and hardware and requirements. Teachers should be able to develop sequential (slide show) and non-sequential (hypermedia) multimedia projects and use a variety of multimedia applications and hardware.

## **II.Integration of Technology into the Curriculum**

Recommendations for technology integration into the curriculum are based on recent literature, discussion with curriculum specialists, examination of plans in other districts, and consultation with educational technology experts. A review of related research reveals technology's potential to improve student learning. Furthermore, interviews of parents, students, and teachers indicate that computer use tends to improve student attitudes towards school and the subjects that they are studying.

An important source used in the development of this plan was the U.S. Congressional Office of Technology Assessment's report titled "Teacher and Technology" published in 1995. Key points of the study include technology's potential for changing teacher practice, offering students a wider variety of alternatives in learning, and providing for a changing curriculum for a changing world. The results of the studies synthesized in this report provided important information on staff development practices, district support, and the use of resources to best support the curricular integration of technology.

### **A. What The Research Says**

... Computers help elementary students of all ability levels to learn science content and to increase their logical thinking and problem-solving skills. (Kirkwood, 1992)

... Students show greater achievement on standardized tests after using computers for math problem solving. (Phillips, 1992)

... Children using computers in mathematics are more independent learners and prefer learning on computers to learning with worksheets or precision teaching. (Vacc, 1991-1992)

... Reviews of the research have found that when word processing use is combined with an effective teaching model, students achieve at a higher level than those not using a word processor. (Snyder, 1993)

... Remedial reading students using computer reading games to develop and reinforce reading comprehension skills showed significant gains on reading achievement and improved attitudes toward reading. (Nixon, 1992)

... When measured holistically, students using laptop computers to keep journals, write stories, and complete assignments in science and English classes showed marked improvement in their ability to communicate persuasively, organize ideas logically, and use a broad vocabulary effectively. (McMillan & Honey, 1993)

... A computer-managed spelling instruction program improved seventh-grade spelling performance significantly. (Assink & van der Linden, 1993)

... Students who used computers to create computational models of scientific processes dealt with more complex problems than those without modeling software. (Miller, 1993)

... Computer tools in science help students understand and master high-level science concepts, working through a progression of conceptual levels. (Linn, Songer, Lewis, Stern, & Ferguson, 1991)

... Students spend more time analyzing and interpreting data when they use computers in an integrated, problem-based curriculum. (Mevarech & Kramarski, 1992)

... Computers help students organize and manipulate information and improve performance in problem solving. (White, 1987)

... Computers help students master the basic skills needed to participate and succeed in vocational education programs—and in the workforce. (Dees, 1990)

... Writing instruction using word processing improves the quality of writing as well as students' attitudes toward writing. (Schramm, 1991)

... Students using computers for algebra did significantly better on a test of knowledge than did a group taught by traditional methods. The computer group also retained more of the information and scored significantly higher on measures of transfer to other areas of mathematics. (Ghamdi, 1987)

... When the computer is used to do what couldn't easily be done without computers, greater achievement gains are seen and attitudes toward science improve. (Lavoie & Good, 1988)

... Computerized simulation expands classroom inquiry and improves learning. Working with simulations encourages the students to think hypothetically and to use complex strategies with variables. (Mintz, 1993)

... Learning-disabled (LD) students using computer simulations score significantly higher than did traditionally taught students—both LD and non-LD—on recall of basic information and problem-solving skills. (Woodward & Gersten, 1988)

... Computer modeling and visualization in physics allow advanced science students to spend more time in active scientific inquiry. (Shore, 1992)

... Reviews of the research on the effects of word processing indicate that there is an increase in revisions, fewer mistakes, and more correction of them. And when word processing use is combined with an effective teaching model, students achieve at a higher level than those not using a word processor. (Snyder, 1993)

... Studies show significant performance differences between students using computers and those writing essays by hand. Students who used computers received higher performance scores and higher grades on their essays. Computer essays contained fewer punctuation errors, and had a greater average sentence length and a greater number of complex sentences. (Robinson-Staveley & Cooper, 1990)

## **B. Curricular Vision**

The vision of technology implementation presented in this plan strives for the integration of technological tools throughout the curriculum. Through this integration, students will use technology to enhance their learning, improve their knowledge and understanding across all areas of study and develop useful technological skills, which they will carry with them for life.

A primary tenet of the integration philosophy is that technology will increase student interest in most areas of study and increase the opportunities students have to fully develop and understand the disciplines under study. In fact, research has shown that using computers for instruction enhances students' interest in and attitudes toward schoolwork and raises self-esteem. This is especially true for those students who typically fail in the traditional classroom.

The incorporation of information processing goals across curricular areas will encourage the development of application and advanced skills on the part of students, beyond rote recall and memorization. In short, technology integrated into the curriculum will increase the chances of true learning and understanding on the part of students.

## **C. Curriculum Development**

The plan needs to ensure that staff development in technology implementation and curriculum development is coordinated.

Curriculum development goals include:

- ... integration of technology into all curricular areas by all teachers;
- ... an environment that supports the development of problem solving skills, application of knowledge, hypothesis development, and testing, pattern recognition, analytical thinking, and information processing;
- ... the evolution of reasonable and consistent professional development goals under the supervision of school administrators and with the support of curricular and technology specialists;
- ... a team approach in which teachers and school specialists model collaboration, information processing, decision making, and problem solving;
- ... a training model that focuses on curricular objectives and student outcomes rather than the mastery of technical competence with computers. This model will also facilitate support, curricular revision, and authentic assessment practices, and will provide a mechanism for all staff to participate in a program of ongoing professional development;
- ... defining and refining staff development goals by regular communication between building leaders and district staff.

## **D. Curriculum Areas**

A discipline specific review of the integration of technology into the various areas follows.

### **1. Art**

The School District supports and encourages the development of curriculum that emphasizes the design and communication aspects of art, including:

- ... the fundamentals of design and composition applied to a variety of media;
- ... the use of art as a visual communication tool;

- ... multimedia applications that explore modern art forms and stimulate discussions about their aesthetic value;
- ... opportunities to develop multiple designs simultaneously;
- ... explorations of the impact, aesthetic appeal, and critical use of the elements of art, such as color, line, shape, textures, and patterns in visual communication;
- ... appreciation for the commercial, scientific, social, practical, and economic uses of art in technology.

Technology can assist students in learning the fundamentals of good design as well as the historical and critical awareness skills that will more totally enrich their lives and help provide them with discrimination capabilities as both future creators and consumers of art products. Technology can enhance the study of the history and criticism of art by bringing the collections of major galleries to classrooms. Graphic databases and network searches allow this access to national and international galleries.

It is becoming increasingly common for visual artists to use computers to rough out compositions and work through design problems before applying paint to canvas, chisel to marble or fibers to looms. Students can emulate these artists in developing their computer skills as well as developing the skills needed for specific media. Various "draw" and "paint" programs are currently available which support this effort.

The whole multimedia area is emerging as a new art medium. As this area develops and as the use of computers for presentations, document production, and the presentation of information becomes more commonplace, students who are not artists will face an increasing need for design and visual arts skills. Technology is required to develop and hone these skills.

The use of the following materials and tools are supported and encouraged:

- ... art studio applications, including draw and paint programs, at a level appropriate to the skills and knowledge of each child;
- ... multimedia programs and systems which allows for a wide range of expression;
- ... laser discs that contain pictorial collections of works with multi-cultural and historical relevance;
- ... peripherals that allow for both the computerized importation and production of color graphics and pictures;

... a variety of media such as videotape, video and digital cameras, scanners, projecting equipment, and editing equipment that allow students to expand their communication repertoire;

... a variety of modern technologies that augment human capability by providing additional dimensions of precision, timing, memory and imagery.

## **2 Career Technology Programs**

The School District supports and encourages the development of curriculum that emphasizes the development of vocational and practical skills in the use of technology across a variety of technical and technological career areas. Career Technology programs include business/marketing, family and consumer science, and industrial technology areas of study. Throughout each career technology area of study, instructional technology plays a dominant role, including, but not limited to:

... the development of learning strategies that provide for the selection of appropriate and efficient tools;

... the development of skills in the use of electronic hardware/software to seek the provision of opportunities to experiment, practice, and apply new skills;

... the manipulation and control of devices through the study of automation;

... the opportunity to exercise inquiry and research skills;

... the provision of a broad variety of modern technologies that students can expect to find in the workplace.

The use of the following materials and tools will be supported and encouraged:

... information processing tools that allow for planning, design, and communication;

... equipment that provides a safe and realistic experiential environment as students develop and refine problem solving skills in the areas of business, industrial, and family and consumer sciences.

## **3. Health/Physical Education**

The School District supports and encourages the development of curriculum that emphasizes rational and systematic decision making in matters of health, safety, and physical well being of students, including:

... the identification of recreational activities that promote the well being of the whole person;

... the development of exercise programs for health, stamina, and lifelong practice;

... the development of principles of good nutrition, including diet analysis, world issues, and cultural effects;

... the development of skills to assess and set goals for optimum personal, social, mental, and emotional health;

... the development and practice of skills related to safety, medical emergency preparedness, and disease preventative practices;

... the development of attitudes that promote social responsibility, economic stability, cultural awareness, sensitivity to individual differences, and positive self esteem, as well as awareness of the dangers of substance abuse, reckless driving, inappropriate relationships, and irresponsible consumerism.

Technology applications related to health and physical education issues are readily apparent. Video presentations examining the body and systems within the body may provide students with understanding of human development and physical attributes. Network and database access which provides search capabilities can provide information on current health issues which can not be maintained in a timely, accurate manner in a printed form.

Simple spreadsheet forms for recording development of physical skills and allowing graphic presentations of trends may encourage students to become more active and physically fit. Simulations may provide students with an opportunity to explore the implications of decisions they may be facing in their lives, either immediately or in the future.

The use of the following materials and tools will be supported and encouraged:

... information processing tools that allow students to enter data and chart trends in personal performance, food consumption, use of time, and budgets;

... network access and databases that allow for the efficient retrieval of information on such information rich sources as nutritional analysis, fitness standards, biomechanics of movement and sports-related skills acquisition and population statistics;

... simulations that provide opportunities for tracking the results of decisions;

... laser discs that provide film and animated sequences depicting the causes and effects of various modern trends;

... peripheral devices that allow students to measure heart rate, lung capacity, and other physiological phenomena that have a bearing on their physical condition and stamina.

