

AN ABSTRACT OF THE THESIS OF

Edward Roy Tice for the degree of Doctor of Education in  
Curriculum and Instruction presented on April 4, 1995.

Title: A Study of the Perceptions of Secondary Students  
and Parents of a Career Education Curriculum in a Small  
Rural School System.

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Abstract approved: \_\_\_\_\_  
Kenneth M. Ahrendt

An investigation of the individual perceptions of selected students, teachers, and parents toward the use of computer-assisted instruction (CAI) in a careers program was undertaken to provide information about the role CAI plays in the career education curriculum and other curricular areas utilizing CAI.

A qualitative methodology was selected which utilized the informal conversational interview, allowing the researcher to be responsive to individual differences and situational changes to establish in-depth communication. Data analysis consisted of a constant comparative process approach, which allowed for analysis of data from different sources, within a data triangulation design across the three subject groups. The subjects were from a small rural school district and consisted of five high school students, six of their parents, and their teacher.

As a result of the research, several significant factors about CAI, career programs, and computer usage were formed into the following hypothesis:

- 1) Students who have access to computers on a regular basis and are provided with training will be comfortable and enthusiastic about their use.
- 2) Computers are an essential information and communication tool whose access and use by students gives them an advantage in school and later in life.
- 3) Students feel the use of the computer for word processing and publishing is significant in that it enables them to be better and more creative writers.
- 4) The computer is an educational tool which should be utilized in all areas of the curriculum.
- 5) Careers curriculum is essential and enhanced by the use of CAI for accessing information and providing search and other functions.

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A Study of the Perceptions of Secondary Students  
and Parents of a Career Education Curriculum  
in a Small Rural School System

by

Edward Roy Tice

A THESIS

submitted to

Oregon State University

in partial fulfillment of  
the requirements for the  
degree of

Doctor of Education

Completed April 4, 1995  
Commencement June 1995

Doctor of Education thesis of Edward Roy Tice presented on  
April 4, 1995

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Edward Roy Tice, Author

## ACKNOWLEDGMENTS

I wish to express my appreciation to Ken Ahrendt, my major professor, for his efforts on my behalf and to the other members of my committee for their support and assistance.

I am eternally grateful for the love and support given me by Mardean, Paul, Jason, and Tracie while I worked for my degree and neglected many family things we could have done together.

I want to express my sincerest appreciation for the support and advice given to me by my Mom and Dad, Leo and Patricia Tice, and to them for instilling in me a desire to achieve beyond what is average.

I want to thank the Lord for giving me the potential, talent, and opportunity to complete this task.

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CHAPTER I

INTRODUCTION

Within the last decade computer-assisted instruction (CAI) has become an integral component of education, transforming many educational activities such as drill and practice, simulation, test preparation, and data storage and retrieval. Prior to 1980, CAI was not readily available to classroom teachers because computer technology utilized mainframe computers to provide sufficient memory to run these programs, which led to many large educational institutions "time-sharing" in order to afford computer capabilities. During the early 1980s a dramatic transition was achieved with the development of the personal computer (PC) equipped with sufficient available memory to perform simple tasks. As PC technology developed and available memory increased, so did the number of PC applications. The use of the PC for CAI began in a modest fashion, employing simple drill and practice exercises and game-style simulations, to the present where PCs have capabilities denied even large mainframes of the early 1980s. With memory expansion, compact disc (CD ROM) development, and the increased sophistication of software, the PC has become the norm in supplying supplemental educational activities. The uses are limited

only by the budgets of individual districts and the imaginations of the users.

Since 1976, career education has undergone the same transformation due to increased awareness by society and educators about the importance of educating students about occupations and job training as early as their late elementary years and definitely during their secondary years. However, the most dramatic transformation in career education in the secondary schools was the development of the Career Information System (CIS) for PCs in 1988. The availability of PCs allowed the smallest school districts the capability of accessing the CIS, previously available only to large institutions utilizing time-share computer technology. Several career information systems have been in use as computer assisted programs since the early 1980s. Among these systems are SIGI-PLUS (System of Interactive Guidance and Information), CHOICE and CIS (Career Information System), which use computer technology to provide career assessment, occupation and college databases, and other career-oriented activities.

Due to the passage of HB 3565 by the Oregon Legislature, career education programs have become an integral part of the secondary program in Oregon and are a requirement for graduation from high school. Career curricula followed the same format of determining occupational aptitudes and preference assessments, searching occupational and school descriptions, providing financial aid informa-

tion, and performing supplementary occupational oriented activities such as resumé development, interviewing techniques, and application procedures. Previously, much of this information and search effort was accomplished through manual assessments and text-based information for occupation and school descriptions. However, schools with access to local community colleges or universities could take advantage of computer technology and access CIS through use of computer-assisted technology. Unfortunately, rural schools were not always able to access this technology because of proximity limitations. With the advent and subsequent development of PC technology, career education for all secondary schools underwent a remarkable transformation. The increased use of PC technology facilitated the delivery of CAI career curriculum. Current career curriculum utilizing CAI has become very "user friendly." The "user friendly" capabilities of PC software allowed students to complete vocational assessments, access occupational and school databases, perform complex sorts within occupation and school data, and access other career-oriented data with a few instructions as to how to use the computer program containing this information.

Another dynamic involving the marriage of PC technology and career curriculum has been the increased use of word processing capabilities to complete such supplemental activities as developing resúmes and application letters. Since CAI career courses can effectively utilize PCs, it is

logical that they use as much of the PC capabilities as is currently available, facilitating the meld of CAI career programs to other PC capabilities such as word processing to many curricula, thus expanding the advantages of computer use within the context of existing curricular activities.

Nocella (1985), Tempestini (1986) and Seeger (1989) utilized the Career Development Inventory and the Survey of Career Development to study high school and college students. It was concluded that students using computer-assisted career programs increased their career development knowledge and that these programs had a positive effect on their perceptions towards career development.

Research studies of computer-assisted career education programs and computer-assisted instruction by Haugsness (1987), Dellario (1987), Nocella (1985), and Tempestini (1986) confirm that CAI is a significant factor in the accumulation, manipulation, and acquisition of knowledge by students at all levels. The ease of operation and amount of information available when utilizing CAI career education programs provides increased knowledge about career development as well as improvement in attitudes toward career development programs.

## Purpose of the Study

Quantitative studies (Chambers, 1980; Bangert, 1983) about CAI career programs have demonstrated the effectiveness of CAI career programs. A logical extension of these quantitative studies would be to study the perceptions of students, their parents, and teachers of career courses which utilize computer-assisted career programs.

Due to the scarcity of qualitative studies of CAI career programs, it is proposed that a qualitative examination of the individual perceptions of students, teachers, and parents, and an analysis of these perceptions of the participants, can be used to: (1) provide information on how current careers curricula can be used best to meet the needs of students; 2) gather information about the potential curricular modifications; and (3) improve the curricula to best meet the needs of students, especially as new factors such as the changing focus of education in the next decade are implemented.

As CAI is evolving into a more involved supplementary role in the education of students, it is important to gauge the perceptions of students, teachers, and parents toward a particular curriculum utilizing CAI, such as the career education curriculum, and use this data to modify CAI curricula to best meet these perceptions and expectations.

### Significance of the Study

Quantitative studies can determine the effectiveness of a particular curriculum. A basic premise of empirical studies is that the behavior of the study subjects is predictable. However, human behavior is not predictable, therefore qualitative research methods may be used effectively to study subjects' perceptions of particular fields of study. Thus, an anticipated outcome of a qualitative study of perceptions of a particular CAI career education curriculum will be additional information about perceptions of CAI and how it can be modified or adapted to the needs of rural school students.

Quantitative studies by Lawson (1988), Dellario (1987), and Liao (1990) have demonstrated that students utilizing CAI in addition to traditional instruction perform certain educational tasks better than those involved in just traditional instruction. A qualitative study of a particular CAI career education curriculum may yield additional data as to the effectiveness of that curriculum and why it is perceived as being effective since learning is a change in the individual due to the interaction of that individual and a particular environment over time. In addition, student perceptions of status differences in curricular areas is also a determinant of the success of individual students as well as a potential determinant of the effectiveness of that program (Measor, 1984).

Word processing is an integral part of the CIS curriculum at the particular school site selected for investigation. Additional information about student perceptions of its use and effectiveness will be invaluable in evaluating the total curriculum. Other activities which do not use CAI, such as interviewing, role playing, and job simulation, should also lend themselves to the same accumulation and analysis of data and yield information beneficial to future modifications of the career curriculum, especially as regards including 7th and 8th grade students.

#### Problem Statement

Quantitative studies of CAI career programs have demonstrated the effectiveness of such programs. A logical extension of these studies would be a qualitative study of perceptions of students, their parents, and the teachers of career courses which utilize computer-assisted career programs. The primary question investigated in this study is: What are the perceptions of students, teachers, and parents of the careers curriculum taught through the use of computer-assisted instruction which utilizes the Career Information System? This study was focused upon secondary students, their parents, and teachers in a small rural school district in northwestern Oregon.

## CHAPTER II

### REVIEW OF THE LITERATURE

The use of computers for computer assisted instruction (CAI) has increased exponentially since the mid-1980s due to the advent of the personal computer (PC). The increased capability of each new generation of computer design brought about changes in memory storage and the capability to manipulate data and run complex programs.

The earliest available PCs were the Commodore 64, Tandy, Apple, and IBM with 8k to 64k of memory. The capability of completing simple word processing and database tasks, as well as drill and practice programs or other available programs, was neither complex nor very powerful. However, in the decade since their appearance, PCs have become extremely powerful. Powerful memory chips became available and have afforded the PC greater capability and sophistication. The PC has become a necessity in the world of business, education, and politics with each new generation becoming more advanced and powerful than the one before. The educational community has been a benefactor of this technology, from completing word processing tasks, performing drill and practice, and providing simulation activities as well as approaching the esoteric uses that interactive disc technology promises.

The technology has advanced so rapidly that the ability to research the effectiveness of CAI on student learn-

ing seems to be hindered not so much by the lack of subjects or areas of study, but more by the sheer rapidity with which the computer itself has changed in a relatively short time. When an existing technology begins as rapid a transition as the computer industry has undergone in the last five years, it is extremely difficult for the educational community to evaluate its effectiveness, especially when research can take anywhere from three months to over a year to complete. Product design and capability can make a complete transition during that time period, thus making obsolete the previous technology.

A search of the literature yielded articles on CAI completed between the years 1986 to 1989. The existence of very little published research after 1990 gives credence to the difficulty of performing research on the effects of a technology which is in a major state of flux. In fact, it is probably safe to state that it is accepted knowledge that CAI is of direct benefit to those students who have access to it.

Haugsness (1987) utilized Commodore 64 technology to study traditional and CAI reading comprehension practice in advanced reading and college-bound reading practice classes, comparing the overall reading comprehension effects of traditional delivery systems with computer-assisted instruction. Students were assigned to high, medium, or low groups according to pre-test scores. The material used was matched for reading level and length for

each group with the control group at each level exposed to practice material with controlled reading projectors, timed comprehension reading, and printed worksheets. The experimental group utilized a CAI program offering a variety of traditional reading practice techniques, including: timed reading with comprehension questions, controlled speed reading, and controlled speed phrases. The experimental group showed a significantly higher score than the control group with no difference between groups (high, medium, and low), thus leading to the conclusion that a highly personalized, yet extremely important, learning experience such as reading can lend itself to the utilization of CAI.

The effect of using CAI in basic skills courses for high risk students was undertaken by Dellario (1987), who studied 202 ninth grade students enrolled in four urban high schools with respect to academic achievements in reading and mathematics. The pre- and post-test instruments included the Metropolitan Achievement Test, the Nelson Reading Test, the Stanford Diagnostic Mathematics Test and the California Achievement Test. Students were divided into two groups, enrolled either in CAI courses or in traditional courses. The results favored the treatment group in both the areas of reading and academic achievement, leading to the assumption that at-risk students respond to CAI curriculum in a positive manner and that this delivery system should be considered when contemplating remediation of students prior to entering high school.

A study by Lawson (1988) supported the findings of Dellario (1987). Lawson studied 54 low-achieving seventh and eighth grade students placed in Chapter I programs, according to academic deficiencies measured by percentile scores on the Comprehensive Test of Basic Skills. The control and experimental groups each received similar mathematics instruction as well as Chapter I services. The control group received supplemental Chapter I services on a pull-out basis, while the experimental group was placed in a CAI course for one semester. The findings were significant. The increased academic gains demonstrated by the experimental group led to the conclusion that CAI is a significant curriculum tool for at-risk low-achieving students in the basic skills.

Current career information systems such as GIS (Guidance Information System), CHOICES and CIS (Career Information Systems), all of which are computer-assisted career information and guidance programs, have become the primary curriculum tools for careers education and guidance in high schools and colleges during the past 10 years (McKinlay, 1984). After the advent of the microcomputer in the mid-1980s, the use of these systems has increased approximately 52 percent at the secondary level between 1982, when the technology was primarily manual sort, Fiche, books, and time-share computers, and 1988, when the use of microcomputers had supplanted previous delivery systems (McKinlay, 1984). Since then the use of microcomputers

systems has risen exponentially, driven by the availability of microcomputers with sufficient memory and capability to drive the software at low costs per unit. The increased computing power, sophistication, and ease of operation of microcomputer technology has resulted in a corresponding increase in the amount of information available to the student on a relatively inexpensive microcomputer. Most systems offer the following features: QUEST, which is a structured accessing device designed to help individuals explore career options (Lewis, 1992). QUEST provides descriptions of occupational duties and requirements; several standard career-assessment instruments, such as the Armed Services Vocational Assessment Battery, information about post-secondary institutions and financial aid, and sorting routines between occupations and colleges.

Nocella (1985) reported that after using the interactive computer system DISCOVER, both with and without subsequent counselor follow-up, students had more positive attitudes related to career development, especially in the areas of career exploration and planning,. Sixty (60) college students were given pre- and post-tests on three different instruments, the Career Development Inventory, Self-Assessment in Confidence and Progress in Educational/Career Planning, and the Survey of Career Development. Test data were analyzed using t-tests and/or chi-square, depending upon the variables used, to determine if career attitudes, knowledge of occupations, and other career-related compo-

nents were affected by the treatments. Thirty (30) students were assigned to the DISCOVER group and 30 were assigned to the DISCOVER group with counselor follow-up. Although the evidence determined that the use of the CAI career program had a positive effect, it could not conclude that a single follow-up session with a career counselor would not significantly affect attitudes more than just the use of DISCOVER without counselor follow-up.

Tempestini (1986) studied 71 volunteer high school students who were randomly assigned to six treatment groups and given pre- and post-tests to assess career development. These were the Career Development Inventory, the Vocational Decision Making Difficulty Scale, the Career Decision Scale, a Confidence and Progress in Educational/Career Planning Questionnaire, and an Alternative Generating Information Seeking Behavior Log. Students utilizing CAI career programs increased their career development knowledge compared to a loss for those who just received counseling, while those who received both improved their career decision making ability.

A study by Seeger (1989) examined the effect of the utilization of SIGI-PLUS (System of Interactive Guidance and Information) and Discover CAI career programs upon student career-related attitudes, knowledge, and activity. Subjects were college students enrolled in an introductory psychology course, randomly assigned to three groups that were pre- and post-tested using the Survey of Career Devel-

opment, the Career Development Inventory, and the Self-Assessment and Record of Career Planning Activity. The results showed significant effects for the use of SIGI-PLUS on career development attitudes and knowledge, and that students had a greater knowledge of career planning and exploration, personal interests, abilities, and information about occupations and decision making. Even though the Seeger study included the effects of gender/treatment interaction on career development, there were no significant results for gender.

The conclusions from the studies of Nocella (1985), Tempestini (1986), and Seeger (1989), utilizing similar test instruments (Career Development Inventory, Survey of Career Development) with college and high school students, yielded results which were identical as to the increase in career development knowledge and positive attitudes toward career planning and information.

Additional studies undertaken by Glaize (1982), Byron (1983), Owens (1983) and Mau (1991) support research in the effectiveness of utilizing CAI career programs as a major factor in the delivery of career information and exploration and career development. The ease of operation and amount of information available in a condensed and time efficient format are determinate factors in this outcome. Compared to previous systems of delivery, the use of a computerized information and exploration format allowed students the ability to compile data, review information, com-

plete sorts, and print out specific information in less time and in a less cumbersome manner than needle-sort, reading information manuals, and completing manual comparisons. Students are extremely impatient in tasks they see as marginally unnecessary and those tasks involving additional searching and reading to find information is accomplished according to the priorities of the individual, with career information ranking as a lessor priority as to time consumption.

The Career Information System is used by thousands of schools throughout the United States in the elementary, middle school, secondary, and college level career programs available (McKinlay, 1984). It is a computer-assisted curriculum available on mainframe and PC computers, with PCs being the technology of choice for secondary schools and the mainframe for community colleges and universities. At the simplest level, the CIS is primarily an information system which provides information on occupations, training programs, two- and four-year colleges, financial aid, job searching, military occupations, and the ability to cross reference information. However, the full CIS curriculum available to secondary career programs includes activities which range from instruction in the use of the system to activities more appropriate to secondary psychology courses. The delivery systems available include Micro-CIS (for school programs), Agency CIS (designed for career transitions, skill assessment, Oregon programs of study,

and training and job search help), and State CIS (designed for state or potential state employees, which includes information about opportunities within state government).

The QUEST component of the CIS curriculum has been developed into a significant tool which combines information retrieval, the instructional process, and a self-assessment instrument with the ability to link with both the occupational and college information components of the CIS. When combined with the Micro-Skills worksheet and other components, such as the ability to LINK with the ASVAB (Armed Services Vocational Aptitude Battery), the QUEST component becomes a very powerful curricular tool for secondary students. As other curricular activities are incorporated, such as those included in the suggested curriculum guide and those provided by individual districts, the CIS becomes a complete career program limited only by the scope and the imaginations of the teachers, students, and school systems involved.

Lewis (1992) undertook research involving QUEST to determine whether the use of QUEST would generate a list of occupations that 9th grade students would want to explore. The four questions posed were as follows:

- 1) Does the administration of QUEST encourage students to engage in career exploration activity?
- 2) To what extent does QUEST contribute to a more realistic list of occupational preferences?

3) Will there be any changes in occupational preferences of 9th grade students upon completion of the QUEST questionnaire?

4) More importantly, can students be guided to make tentative career decisions based on the information they already know about themselves?

Ninth grade students from Lakewood High School, Longbeach, CA, were given the Assessment of Career Development Needs as a pre- and post-test. The experimental group was shown a video explaining each question in QUEST while they answered the QUEST questionnaire, whereas the control group received neither. The group exposed to QUEST posted a higher overall average score on post-tests, thus recording career searches of a higher level of perceived importance.

The available research involving CAI and especially CAI in a careers curriculum demonstrates that the combination of technology, information and teaching activities has proven effective with all students, regardless of age, cultural diversity, economics, or prior computer knowledge or accessibility.

Further research utilizing the use of computers in areas other than instruction, as well as their upon basic skill levels and higher order thinking skills when used in a CAI-based curriculum, makes a very strong statement for the effectiveness of computers as an instructional tool in any curriculum or educational environment. In fact, the statement is so strong that it is becoming more widely accepted in the educational community that computer technology will eventually emerge as one of the most effective and

necessary tools for the education of all ages and levels of students.

An area that has not yet been the subject of intensive research studies is the use of the word-processing capabilities of current microcomputers. Current microcomputer technology enables the user to complete complex word-processing tasks beyond the capabilities of prior technology and includes the ability to edit, manipulate, and save data in a variety of fonts, styles, formats, and templates. It is utilized to construct graphs and tables, compile databases, execute spreadsheets and perform myriad other tasks limited only by the software available and the technology to run it.

With the advent of CD-ROM and modem technology the computer has become the most powerful information and educational tool ever known and is transforming the world of today in all respects. The use of the word processor by the student to perform the simplest tasks of writing has been known to transform even the most reluctant and unskilled writer into an adequate writer in a matter of months. Schools which have implemented a mandatory word-processing curriculum and have maintained student accessibility to computers after course completion have noted a remarkable change in the quality and length of student compositions, especially among male students.

These types of classes have been in existence at the school investigated since 1985 and learner outcomes as re-

gards the ability of students to utilize this technology effectively has been remarkable. By 1988, junior and senior level students were required to utilize the word-processor to compose their history and government research papers, resulting in papers which were of high quality in terms of composition, content, grammar, and spelling. However, one area of concern arose which required a perceptive teacher to curtail was the utilization of the computer for purposes of plagiarism by future students!

## CHAPTER III

### RESEARCH DESIGN AND METHODOLOGY

#### Introduction

The primary question posed in this study was: "What are the perceptions of students, teachers and parents of the careers curriculum as taught through the use of computer-assisted instruction utilizing the Career Information System (CIS) program?" Quantitative research has validated the effectiveness of utilizing computer-assisted instruction (CAI), as well as computer-assisted career programs at the secondary and college levels. Research subjects have included at-risk youth, minorities, all levels of high school students, community college and university students, and adults. A qualitative study of the perceptions of those using computer-assisted career programs would be a natural extension of the existing quantitative research on the utilization of CAI career programs since this particular area of research naturally lends itself to the uncovering of experiences and perceptions.

#### Qualitative Research Methods

The theory of qualitative research has been identified with various alternative approaches, including ethnographic, ecological, case study, participant observational, or phenomenological methodologies. Qualitative methodology

was selected for this study in the hope that the investigative approach to the problem might provide clues about the nature and structure of student, parent, and teacher perceptions of CAI career education curriculum. This mode of inquiry looks for answers to questions such as "what is happening here" and "what do these phenomena mean to the people involved?"

Erickson (1986) suggested that the best interpretive researchers identify several issues of research interest before they begin their studies. Therefore, a central concern for the researcher should be initial questions for the study, questions which provide focus and direction. The development of initial questions shapes the inquiry even though the direction of the study may be altered once the data collection and interpretation have begun.

According to Patton (1989), qualitative inquiry is highly appropriate in studying process because "depicting process requires detailed description; the experience of process typically varies for different subjects; process is fluid and dynamic; and subjects' perceptions are a key process consideration" (p.42). The question which prompted this study and the design of the study fit this interpretative or qualitative mode of research since the object is to seek information about the perceptions of students, teachers, and parents about CAI career education curriculum.

Seidman (1991) provides recommendations as to whom to interview, how interviews should be conducted, and what

types of questions to ask. The interviews in this study had no set length, as opposed to a suggested length of 90 minutes, contributing to a more relaxed and informal interview that allowed both the researcher and subject a chance to minimize concern over time factors, especially artificial ones. According to Patton (1989), the purpose of the interview is to determine the perspectives of the person being interviewed. Patton further argues,

we can't observe how people have organized their world and the meanings they attach to what goes on in the world, we have to ask people questions about these things. The purpose of interviewing them, is to allow us to enter into the other person's perspective. The assumption is that the perspective is meaningful, knowable, and capable of being made explicit. (p. 161)

Interview data for program evaluation purposes allow the researcher to capture the perspectives of program participants, staff, and others, including parents associated with the program. What does the program look and feel like to the subjects involved? What are the experiences of the subject participants? What thoughts did the teachers and parents have about the program operation, processes, and outcomes? What are the subject's expectations about the program? It is the responsibility of the researcher to provide a framework within which people can respond comfortably, accurately, and honestly to these kinds of questions (Patton, 1989).

The informal conversational interview is the most open-ended approach to interviewing. The conversational interviewer wants to maintain maximum flexibility to be able to pursue information in whatever direction appears to be appropriate, depending on what emerges from talking to one or more individuals in the research setting (Patton, 1989). Thus, the data gathered from informal conversational interviews will be different for each person interviewed.

The strength of the informal conversational approach is that it allows the researcher to be highly responsive to individual differences and situational changes. Questions can be individualized to establish in-depth communication with the subject being interviewed and to make use of the immediate surroundings and situations to increase concreteness and immediacy of the interview questions and responses (Patton, 1989). Interviews are interventions. They affect people. A good interview lays open thoughts, feelings, knowledge and experience, not only to the researcher but also to the subject.

A study of the perceptions of students and parents toward a particular curriculum is an extension of the quantitative research which has focused on knowledge acquisition and attitudes toward CAI and the CIS system. Measor (1984) determined that different areas of the curriculum are perceived to have different meanings for students as well as different kinds of status, thus yielding a reaction or per-

ception on the part of the consumer to a particular "product." This meaning and status attributed by students and parents towards a particular curriculum acts as a very significant constraint or impetus upon teachers and significantly affects the development of the curriculum. Subjects which are perceived as essential for the world of work (mathematics, science, and vocational arts) had higher status than others, thus student performance and behavior in these courses differed accordingly. Woods (1984) further stated that the teacher "makes" the curriculum in that they find expression in the curriculum as well as give expression to it, leading one to assume that this positive or negative involvement on the part of the teacher also affects the perception that students and parents have towards a curriculum.

The perception each individual has toward an activity, that is, a curriculum, is unique to that individual and is an integrated composite of interpretations developed over time and life experiences and thus cannot mean the same thing to any other individual. However, when similarities occur in the analysis of several individual's perceptions toward a curriculum, there exists significance.

Bruner's (1973) properties of perception center around the concept that perception is a decision-making process based on the utilization of discriminatory cues, which are coded or identified according to categories, and involves inferential and predictive thought processes. Caruso and

Sternberg (1985) found that the interaction of an individual's perceptions with a specific activity over a period of time leads to the development of what is known as "practical knowledge," if it is procedural, that is, knowledge stored in the form of productions or condition-action sequences that implement actions when certain pre-conditions are met, and are relevant to one's everyday life.

Thus knowledge acquisition occurs through selective encoding, combination, and comparison which allows for the separation of relevant information, the integration of selected information into an acceptable cognitive structure, and the relation of the new knowledge to knowledge already acquired.