### **Scenario: Budgeting the Balance**

In their P. E. class, students are learning to use the balance beam. Many students are having difficulty understanding what Mrs. Atkins means by the "center of gravity." She consults with a science teacher during her prep period and discovers that the science department has a great tutorial program for teaching this concept. Students go through a lesson on the theory behind gravity and then use a point-and-click system to identify the center of gravity of various items, including animals and humans. The next day, some students are still teetering wildly on the balance beam, but they are able to follow corrective procedures that Mrs. Atkins suggests with greater ease.

## **4. Language Arts**

The School District supports and encourages the development of curriculum that emphasizes the information processing aspects of language development, including:

... the development of positive attitudes toward reading and writing and the provision of frequent opportunities to carry out reading and writing activities, both in the language arts classroom and in other content areas;

... the use of writing tools that decrease the tedium of writing and revising and encourage the use of frequent critique and editing of written work, both at a surface level (grammar, spelling, and punctuation) and at the logical level (sequencing, developing a sense of audience, building suspense, developing a theme, writing a character sketch, etc.);

... the use of programs that stimulate thought and creativity in the reader and writer;

... the use of tools that provide opportunities to display textual work that is augmented by graphics and other media;

... the development of oral language that is clear and effective and prepares students for collaboration in the workplace, efficient and effective business presentations, and creative endeavors such as story writing, publishing, poetry, and play writing.

Technology can assist in providing this curriculum to students and also supports the national, state, and ASDO language arts standards.

The use of technology in the writing process is the most obvious. It can make writing less tedious and more engaging because editing is easier and more palatable than when done by hand. Reducing the drudgery helps students to learn to use language creatively. It may be easier to get students to focus on the clarity of ideas in their own and others writing through the use of technology. They can develop products, which they value.

With proper networking capabilities, schools could move to "paperless" classrooms for the development, editing, grading, and return of student pieces. Networking may also encourage students to edit each other's works and to share works across classrooms. There is research data indicating students perform at a higher level when they are producing for an audience.

Commercial products are currently being demonstrated which provide most help and information that has been offered previously in textbooks, handbooks, and traditional resource materials built into a full word processing program; including such features as pre-writing, drafting, revision and publication assistance.

In composition class, students work independently with individual computer interactions with teachers, to construct texts ("papers"). When they encounter problems, they move in a recursive fashion into brainstorming or mapping and then back into their text. Students may move out of text to use network or CD-ROM searching capabilities to research a topic or to exchange ideas with others via an electronic mail system. This will allow them to discover and verify information for inclusion in their works. Teachers roles become more varied, ranging from supervisor to facilitator, helping students think, access information, construct meaning from information, and report back on their development.

Graphics presentation and research tools will be an integral part of the oral language component. Speeches are enhanced through graphic and multimedia presentations. Research capabilities are required to produce information and arguments for speeches and presentations. Access to research bases ranging from CD-ROM encyclopedias to ERIC on-line search capabilities can meet the research needs of students regardless of their developmental level.

The use of the following materials and tools will be supported and encouraged:

- ... word processing programs and writing tools (spelling checkers, publishing tools, outliners, and grammar analysis programs) across curricular areas;
- environments such as telecommunications and local area networks that allow for the sharing of information in realistic settings with external audiences;
- tools that provide support for high interest presentations, such as graphics and multimedia development programs;
- commercial software that efficiently and effectively allows students to gain proficiency in basic areas such as spelling, grammar, capitalization

and punctuation; commercial software that stimulates creative writing such as plays, poetry, character sketches, short stories, and articles; productivity and information analysis tools that allow students to track their reading, and information databases such as authors, creative works, and historical events; speech synthesis applications such as hypertext that provide immediate access to pronunciation, definitions, and derivations of selected words.

## **5. Mathematics**

The School District supports and encourages the development of curriculum that emphasizes the information processing aspects of mathematics, including:

- ... the development of a repertoire of problem solving strategies appropriate to the developmental level of each student;
- ... the use of relevant and appropriate problem sets that allow for a broad and varied application of problem-solving strategies and the transfer of problem-solving skills to new and real life situations;
- ... the development of articulation skills that allow students to express findings and conclusions in appropriate mathematical language;
- ... the use of estimation and mental calculation skills that support efficient and effective decision making;
- ... the development of a number sense appropriate to the developmental level of each child.

The use of manipulative materials and programmable calculators is becoming increasingly common in mathematics education. The primary intent of changes in mathematics education in recent years is to move beyond simple arithmetic calculation to real conceptual understanding and real world problem solving.

Technology can be used to complement and supplement manipulative materials in the classroom and provide concrete visual images and representations for mathematics concepts to improve students' understanding. Interactive software supports an inquiry model of learning where students function as co-manipulators, rather than inactive recipients, of concepts and information.

Graphic calculators already are used to display multiple representations of functions. Software, which allows three-dimensional rotations of graphic representations, could further enhance the conceptual understanding of symbolic representations as physical models of the real world.

Spreadsheet, database software, and analysis software allows students to apply mathematics to real world problems to seek answers to real questions, as they are developmentally ready and capable. Students are required to recognize what information is relevant to solve a given problem. They are required to recognize and use an appropriate analytic strategy. They would be able to use the computer to do calculations and graphic representations of results. The use of such tools and packages might change mathematics from being a gatekeeper which keeps many students from examining various career options to being a discipline which stimulates interests students may not have realized they had.

The use of the following materials and tools will be supported and encouraged:

- ... programmable, graphing calculators appropriate to the students' level of development and study;
- ... problem sets that require the systematic organization and analysis of information using information processing tools such as spreadsheets, databases, and interpretive graphics programs;
- ... software packages that provide the visual equivalent of mathematical manipulatives at all levels, from geometric shapes to simulations of graphing calculators;
- ... software packages that provide simulated problem solving situations;
- ... drill and practice programs and tutorials that provide practice in and remediation of areas of deficiency;
- ... algebraic and geometric modeling programs;
- ... interactive multimedia that provides motion and animation that illustrates mathematical concepts and allows students to make conceptual connections between science and mathematics.

## **6. Music**

The School District supports and encourages the development of curriculum that emphasizes the performance, interpretation, and composition of music, including:

- ... listening skills that result in an appreciation of a wide array of composers and selections;
- ... composition skills that allow for systematic and effective editing;
- ... opportunities to improve performance skills appropriate to the student's developmental level;

... developing the skills and knowledge so students can analyze and critique performance or recorded music.

In music, MIDI (Musical Instrument Digital Interface) is the standard format for recording, storing and playing digital music. With a MIDI connection to keyboards and/or special instrumentation such as drums, saxophones, etc., computers become professional recording, editing and playback studios.

A MIDI allows the connection of a computer to a synthesizer. The computer can then record and play back musical performances using the attached synthesizer. Music recorded in this manner can be edited in ways different from a tape recording because it is digital.

Sequencing programs permit music to be recorded and played back. It is also possible to make a recording of a single musician sound like a large ensemble. One musical line, or track, is recorded at a time. The first track(s) is(are) played while the next one is recorded.

Composition programs allow the computer to write out music in standard sheet music notation. With a MIDI connection from a computer to a musical keyboard, parts that are played on the keyboard can be printed as sheet music.

An electronic accompanying device is needed to allow secondary students to practice and perform for solo and ensemble contests. A Vivace accompanying machine along with a computer will enable students to practice individually with real time tempo changes.

The use of the following materials and tools will be supported and encouraged:

- \_ instrumentation that utilizes the power and convenience of the MIDI interface;
- ? musical composition programs that provide printed output of creative and edited works in an easy and efficient manner;
- ? equipment that allows for the editing of multiple tracks of music;
- ? display equipment that allows for digitized recording of audio performances;
- ? software that provides practice and remediation in basic skills areas such as note identification, ear training, and reading music.

## **7. Science**

The School District supports and encourages the development of curriculum that emphasizes the information processing aspects of science, including:

- the scientific process;
- ? conducting research that includes data gathering, analysis, synthesis, and communication of findings;
- ? the application of thinking skills such as sequencing, inference, and deduction, and the transfer of such skills into daily use.

Technology can assist students to see science as a process rather than as a collection of facts and definitions to be learned. In a science lesson, students may have to do research and decide what is relevant, design an experiment to test a hypothesis, or analyze data and draw conclusions. This kind of activity gives students the opportunity to develop and apply processing and thinking skills (sequencing, making inferences, developing deductions) which can be used both in school and in daily life.

Science activities can be supported and enhanced by the use of probes which automatically record data on spreadsheets for later analysis. Analysis packages on computers deal with large amounts of information, and simulation programs allow experimentation which would otherwise not be possible within a regular classroom. Databases provide information relevant to the field of study and are updated on a regular and timely basis. Networks allow access to individuals prominent in a field and other classrooms for pooling of information, and real time access satellite information from NASA, the National Weather Service or other agencies which may provide such services. Word processing, spreadsheet, statistical analyses and multimedia capabilities in the science classroom will allow students to move from data collection to analysis and reporting in a realistic manner and allow the realistic connection of skills developed in other disciplines into the science classroom.

The use of the following materials and tools will be supported and encouraged:

- microcomputer based laboratory equipment that utilizes data gathering implements such as probes, thermistors, pH meters, and photometers;
- ? simulations and mathematical models of scientific phenomena;
- ? telecommunications services that provide collaborative projects on a national or international level with distant scientists, students, and other experts;
- commercial and student-created databases that provide environments for data collection and analysis, inquiry, and synthesis of information;
- ? on-line information databases that provide satellite photos, weather information, information stacks, and textual information that are updated regularly.

## **Scenario: Probeware**

Mr. Lang's seventh grade class is studying the concept of insulation. Mr. Lang has placed several tools at the disposal of his group. At one station, a group of four students is measuring the heat loss from a glass of hot water over time. They first measure heat loss over 10 minutes using a glass cup, then an aluminum can, a thermos, and a Styrofoam cup. The data are collected in 30-second intervals. The students in this group make use of a temperature probe connected to a computer so that all 80 data points are automatically recorded on a simulated paper tape. The data are graphed and printed out. Students use a portable keyboard to summarize and explain their results.