The sampling strategy and analysis are two-fold, utilizing the comparative pattern analysis approach within a data triangulation design to strengthen the design, yet allow for analysis of data from different sources (Patton, 1989). Comparative pattern analysis was used within each of the data groups as well as across the three sample groups to look for recurring patterns throughout the data in terms of "internal homogeneity" or data similarity and "external heterogeneity" or data contrast.

This study adhered to Denzin's (1978) "logic of triangulation", which states that "multiple methods should be used in every investigation" (p. 292). Therefore, several small groups of subjects were used in this study, as fol-

lows: 1) students whom had used or were using the career education curriculum; 2) the parents of these students; and 3) the teachers who had taught or were teaching this curriculum in the school setting.

### The Human Instrument

I became knowledgeable about computers and their potential in the early 1970s as a result of programming classes at Oregon State University (OSU), as well as information gathered from my father's employment while in the Air Force and later at OSU as a computer technician. During this time I became aware of the future potential of computers as a technological tool in our society and more especially in education. While pursuing a Bachelor of Science degree (1972) and a Masters in Education (1977), I prepared several analyses about what I felt the role of computers would be to the future of education and provided predictions about computer developments and capabilities which have been met and exceeded since that time.

As a teacher for 14 years in the district from which subjects for the investigation have been selected, I have had the opportunity to use PCs since 1984 when I had a Commodore 64 lab. This lab consisted of seven computers in my social science classroom, which were utilized for word-processing, databases or spreadsheets, drill and practice, and simulations. In 1988, I switched to the Apple IIg as

the school had developed an Apple-based business lab and a system became available for my use. However, I continued using the Commodore 64 system for drill and practice and word processing in my classroom until 1990.

In 1990, after 11 years of teaching, I moved into administration in the same district and inherited an IBM 386 PC, which I have used ever since, even purchasing a laptop IBM 386 for personal use. Most of my knowledge and skills involving the PC are self-taught, with assistance from other computer literate individuals. As such it has not been totally inclusive of all the particular functions, but neither has it been extremely time consuming as I have been able to access processes which I needed while bypassing that background which I considered superfluous and time consuming. As a result of this self-training, in addition to the instructional uses of my classroom lab and the business lab, I have seen the gradual inclusion of CAI in our total curriculum, especially in the areas of business and career development, and in the school's other curricular areas.

I taught the careers curriculum at the school under study during the first three years of my tenure, utilizing text-based material and the needle sort, as the mainframe computer time share CIS was not yet available. I had no formal training in the careers curriculum, but attended state and local workshops on career education, where I learned not only methodologies and techniques but also the

eventual availability of computer-assisted career education information offered through the Clatsop Community College computer system. Another teacher was given responsibility for the careers curriculum and utilized the CIS through the community college until the careers curriculum was placed under the responsibility of the Business Department, whose teacher enabled the transition of CIS from the community college mainframe to the IBM PC business lab with subsequent inclusion of careers within the word-processing curriculum.

The reason I am evaluating this curriculum and the perceptions of those involved with it is that it is one of the most complete CAI programs in use in the secondary schools today and yet utilizes traditional teaching methods and activities to produce a comprehensive curriculum which has been shown to be effective and which can be adapted by schools with limited numbers of computer systems. When a one-to-one student to computer ratio is attained for use of the entire program it has the potential to be a complete CAI curriculum and thus a model for other curricular areas. As history is my major field of study, I would have considered it for this application, however, the use of CAI in the social sciences is just beginning to be developed, especially with the advent of CD-ROM technology. I feel that this research should assist in the further development of social science and other CAI programs as the more sophisticated programs rely on more than simple drill and practice

and are more effective if there exists interest and involvement on the part of the student.

### Research Setting

The school district is located 70 miles west of Portland in the Oregon Coast Range and is comprised of 165 students in grades K-12. The district serves approximately 850 residents along a 50-mile stretch of the Nehalem River and is the only governmental entity since there are no incorporated areas within the district boundaries. Three restaurants, two mercantiles, a gas station, and a tavern provide peripheral services to the community, which is dependent on the Portland or Astoria/Seaside areas for essential goods and services.

The community's economic base is composed primarily of logging enterprises and lumber mills, the school itself, or employment in service industries. Secondary employment involves commuting to Portland, Beaverton-Hillsboro, Seaside-Astoria, or the Knappa area. Prior to the late 1970s, the primary workforce was male and predominately involved in logging-related industries. They were dependent on federal, state, and private timber sales and subject to the vagaries of the timber and housing industries, which played a significant role in the fortunes of those reliant on employment in these industries. Several times during the 1970s and 1980s a number of families migrated to timber

cuts in Washington, Alaska, Idaho, and Southern Oregon because of the changes in the availability of local lumber sources. These moves also necessitated changes of schools for many of their children. Many of those involved in the timber industry in the area are descendants and relatives of those who came to the area at the turn of the century and during the 1920s to harvest the timber in Northwest Oregon.

Prior to the 1980s, the primary income in the valley was distributed among those who owned logging or log-trucking companies, their workers, the school, small cattle ranching enterprises, and small storeowners. The average income level ranged in the upper lower to upper middle class level, dependent upon market conditions and economic conditions. Income fluctuations were due primarily to the wood products market, with constant shifts in the income levels of all participants, necessitating short migrations to follow the market, reliance on public assistance, or finding part-time work in other vocational areas. The fluctuations also affected the income of other peripheral businesses such as the restaurants and mercantiles since their existence depended on the local residents, much like the "company store" of timber and mining towns.

This reliance on a single industry for income has led to a highly emotional and aggressive protectionist philosophy regarding logging and loggers which presents a contemptuous and derogatory face to those who are not involved in

any aspect of the industry or who are white collar or professional workers, especially those in education. This attitude is understandable in light of the fact that the local logging industry is primarily familial, oftentimes economically endangered, and hazardous in nature. Environmental, political or economic issues which affect the industry are taken very seriously with subsequent inflammatory rhetoric and defensive posturing being the norm, versus intellectual discussion and compromise.

When one considers the extent of intermarriage among the original pre-1980 families of the valley it becomes easy to view them as a large extended family, often referring to themselves and their extended families as "valley people," regarding those who have resided in the valley less than 30 years or who hadn't "married in to the valley" as "outsiders."

This attitude is extended throughout every aspect of family and social life within the community, which centers around the school. The average education of the adult population of "valley" people is at the high school level, most of them alumni of the local school, resulting in a traditionalist and protectionist attitude towards all that takes place at school. Teachers and administrators are often treated with a marked lack of respect, which further intensifies the underlying attitude towards "outsiders" and especially "outsiders" from a different socio-economic and educational background. Those teachers whose background

and mannerisms closely match those of the community tend to be accepted more readily, although never completely unless they "marry in" to a valley family.

In the mid-1970s a migration into the valley began. People from other areas and different socio-economic backgrounds were drawn to the area to take advantage of inexpensive land prices, low rents, and a beautiful, forested, scenic river valley lifestyle. Some were professionals who commuted to the Beaverton/Hillsboro area and had purchased acreage to get away from urban and suburban lifestyles for various reasons. For the most part, these people were educated and had middle to upper middle class lifestyles and brought with them suburban ideas as regards education and other issues. This migration was slow at first and thus the impact of their ideas and expectations for the educational system were not as significant as they were to become later. During the 1980s, this migration increased as land became more expensive in the Portland area and the problems in urban and suburban areas increased and began impacting schools and family life.

More families who bought and rented houses from those who were forced to follow the timber sales, as well as some of the more substandard and inexpensive dwellings, moved into the valley. These families brought with them different expectations and experiences from the educational systems they had previously experienced, which caused a gradual shift in the direction the educational system at this

school was to take in the next 12 years as more "outsiders" served on the local school board and became involved in the total operation of the district.

As well as a migration of middle class professionals and blue collar workers, there was an influx of people who came because land and housing was so inexpensive as well as those who came to escape whatever it was they had to escape. The valley became a center for illicit drug activity for much of the 1980s, especially marijuana and cocaine trafficking, since there was no police force other than the State Police or the Sheriff's office, which seldom patrolled and didn't get a handle on the problem until the 1990s. In fact, the lack of a visible police force led many to come to the valley as they would be able to avoid scrutiny of their past as well as their lifestyles. This became especially apparent as the composition of the students attending the school began to change.

Prior to this time, most of the students were children of logging families or local teachers from a fairly normal lower to middle class nuclear family orientation, exhibiting the types of educational problems manifested by students with an average distribution of learning abilities across the spectrum. With this latest influx, the student population has shown a marked increase in the number of at-risk, learning disabled, and severely emotionally disabled students. According to the 1993 State Student Report, the district has a student population of 165 with 15 students

identified for special education, 25 additional students entitled to Chapter I services, and an estimated 75 students at-risk due to factors such as family drug and alcohol abuse, physical abuse, domestic abuse, fetal alcohol syndrome, and other educational and non-educational factors. Currently, there are approximately 45 students receiving free or reduced price lunches.

Over the last decade, scores on the standardized California Achievement Test given to grades 4 through 12 demonstrate that the students on the whole perform below the 70th percentile on all of the tests. Taking into consideration the limiting factors and bias of such tests, there still exists a prevalent and significant indication of a lack of educational achievement among the student population, especially in the secondary population.

Although the teachers enjoy a low student-teacher ratio for instruction they are forced to deal with this at-risk population, especially among the secondary students, as well as a prevailing negative attitude towards education and teachers on the part of the school board and community. However, the financial situation of the district coupled with innovative ideas from the staff have allowed the school to implement programs to an extent seldom realized in larger schools. During the 1970s and 1980s, the district benefited from an increase in timber revenues which averaged between \$700,000 and \$900,000 yearly and allowed them to build a savings account, which is currently at \$6.5

million. This money was used to build a new school, stage, and auditorium, track and football complex, and other additions, as well as provide for many new programs such as the computer lab.

The district instituted a business curriculum in 1985 and purchased Apple computers for each teacher and for a 16 station, 7-12 business lab. They also required all 7th through 10th grade students to take word-processing classes to be moderately competent in the use of computers for word-processing and CAI activities. In addition to the business lab, the social science room had seven Commodore-64 PCs for CAI and word-processing uses. The student-to-computer ratio in the 7-12th grades was approximately one-to-three, allowing all students considerable access to the computers for their many different uses.

In 1990, the district purchased IBM PCs and expanded the computer applications, database, and spreadsheet capabilities of the business curriculum, maintaining the basic curriculum requirements for word-processing and applicable activities. In 1991, the district purchased the Career Information System for the IBM computer to supplement the careers curriculum, which had, until this time, utilized workbook and needle-sort learning activities. At the time the information base was accessed by using textual material or utilizing the computer search available at the nearest community college, 35 miles away, which allowed limited access and use.

In the past the careers curriculum was separate from the word-processing and business curriculum, however with the advent and use of the CIS on computers the district decided to combine the word-processing and careers curricula, taking advantage of the computer's capabilities to perform many of the supplemental activities such as reports, résumés, application letters, and occupational and educational institution searches. A major reason for combining the two curricular areas was the ability to use the word-processing program to complete the supplemental activities for the CIS program and to maximize the use of the computer lab. The 9th and 10th grade students were required to take a combination of word-processing and careers for both years, while the 7th and 8th grades were required to take keyboarding and computer basics. Further follow-up of the careers curriculum occurs in the personal finance course for juniors and seniors, who utilize the system for more personal occupational and education information.

### The Curriculum

The CIS Curriculum was developed in Oregon during the 1970s and 1980s and was designed to provide occupational and college information to college and high school students. Time share computer systems handled the CAI aspects of the CIS program with books/workbooks providing the supplemental activities and information for sites without ac-

cess to the computers. By the mid-1980s, a shift to micro-computer systems resulted in their almost exclusive use in the secondary schools. Colleges and state agencies utilize time share or networked systems to provide CIS.

The CIS system accounts for over 3800 sites in 16 states and is the main provider of career information in Oregon (McKinlay, 1984). Major features of the system include descriptions of occupational duties and requirements; regional and localized information about employment, wages, and prospects; characteristics of institutions providing post-secondary educational programs; sorting routines for occupations and colleges; auxiliary files and searches for military occupations, apprenticeships, standardized assessment instruments, job searches, and career publications; and coordination of searches between assessment instruments and military and civilian occupations.

The CIS program for secondary students begins with a series of activities designed to motivate students to examine their abilities, skills, and aspirations as regards occupations. The Micro-Skills worksheet is a primary tool and is used in conjunction with the QUEST program. The worksheet is a series of CAI questions students answer on the computer rather than on a separate answer sheet. The results obtained are used to help students understand the labor market and how their choices influence their career options. They further explore occupational choices which can be narrowed to selected occupational titles, which are

then searched through the database to obtain a full readout of the job description, also including skill levels and type of educational backgrounds necessary for the particular occupation choices.

Students who wish to explore different post-secondary institutions have available an extensive database which provides both general and concise information on these institutions and the types of financial aid and scholarships available. Students who have little idea about which institution to attend, or who are searching schools based on their interests, can use SCHOOL SORT which allows them to answer particular questions about the type of degree they wish to pursue, their major study interests, type of school, etc. SCHOOL SORT will then print out a list of choices which can then be expanded into full descriptions of each choice.

The curricular activities are designed to prepare students for each phase of the CIS program and can be expanded by each school according to their curricular requirements. Many of these particular activities are designed to utilize the word-processing capabilities of the lab as well as provide meaningful simulations for occupational-related activities such as interviewing and developing resumés.

## Population

### Sample Selection

The population from which the subjects were selected consisted of 7 sophomore and 12 senior students (spring, 1993) who had taken careers/word-processing or who were currently enrolled in the class. From this population, students were asked if they wished to participate in the study. They were given an overview of what the study entailed and apprised of the fact that their parents would be involved. Two male seniors, a junior female, a male and female sophomore, six parents, and a teacher volunteered for the study.

The students and their parents naturally divided into two groups, those whose parents attended and graduated from the school, and those whose parents attended schools elsewhere and then later moved into the valley. The natural division of these students and their parents could not have been more appropriate to the needs of this study than if specifically selected by the researcher.

The seniors were the first students to utilize the computer-based CIS program and the sophomores were the first students to be involved in the current careers curriculum, utilizing the computer for supplementary activities as well as for the CIS system. The fact that these students and their parents naturally divided into "valley"

and "newcomers" was an added bonus as the educational background, life experiences, and expectations of these groups were markedly different from one another. The fact that a teacher was willing to participate added to the depth of material the researcher would be able to generate and lent additional credibility to the research outcomes.

### Subject Backgrounds

Two of the students, one a sophomore and one a senior, were brothers whose parents graduated from this school together and married after graduation. Their family, on both the paternal and maternal sides, had been in the valley since early in the century and had been involved in logging ever since their arrival. Between them, both sides of the extended family own five different logging and log-trucking outfits which employed over 30 people, and are related to many of the long time residents by intermarriage.

The sophomore female student moved to the valley during the sixth grade after her mother re-married a man who grew up and lives in the northern part of the valley and attended this school for most of his schooling. He is related to many of the families in the valley and has worked in the logging industry until recently. He is a current board member of the school district. Her mother attended school and raised her family in another area and moved to

the valley after her re-marriage. She is employed by the school as a bus driver.

The junior female student's father was born and raised in the valley, graduated from the school and has always been employed as a logger. Her mother moved into the valley after she married and the family had lived in many different places as her father was career military. Her mother has worked at the school as an aide for several years.

The other senior male student's parents moved to the valley when he entered kindergarten and were recently divorced. His mother still resides in the valley and works at the school. His father works in the Portland area.

The teacher who participated in the study is the current teacher of the CAI career program and provided the supplemental teaching activities which helped integrate the word-processing and careers curriculum. The teacher utilizing the CAI careers curriculum is a second-year teacher in business and computers.

### Data Acquisition

Preliminary interviews began in March of 1993 with the sophomore female student and her mother to help establish some of the questions for the guided interview aspect of the study. This also helped to set approximate interview lengths and other physical considerations which would en-

hance the interview environment, such as using subject homes rather than the school and allowing the subjects to set the "saturation level" of the interviews.

The initial interviews for all subjects took place between April and October, 1993 and followed the informal conversational approach. These interviews ranged in length from 30 to 45 minutes and were recorded on audiotape and later transcribed by the researcher to computer files and paper copies. The questions for the follow-up interviews were composed from the answers to the initial interviews. These follow-up interviews, based on structured questions, were intended to further develop areas of perceptions which were comparative or triangulated between the subjects. Follow-up interviews were completed by March 1994 (Appendices A-C).

## CHAPTER IV

### ANALYSIS OF DATA

The process of data collection and analysis occurred from the beginning of the study and intensified as the study progressed. Theoretically indefinite but more intensive analysis occurs during the final stages of interviewing, especially as previous interviews with the same subject lead to the development of more specific questioning (Merriam, 1988). The constant comparative method (Glaser & Strauss, 1967) of data analysis involves: 1) comparing categorized data in the same category, 2) integrating categorized data which leads to theory development, 3) delimiting theory, and 4) writing theory. This was the basis for "comparative pattern analysis" across the three subject groups (triangulation), where events were constantly compared with previous events, and once certain patterns emerged within a category, comparisons and contrasts were made across the other categories. Essentially, the researcher focused on each subject and then the subjects within the category and finally across categories, looking for recurring patterns of "internal homogeneity and external heterogeneity" (Patton 1990). Seven major categories of data were derived from the data analysis, including: 1) attitudes toward computers, 2) the school, 3) writing (with and without the computer), 4) careers

courses (with and without computer assistance), 5) use of technology, 6) life skills, and 7) work skills.

Student A: Anna

Anna is a female sophomore student 15 years of age who came to this school in the 6th grade. Her mother lived outside the valley, moving here after her marriage to her stepfather, who was a student in the school until his junior year when he moved to a nearby town to attend school. They live on a ranch in the north end of the valley, approximately 15 miles from the school and Anna has two stepbrothers who are currently in the elementary grades at the school. She has been intensively involved with computers, beginning with computer application courses in 7th grade. She has taken careers and word-processing during her freshman year and is currently taking advanced computer application courses. The family recently purchased an IBM system for her use and she is in the process of instructing her family members in its use.

Anna is exuberant about what computers can do and the role they play in her life. When asked her impressions about the CIS system itself, Anna was effusive in praise of its capabilities:

I like it a lot. It's really helpful and easy to use. It can give you information about any school that you want, the tuition, location, number of students. It also gives you lots of

information about jobs and training. I can't imagine doing it out of books because I don't think I'd find out as much information. I mean, it would take longer and this is just type it in and print it out if you want to. I just like all the information that it gave you and that there was so much of it.

Anna's experience with the CIS has been positive and she has no problem accessing the type of information she wishes whenever she wants. It is her feeling that as she enters her last two years of high school she will use the CIS program more to her advantage to finalize college choices and obtain scholarship information. She felt that she took the college and occupation aspects of CIS more seriously after she started to use the computer for her own purposes—primarily because she was in high school and it was time to find some direction.

When asked whether students should be required to take careers as a course, she replied in the affirmative. When asked if it was too early to have it at the 9th grade, she responded:

No, because some kids want to start planning their life now and CIS helps them. Many 7th and 8th graders would take it seriously, although not all of them would like the additional stuff like the resumés, interviewing, and other things. It should be offered as an elective at those levels. It really is for any student because it gives them an idea of where they can go and what they can do. 8th graders should be required to take a half year and 9th graders a full year. I think they would really benefit by it and then it should be made available to students to use any time they want. It would better if it was sepa-

rate from word-processing, at least at the freshman year, and it could be done in a semester.

Anna feels that a strong knowledge of computers and computer applications gives one an advantage in school and at work. The ease of accessing information and the ability to edit whatever is written and to save on a computer disc are essential tools for today's students and provide her the ability to write with greater ease:

I like to write with the computer because I can change my mistakes and save stuff. It's also easier and faster to use the computer than to write by hand, which gets tiring. I can use the spell checker and the thesaurus to help my sentences look better, which is important to me . . . . I feel that I have started writing more since I learned to use the computer and what I am writing has gotten better.

She feels that the ability to access information with computers is an important tool for her to have available. Accessing information and being able to fully edit her writing has changed her outlook on her abilities as a student:

I feel more confident when I use a computer as I can tell it what to write and it will write it. I can find information easily, it saves time . . . . It helps me to think, especially when I am writing an assignment . . . . Most of the kids feel the same way about using the computer for writing and finding information and would use it more if they had more access. With CD-ROM, it has become more interesting as you can see pictures on the computer with description.

Anna discussed at length some modifications to the current CAI-CIS careers curriculum which would involve utilizing the CD-ROM capabilities to provide visual displays of occupations and colleges while giving textual information about each. The actual day-to-day work in each occupation would be an advantage as would the ability to visit each campus and see what they look like visually. Also, the visual representation of textual information would help clarify questions about any aspect of careers.

Students B and C: Bob and Carl

Bob, age 18 years, and Carl, age 16 years, are brothers in the 12th and 10th grades, respectively, and have attended the school since kindergarten, with the exception of three years when their father was logging in other areas. Their parents come from logging families who moved into the valley as either homesteaders or loggers and have been here since the late 1800s and early 1900s. Both sides of the family are involved closely with the logging industry and both students have worked summers in the woods. They both began using computers when they were in elementary school and have had required courses in keyboarding, computer applications, and careers. They both use computers in the classes they take now and have used them for a variety of applications, including simulation, games, and word-processing as well as for career applications.

When asked how he felt when he first started using computers, compared with the present, Bob responded:

When I first started using them in 3rd grade I liked them because I was mainly playing games. When we moved south for three years, I was the only kid who could use computers because they didn't have them at the school I went to. When I had to take keyboarding and word-processing in 7th and 8th grade I hated it because I couldn't type many lines and would have to have help all of the time and others were faster than me and always ahead of me. But after I had it in 9th and 10th grades I eventually got used to it and now I use it for papers and other stuff.

Neither brother had any careers instruction prior to their freshman years, when each were required to take careers and both were able to utilize the computer-assisted curriculum which had been purchased by the school. Both were very enthusiastic about their use of the CIS and what it was able to do for them. Carl utilized the CIS primarily in his freshman year while Bob used it in his sophomore and senior years. Bob utilized it more in his senior year, even though he had found the resumé and interviewing activities valuable when he took careers as a sophomore:

The things we did in careers when I was a 10th grader didn't seem that important then, in fact they were boring at times. Now they seem more important because I'm looking for jobs and want to go on to school. The careers stuff (CIS) is a lot more interesting to me now, especially the school and financial aid information. I think it's because I'm planning on going to Oregon or some other school and play ball and I want to know what they're like . . . . If I would have had to look stuff up in a book I probably

wouldn't do it. The computer gives you all kinds of information in a short amount of time. I had the stuff I wanted printed out so I could read it at home. I was amazed at the amount of information you can get on anything about jobs or schools, especially the qualifications and financial aid.

Carl really liked the CIS because it was easy to use, but mainly because he was able to bring up the information quickly and there was so much of it. He searched the occupations, especially the military, and took the QUEST. He created his resumé, prepared for job interviews, and completed job simulations among other activities, in addition to completing occupational and college searches. Other than the college searches, he felt that developing a resumé with references was the most valuable activity in careers. His attitude towards the course changed from his freshman to his sophomore years:

I hated the course while I was taking it, even though I knew I needed the information and other stuff that we did. When I took it again this year I took it a lot more seriously. It helped me a lot and gave me an idea of where to get started. It was a lot quicker than looking stuff up in books, which I would have really hated. You pay more attention when it is on the computer and you can search quicker by just using the numbers. The search options are fantastic with lots of detail and information to help find more information.

Both felt that careers should be required and that the CIS on the computer is necessary to today's students because of the ease of use, amount of search areas, and the

amount of data available in a search. They each felt that the 9th or 10th grades were the best years to take careers, but that students should have access to the CIS at all times during high school. They felt that one semester of CIS would be adequate if a student already had keyboarding. They also felt that all students needed instruction in preparing resumés, applications, and application forms as well as how to prepare for an interview and how to act in a job environment. Proper manners, communication skills, how to talk to people, working in groups, and other people-related skills need to be taught during this course as it is possibly the only course in high school where all of these could be taught.

When asked what they would do to improve the CIS aspect of the instruction they both agreed that the computer could give screen prompts rather than having to rely on the handbook. They also agreed that seeing job activities and college campuses on CD-ROM would be a dramatic addition to the CIS and would help develop student interest. They felt that the availability and amount of information was exceptional for their needs and the fact that there existed addresses and phone numbers to obtain more specific information was a definite plus.

Bob and Carl discussed the advantages that using the word processor gave them when completing their resumés, application letters, and other careers and non-careers

coursework. Bob's perspective on using word-processing was as follows:

Writing longhand is a chore and I just do it until it's done and I don't rewrite unless I have to. Using the word-pro allows me to change my mistakes, use spell check and grammar check and save what I've written. I think I write more than I would if I had to write it longhand. You can edit what you write easier and that makes you want to write more and revise what you've written.

Carl agreed with Bob, but added:

Being able to see what I am writing helps me to think about other stuff to add without having to rewrite everything. I feel computers make me a better writer and with the dictionary and encyclopedia on CD-ROM, I can insert data where I need to. It makes me think more about what I am writing and I think it gives me an advantage over those who don't have computers. If I had one I would use it all of the time.

Bob and Carl felt they were fortunate to have the ability to use computers on a regular basis in addition to classes such as careers and were impressed by the capabilities of computers now, compared to when they started using them in elementary school. They see them as essential tools for students, becoming more essential in all areas of employment.

Student D: Diane

Diane is a female junior 16 years of age and has attended this school since kindergarten. Her father is a logger whose family has lived in the valley for several generations and he graduated from this school. Her mother is a school employee whose father was a career Army NCO. She attended schools in many different places, and her final enrollment was in a coastal town approximately 35 miles away from the school. Her mother moved to the valley after marriage to Diane's father.

Diane had taken the required computer courses of computer applications for grades 7-10 and careers for one year. She is currently enrolled in personal finance, in which the CIS program is used to explore college choices and occupations. She was also enrolled in advanced computer applications.