In the meantime, another group who completed the data-gathering phase earlier has searched the Internet for information on insulation. They have found a number of useful resources that explain how insulation is used in home building, airplane design, and soundproofing. Another group has used the Internet to enter into a discussion with Native children of the southwestern U. S. how they use adobe to cool their homes and insulate them against heat. They will use the information to build adobe, wood, and stone models of houses and measure heat loss over time.

### **8. Social Studies**

The School District supports and encourages the development of curriculum that emphasizes the information processing aspects of the social sciences, including:

- \_ curriculum that requires the gathering and analysis of primary and secondary source data;
- ? curriculum that requires the use of on-line resources for the gathering of support data in the development of a theme or argument;
- ? curriculum that makes ample use of visual tools such as maps, charts, graphs, and illustrations;
- ? communication that involves the use of a variety of media beyond the traditional textual and verbal delivery methods;
- ? curriculum that elevates student skills beyond recall of facts and processes and encourages the development of strategies such as pattern recognition and trend identification, hypothesis testing, prediction, and generalizing.

An obvious use of technology in Social Studies is the use of word processing to develop and prepare reports for classes. Less obvious uses of technology can also be appropriately applied in the social sciences areas resulting in positive experiences for students.

Social studies teachers can develop units that incorporate geographic, civic, cultural, economic, social or historical issues of relevance to their students and their communities. Students can work with governmental, nonprofit, and business groups to attain resources, discuss issues, analyze trends, and present solutions on a wide range of topics. Using the capabilities of the computer, students can create maps, pictures, graphs, and charts to make data intelligible and to identify trends more easily.

History is the study of the past to illuminate the present and the future. Geography is the study of the earth and all that happens on it. Technology offers the opportunity to provide history and geography instructions in ways that use more original source material and facilitate student investigation. Listening to a speech as given by its presenter or watching a video clip of an actual event may be much more powerful in allowing interpretation than simply reading about the event in a textbook.

Simulations provide students with opportunities to experience situations that would not be possible otherwise. Simulations could allow students to design their own community, to invest in stocks and bonds over a period of time, to examine complex social and cultural interactions and to examine the effects of specific courses of action in specific situations. Simulations can allow students to go on historical treasure hunts or archeological digs. Coupled with database programs and network search capabilities, simulation activities, computerized data gathering and recording activities, and video-graphic reporting can do much to enliven social sciences for students, thereby increasing their interests in and understanding of the topics under study.

The use of the following materials and tools will be supported and encouraged:

- commercial and student-prepared databases that provide the basis for inquiry and support for student hypotheses;
- ? on-line systems that provide numerical data, visual and graphic information (maps, charts, and photographs, for example), textual information, and population statistics;
- ? presentation tools such as multimedia development programs, graphics packages (draw and paint programs), desktop publishing, graphing tools, spreadsheets, and videotape;
- ? electronic encyclopedias that provide sophisticated search strategies;
- ? geographical, historical, and other simulations that provide opportunities for problem solving and decision making, with feedback on the results of the applications of various strategies or decisions;
- ? commercial software that quickly and efficiently teaches and provides practice or remediation in basic concepts such as compass use, map use, navigation, or measurement.

### **Scenario: The Making of a Revolution**

Some of Ms. Andrews' history students have gone on-line with the World Wide Web to read the headline news of the day. They discover that a Latin American country is experiencing civil unrest. They don't understand why martial law has been imposed on the country and why the rebels are randomly bombing the cities. Ms. Andrews assigns student groups to investigate this phenomenon in other countries and has them enter the information into a database. Over the next two weeks, students enter information about revolutions in 28 different countries. When the database is complete, each group examines the information to determine what might have led to the revolutions, and the relationship between the escalation of the conflict and the type of government in place at the onset of the revolution. They also examine the impact of the political system, the country's economy, and the geographic location of the country. Students use a multimedia program to illustrate their findings and enhance their presentations with digitized video, sound, music, and photographs.

## **9. World Languages**

The School District supports and encourages the development of curriculum that emphasizes the information processing aspects of second language development, including:

- \_ authentic environments for practice with oral and written language communication;
- ? student appreciation of the importance and implications of a second language for communication, culture, history, and global understanding;
- ? opportunities to hear formal and informal conversation in a real context;
- ? opportunities to read and write in the second language in context;
- ? opportunities to compare and contrast the experiences of age group peers, both nationally and internationally.

Technology can assist in providing this curriculum to students. Aside from materials created specifically for second language study, elementary grade level materials, such as children's literature that is "read" by the computer, are available in several languages

other than English. Beginning language students, regardless of grade level, can make use of these materials as they learn to read in a second language. Film clips, animation, music and sound enhances vocabulary learning. Students can also develop their own interactive multimedia projects, which can be shared with others.

Students can access language software which allows students to record and then listen to their own pronunciations along with those of native speakers and technology enables students and teachers to print documents in other writing systems.

Geographic and cultural themes related to world language study can be accessed through CDs. Networks allow students to access others across the country at a similar development level as well as native speakers in other countries to exchange ideas, develop cultural understanding and carry on dialogues in the target language(s).

The use of the following materials and tools will be supported and encouraged:

- \_ commercial programs that provide audio output whose pacing and volume are under student control;
- ? programs that allow for the printing of authentic language materials;
- ... speech synthesis that allows students to digitize their own utterances and compare them with those of native speakers of the target language;
- ... laser disc and video formats that allow students to listen to and discuss second language film appropriate to their developmental level;
- ... world atlas databases on CD-ROM that allow for effective retrieval of information on foreign countries;
- ... on-line services that provide electronic mail correspondence with peers who are also studying the target language and/or native speakers from other countries;
- ... programs that allow students to produce multimedia projects which integrate all the language skills (reading, writing, speaking, and listening).

### **Scenario: *Vive la difference!***

Students in Mr. Taylor's French class cannot seem to understand the gist of the film clip they have watched. The teenagers in the video are using unfamiliar language, and even the use of the dictionary has not helped. Mr. Taylor sets up an Internet connection with a class of students in the south of France. He transmits the film clip to their teacher, and students in

the French group analyze the language and report back to Mr. Taylor's class the next day. It turns out that the protagonists in the film are using slang and colloquialisms that are difficult to translate and are somewhat amusing when translated literally. The students exchange the information, and Mr. Taylor's students compile a list of their favorite English slang and colloquialisms to send to France in return for the information they received. Students also exchange digitized photographs of interesting signs and notices posted throughout their community. The French students particularly loved Jeanette's photo of a sign from the Portage Glacier viewing site, advising tourists to avoid stepping on ice for fear of being crushed by an iceberg.

## **10. Multi-disciplinary Applications of Technology\***

The Anchorage School District recognizes that technology has become a catalyst for discussing and analyzing curriculum and student learning. While a systematic and well structured revision of curriculum necessitates the identification of distinct outcomes for the variety of subject areas, the analysis of student needs reveals that our instructional mission must also include opportunities for the learner to make connections among and across the various disciplines, apply learning from one area to another, and consider the solution of problems from the perspective of several disciplines. In fact, the encouragement provided by instructional uses of technology to develop multi-disciplinary lessons and curriculum may well be one of its primary instructional advantages.

On that basis, the District supports and encourages:

- ... the development of curriculum that brings together information bases from a variety of disciplines;
- ... the imaginative use of technology to support the models that mobilize students' participation in the inquiry process;
- ... the identification of students' strengths and areas of need as they prepare to collaboratively explore a multifaceted world;
- ... assessment practices that include reasonable measures of the extent to which students are able to apply, transfer, generalize, and extend information across disciplines.

The use of the following materials and tools will be supported and encouraged:

... telecommunications tools that provide access to a wide variety of opinions, expertise, data, and perspectives;

... communications tools that facilitate the articulation of concepts, principles, generalizations that demonstrate students' understanding of multi-disciplinary issues and problems;

... software that is designed with a specific view to promoting a multi-disciplinary approach to an area of study.

*\* Note: For the purposes of this section, the term "multi-disciplinary applications of technology" will mean the use of technology to support instructional units that address or include topics from two or more curricular areas.*

### **Scenario : *The Voyage of the Mimi***

The fifth grade teachers at Sasquatch Elementary have agreed to adopt the *Mimi* program for the entire first semester of social studies, language arts, and science. *Mimi* is an integrated video-based program (based on a popular television show) that takes a group of children on a sailing adventure. On the way, children learn about whales, their classification, their aquatic environment, and conditions that endanger them as a species. They particularly love the video in which one of the protagonists learns how scientists analyze whale songs. Some students pick other fascinating ocean creatures for their reports on sea life. They also learn to read maps of the ocean floor, including concepts in geography and oceanography.

Meanwhile, they are learning to sail the ship using tools such as sextants and techniques for tracking their latitude and longitude based on the position of the stars (some of these are computer simulations). Their teacher has insisted that they will keep journals of their experiences and make use of presentation tools to update the rest of the class on the activities of their groups. Some groups have prepared proposals for legislators on the preservation of the whales' aquatic environments, and others are preparing ad campaigns for public awareness.

Back on board the *Mimi*, students are preparing to discuss what Columbus and his sailors might have been thinking when they first laid eyes on the shoreline that is now the United States of America. The students discuss among themselves how they will communicate their opinions. One group is preparing a short play, two groups have decided to write a story, and one group decides to prepare a diorama depicting the moment.

The students in the fifth grade classes communicate weekly with classes in their sister school in Boston. Students in Boston regularly provide information on oceans and whales from their aquariums and museums, in exchange for digitized photographs and video on native art that features whales, sea otters, and other ocean creatures.

The fifth grade teachers have carefully developed an assessment rubric that identifies minimum criteria for a variety of submissions from students. Students collect their submissions (including spreadsheets, graphs, databases, journals, artwork, written analyses, interaction logs, and many other pieces) into a portfolio. Parents regularly view portfolio contents and enjoy student presentations during open house each year.

### **III. Instructional Support Services**

#### **A. Library Services**

The school library is fully integrated into the school's curriculum, programs and activities and is central to the process of life-long learning.