At first, it was difficult for her to expand on her perceptions, but she became more specific after she relaxed. She felt that the CIS program was very beneficial to her and that it provided a lot of information about colleges, occupations, and financial aid.

I got a lot of information about some colleges I didn't know existed. There was information about dorm costs, programs, the student body and everything. It tells you about a lot of information that is covered in their school catalogs, but it's nice because you don't have to write and get them to send you the catalogs. It also makes the information easier to read and takes less time,

which is important to me. One thing I felt was missing was a GPA requirement and grade requirements for entry.

I found out a lot about a certain college I wanted to go to in Hawaii. I found out it was real expensive, like close to \$80,000 for four years. I decided that was too much and am looking at those in the \$1500-2000 tuition range. By finding out that it was really expensive I was able to look at local colleges differently and found that many programs are very similar (although the weather isn't!!).

Diane went through the QUEST material twice, once when she first took the careers course and later when she was enrolled in personal finance. She felt that the QUEST and subsequent search of occupations was very valuable, and that she was able to see the value of the searches easily by the time she was using it for personal finance. She did question the validity of some of the search method:

I answered the questions and got back a search which said I should be a mortician!! Yuck!! That means I have to work on dead people like the science teacher. No Way!! However, the other areas were more like what I want to be, like a marine biologist or historian. They could make the search broader to include more occupations and then allow you to narrow it down within an occupational area. I guess what they have is OK, but I felt they could help you narrow it down more. If you liked what you got there was a lot of information about training, wages, etc.

When asked about how she felt about the word-processing aspects of computers, she responded favorably though she did express concern over her ability to master the keyboard. She was extremely favorable about the use of

word-processing for her coursework and the fact that she could write more with greater ease when using it.

I'm not real good at using the computer, but I'm real lazy when I write stuff and the computer makes it easier for me to write, especially with spell check and being able to change stuff. I know I'm not the best person to interview, but I guess that I know what I like and I like using the computer to get information and write.

Student E: Ed

Ed is male senior 18 years of age who has attended this school since kindergarten. His parents moved into the valley from the Portland area for the type of lifestyle it could provide. His father is a fireman in the Portland area and his mother works at the school. They have recently divorced and Ed and his brother live with their mother. He is very proficient at using the computer, in fact, he is the school's resident expert in utilizing the IBM with Microsoft software. He has had exposure to Commodore 64, Apple, and IBM technology and is currently using the new CD-ROM equipment recently purchased by the district. Ed started using computers in the third grade, then mostly for games. From about the 5th grade he began to experiment with basic programming languages for the Commodores and Apples and worked on them until he was ready to move on to another level. The school purchased IBMs and he was able to do more advanced programming, for example, of

war games and some programs for the school. Ed learned to use computers on his own, by trial and error, and seldom utilizes the manuals to help him. He values computers as an educational tool and is extremely supportive of their use by all students.

When asked if all students should have computers at home, Ed agreed that this would provide a definite advantage for them at school and later in life. He feels that the word processor is the most powerful that may be given to a student:

I use word-processing for doing all my assignments, anything that I can. I save everything and if I can use it again I will, because it helps with big projects. It helps me with my writing because when I write things handwritten, it's always messy and takes much longer to do. When I'm typing I just type it, edit it, and keep on going. A major plus is using spell check, grammar check and other utilities. Changes are so much easier since you don't have to rewrite everything, just make your changes and save them. I've been word-processing since 7th grade as it was required 7th through 10th at our school.

Ed had taken careers prior to the addition of computer-assisted CIS, but has used the CIS system during his personal finance and economics courses this year. He used the system as soon as it was installed:

When I first used it I was a sophomore and I wasn't really into it, and I thought it was just something else to do in class. However, it was kind of neat to go through and fill out all the questions to find out which career I was best suited for, and then pull up information on occu-

pations and the different colleges. It became more useful this year as I selected scholarship programs and looked up different information about the colleges I was interested in.

While on one hand he was impressed with the ability of the CIS program to supply information tailored to responses to specific questions, on the other he felt that it could provide more information rather than a general overview. Ed felt that it also needed an extensive bibliography to enable serious students to further search out information on a particular career or college as well as names of firms who employ in selected occupational areas and are willing to be contacted. He felt the QUEST search was very positive and did a pretty good job of helping him select occupational areas in broad terms and could be manipulated to be more selective.

Ed was very supportive of the search process for colleges which offered programs fitting the occupational areas he chose. There was more than an adequate amount of information about each college and he felt that it supplied good coverage of what a college had to offer, tuition and other costs, living arrangements, extracurricular activities, and other basic information. Each heading (e.g., financial aid) had places where you could write and obtain more information. He felt it would be a help if the college search could take into consideration such personal information as hobbies and such special information as proximity to the beach or skiing. Having the different programs

rated at a university on a national scale, for example, engineering, would also be a plus. He felt that though there are numbers to call and request information or applications, the scholarship information could provide more information on such criteria as community service, organizational affiliations, the number of awards offered, and the selection process.

If someone didn't have a lot of knowledge about computer applications or careers and they sat down with this program, they would be able to access lots of information about occupations, colleges, and financial aid. It could be more self-explanatory with a HELP screen which would allow you to press a number and access a function or other computer commands. For a small school such as ours it is a definite advantage to have micros with CIS. I think it kind of evens it out for the kids here because I think a lot of them are disadvantaged in some respects, not because of the school, but because of their lifestyles, with their parents and other things, they don't have a lot of positive things going for them. Anything that can give them information to help them out is an advantage.

When asked what could be done to improve the careers curriculum, Ed had several suggestions dealing with computer applications and how they could stimulate and improve learning and access to information. He felt that more visual usage of the computer would add to the curriculum. Providing a multi-media presentation incorporating CD-ROM would greatly enhance information about certain occupations and the different colleges. Providing a video (CD-ROM) on occupations and job tasks would be a definite advantage

since you could show actual working conditions and job tasks without having to do job shadowing or visitations. He also thought that a full-scale simulation on applying for and getting a job would give a person first-hand experience which could simulate the whole experience and allow them to obtain feedback about their performance at all levels.

Ed elaborated on the advantage a student possessed when provided with access to computers, especially for word processing activities.

With the technical support incorporated in the current computers, the student has help in correcting spelling and grammar mistakes and also being able to learn from those mistakes. You can save work, edit it, add to it, and it is also neater than handwritten. With CD-ROM you have access to dictionaries and encyclopedias and lots of information. If you take it further, students can have network contact with databases and experts in any field with a modem [Internet]. If you are doing a paper on rain forests, you could call Portland and hook up with Internet and contact someone in Brazil and find out first hand about it. Scanners will copy stuff right on the computer and then you can edit it or include it in what you're doing. You can get a whole bookshelf of books and things condensed on a few CDs and you don't have to file anything. You ask for information on a particular topic and you get everything you want on that topic, you don't have to go flipping through books and stuff.

The development of CD-ROM and modem access has opened a multitude of areas to students and teachers which will change education. Ed and the researcher had a lengthy discussion about the utilization of CD-ROM technology. The

topic of using CD-ROM technology for textbooks was explored and he felt that this would be a definite advantage for certain curriculum areas, such as history which could take advantage of multimedia storage and interaction features.

I think it would work real well as a part of class. It would get the student involved and when you do that, you maintain their interest. I know it can be more detailed than reading a text, seeing a movie, or listening to a lecture. You can see actual footage of an event, such as Desert Storm, which has lots of footage available. You can take a trip without leaving [home] and that would be a real advantage for geography classes, when you could see what some other part of the world looked like rather than looking at pictures or watching real old films. You can fly through the Grand Canyon as if you were in a plane and see the whole thing.

I just saw something recently on NOVA where they cut a frozen human body through both horizontally and vertically and were taking photographs millimeter by millimeter in order to accumulate an entire database of the human body. They will have a specific anatomy and be able to look at an actual 3-D picture of a human heart or whatever and be able to twist it and turn it, look at it internally, and even take pieces off. This would be extremely interesting for science classes. History would be harder as there is a lot more information to sort through for each event. Recent events would have lots of film and video, but events like the Punic Wars would not have a lot of visual images, but you could show reenactments, artifacts and such.

When you get a student involved in something, where they feel like they're doing something constructive, they tend to pay attention a lot better. With a computer you can be involved, like in science field work, but you don't have to leave. It's cheaper, a lot easier and safer. It makes the teacher's job easier, especially if each student has their own system and the teacher can access each individual and give them feedback rather than try and do something for the entire class. Each person could be self paced and yet

the teacher would know where each student was all of the time.

When asked if students had an advantage if they had computer application skills, Ed responded affirmatively and went on to state that students without computer application skills will be disadvantaged when they begin looking for jobs since the next 10 years will be very demanding in the types of skills entry level workers need to have to obtain jobs other than basic service or manual labor occupations. He felt that those who had no computer skills would not gain any positions with the possibility of future advancement. People who have the ability to fully utilize the new technology will have a definite advantage and the sooner they obtain those skills the better.

Ed felt that all students should have a careers course which allows them to access occupational, college, and financial aid information, and that computer-assisted CIS is currently the best format for that information. Additional skills such as writing resumés and application letters, interview skills, and occupationally-related activities are also essential to the course. As stated above, Ed felt that the more computer application skills students have, the better prepared for the future they will be.

## Parent F: Faith

Faith is a school employee whose daughter, Anna, is a student at the school, and who has a second marriage to a valley "old-timer." She graduated from a medium-sized school on the coast and recently moved to the valley with her husband. Her school had no organized careers curricula, nor any career activities other than visits with the guidance counselor. As a student she did not feel the need for a careers course since she had already chosen her direction in terms of an occupation and was working full time in addition to attending high school.

I left school two periods early and started working as a waitress. I moved out of my house at the end of my junior year and I had an apartment through that summer, and then through my whole senior year I lived on my own and worked at a local restaurant. And instead of my shift starting at 5, I had a job experience class and started at 2:30. It was a way of getting credit and it worked out great. I've been working ever since.

Faith felt that students of today need a comprehensive careers course which covers everything from occupational and school information to writing resumés and application letters, as well as developing interview skills, people skills, and other career-enhancing skills. She felt that students as young as the 8th grade level would benefit from part of this program, but that it should intensify when they reach high school level. The crucial time would be

about 10th grade, when they get work permits, work at jobs that don't pay much, and find out that money doesn't come easily.

I think too much has been given to kids today, too much provided. They have a higher estimation of their value right now than what they actually should. They want a high paying job right off the bat and they don't want to start at the bottom anymore, like we did.

Faith felt that rural areas needed programs such as the CIS since the kids don't get the exposure to different occupations that are available to urban students. She had many ideas about how to enhance the careers program as well as the CIS, for example, having guest speakers and visitations to job sites are activities that are essential to a good rural program. Students should do internships or job shadowing where they are on site at certain jobs, seeing what is involved and which skills are required. They could also have short term exchange programs with other schools where they could be exposed to different teachers and peers. She felt they should also go to the Employment Office and learn what is available to them.

Faith has virtually no experience with computers and yet purchased a system for her daughter because she felt it gave her an advantage in school and would be a necessary tool for her when she seeks employment.

She has really gotten into using the computer and does our business letters and other stuff. Her

grades really took off after she learned word-processing and now she helps the kids at school with some of the programs. She does most of her written homework and papers on the computer and gets upset if we interrupt her when she's doing it. I can tell she's impressed by the computer.

When the CAI-CIS system was explained to her and she saw a sample printout, she was impressed at the availability of so much data in such a small amount of time. When the full capabilities of the system were explained to her, she was enthusiastic about the potential it held for students, especially as she has two younger boys who will be using the system in less than five years.

Parents G and H: George and Helen

Helen attended this school from grade one until she graduated in 1972. Her husband, George, also attended from entry until he graduated in 1971. Their four sons currently attend the local school and are in the 12th, 10th, 6th and 3rd grades, respectively. The subjects Bob and Carl are two of their sons. Most of their extended family and friends also attended the school, as do their children. They have witnessed the many changes which have occurred at the school from the time they attended to the present.

During their school years, they were offered a very basic curriculum with few extras since funding for the school had not hit the peak years of timber revenue receipts that it was to experience from 1972 until 1991. The

secondary and elementary schools also shared staff between programs, which also reduced the amount of available electives for high school students. School took place in a building built in the early 1920s, which was not replaced by a new one until after this parental generation had graduated. The opinion they had of their teachers was mixed, with praise given to the preparation received from their English teacher to feelings of anger and frustration with respect to teachers in other areas. The math and science curriculum was always in turmoil since staff turnover was greatest in those areas. There was a consensus that what they learned in these areas was minimal, especially as preparation for any post-college programs.

When asked what preparation she had in terms of careers education or college entry, Helen responded:

They didn't do anything at all to help us about anything, either college or careers, there was nothing about college, careers, college roundups, or anything. I was really resentful, knowing how we were treated, because they did nothing other than tell us whether we would make it in smaller or bigger colleges based on our SAT scores. They gave us vocational tests when we were juniors, but we never had the PSAT or other tests to help us with the SAT.