The library must provide resources and assistance in locating, utilizing, and evaluating information. It should allow for the unique needs of its students, educators and the community. This requires an on-line retrieval system that can be used by students throughout the school and should also be accessible to the community. This will permit resource sharing within and outside the ASD library system.

The mission of the library is to:

- Support the educational goals of the Anchorage School District;
- Improve student achievement;
- Ensure that every library user has the opportunity to become an effective user of information;
- Promote literacy and the enjoyment of reading, listening and viewing;
- Support academic and recreational reading;
- Provide resources and learning activities that represent a diversity of experiences, and opinions;
- Promote intellectual freedom and access to information;
- Help produce a technologically astute work force;

- Help create engaged citizens;
- Nurture life-long learning;
- Provide an environment conducive to academic preparation, research, study, personal interest, and interaction.

The library serves as a focal point of the student's learning environment. Therefore the library must facilitate access to information by being equipped with technology and staffed with a professional librarian and support staff. The library needs to be accessible before and after school to provide additional time for students to access information. The staff provides leadership and expertise in use of information and instructional technologies. All workstations need to be able to access the Internet and other information sources. Equipment capable of accessing and utilizing all current forms of media and information should be made available in the library.

In this age, access to current information is critical to users. The existing library technology system must continually improve in order to integrate all necessary functions and interface with other systems outside the District. This will require ongoing training and professional development of all staff. Additionally, because centralized technical support is essential, staffing needs to be sufficient to support the level of technology in the library and throughout the school.

Most of the District library technology is more than seven years old, resulting in increased maintenance, repair, and support requirements. The current system is not Year 2000 compliant and must be either upgraded or replaced. The cost to upgrade the current system to make it Year 2000 compliant is approximately \$386,000. The District issued a Request For Information for a replacement library system. Responses were received on or before December 1, 1998. Based upon information gathered from the Request For Information, the replacement cost for a new library automation system is estimated to be approximately \$1,700,000. A replacement system would resolve the Year 2000 problem as well as providing integration with the Municipal and University library systems. A new system would relieve many of the system maintenance functions that ASD librarians must currently perform.

The following section in the School Board Policy recognizes the importance of Library Services.

#### 345.31 Mission and Objectives

The mission of the library media program is to support the educational goals of the Anchorage School District by providing resources that meet the educational and personal needs of students and staff, and by ensuring that all students are provided instruction and assistance that encourage their becoming lifelong learners and library users.

This mission is addressed in the following objectives: (1) to provide intellectual access to information; (2) to provide physical access to information; (3) to provide learning experiences that encourage students to use information selectively in creating both print and non-print products; (4) to provide leadership and instruction in the use of information technology; (5) to provide resources and activities that contribute to lifelong learning; (6) to provide a facility that functions as the information center of the school; (7) to provide resources and learning activities that represent a diversity of experiences, opinions, social and cultural perspectives, supporting the concept that intellectual freedom and access to information are prerequisite to effective and responsible citizenship in a democratic republic, and (8) to reflect the differing maturity and informational needs of elementary, middle level and secondary students.

In identifying this mission and these objectives, it is recognized that their accomplishment requires a partnership among community, Board of Education, district and school administration, librarians, teachers, parents, and students, full integration of the library program into the curriculum; and the commitment of each of these partners to the value of information skills and access to information.

The Superintendent shall develop and implement procedures, which insure that this mission and these objectives are attained.

(Section 345.31 - Approved October 11, 1993)

## **B. Special Education**

The School District supports and encourages the development of curriculum that emphasizes the individualization of instruction for students with special needs, including:

- ... the preparation of individualized educational plans (IEP) in a collaborative fashion with students and their diagnostic teams;
- ... the selection of software and hardware that enhances the student's performance and independence;
- ... the elevation of curricular outcomes to promote effective problem solving, decision making, adaptation, and socialization;
- ... the inclusion, where possible, of students within age appropriate peer groups;
- ... the enhancement of communication and self expression;
- ... the selection of activities and materials that allow for self-monitoring of academic performance, behavior, and social interaction.

The use of the following materials and tools will be supported and encouraged:

- ... the use of IEP preparation programs and learning outcome databases that facilitate the specification of individual student learning outcomes;
- ... software programs, laser discs, and other media that provide a variety of alternatives to text-based information for students with perceptual and reading deficiencies;
- ... the use of high interest programs that augment time on task and provide consistent and appropriate feedback for students with behavior difficulties and attention disorders;
- ... the use of adaptive devices for communication, mobility, auditory output, and other assistive technologies for students with physical disabilities;
- the use of information processing tools and courseware that promotes independence and provides a monitoring system that tracks student progress;
- ... the use of personal productivity tools that enhance fine motor skills, writing, communication, and the tracking of personal accomplishments.

### **Scenario: *Technology for Inclusion***

This is Dennis' first day in fourth grade. In past years, he has done most of his schoolwork isolated from his peers in a resource room. This year, he has learned to use a computer to communicate. Dennis has cerebral palsy that affects his ability to speak. With the computer, Dennis can point to words and sentences that have been pre-programmed by his mother and his special education teacher to express his wants, needs and ideas. Not only is Dennis getting good practice at communicating with his computer, but students in his fourth grade class love to participate when they are asked to record their speech for Dennis' communication program.

### **C. Counseling**

The School District supports and encourages the development of counseling services that emphasize the development of individual student academic programs for high school and beyond which are based on individual student career interests, aptitudes, and abilities. Support must be provided for the information processing aspects of the counseling program, including:

- ... the development of "four-year" plans when students are entering high school and their refinement over the students' high school years;

- ... access to career information, including educational requirements for different occupations, projected availability of work in defined areas, and specialized licensing requirements for specific occupations;
- ... interest inventories and aptitude measures available for individualized use;
- ... access to information of colleges and universities and other post secondary educational opportunities, including information on entry requirements, tuition and fees, scholarship availability, descriptions of the student body at specific institutions, graduation rates, and placement rates of graduates;
- record keeping through the high school years of progress toward meeting both the District's graduation requirements and the students' individual plans.

The use of the following materials and tools will be supported and encouraged:

- ... databases on career information, university and college entrance requirements, program offerings at public and private institutions, financial aid and scholarships, tuition and fees, and licensing requirements;
- ... network capabilities to allow students to search national as well as local data bases;
- ... software which assists students in the development of their four-year plan;
- ... computerized interest inventories and aptitude measures for individual use;
- ... software which helps students prepare for college entry examinations;
- record keeping programs and storage mechanisms, which maintain both the students' individual plans and their progress toward meeting those plans.

#### **D. Bilingual Education**

The District supports and encourages the development of curriculum that emphasizes the information processing aspects of second language acquisition, including:

- language as both the vehicle for becoming part of the school and wider culture and as a requisite tool for mastery of subject area content;
- environments in which learners can, in theory, become immersed and involved, and with which they can in turn make sense of and produce meaningful language;

- rich contexts made up of visual and auditory information;
- quick, efficient access to on-line reference and instructionally supportive material (i.e., on-line dictionaries, visual support for lexical items, and access to contextual clues to meaning);
- a response to the needs of limited-English-proficient (LEP) students for enhanced literacy development activity as well as their need for empowerment through the vehicle of technology.

Technology provides practical options in terms of both fulfilling contact hour requirements, and as a means of expediting English language development so students can become full participants in regular classroom and school activities where certificated teachers are not assigned. Ideally, in the field of second language and literacy acquisition interaction with electronic texts is task-based and socio-collaboratively oriented instead of students drilled in isolation from the rich context of school life. Technology is a tool with which, and through which, language can be developed in task/process-oriented frameworks. Use of technology provides sensitivity to the importance of content richness and the conceptual needs of LEP students.

Technology provides an opportunity for shy and reticent students who are not prone to risk taking in the regular classroom may also benefit from multimedia language learning. On the computer a student can exercise thinking and action that is not necessarily subject to immediate peer and teacher judgment. Often LEP students feel uncomfortable about participating fully in the daily instructional stream. Their on-line work is an opportunity for them to actually do something that is both academic and that carries a sense of accomplishment.

In situations where an ESL instructor works with groups of students who are at varying levels of English-language ability and/or from different grade levels, computers represent a means of involving learners in activity that is tailored to their individual language ability and grade level as well as their individual learning needs and preferences.

Technology is a means of enabling students to construct situations and obtain information that can be brought back to the whole class and that can serve as stimuli for rich language use activities. The following kinds of computer use are identified and encouraged:

- emergent literacy (K — early elementary): alphabet and spelling programs to develop basic literacy skills; graphics programs to support learners in making connections between images and text. Graphics often serve as a springboard for discussion and writing in the target language;
- literacy through stories (elementary): programs that allow students to choose environments and graphics to support the stories they write. The preference is for software that allows students to write, voice record their stories, and listen to the playback as they follow the text on the screen. Book-length reading programs are

- also available which allow learners, while reading the story, to access explanations and animations through hypertext links;
- literacy through personal journal writing (elementary — middle): word processing as a medium for interactive dialogue journals. Personal entries and responses can be saved on disk;
  - literacy through content (upper elementary — middle): programs in science, math, and social studies, which provide interdisciplinary, theme-based activities. Multimedia encyclopedias can be used for content research;
  - literacy through publishing (upper elementary — middle): word processors and desktop publishing packages to create booklets and newsletters. Multimedia presentation tools can be used by students to create slide shows and photo displays;
  - literacy through problem solving (upper elementary, middle, high): interactive games and simulations in conjunction with content-based work. Students make thoughtful choices based on their understanding of text and visual materials;
  - literacy through telecommunications (middle — high): E-mail to connect students to other schools, to experts, and to shared problem-solving hubs. The internet can be used to access information relevant to students' native language and culture, to the interests of individual students, and to support mainstream classroom work;
  - autonomous usage with integration across the curriculum (high): computers for individual projects. When the system is networked, students are able to access their work in a variety of content areas from a number of locations in the school building;

#### **IV. Staff Development**

The initial focus of staff development is to help build awareness among staff of the possibilities, capabilities, and advantages of using technology in the school setting. Aware staff members then can go about learning the teaching techniques, hardware, software, and technology skills required for a particular purpose. To be effective, staff development activities must be designed to take teachers from their present level of knowledge to the required level of competence as efficiently as possible.

The Office of Technology Assessment of the U.S. Congress published a report in 1995 called, *Teachers & Technology: Making the Connection*, which made the following observation: "To use new technologies well, teachers need more than just access to these resources, they also need opportunities to discover what the technologies can do, to learn how to operate them, and to experiment with ways to best apply them in their classrooms." The report recommends avoiding the common approach of "short-term, one-shot training to familiarize teachers with a specific application or encourage general

computer literacy" in favor of more long-term training that centers on the relationship between technology and the teacher's role. "Helping teachers effectively incorporate technology into the teaching and learning process may not only help students become competent technology users, but may also help them become more accomplished learners overall, with skills necessary for the information age."

This plan will not focus on the isolated acquisition of technology skills, but will concentrate on the rationale and strategies for integrating technology across the curriculum, as well as an understanding of the diffusion of innovation (Rogers, 1996; Moore, 1995, Geoghagan, 1995). Another component of the training is to involve teachers who are ready to begin integrating technology into the curriculum. Teachers within a building could participate in classroom-based activities with one of the technology teacher experts, or with several other teachers. The purpose of these activities is to acquaint teachers with the most effective ways that technology can be used to enhance student learning using a model that involves collegial sharing within the context of real classroom applications (ACOT, 1966). Some buildings may choose to participate in Teacher Exploration Center training activities, or may attend statewide technology activities sponsored by the Alaska Society for Technology in Education or the Alaska Staff Development Network. The most successful staff development and technology management programs are those in which a collaborative team approach is emphasized. Each site's technology committee will make decisions about direction, management, and purchases.

#### **A. Staff Development Components**

... Teacher Exploration Centers: During the 1997-98 school year, British Petroleum donated 250 computers to the District, 60 of which are located in three Technology Exploration Centers (TECs) in three high schools. These centers are used for teacher training, and are available for technology training during non-school hours.

... Credit Classes: The District will continue to facilitate credit courses on a self-support basis throughout the year and will collaborate with the Staff Development Network on the summer Technology Academy. During the 1997-98 school year, the district sponsored 74 credit classes in Instructional Technology. Approximately 890 teachers attended these classes. In addition to the credit classes offered throughout the year, 18 courses were offered at the Summer Technology Academy with approximately 216 teachers attending. These programs will continue to be offered.

... Web-Based Support and Self-Directed Learning Materials (WWW and CD-ROM-based): Most people rely on self-directed learning to gain competency in using information technology. To better support this model of adult learning, a series of web pages will be added to the District's web site, to provide a series of on-line learning resources available on the Internet for teachers throughout the state. Technology Teacher Experts will provide support in developing web sites.

In collaboration with UAA's New Media Center, these materials could also be placed on cross-platform CD-ROM discs, along with digital training movies, and made available, at cost, to teachers throughout the state who do not have high speed Internet access.

... Training of Building-Level Mentors, Curriculum Coordinators, and Administration: Over the course of the 1997-98 school year, a group of teachers participated in a Technology Mentor Training process that prepared them to conduct a variety of inservice activities and authorized some of them to teach approved credit courses. Release time was provided to two teachers from one-third (22) of the elementary schools, three from each (9) middle school and four from each (6) high school, for two full days and four half days of training. Over 100 mentor teachers were provided with this training.

... The 34 remaining elementary schools will receive mentor training during the 1998-99 school year. This training will also be made available to ASD Curriculum Coordinators and other administrative staff.

... Summer Training Institute: In an effort to lessen the amount of training that occurs during school hours, a comprehensive technology training institute was offered during the summer of 1998. Trainers and workshop leaders offered a variety of technology integration credit courses for teachers and administrators beginning in June and ending in August of 1998. Approximately 1200 teachers and administrators attended these trainings. This model will be replicated during the summer of 1999 if funds are available.

... Building-Level Technology Plans: During the 1998 school year, each school within the Anchorage School District was asked to develop a three to five year educational technology plan. Plans were to have a strong professional development component that addresses how individual schools can effectively use technology to help students meet appropriate local, state and national standards. Training will be provided to help principals and staff write their technology plans.

- School Technology Assistance Team (STAT): During the 1998-99 school year, a team of technology experts will work directly in schools with teachers to help them achieve their individual and school technology goals. The School Technology Assistance Team will be available to help train three teachers and their students at one time, impacting up to twelve classrooms per day. STAT training is provided to teams of teachers who have developed Learning Quests that integrates technology into the classroom curriculum. A list of suggested training activities will be available to choose from; however, this training is meant to be tailored to meet individual student and teacher needs as related to their school's technology plan. This component of the district's professional development plan provides follow-up support for the individual teacher training which will happen in the summer. As an example of this training model, one STAT member might train the three teachers separately from their students. The

other School Technology Assistance Team members will take over the teachers' classes and train their students on the same topic. This will give the teachers an opportunity to focus 100% of their attention on the training.

- **Building Technology Coordinators:** During the 1998-99 school year, the Board approved funding for Technology Coordinators at the six senior high schools. The primary focus of these positions was to integrate technology into all curricular areas. A complete description of the role and responsibilities of this position is provided in Attachment D.

## **B. Required Resources**

### **1. Districtwide Technology Teacher Experts**

Three Districtwide Technology Teacher Experts, who are certificated teachers, develop and implement technology training models and materials. The district currently has three Technology Teacher Experts who are funded through grants. With the focus on summer training models, all of these positions are funded for 12 months through addendum's using grant funds. If grant funding becomes unavailable, these positions should be funded for 12 month through the regular budget.

Additional responsibilities include:

... working with staff to assess available instructional technology and software in the school, coordinating available resources, and developing short and long term plans for overall coordination of instructional technology within the school;

... collaborating with staff in planning, developing lesson plans and activities, and using instructional technology in the instructional program;

... assisting in the selection and evaluation of instructional technology equipment and software compatible with District curriculum and student needs;

... supplying and/or recommending software to classroom teachers and making recommendations for instruction as appropriate and requested;

... planning with classroom teachers and other program specialists to assure smooth functioning of program components;

... facilitating inservices and classes;

... maintaining communication with building administrators to ensure smooth integration of technology into the curriculum;

... sharing successful methods and projects with other educators electronically or in forums and conferences.

## **2. Funding for Professional Development**

The following requirements are currently funded through the Technology Literacy Challenge. If these grant funds become unavailable, these requirements would need to be funded from the operational budget.

- ... Funding for equipment, supplies, and training materials;
- ... Funding to facilitate individual school professional development plans ;
- ... Summer stipends for teacher training;
- ... Funding for the development of training materials and teacher resources.

## **V. Assessment Systems**

The Assessment and Evaluation Department supports a variety of system to provide information to Anchorage decision makers about the academic success of Anchorage students. Educational assessment is the process of obtaining information about student learning for the purpose of making decisions. Technology plays an increasingly important role in collecting, organizing, and reporting information on the success of students, schools, and academic programs.

The Anchorage School District administers norm-referenced tests of achievement to more than 33,000 students in grades 3 — 11 each year. In addition to the norm-referenced tests, Criterion Referenced Tests and other Performance Assessments are administered in selected grades to groups of as many as 11,000 students. Teachers and schools have developed their own performance tasks and portfolios of student work as part of local assessment efforts.

Technology is used to assist in the development, scoring, and reporting of all district-wide assessments. Through the course of the year, more than 50,000 tests are scored by Assessment and Evaluation ASD Data Processing. Reports of student performance are produced for parents, teachers, and schools and added to student records.

Students and teachers in elementary grades now have access to the new WWW based on-line grade 3 Independent Reader Assessment. Soon, all Anchorage teachers will have access to the Council of Chief State School Officers Health Help assessments and instructional materials. Students and teachers have the ability to use the on demand

Independent Reader Assessment that integrates traditional tests of reading comprehension with on going teacher assessments of performance. Student and class reports of reading strengths and weaknesses, along with instructional tips, are available on-line along with exam results. Health Help is supported by the Alaska Science and Technology Foundation Grant. The grant will give all Alaska teachers access to high quality assessments, lessons, and curriculum materials along with a Health Teacher Chat Room where ideas on successful instruction may be shared.

Assessment and Evaluation is now exploring the possibility of making a practice version of the Alaska High School Qualifying Examination available on-line to parents and students. HSQE on-line would let parents and students take the practice exam and immediately view their results along with suggestions on how they might better prepare for the required state graduation exam.

Technology enhances traditional methods of student assessment and feedback of student success. As the District moves toward more standards based assessments and classroom teachers make more use of portfolios and performance assessments, there is an increased need for technological applications in assessment tools in the classroom. Computers are now a part of day-to-day class work and are becoming a more important tool in how work is evaluated and reported.

Standards based assessments using technology can provide better and immediate feedback to guide learning. They encourage students to become more involved in self-assessment and self-improvement. For example, teachers commonly critique oral reports and assign letter grades; videotaping an oral report allows students to reflect on their own performance and consider it relative to an exemplar performance. They can then seek the suggestions of peers prior to making the final report.

Integrated classroom assessment systems use technology to combine the following three elements for documenting student achievement:

- teacher observations that document specific skills and accomplishments against a standard and allow for decisions about curriculum and instruction;
- collections of student work that demonstrate progress and involve students in evaluating their own work;
- objective assessments.

Teachers can keep track of student performance using a variety of computer programs and emerging assessment technologies. Student work samples can be recorded on computer or videotape for assessment and viewed at parent conferences; teachers can use these records to efficiently prepare summary reports on individual student learning and class profiles. Many teachers who have computers available use electronic grade book programs. Some schools and teachers have experimented with portfolio systems that include images of student work. Emerging technologies, such as recordable optical discs,

allow more long-term storage of student work for permanent records and tracking growth.

Principals and school level administrators use computer systems for recording school goals and preparing end-of-year school report cards. Increased WWW availability of reports, such as the Anchorage School District Profile of Performance, assist goal setting and report preparation.

Assessment is also active in the collection of information on the satisfaction of Anchorage residents, district staff, and students. Extensive surveys take part as part of the program planning cycle, program evaluations, staff evaluation, and the school report card progress. Most surveys are designed by the ASD Assessment Department, printed and processed using MIS optical scanners and computers, and reported by the ASD Assessment.