There was no formal careers course and no guidance counseling since there was no counselor employed in the school. Both were upset about the lack of career preparation or the information they received, especially information related to college. They both felt that they would

have benefited greatly if they had just been given information about colleges. Helen related the following about her preparation for her college education:

My best friend and Joe C. were Oregon fans and helped me to get accepted to the University of Oregon; they helped me to get the application materials and fill them out. No one at school helped me in any way. I was accepted at the University of Oregon and when Mom and Dad took me to Eugene I couldn't believe how far away it was, or how different . . . to me, I thought it was at the ends of the earth. Our teams had traveled some with sports, but we never even got into Portland. I entered college sight unseen with no preparation other than from my English teacher who taught me research skills and how to write. When I first entered the U. of O. library I was in culture shock, especially compared to our little library . . . I was able to maintain a B average but after my first essay test in history, I almost flipped out, I came home and cried and almost quit right then . . . , how I pulled out I don't know, other than that I knew I was capable and had the brains. Of the seven we had in our graduating class, four went on to college. One graduated and became a nurse while another graduated just recently.

Helen emphasized that she was content with her role as a wife and mother, in addition to keeping books for the family's logging business, and that this is what she wanted to do with her life. It is hard work trying to meet all the children's schedules and being prepared for meals and events, but it is the life she prefers.

George graduated in 1971 and planned on playing professional baseball, but broke his ankle playing football for Pacific University. As a result of his injury he quit

school at the end of his first semester and never realized his dream of becoming a professional baseball player. He regrets that he didn't continue and has been working in the woods ever since. He owns his own logging company and likes to log. It is a challenge, is dangerous, and has its economic ups and downs. It is hard on the body and is not a very secure occupation. He has had opportunities to be in a primarily supervisory role, but prefers working alongside the men on the job, even though that is beginning to take its toll as the years pass.

Helen was quick to point out that the valley and the school had changed drastically since she graduated, particularly within the last 10 years. There seemed to be a greater influx of transients who had no connections to the valley, nor any interest in establishing connections. She was able to separate the newcomers into two distinct groups: 1) those who bought land away from the city and suburbs and were primarily commuters to the Portland area and 2) those who were definitely out to take advantage of the system and were not necessarily positive additions to the valley or to the school. In either case, there did not seem to be positive feelings toward the contributions that either group would provide to the existing "valley" culture.

In the case of those who see the valley as a bedroom community, both felt that these residents were trying to instill their life styles and philosophies on the existing

educational system, frequently in opposition to the will of the older valley residents. They felt that this particular philosophical differentiation has led to many changes in the educational system which, at times, have been difficult to accept since the new residents favor more "progressive" educational approaches in comparison to older, traditional approaches. In summary, it is probably more accurate to say that they are suspicious of new ideas which are not proven to their satisfaction and possibly envious that what is available to students today was not available to them, especially when it could have been made available to them.

Their attitude towards those who have come to the valley to take advantage of cheap rent, avoid the law, or for other not necessarily positive reasons was less than complimentary. They felt that the drug problems and some of the behavioral problems at school were directly attributable to this group.

There was some criticism of teachers and what they perceived to be the role of teachers versus the roles teachers had assumed in the years following their graduation. There was expressed criticism of the reluctance of current teachers to involve themselves in the community and to commit themselves and extracurricular time to the community and the school. They did not express any sympathy for the fact that these teachers had families and lives of their own and were not to be compensated for these extracurricular hours. This was simply part of the job.

Helen also noted that her son Bob had a definite advantage when he transferred to another school because of the access to computers he had at the local school. However, she did not note the extent to which this observation contradicted her previous statements about progressive ideas and their place in the school. In addition to feeling that Bob had privileges not accorded to others, she seemed to express the opinion that having the advantage of computer access was a sign of how spoiled the teachers and the newcomers to the community have become and of their lack of willingness to sacrifice, especially the teachers, whose salary had increased dramatically and who weren't willing to do anything that was not contractual. Helen related:

The teachers have never had any desire to work together with the community. They saw the school as a stepping stone to moving on to a better position in the 70s, and now they have no inclination to move on because they are better paid than most teachers in the state. The kids say it is hard to get a good grade here and you can't slide through the cracks. Teachers need to help the kids out more and be more understanding. Teachers are there for the money and won't go to activities unless it's in the contract.

The one area they had mixed feeling about, but were pleased with, was the availability of computers and the access their children had from an early age. Both perceived the importance of computers to society, but had reservations about their use and, more importantly, their misuse.

Helen knew that computers were essential to society and felt that they were a great educational tool. However, she still have mixed feelings about computer technology:

Nobody has privacy anymore; your life is an open book. I feel privacy is more important than information. Computers are impersonal, your life is taken over by a machine. A lot of things I had to learn in school, a computer does for you now. You wonder what people could do without a computer. It is important that today's students know all they can about computers and also learn how to use them for their own benefit.

George was even more adamant about the role computers should play in school and otherwise, though he accepted their necessity only with reluctance:

Computers should play a smaller role in schools than they do as they are doing more of the work for students. I'm a real computer hater as they make mistakes which affect our business and have cost me a lot of money. Students need to know how to use them, be aware of them, and be familiar with them. Most jobs require them, but I hope they don't rely on them to do their thinking for them as they need a good educational foundation, especially in math fundamentals and in reading.

Both George and Helen have definite ideas about what skills and information students should be able to access prior to leaving high school. Students should be able to handle budgets, personal life skills, and have the ability to compile a resumé, search and apply for jobs, interview effectively, and to present themselves both in writing and orally. They felt the ability to access information

quickly and easily was a definite advantage and one they wished they had when they were in school.

They feel that careers should begin in the 6th grade with basic information about occupations and education and then gradually narrow the focus in subsequent years, until the students were actively preparing for occupations or post-secondary education. The fact that much of this information is currently contained within computer programs impressed them and elicited their support for utilizing computers as databases for students. Both felt that all students should visit job sites and see what the different occupations were like and even have guest speakers so that students would have maximum exposure to different occupations. A careers course should be required of all students which would include occupational information, testing, information searches, college information, financial aid information, and the development of resumés, interviewing skills, and communication skills as well as the ability to fill out applications and other job-related forms.

Both have encouraged their children to work as soon as possible and have exposure to as many different jobs as possible. Neither one felt that a logging occupation was a positive choice, though their livelihood was tied to logging, and they have deliberately exposed their children to all the negatives about a logging career. Their two oldest children have worked in the woods, however Bob has expressed a definite lack of interest in pursuing this par-

ticular career. These parents did not want to impose their occupational preferences on their children and preferred them to choose their own paths.

Parent I: Ingrid

Subject I (Ingrid) is Ed's mother, the single parent of two boys who works at the school. Computers are an essential tool in her position and she has definite ideas about their use and potential. She graduated in 1970 from a large urban high school which did not have a careers curriculum or any type of computer. The class which was closest in approach was called business office practices, covered primarily business careers. There were counselors to whom students were assigned that handled guidance and scheduling. She felt very fortunate in that she was able to make contact with a counselor who was instrumental in helping her with career choices:

Actually, I was very fortunate, my freshman year I met up with a very good counselor—it wasn't the one that had been assigned to me, but I think that we had a careers fair or a careers night at the school and I knew that this woman was really good. One of my sisters had her as a counselor, and I knew she was very career minded, especially for women. She was right at the front edge of that movement for trying to get girls to look at or see that it was important that they look at something past high school for themselves, other than just getting married. So I went and I talked to her and asked her . . . a few questions about what I wanted to do after high school and what I should do or what kind of classes I should

take. She met with me at school and asked me what my interests were and what I wanted to do and I told her that I wasn't sure, that I either wanted to teach or I wanted to do something in secretarial or business field. At that time, secretarial work was pretty much what girls went into if they were interested in the business field. And she mapped out a plan for me for my four years of high school—what I should take—so that I could go either direction. And, that's exactly what I did. I followed exactly what she told me to do. She told me every year the classes I needed to take as far as what was being offered then at Roosevelt, and that by doing that when I got to my senior year I would be able to apply either to a liberal arts college or to a business college. I would be well on my way to doing that. And it worked really well for me.

She attended Linfield and did quite well, qualifying as an Oregon Scholar. She achieved a 3.3 the first semester, but met her future husband and decided to enroll in Northwestern College of Business in the executive secretary course, which she completed three months ahead of schedule, a feat she attributes to the training she had in high school and the counselor who helped her.

At the Business College she had a class on computer education, but had no computer experience as they were large mainframes and the course was primarily about basic computer languages, understanding their working principles, etc. At the time it was not interesting to her since the primary tools of business were typewriters and adding machines and even hand-held calculators weren't yet available. She first started using the computer six years ago when she was able to take classes through the school, and

though she was a little afraid of computers at first. Once she was able to master the necessary techniques, she was impressed with the amount of time and energy computers saved and the fact that she could reach the final product sooner and be able to use her intellect in addition to her skills to achieve the final product.

She was familiar with the CAI-CIS program from its inception at the local school since her son was involved with it from the beginning, brought printouts home, and discussed it at length. She was emphatic about requiring careers at the high school level and what it should entail:

Well, I think it needs to cover the different types of careers available, [and] what type of education you need at the different levels to prepare you for those different types of careers. Meaning, I'd say even middle school level, just the beginnings, just thinking about it. I think something like that where you could do a brief survey with the 7th and 8th grade and then in the high school discussing the different options that are available to them. Because a lot of it can overlap on what you would be interested in doing, what you need to take for courses in high school. I see it as an opportunity for them to see what's available to them, what's out there, and maybe make a choice realizing that they might change it somewhere down along the road, but have a direction in their life and get some training to do it. I don't think we have the luxury anymore to just flounder around and put in time saying well, I learned my ABC's and my 1,2,3's, and here I am, now what do I do? There's too much competition in the world market for that. Because if you don't know those choices that are out there, how are you ever going to decide?

I think computers can cover a lot of it myself, because I'm impressed with computers, especially now with the CD ROMs. I think that for an area like curs—because we are limited geographi-

cally, because we don't have a lot of business surrounding us—that the computer can open a lot of worlds for our kids. To me it's unlimited. I think it's exciting. I told the business teacher the other day that if I were her, I would be asking for the world from this school district for her programs. Because that's where the future is and she can do it. She has the ability to see something happen here that can impact these kids that a lot of other things are not going to be able to do. And it can be done relatively inexpensively, considering the size of the school. When you think of the potential that is there, these people out here, so many of them don't know about the computer industry and where it's going, but there's enough of them that know that this is where it's going.

When Ingrid was asked what skills and information a student should have when they exit a careers program, she stated that they should know how to operate a computer, which should be integrated with word-processing. They should have basic communication skills, how to address people, make a simple introduction, answer a phone, take a message, and other simple business protocols. They should know how to develop an effective resumé and how to apply and interview for a job.

When she was asked about the role of computers in education she was effusive about their use and potential:

Well, there again, I'm sold on computers. I think they're fantastic. I think they should be used in every aspect of education. I have seen the difference. Personally I've seen the difference it's made in my children's education. Ed went from a struggling student, grade-wise, because he struggled with the actual physical limitations of having to write what he was thinking [fine-motor skills]. In that way, now when you're talking about gender things, and boys at

certain ages and their abilities to write and use fine-motor skills, I felt the computer was just a wonderful aide to Ed because he is an intelligent boy. He had what he needed in his mind, but he didn't have the fine motor skills to put it down on paper for somebody else to understand. And as a result it was a very frustrating experience for him because he couldn't communicate what he wanted to on paper, and he didn't want to because it was frustrating, and his teachers weren't able to see what he was learning, he wasn't able to show them that, so therefore, they had no other choice but to grade him low according to that. Because that was all they had to go by. But once he was able to use the computer, the computer thought fast enough, that he could get those thoughts out and not be frustrated. There again, to me that was a good reason, I was very happy that he had keyboarding at a young age—I think it could have been younger. Because he could have learned so much more at the younger years. I don't think the school has near explored what they could do in math with computers. We haven't even touched it. We've done the word processing. And we're working on that and I think we've made some good progress in that, but I'm still disappointed to not see it in the lower grades, especially 5th and 6th grades, at the very least. Those kids are starting to do essays and papers and things where they're putting a lot of thoughts together and having to express themselves. It just made a world of difference for Bob. He went from a C student to an A student as a result of using the computer.

Many in the community are afraid of computers. They don't understand them. They think that they have to be a brain to understand them, to be able to operate them. Computers are very easy to understand. They're very easy to get into. I mean, the world's the limit—you can do anything that you want. But, anybody can do the very basics on it and the computer can do a lot for them as a result of it. But I think people don't understand it, they're afraid of that. That's another thing that I've thought could be good. I've thought it would be great to involve the community more, especially parents, in our computer education. People need to be exposed to it and see what's available and I think once they see what it can do, they'll be just excited and

realize that for a small, geographically isolated school, that those computers can open up the world, literally. We can communicate with the world through those computers. It's to me just mind boggling, in just 10 years time, where we've come to. The sky's the limit. We can do anything. And all we need is the phone lines and the hardware to do it.