The State School Report Card Surveys alone result in the processing of more than 250,000 pages of surveys from teachers, parents, and students to assess ASD success on school goals. Over 100,000 parent, staff, and student surveys collect in-put into certificated staff evaluation. These surveys are now collected, summarized, and reported to certificated staff and their supervisors using much the same type of systems under a contract with National Computer Systems.

## **A. Technology Needs for Student Assessment**

### **1. District Level**

... networked system supported by dedicated Assessment and Evaluation servers to allow access to student, classroom, school, and district wide data for district program evaluation and accountability;

- software, equipment, and staffing to support the development and continuation of on-line testing, survey, and reporting systems;

... central processing facility with updated scanning equipment for traditional tests, surveys and large scale assessments;

... updated MAC and Wintel systems in Assessment and Evaluation to allow the preparation of surveys, tests, and reports for parents;

... integrated software allowing the tracking of students over time to document individual and program success.

### **2. School Level**

... administrative access to examine individual student, class and grade level progress on district and school goals;

... achievement reporting system for use by counselors, psychologists and staff from Special Education, Gifted, and Federal Funded Programs;

- integrated reporting systems that allow rapid access to the student history and success on required state examinations.

### **3. Classroom Level**

... networked classroom systems allow student assessment and teacher monitoring of all students toward ASD performance goals. Teachers can also identify students who are not mastering the skills needed to pass the Alaska High School Qualification examination;

... standardized student performance assessment activities keyed to ASD and Alaska standards that are consistent with approved ASD curriculum to show success and progress at each grade level;

... computer adaptive testing of Basic Skills using standardized norm referenced measures as an objective measure of progress;

... assessment software including relational database systems to allow the organization and storage of student performance demonstrations and related evaluations;

... adequate student accesses to technology to allow the direct assessment of student performance;

... adequate teacher access to technology to allow collection, assessment, and evaluation of student performance data and success relative to grade level performance standards;

... adequate teacher access to technology to allow use of computerized grade books and record keeping systems.

## **VI. Anchorage School District Hardware and Software Standards**

It is important that standards be established for a student to computer ratio and technology resources be available in each building.

The following are the hardware and software standards:

... a 5:1 student to computer ratio in all schools;

... a computer for each teacher;

... each new computer shall have a CD-ROM drive, a minimum of 64MB RAM, built-in Ethernet, and a minimum 4GB hard drive;

... existing computers should be upgraded to the standard if possible and cost effective;

... internet access available for each computer;

... one computer with AV (video in/out) capability in each classroom;

... a minimum software configuration consisting of:

-productivity software (word processor, database, and spreadsheet)

-multimedia authoring program;

-web browser;

-virus protection.

- instructional software standards for new computers:

**Mac   Wintel**

Word Processing, K-8   AppleWorks 5   AppleWorks 5

Word Processing, 9-12   Word 98   Word 2000

Spread Sheet, K-8   AppleWorks 5   AppleWorks 5

Spread Sheet, 9-12   Excel 98   Excel 2000

Database, K-8   AppleWorks 5   AppleWorks 5

Database, 9-12   Filemaker Pro 4   Access 2000

Multimedia Authoring

Program, K-8   Hyperstudio   Hyperstudio

Multimedia Authoring

Program, 9-12   Hyperstudio   Hyperstudio

Web Browser, K-8   Netscape or   Netscape or

Internet Explorer      Internet Explorer

Web Browser, 9-12      Netscape or      Netscape or

Internet Explorer      Internet Explorer

... one ink-jet printer for every five computers;

... a minimum number of projection devices:

-two at each elementary school

-one per team at a middle school

-one per department at each high school;

... a minimum number of laser printers:

-two per elementary

-four per middle school

-eight per high school;

... scanners for instructional use:

-two per elementary

-four per middle school

-six per high school;

... video camera(s)

-one per elementary

-two per middle school

-four per high school;

... digital cameras

-two per elementary;

-four per middle school;

-eight per high school;

... a wall mounted TV/VCR in each classroom;

... thirty additional computers available in elementary and middle schools for whole group instruction (this may be in the form of a lab, mobile stations or laptop computers);

... at least one thirty station lab in each high school available for all curricular areas;

... network connections shall consist of two outlets per classroom with two network ports and one voice communications port per outlet;

... all staff and students shall have access to electronic mail;

... software and hardware for special curricular needs such as Midi equipment, science probes and adaptive technology;

... teacher access to student management systems and technology to improve parent-teacher communications;

... a full feature telephone with access to individual voice mailboxes for each teacher;

... a television distribution system allowing local origination from every classroom.

These are desired standards for school technology. It is recognized that limited funding may delay full implementation of the desired standards. Schools have differing needs and therefore, each school should have flexibility in equipment and software purchases as long as the minimum standards are met. Space constraints may affect the placement of some equipment within a school.

## **VII. Networking**

Networks allow students and teachers to communicate within the classroom or building, across the district and around the world. Networks encourage exploration and learning by bringing a challenging, information-rich environment to the teacher and learner. Networks also foster collaboration and communication.

### **A. Network Structure**

The Anchorage School District Network is comprised of two major elements: the network within each school and the network across the District that serves to connect the schools to each other and to the Internet.

## **B. Network Standards**

Network standards are essential to ensure cost effective support and maintenance. The following standards provide for growth in network capability and changes in technology while maintaining current service.

### **1. Network Standards for Schools:**

- category V wiring (EIA/TIA568 compliant) or greater throughout the building;
- fiber optic backbones where cost effective;
- RJ45 terminations throughout the building including patch panels;
- classroom network connections shall consist of two outlets per classroom with two network ports and one voice communications port per outlet;
- Ethernet shall be the standard for all District networks;

### **2. Wide Area Network Standards:**

- the connection from each school to the District backbone shall be a minimum of 1.54Mb;
- the throughput of the District backbone shall be a minimum of 20Mb;
- the District protocol standard shall be TCP/IP;
- Ethernet shall be the standard for all District networks;

## **C. Current Status - ASD Networks**

The networking facilities across the District have evolved over a period of years in accordance with budget constraints and program need. The following paragraphs summarize current District networks.

### **1. High Schools**

All six senior high schools and the Martin Luther King Career Center, have an Ethernet connection to the building. East and West High Schools come the closest to meeting the District standard by having network drops in every classroom. West was able to accomplish this with construction

funds and East High school was able to provide one connection per classroom through a NetDay project. NetDays are planned at the remaining high schools.

All of the senior high schools have one or more computer labs connected to the District network. Bartlett, Chugiak, Dimond and Service have minimal classroom connectivity. In addition, each high school library has at least five, fully networked, computers for student research.

## **2. Middle Schools**

All nine middle schools have a 768 Kbs Ethernet connection to the building. Goldenview and Mirror Lake Middle Schools meet the District building standard for networks. Central, Gruening, Hanshew, Mears and Romig have conducted a NetDay project and have connectivity to most classrooms. Clark is scheduled to be networked during the 1998-99 school year through Universal Service Funding . Wendler is actively planning for a NetDay project later in this school year.

## **3. Elementary Schools**

All elementary schools have a 768 Kbs Ethernet connection to the building. Through the use of construction funds, NetDay projects and grants from the Alaska Science and Technology Foundation, we have made tremendous strides in providing classroom connectivity at the elementary level. As of November 1998, nineteen elementary schools meet the District standard of two outlets per classroom with two ports per outlet. Thirty-three elementary schools have at least one network outlet in each classroom. Three elementary schools have only some of their classrooms connected. Two of the three will meet the standard by the end of the 1998-99 school year through the use of construction funds. There are seven elementary schools that do not have any classroom connectivity as of November 1998, however all will have connectivity to classrooms by the end of the 1999-2000 school year. Four of the seven schools will meet the District standards by the end of the 1999-2000 school year due to construction projects.

## **4. Other Schools and Programs**

AVAIL, Benny Benson, McLaughlin, SAVE, Steller and Whaley have at least one classroom network outlet in each classroom.

## **D. Internet**

The School District is currently connected to the Internet via 1.54 Mb shared connection to Seattle.

To increase the efficiency, an Internet caching engine has been installed. This computer stores frequently accessed web pages. When the same page is requested again, the information is retrieved locally, thus saving time.

The District has a license for an Internet filtering software program. This program is made available to all schools and programs. Usage is a site-based decision made by the principal, staff and school community.

## **VIII. Technology Support and Maintenance**

### **A. Building Level Support**

As of the start of the 1998-99 school year, each senior high school has a full time technology coordinator whose sole responsibility is to support the integration of technology in the curriculum. The plan is to expand this support into all schools.

The recommended standard for building level support is:

- ...Senior High Schools- one FTE per building;
- ... Middle Schools- .5 FTE per building;
- Elementary Schools- one FTE per five schools;
- ... Alternative Schools and Programs- one FTE serving all schools and programs;

### **B. Microcomputer Support**

As of November 1998 the District has two Microcomputer Specialists attempting to support over 5,000 Macintosh and 1,400 DOS/Wintel computers as well as maintain the ASD electronic mail systems and the ASD Web and Internet Servers. The electronic mail and Internet servers are expanding as more schools conduct NetDay projects and connect to the District network. The acquisition of Wintel microcomputers at Goldenview, Bartlett, Service and for the New Business System has increased the number of Wintel computers significantly.

The District is below the industry standard of one support person to 250 pieces of equipment. The District currently provides support at a one to 3,000 ratio. The number of microcomputers will double when the District meets the recommended standards of a 1:5

computer to student ratio. The District currently needs at least four more Microcomputer Specialists.

### **C. Network Support**

The rapid expansion of the District network has increased the demands on the network support staff and they can no longer keep up with the support demands. The District needs to acquire and implement a network monitoring system. This system will provide for ability to centrally diagnose, and often correct, network problems without physically sending a technician to the site. The District needs two additional Network Support Specialist to meet the current demands. Two more Network Support Specialists will be needed to maintain the network, once the 5:1 student to computer ratio is met.

### **D. Microcomputer Repair**

The increase in the number of donated computers has greatly increased the workload of the existing repair staff. If the District should decide to purchase new computers rather than lease, then the implementation of the 5:1 ratio called for in this plan will require four additional repair technicians. An alternative to acquiring additional repair staff would be to incorporate computer repair as part of an ongoing computer leasing plan.