Parents J and K: Jake and Kay

Jake was born and raised in the valley, graduated from school there, and has worked as a logger for his entire career. He has suffered some rather extensive injuries as a logger, at times being close to death. He is well read and has an ardent interest in history and current events. Many of his views are progressive in nature, especially as regards education, and he strongly supports the use of technology in schools. Jake has no working knowledge of the computer, but he grasps the significance it has in today's world. Kay is an employee of the district and uses computer technology on a daily basis. Her father was career Army, thus she traveled extensively and was exposed to many different cultures and environments. She graduated from a coastal high school, met and married Jake, then moved to the valley to raise their children.

When Jake and Kay were asked to reflect about the changes in the valley and school in the past decade, they both commented on the fact that there was an infusion of people from other areas and that it had affected the school in significant ways. Jake related:

For many years while I was going to school and afterward there wasn't much change in the valley or the school. Most everybody earned their living from the woods and the school was the focal point for the valley because there was no town. School didn't offer much more than the basics up until the last 10 years or so. We didn't have many electives and there were no counselors for college. I wasn't going to go to college so I didn't worry about whether a counselor could help me or not. We didn't have a course called careers or any instruction in careers. At this time (late 1950s) there wasn't much of a push to educate us about careers since we knew what we were going to do anyway, especially if we were male. We would work in the woods like our dads and friends.

The school has really changed a lot in the last 10 to 15 years, but not just because we have had new people move into the valley. One of the main reasons it has changed is that the timber revenue provided a lot of money in a short time. They were able to replace the school I attended with a new school and to hire more teachers and provide computers and other technology to the students. They also had teachers who wanted to follow new ideas. A lot of the valley people want the school to return to the way it was when they went to school, but they forget the bad stuff and the fact we didn't have any choices. The main thing that holds the school back is the attitudes of the valley people.

They both felt that the newcomers to the valley came from two different backgrounds, those who were middle to upper middle class and looking for a home outside of the metropolitan area, and those who were hiding out or running away because the rents were lower and there was no police presence. The newcomers have brought changes in the school which both felt were for the better, especially as regards elementary programs and technology. They both felt that

the other group has led to a decline in the quality of life and an increase in drug usage and other negative factors in the school and the valley.

In many respects, they liked the closeness of the valley some 15 years ago, but they also disliked the insular, prejudiced attitudes they encountered. Kay remarked that she is still not considered a valley person, though she has lived here for over 17 years and is married to a valley person. She feels that these attitudes have negatively influenced the direction the school has taken recently as there is almost a backlash against the outsiders by a predominantly "valley" oriented school board.

Kay has worked at the school for several years as an assistant cook, Chapter I aide, and last as a discipline aide and satellite course facilitator. In the last two capacities she has used a computer on a daily basis and is familiar with all aspect of word-processing, spreadsheets and databases. She had nothing but praise for computers:

I knew when I got to use my first computer to do word-processing that I was hooked and I'm really hooked now that I have an IBM-386 with all sorts of capabilities. I use it all the time in my job and would be lost without it. I can store data and edit stuff really fast and feel that all students should have total access to computers all of the time. I've noticed that Diane has really improved her writing skills since she has had access to computers in school.

I was really glad when the school made computer applications mandatory in the 7th through 10th grades. It meant that students would have to use computers and they would be available.

Computers are here to stay and are the wave of the future. Kids need to know how to use them and the earlier the better.

Teacher L: Lois

Careers as a course was not available to Lois when she was in secondary school, but rather the guidance counselor provided information about colleges and training programs. She had already decided very early that she was going to college and was more interested in selecting colleges than in exploring career options. As she attended high school in the 1960s, there were very few schools which had implemented any form of a careers curriculum. Lois stated that much of the career information she received was from the teachers of subjects she was interested in and further added:

When I was in school an individual who was really dedicated would go out and find their own information. That happens less and less nowadays and unless the information is given to students, then they aren't going to look until it's too late. Competition has become quite a bit more intense for jobs so they need to know at an earlier time in their life how to look for jobs, get jobs, and keep a job. The mobility of our culture and the change from an industrial job base where people would stay in a job for their lifetime has changed to an information society, with people having over three career changes in their lifetime. Well, the world has become smaller, I mean, in Kelso, Washington in the 1960s, who cared what was happening in Japan or California and now it's really affecting jobs here.

Lois had no formal training in careers while in college, but as a teacher at private vocational colleges, including Trend and Pioneer Pacific, she worked with people in skill development classes and placement. This experience was to be essential as she not only became the business teacher, but also the careers, economics, personal finance and French teacher at this school. The one advantage she has enjoyed during her tenure here is a computer lab of IBM computers, which were installed with the CIS software, enabling users to access occupational, college, financial aid, and other career-oriented information. She was able to combine her vocational college experience with the existing CAI-CIS and develop a comprehensive careers curriculum. After her first year of using the CIS in combination with other activities, she had developed definite perceptions as to its effectiveness and some ideas as to the developmental directions she intended for the entire program. She stated:

I think from what we did this year, if they participated and if they listened, and if they tried, and if they will stop and reflect about what they have learned, they should know how to develop the resumé, how to interview, know what types of things to avoid and the attitude behind what you are trying to accomplish when you are interviewing. I tried to stress that it's not a game, per se, although there are game elements in interviewing, but if you're going out to interview your goal is to get the best job you like for the most amount of money. But the person interviewing you does not have the same goals. They want to get the person who will do the best

for their company for the least amount of money. Something has to coincide, to be able to get the job and to keep it. That's what I think they should know how to do, how to start looking for a job and for a school, if that's what they are going for, because they are either going to leave this school and look for a job or go on to another school.

The CIS program offers a complete careers curriculum which extends beyond the information-based, computer-assisted software, and includes 12 complete units of supplemental instruction composed of worksheets, lessons, simulation models, and other related materials designed to assist teachers in developing a comprehensive careers curriculum. Lois utilized the CAI program, much of the supplemental materials, materials she designed, and lessons she prepared which took advantage of her expertise and experience in teaching at Trend and Pioneer Pacific College. She utilizes the CAI aspect of the CIS curriculum to provide an informational base for students on occupations, schooling available, college programs, costs, and financial aid. When asked how she utilized the CIS, she replied:

The first thing I do is have them complete the QUEST, which asks them interest questions about the type of things they like to do and the skills they feel are important to them. They enter these answers on the computer and it begins a search of occupations and selects the different occupations suited to their QUEST. Then they were directed to gather certain types of information about different QUEST-selected careers as well as other related occupational areas and complete a report. The report utilized information they were required to obtain from CIS as well as other sources available in the library and

through state agencies. This included information on required schooling, selection of schools, costs, and financial aid.

When asked what she felt they perceived as interesting or meaningful in this particular CIS activity, she related:

They liked being able to categorize skills and prioritize what was more meaningful to them. And, even though at first I got some complaints that it was boring or dumb, or whatever, I think that as we went through the process and put it into the computer, and then came out with what kind of personality, per se, each of these individuals are, I think some of them felt . . . , yeah, I agree with that, or . . . I'm surprised at that . . . , but they were all kind of interested in their results. I thought it was interesting to see the differences in what they felt were important. The other thing that was very interesting was the school sort after they got to the point where they wanted to look for a program and they put in the variables about whether or not they wanted an associates degree or whether they wanted a bachelor's degree, whether they wanted in the Pacific Coast or if they wanted anywhere in the United States or whatever, and how that made a difference in what schools came up and then what kinds of tuition and the comparisons and the fact that you could compare three schools together. A lot of them were very interested about what they were going to do outside of school and utilized it as an information gathering tool. Some showed appreciation that they didn't have to look the information up in books.

Lois expressed total support for the use of the CAI-CIS program and the capabilities available to all the users of the system. The combination of CAI, supplemental worksheets and other materials, simulations and other activities enabled her to offer a curriculum which was comprehen-

sive in scope and yet very adaptable on an individual level. She had no reservations at all about the curriculum and the capabilities of the computer instruction, but had suggestions to offer about how to improve different aspects of the computer instruction. She felt that they should have a help screen which would include all the commands and allow you to access all aspects of the program more easily. She would add more traditional job search activities with juniors and seniors, focused on areas more specific to their needs. However, she felt that younger students (i.e., grades 6 through 8) should be introduced to the program so that they will benefit from the maturing process and be able to make more informed choices. The best vehicle for this introduction would be through a required word processing course for middle school students which could be used to instruct students in how to use the program and yet allow exploration in the various aspects of the CIS program.

## CHAPTER V

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Summary

All five of the students had computer instruction which included keyboarding, word-processing, spreadsheets, databases, and careers instruction. These courses were mandatory for all 7th through 10th grade students at this school. Anna, Diane and Ed were taking or had taken advanced computer applications, which includes further training in word processing, business, and technological applications. Ed has pursued courses in Visual Basic and Pascal and will study engineering and computer science at OSU. Anna and Ed both have IBM computer systems at home and utilize them on a regular basis. Of the parents, only Ingrid and Kay had any experience utilizing computers and both used them on a daily basis in their occupations. The teacher not only had access to computers in her class, but had a sophisticated system at home which she used on a regular basis.

Working Hypothesis One

- 1) Students who have access to computers on a regular basis and are provided with training will be comfortable and enthusiastic about their use.

One significant factor about computer usage which emerged following analysis of the data was that those who had access to computers on a regular basis and were provided with training were the most comfortable with them and were extremely enthusiastic about their use and capabilities. The students and the two parents who used computers had difficulty when they began to learn how to use them. However, when they learned how to use them they found them to be valuable tools. On the other hand, Faith, George and Helen had had little or no experience with computers and exhibited the most uncertainty and even dislike toward computers, though they deemed them as necessary for their children's success.

Nobody has privacy anymore; your life is an open book. . . . Computers are impersonal, your life is taken over by a machine. A lot of things I had to learn in school, a computer does for you now. You wonder what people could do without a computer. It is important that today's students know all they can about computers and also learn how to use them for their own benefit. [Helen]

Many in the community are afraid of computers. They don't understand them. They think that they have to be a brain to understand them, to be able to operate them. Computers are very easy to understand. They're very easy to get into. I mean, the world's the limit—you can do anything that you want. But, anybody can do the very basics on it and the computer can do a lot for them as a result of it. But I think people don't understand it, they're afraid of that. That's another thing that I've thought could be good. I've thought it would be great to involve the community more, especially parents, in our computer education. People need to be exposed to it and see what's available and I think once they

see what it can do, they'll be just excited and realize that for a small, geographically isolated school, that those computers can open up the world, literally. We can communicate with the world through those computers. It's to me just mind boggling, in just 10 years time, where we've come to. [Ingrid]

### Working Hypothesis Two

- 2) Computers are an essential information and communication tool whose access and use by students gives them an advantage in school and later in life.

The use of the computer as an essential information and communication tool for students and society as a whole was strongly supported by all of the students, the teacher, and all but one of the parents in this study. Computer use by students included word-processing and full-scale editing, databases, spreadsheets, information saving and retrieval, business applications, computer-assisted drafting, and computer-assisted instruction.

With the technical support incorporated in the current computers, the student has help in correcting spelling and grammar mistakes and also being able to learn from those mistakes. You can save work, edit it, add to it, and it is also neater than handwritten. With CD-ROM you have access to dictionaries and encyclopedias and lots of information. If you take it further, students can have network contact with databases and experts in any field with a modem [Internet]. If you are doing a paper on rain forests, you could call Portland and hook up with Internet and contact someone in Brazil and find out first hand about it. Scanners will copy stuff right on the

computer and then you can edit it or include it in what you're doing. You can get a whole bookshelf of books and things condensed on a few CDs and you don't have to file anything. You ask for information on a particular topic and you get everything you want on that topic, you don't have to go flipping through books and stuff. [Ed]

### Working Hypothesis Three

- 3) Students feel the use of the computer for word processing and publishing is significant in that it enables them to be better and more creative writers.

All of the regular computer users in the study were unanimous in their acclaim for the ability of the computer to process and publish their writing and other data, enabling them to be more effective writers. The capability of the computer to store and retrieve data as well as its ability to manipulate the data already stored has allowed these students to access information and complete projects not possible until just recently due to time and technology constraints.

I feel more confident when I use a computer as I can tell it what to write and it will write it. I can find information easily, it saves time . . . . It helps me to think, especially when I am writing an assignment . . . . Most of the kids feel the same way about using the computer for writing and finding information and would use it more if they had more access. With CD-ROM, it has become more interesting as you can see pictures on the computer with description. [Anna]

I think [CD-ROM] would work real well as a part of class. It would get the student involved and when you do that, you maintain their interest. I know it can be more detailed than reading a text, seeing a movie, or listening to a lecture. You can see actual footage of an event, such as Desert Storm, which has lots of footage available. You can take a trip without leaving [home] and that would be a real advantage for geography classes, when you could see what some other part of the world looked like rather than looking at pictures or watching real old films. You can fly through the Grand Canyon as if you were in a plane and see the whole thing.