## **IX. Replacement Cycle**

Funding for instructional technology should be incorporated into the Anchorage School District operating budget. One of the problems that the District faces is the fact that technology becomes outdated in three to five years after it is acquired. This leads to a situation where a large acquisition of computer technology in the schools meets the need for several years only to have the need arise again because of outdated technology. A solution to this ongoing problem is to build the cost of technology into the operational budget of schools. In other words, just as supplies and utilities are considered essential items in a school budget, technology for students would become an annual operating expense. This needs to be phased in over several years to lessen the impact of the increase in the operational budget in any one year.

To that end it is recommended that the District consider a leasing plan for computer hardware. The advantages of a leasing plan are:

... the cost of computer hardware is known and incorporated into the District's operating budget;

... hardware would not become obsolete as the leasing plan would call for the replacement on a five year cycle;

... repair costs could be incorporated into the leasing plan, thus eliminating the need for additional repair staff;

... technology bonds would no longer be required every five to seven years because the cost of school technology would be a part of the yearly operational budget;

## **X. Implementation Plan**

### **A. Progress Since April 1996**

Despite the fact that the School Technology Bond was defeated in April 1996, the District has made significant progress in meeting the objectives contained in the District Instructional Technology Plan.

#### **1. Teacher Training**

... the District applied for and was awarded a Technology Literacy Challenge Grant for the 1997-98 school year in the amount of \$217,000. The focus of this grant was to foster teacher training, particularly the integration of technology in the classroom. The training was mentor oriented so that teachers could be a resource and trainer within their schools.

...during the 1998-99 school year, the District received a \$600,000 Technology Literacy Challenge Grant for teacher training. This grant included a summer institute which provided 64 credit classes which were delivered from June 15 to August 16. Approximately 1175 teachers and administrators attended these training sessions. In addition, the grant funded a full time staff member to provide support and training in technology integration for the secondary school coordinators. A team of three teacher experts is available to work with schools on modeling lessons for teachers and students. In addition, Internet based resources will be developed by the Instructional Technology department. These resources will include on-line training modules, model teaching units and helpful educational links.

... B-P provided computers, and \$28,000 for software and teacher training to the District. The District utilized the B-P grant in conjunction with District funds in the amount of \$88,000 to develop three Teacher Exploration Centers (TECs) at Bartlett, Dimond, and East Senior High Schools. These centers are used by the schools during the school day and are used in after school hours for teacher training.

#### **2. Computers**

...during the 1997-98 school year, the District received a donation of 250 computers from B-P, 65 computers from Alyeska, and approximately 1000 computers from ARCO.

... the construction of eight new schools and renovation projects at five schools has resulted in the addition of approximately 1,100 computers.

... the Board approved senior high school computer lab and library research project. This resulted in an increase of 200 computers.

### **3. Networking**

... the District has made significant progress in meeting the networking objectives as specified in the Instructional Technology Plan. During the past two years we have gone from a handful of schools having high speed connectivity to the District network and the Internet to a current status where all schools have network connectivity to the District network and the Internet.

- thirty-three NetDay Projects have been successfully completed over the past two years. The Alaska Science & Technology Foundation has provided \$10,000 grants to schools to help defray the costs associated with networking a school. By the end of the 1999-2000 school year, it is expected that there will be Internet connectivity to every classroom in the District.

### **4. Electrical Infrastructure**

- adequate electrical service has been provided in the eight new schools and the five schools who have had renovation projects over the past three years.
- electrical upgrades are being completed in twenty schools utilizing bond funds. Upgrades will also be made to schools having approved renovation projects.
- schools requiring electrical upgrades will be identified and upgrades made subject to funding.

### **5. Universal Service Fund**

... the Universal Service Fund has the potential to provide funding to meet 50% of the operational costs of networking and voice communications within the Anchorage School District.

### **6. Building Level Support**

- during the 1998-99 school year, one building level technology coordinator was funded for each high school. The major role of these individuals is to provide classroom support for the integration of technology into all curricular areas and the coordination, scheduling and management of the new computer labs.

## **B. Future Implementation**

The District has made significant progress in the areas of teacher training, computers in schools, and networking. The critical needs are:

... two computers in each classroom in schools not meeting the District standard;

- building level technology coordinators at Middle Level (.5) and Elementary schools (1:5);
- districtwide support personnel in the areas of microcomputer systems support and network support;

In order to meet these critical needs, it is recommended that:

### Year 1

... add one computer to every classroom in schools that do not meet the District standard. The yearly cost on a five year lease would be approximately \$800,000. This would include necessary software and repair for the life of the lease;

- add a building level technology coordinator (.5) FTE to all of the middle schools. The approximate cost would be \$198,000;

Note: A new to the District average teacher salary/benefit amount is \$44,000. This amount was used to determine the funding necessary to support the Instructional Technology Plan. This is lower than the average Districtwide teacher salary/benefit package. Although existing teachers in the District may transfer into the Building Technology Coordinator positions, a replacement teacher would be new to the District.

- add six building level technology coordinators for the elementary schools. The approximate cost would be \$264,000;
- add one building technology coordinator to be shared among the alternative schools and programs. The approximate cost would be \$44,000;

... add two Microcomputer Specialists for districtwide support. The approximate cost would be \$108,000;

- add one Network Support Specialist. The approximate cost would be \$54,000;

The year one increase to the operational budget would be \$1,468,000.

### Year 2

... add one additional computer to every classroom in schools that do not meet the District standard. The additional yearly cost on a five year lease would be approximately \$800,000. This would bring the total yearly expenditure for computer leasing to \$1,600,000;

... add six additional building level technology coordinators for the elementary schools. The approximate cost would be \$264,000. This addition will bring the District in compliance with the recommended District standard of one technology coordinator per five elementary schools;

... add two Microcomputer Specialists for districtwide support. The approximate cost would be \$108,000;

- add one Network Support Specialist. The approximate cost would be \$54,000;

The year two increase to the operational budget would be \$1,226,000.

The net increase to the operational budget after implementing the above would be \$2,694,000 annually. This will be an on-going cost.

## Appendix A

### Glossary of Terms

**Assistive technologies** - Hardware and/or software used to increase, maintain or improve functional capabilities of individuals with disabilities.

**Applications software** - Computer programs designed and written to perform certain major tasks, especially spreadsheets, databases, or word processors.

**CD-ROM** (Compact Disc Read Only Memory) - Stores 660 megabytes of data. This is equivalent to 250,000 pages of text and 40,000 pages of images. Information may be retrieved in seconds.

**CD-R** (Compact Disk Recordable) - Device used to record CD-Rom, can only be written once.

**CD-RW** (Compact Disk Rewritable) - Device similar to CD-R, which can write to Compact Disks multiple times.

**Clip art** - Professionally drawn graphics purchased specifically for use in one's own products, such as reports or desktop-publishing materials, in lieu of costly original artwork.

**Communication** - The process of one computer transferring data to and from another computer through channels such as telephone lines.

**Computer awareness** - Intellectual knowledge of computers with no implication of any specific usage.

**Data** - Pieces of information, especially information used by a computer.

**Database** - A collection of information; also, software you use to collect, organize and search for information.

**Digital Video Device (DVD)** - Read only media capable of storing up to 17 gigabytes of data.

**Digital Camera** - Camera used to capture images digitally. Images are transferred directly to the computer. No film is used.

**Ethernet** - A standard specification for high-speed LAN connections.

**File server** - A mass storage device that can be accessed by several computers; enables the storage and sharing of files.

**Graphics** - Computer output in the form of images, pictures, charts, graphs, etc. as opposed to alphanumeric characters.

**Hardware** - The physical components of a computer system.

**Integration** - The use of computers to support and enhance curriculum goals and objectives in all content areas and in any appropriate manner so that the computer is no longer viewed as something special or unusual.

**Interactive multimedia** - Software which incorporates media beyond the computer, such as digitized video, still photos, sound, and text in a non-linear environment. Also called hypermedia.

**Keyboarding** - Use of computer keyboard efficiently, without need to look at one's hand movements. Differs from touch-typing in that keyboarding does not involve page layout concerns.

**LAN** - Local Area Network. An interconnected group of computers that share applications, data files and peripherals through a centralized file server.

**Laser printer** - Printer whose characters are formed using technology similar to photocopies. Produces the highest-quality output among printers.

**MAN** - Metropolitan Area Network. A very large wide area network connecting many machines over large distances.

**MIDI** - Musical Instrument Digital Interface connects a computer to a synthesizer.

**Modem** - Computer peripheral that MODulates/DEModulates information, enabling computers to communicate over telephone lines.

**Multimedia** - combines words, photo-images, animation's, sounds and video clips into real-time events. The data may be refined on computers and recorded on compact or laser discs.

**Multimedia Projector** - Projection device that connects to the video output of a computer or video cassette recorder to project images onto a large screen for group viewing.

**On-line** - Ability of a user to gain immediate access to data through a computer system.

**Peripheral** - Any piece of auxiliary hardware, such as a printer, modem or scanner.

**Printer** - Output device that produces hard copy on paper or transparency plastic.

**QuickTime** - A system extension that makes it possible to play movies on a Macintosh computer.

**RAM** - Random Access Memory. Memory chips in a computer system that accept and retain data temporarily, but lose it when the system is shut off.

**ROM** - Read Only Memory. Memory chips that are programmed by the manufacturer. The computer system can read their contents, but cannot write to them.

**Scanner** - An input device that "reads" existing materials such as pages of text or pictures and creates computer files from them. Also called optical scanner.

**Simulation** - A form of computer assisted instruction in which the learner assumes a role to play within a structured environment that is an interactive model of some "reality".

**Software** - The programs that cause a computer system to perform desired tasks.

**Spreadsheet** - An electronic tabular workspace that is used to enter and manipulate data, especially numeric data.

**Stack** - Collection of related screens ("cards") in HyperCard among which the users can move about in a non-linear fashion. Similar to a database file.

**Telecommunications** - Communication by telephone lines that does not necessarily involve computers and modems.

**Touch screen** - A special monitor that allows the user to input information by touching designated areas on the screen.

**Virtual Reality (VR)** - A computer-generated microworld with which a user may interact as if it were real. Often requires special viewing helmets and controls such as a wired glove.

**Voice Synthesizer** - Output device that converts computer output into intelligible speech, especially useful for the visually impaired.

**WAN** - Wide Area Network. A network that spans a large area, necessitating connections through dedicated telephone lines rather than direct cabling.

**Word processing** - The act of using a word processor to generate written materials.

**Word processor** - Software for writing, editing, revising, formatting, and printing text. Also a computer running such software, or a skilled user of such a system.

## **Appendix B**

### **State Technology Standards**

#### **PERFORMANCE STANDARD 1: OPERATE**

All Alaska students will operate technology-based tools.

Rationale:

The world community is increasingly dependent upon technology. In order to use technology effectively, students should master basic operational skills. These skills are essential for all students regardless of educational and career goals. Technological skills enable the student to assume a productive role in the world community.

*Students meeting this standard will:*

- use a computer to enter and retrieve information;
- use applications for learning, communications, and productivity;
- use local and world-wide networks;
- use other technological tools as appropriate;
- manage and maintain technology tools;
- diagnose and solve common technology problems;

## **PERFORMANCE STANDARD 2: INQUIRE**

All Alaska students will use technology to locate, select, and manage information.

Rationale:

Intelligent decision making is based on accurate and complete information. The Information Age requires that everyone be able to sift through and manage large amounts of information. These skills are important in the workplace and for lifelong learning.

*Students meeting this standard will:*

- identify and locate information sources using technology;
- choose sources of information from a variety of media;
- select relevant information by applying accepted research methods;

## **PERFORMANCE STANDARD 3: SYNTHESIZE**

All Alaska students will use technology to explore ideas, solve problems, and derive meaning.

Rationale:

Productive workers are expected to use information resources effectively. Technology enables students to explore information resources, evaluate resources, and develop their own meaning. Authentic learning occurs when students question, integrate, and collaborate.

*Students meeting this standard will:*

- use technology to observe, analyze, interpret, and draw conclusions;
- solve problems using individual and collaborative strategies;
- create new knowledge by evaluating, combining, or extending information using multiple technologies;

## **PERFORMANCE STANDARD 4: COMMUNICATE**

All Alaska students will use technology to express ideas and exchange information.

Rationale:

Communication is the essence of human interaction. Technology transforms communications and society. Effective and immediate communication is now possible through a variety of media. Technology eliminates the barrier of geography and promotes broad-based entrepreneurial activity. Fluency with communication technologies

encourages life-long learning, participatory citizenship, development of career skills, and interaction with communities around the world.

*Students meeting this standard will:*

- convey ideas to a variety of audiences using publishing, multimedia and communication tools;
- utilize communication technology to exchange ideas and information;
- use technology to explore new and innovative methods for interaction with others;

### **PERFORMANCE STANDARD 5: APPRECIATE**

All Alaska students will use technology responsibly and understand its impact on individuals and society.

Rationale:

A comprehensive appreciation of the opportunities and limitations of technology in the world includes recognizing its role in history, its part in everyday life, and its potential for the future. Therefore, as informed technology users, students will be required to make ethical decisions regarding learning, living, and working with technology.

*Students meeting this standard will:*

- evaluate the potentials and limitations of existing technologies;
- discriminate between responsible and irresponsible uses of technology;
- respect others' rights of privacy in electronic environments;
- demonstrate ethical and legal behavior regarding intellectual property;
- examine the role of technology in the work place;
- evaluate ways technology impacts culture and the environment;
- integrate technology into daily living;
- recognize the implications of emerging technologies;.

## **Appendix C**

### **1995 Instructional Technology Committee**

<b>First Name</b>	<b>Last Name</b>	<b>Organization</b>
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Lance	Ahern	Internet Alaska
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John	Andrews	Bowman Elementary School
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Don Bailey SEAC

Sharon Bandle Anchorage School District

Helen Barrett University of Alaska Anchorage

Wes Bell ASD - Data Processing Center

Red Boucher Boucher & Associates

Robb Boyer Anchorage School District

Bob Butler Computerland

Gary Cannon Rabbit Creek Elementary School

Naz Chaudry MECC

Jan Christensen Chugiak High School

Carol Comeau Anchorage School District

Harriet Drummond Anchorage School Board

Steve Dunlap Digitech Solutions, Inc.

Tom Edrington Anchorage Telephone Utility

John Effinger Anchorage School District

Ray Fenton Anchorage School District

Patricia Gold Anchorage School District

Carol Goltz West Anchorage High School

Ernie Hall Anchorage Chamber of Commerce

Lynn Halquist Anchorage School District

Norm Holthouse Anchorage School District, Committee Chair

Joseph Jackson MECC

Janet Jahnsen Special Education

Sue Keeling Anchorage Telephone Utility  
 Trudy Keller Parent Representative  
 Gene Meck Wyle Electronics  
 Bill Mell Anchorage School District  
 Carol Mell ASD - Data Processing Center  
 Sue Moore Anchorage School District  
 Wes Newman IBM  
 Gail Opalinski Anchorage School District  
 Bob Penzenik Anchorage School District  
 Bill Rasmussen Municipality of Anchorage  
 Robyn Rehmann Anchorage School District  
 Marty Robinson Prime Cable of Alaska, L.P.  
 Bill Rosetti Advanced Information Services  
 Steven Simkins Digitech Solutions

**Instructional Technology Committee (cont'd)**

<b>First Name</b>	<b>Last Name</b>	<b>Organization</b>
Ed	Spradling	GCI
Mark	Standley	Apple Computer, Inc.
Fred	Stofflet	Anchorage School District
Jeff	Stout	AIS -Micro
Keith	Taton	Anchorage School District
Sue	Templeton	Anchorage Council of PTAs

Jim Tobin Apple Computer Inc.

Karen Wood Digital Equipment Corp.

## **Appendix D**

### **Role of the Building Technology Coordinator**

#### **Goal Statement**

The Building Technology Coordinator's primary goal is to promote and facilitate the effective use of technology for learning. This involves providing on-going opportunities for students and staff to develop skills in using technology, and helping others to utilize technology as a tool for teaching and learning. The learning includes both curricular content as well as valuable life-long skills such as critical thinking, problem solving, communication, collaboration, and research.

To fulfill this role, the Building Technology Coordinator must provide positive leadership and expertise in technology integration in the curriculum.

Achieving the above stated goal involves the following:

- integration of technology into all curricular area;
- providing on-going training opportunities for students and staff in the use of technology;
- maintaining an environment which encourages the appropriate use of technology to promote learning and skill development at all levels;
- first-line troubleshooting of the technology;
- informing students, staff, and the community about new technologies and learning opportunities;
- communicating with staff, students, and the community to assess the needs they have which technology can help to address.

## **Responsibilities**

The major responsibilities of the Building Technology Coordinator are:

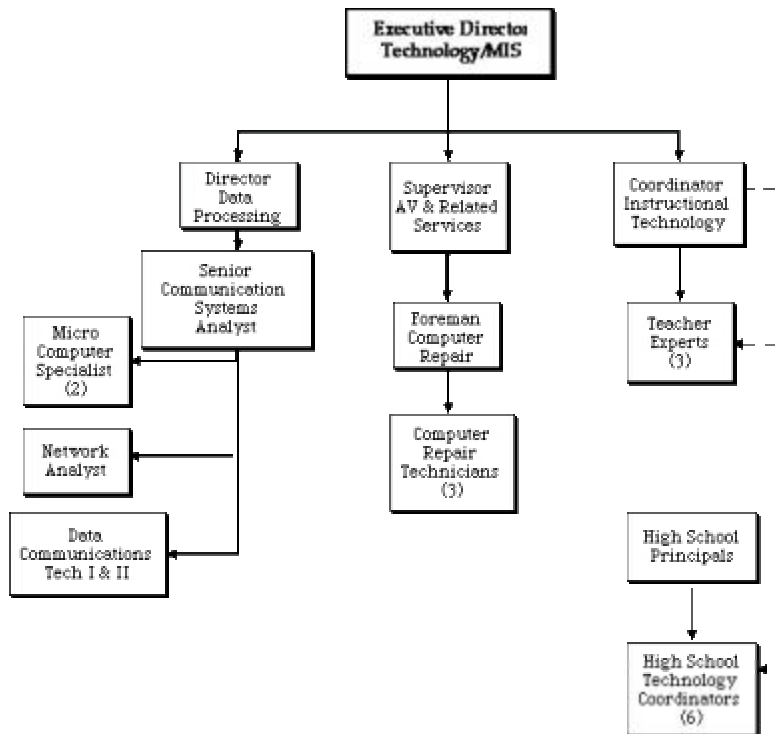
- provide leadership in planning for and supporting technology within the school;
- serve as the technology "point of contact" for the school in communicating and collaborating with ASD staff at locations such as Instructional Technology, Data Processing, and AV Repair;
- communicate with students and staff about ASD policies, practices, and opportunities related to educational technology, and help support those at the building level;
- develop appropriate school-wide guidelines/standards for the use of technology, with input from others, and help see that those guidelines/standards are publicized, understood, and implemented;
- showcase technology as a tool for learning and teaching;
- assess curricular and program needs, and work with others to plan strategies for addressing those needs through technology;
- help keep the technology in labs and classrooms in good working order;
- coordinate the use of technology labs and training in the school, involving others as trainers as much as possible -- students, staff and community members;
- oversee the development and maintenance of web pages for the school;
- provide current information regarding staff members to be included in the e-mail group for that school on the ASD mail server;
- ensure that an inventory of the computer-related equipment/software and its location in the school is maintained.

## **Data Collection and Record Keeping**

It is necessary to maintain school-wide records related to the technology in the building. The technology coordinator should see that such records are being maintained. This includes records about hardware, software, networking, and users.

- copyright monitoring and reporting;
- computers, monitors, keyboards, scanners, digital cameras, printers, memory, external drives, and other computer-related peripherals;
- computer software, CD's, laser discs, licensing agreements, etc.;
- IP and Ethernet addresses, passwords for administering technology in the school, network design and labeling, etc.;
- e-mail accounts, Internet User Agreement authorization and restriction, network/server privileges for users and groups, etc.;

**Appendix E**  
**Anchorage School District**  
*Instructional Technology Organizational Chart*



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