I just saw something recently on NOVA where they cut a frozen human body through both horizontally and vertically and were taking photographs millimeter by millimeter in order to accumulate an entire database of the human body. They will have a specific anatomy and be able to look at an actual 3-D picture of a human heart or whatever and be able to twist it and turn it, look at it internally, and even take pieces off. This would be extremely interesting for science classes. History would be harder as there is a lot more information to sort through for each event. Recent events would have lots of film and video, but events like the Punic Wars would not have a lot of visual images, but you could show reenactments, artifacts and such.

When you get a student involved in something, where they feel like they're doing something constructive, they tend to pay attention a lot better. With a computer you can be involved, like in science field work, but you don't have to leave. It's cheaper, a lot easier and safer. It makes the teacher's job easier, especially if each student has their own system and the teacher can access each individual and give them feedback rather than try and do something for the entire class. Each person could be self paced and yet the teacher would know where each student was all of the time. [Ed]

Working Hypothesis Four

- 4) The computer is an educational tool which should be utilized in all areas of the curriculum.

All but one of the parents (George) were convinced that computers had proven to be advantageous to their children and would be essential to their future occupations. They were also very pleased that their children had access to computers on a daily basis and two of them had purchased systems for them to use at home.

She has really gotten into using the computer and does our business letters and other stuff. Her grades really took off after she learned word-processing and now she helps the kids at school with some of the programs. She does most of her written homework and papers on the computer and gets upset if we interrupt her when she's doing it. I can tell she's impressed by the computer. [Faith]

I'm sold on computers. I think they're fantastic. I think they should be used in every aspect of education. . . . Personally I've seen the difference it's made in my children's education. Ed went from a struggling student, grade-wise, because he struggled with the actual physical limitations of having to write what he was thinking [fine-motor skills]. . . . He had what he needed in his mind, but he didn't have the fine motor skills to put it down on paper for somebody else to understand. And as a result it was a very frustrating experience for him because he couldn't communicate what he wanted to on paper . . . . Once he was able to use the computer . . . he could get those thoughts out and not be frustrated. [Ingrid]

I knew when I got to use my first computer to do word-processing that I was hooked and I'm really hooked now that I have an IBM-386 with all sorts

of capabilities. I use it all the time in my job and would be lost without it. I can store data and edit stuff really fast and feel that all students should have total access to computers all of the time. I've noticed that Diane has really improved her writing skills since she has had access to computers in school.

I was really glad when the school made computer applications mandatory in the 7th through 10th grades. It meant that students would have to use computers and they would be available. Computers are here to stay and are the wave of the future. Kids need to know how to use them and the earlier the better. [Kay]

The consensus of all but one of the participants (George) was that knowledge of computer applications and the ability to use a computer gave students an advantage while they are still in school. It would also be an essential skill in their careers, regardless of the occupation they choose. They feel it is important for students to have full access to current computer technology. They also feel it is very important that training in using computers begin at an early age and that all students have access to that training.

One parent responded negatively regarding many areas of computer usage in schools and in society. However, he agreed that students needed to know how to use them and be familiar with their capability.

Computers should play a smaller role in schools than they do as they are doing more of the work for students. I'm a real computer hater as they make mistakes which affect our business and have cost me a lot of money. Students need to know how to use them, be aware of them, and be familiar with them. Most jobs require them, but I

hope they don't rely on them to do their thinking for them as they need a good educational foundation, especially in math fundamentals and in reading. [George]

The use of the computer for word-processing and all of its related functions is the primary utility of the computer at the high school level. Computer-assisted instruction in certain curricular areas and the Career Information System are areas which seem to have a substantial amount of utilization, but the area which sees the most computer use is that of word-processing. This area draws the most acclaim and positive response from the students as they feel that the word-processing capability allows them to be better and more creative writers. Internal spell check, dictionary, thesaurus, encyclopedia, and the ability to save data, edit it, copy or delete, and to manipulate it in a myriad number of ways, it is no wonder that they are so enthusiastic about what it allows them to do when writing, especially when compared to what students had available to them previous to computers, that is, typewriters, whiteout, and rewriting.

I like to write with the computer because I can change my mistakes and save stuff. It's also easier and faster to use the computer than to write by hand, which gets tiring. I can use the spell checker and the thesaurus to help my sentences look better, which is important to me . . . . I feel that I have started writing more since I learned to use the computer and what I am writing has gotten better. [Anna]

Writing longhand is a chore and I just do it until it's done and I don't rewrite unless I have to. Using the word-pro allows me to change my mistakes, use spell check and grammar check and save what I've written. I think I write more than I would if I had to write it longhand. You can edit what you write easier and that makes you want to write more and revise what you've written. [Bob]

Being able to see what I am writing helps me to think about other stuff to add without having to rewrite everything. I feel computers make me a better writer and with the dictionary and encyclopedia on CD-ROM, I can insert data where I need to. It makes me think more about what I am writing and I think it gives me an advantage over those who don't have computers. If I had one I would use it all of the time. [Carl]

I'm not real good at using the computer, but I'm real lazy when I write stuff and the computer makes it easier for me to write, especially with spell check and being able to change stuff. . . . I like using the computer to get information and write. [Diane]

I use word-processing for doing all my assignments, anything that I can. I save everything and if I can use it again I will, because it helps with big projects. It helps me with my writing because when I write things handwritten, it's always messy and takes much longer to do. When I'm typing I just type it, edit it, and keep on going. A major plus is using spell check, grammar check and other utilities. Changes are so much easier since you don't have to rewrite everything, just make your changes and save them. [Ed]

The data suggests that computers with full functions for word-processing, spreadsheets, databases, and storage and retrieval are becoming essential tools for students. Students who have regular access to computers are able to demonstrate proficient use and find them an invaluable tool

for completing work and searching for information. The parents agreed that the computer is becoming an essential tool for students and that their students will have an advantage in school and work if they have the ability to operate computers proficiently.

#### Working Hypothesis Five

- 5) Careers curriculum is essential and enhanced by the use of CAI for accessing information and providing search and other functions.

Only the students and the teacher in this study had any experience with the computer-assisted Career Information System curriculum. The parents were aware that the program was in use, but were not aware that it utilized the computer. The student response to the program varied from total enthusiasm about its capabilities to a semblance of bored acceptance. However, the two students who had the most background, experience, and access to computers were the most enthusiastic about the CIS and perceived the potential uses of the program. The teacher was extremely enthusiastic about the program and wholeheartedly endorsed it as a curricular tool.

All of the students felt that the CIS was extremely easy to use, especially for a first time user with little or no computer experience. The CIS is menu driven, flows from question to question, and posed no problems for these

students. They felt that this was a key point for a program such as this and even offered the suggestion that having more information on the screen would make it even more user friendly. All the students mentioned that ease of use kept them interested in searching for information and that they probably wouldn't have expended much effort at all if they would have had to obtain the information from books.

I like it a lot. It's really helpful and easy to use. It can give you information about any school that you want, the tuition, location, number of students. It also gives you lots of information about jobs and training. I can't imagine doing it out of books because I don't think I'd find out as much information. I mean, it would take longer and this is just type it in and print it out if you want to. I just like all the information that it gave you and that there was so much of it. [Anna]

If I would have had to look stuff up in a book I probably wouldn't do it. The computer gives you all kinds of information in a short amount of time. I had the stuff I wanted printed out so I could read it at home. [Bob]

It was a lot quicker than looking stuff up in books, which I would have really hated. [Carl]

Students were impressed with the amount of information available about occupations, colleges, and financial aid, and the speed with which it was accessed. The normal college printout was from three to five pages and covered all aspects of college from costs to programs to living groups. The availability of information about colleges which were not their normal selections (i.e., Oregon and Washington

colleges) surprised some of the students and allowed them to expand their horizons, so to speak.

I got a lot of information about some colleges I didn't know existed. There was information about dorm costs, programs, the student body and everything. It tells you about a lot of information that is covered in their school catalogs, but it's nice because you don't have to write and get them to send you the catalogs. It also makes the information easier to read and takes less time, which is important to me. One thing I felt was missing was a GPA requirement and grade requirements for entry.

I found out a lot about a certain college I wanted to go to in Hawaii. I found out it was real expensive, like close to \$80,000 for four years. I decided that was too much and am looking at those in the \$1500-2000 tuition range. By finding out that it was really expensive I was able to look at local colleges differently and found that many programs are very similar (although the weather isn't!!). [Diane]

The search function of CIS met with mixed reviews due to the responses students received after they completed certain sections of the QUEST. The occupational search elicited more discussion than the college search, primarily because of the occupations selected by the individual rather than the type, quality, or amount of information generated. Overall, the students were impressed with the ability of the program to supply information tailored to responses to specific QUEST search questions, but also felt that more specific information could be provided about occupations and colleges.

The careers stuff (CIS) is a lot more interesting to me now, especially the school and financial aid information. I think it's because I'm planning on going to Oregon or some other school and play ball and I want to know what they're like . . . I was amazed at the amount of information you can get on anything about jobs or schools, especially the qualifications and financial aid.  
[Bob]

The two senior students, Bob and Ed, the value of the attributes of ease of access, speed, and amount and type of information provided by the CIS. They were able to access any aspect of the search and pull up information about colleges and scholarship programs since both are interested in pursuing a college education. Neither were enthusiastic about the course when they took it as sophomores, but once they began to need the information the system has proven invaluable. Anna perceived the value almost immediately and increased her use of the system as she began to make decisions about college programs and scholarships. Diane still had mixed feelings, though in the near future she needed to make some college choices, and found some interesting information about some of her choices. Carl was negative at first, but warmed to the CIS after he became more familiar with it.

The teacher, Lois, was extremely supportive of the entire computer-based CIS program and had utilized it fully since the district purchased the program. She felt that the CAI-CIS made a difference for rural students since they did not have the same resources available to them that stu-

dents from larger, urban or suburban schools did, especially as regards occupational and college information.

They liked being able to categorize skills and prioritize what was more meaningful to them. And, even though at first I got some complaints that it was boring or dumb, or whatever, I think that as we went through the process and put it into the computer, and then came out with what kind of personality, per se, each of these individuals are, I think some of them felt . . . , yeah, I agree with that, or . . . I'm surprised at that . . . , but they were all kind of interested in their results. I thought it was interesting to see the differences in what they felt were important. The other thing that was very interesting was the school sort after they got to the point where they wanted to look for a program and they put in the variables about whether or not they wanted an associates degree or whether they wanted a bachelor's degree, whether they wanted in the Pacific Coast or if they wanted anywhere in the United States or whatever, and how that made a difference in what schools came up and then what kinds of tuition and the comparisons and the fact that you could compare three schools together. A lot of them were very interested about what they were going to do outside of school and utilized it as an information gathering tool. Some showed appreciation that they didn't have to look the information up in books. [Lois]

Students found the CAI-CIS an invaluable tool with which to search occupational and college information and were impressed by the amount of information generated in a short time about specific occupational areas and colleges. They felt that this tool should be available to all students throughout their secondary schooling.

All the participants in the study agreed that a comprehensive careers course was necessary and should be re-

quired for all students prior to graduation. They also agreed that the curriculum should include aptitude and interest assessments, occupational and post-secondary programs, and essential paperwork such as applications and résumés. The teacher and the students all agreed that the computer-assisted CIS program should definitely be an integral part of any careers curricula.

Enhancing the CIS with the addition of CD-ROM technology would allow students to actually see the type of work they would be doing in a certain occupation and "visit" a college campus. Utilizing the CD-ROM would allow a student to "job shadow" without having to actually be on the job site, which would be a definite advantage when occupations are extremely dangerous. It would also be a distinct advantage to rural students who have the least amount of access to a variety of occupational areas. When you expand CD-ROM use to exploring colleges, a student could "visit" the campus, be involved in curricular and extra-curricular activities, and experience the campus without being there.

I think computers can cover a lot of it myself, because I'm impressed with computers, especially now with the CD ROMs . . . for an area like ours—because we are limited geographically, because we don't have a lot of business surrounding us—that the computer can open a lot of worlds for our kids. To me it's unlimited. I think it's exciting. [Ingrid]

Development of a résumé, filling out application forms, drafting application letters, and other job search

skills are areas all participants felt were essential for any careers curricula. All of the participants agreed that simulations involving interviewing are a necessary activity for careers. Several parents mentioned that students also needed to develop communication and "people" skills and that these were just as essential to success in an occupation as any of the other skills they should learn in school.

The students felt that careers should be introduced at the 7th or 8th grade levels, but not later than the 9th, and be fully developed as a required high school course.

Some kids want to start planning their life now and CIS helps them. Many 7th and 8th graders would take it seriously, although not all of them would like the additional stuff like the resumés, interviewing, and other things . . . . 8th graders should be required to take a half year and 9th graders a full year. I think they would really benefit by it and then it should be made available to students to use any time they want.  
[Anna]

The parents, on the other hand, felt that careers should be introduced at the 5th or 6th grade levels and be covered more thoroughly in high school, but be an ongoing process for high school students. One reason which supports early introduction of careers and full involvement during high school might be the fact that none of the parent participants had any formalized careers course or training. For the most part they expressed disappointment that they were not afforded any opportunity to explore careers or

college programs and that the opportunity to do so might have made a difference in their life directions.

They didn't do anything at all to help us about anything, either college or careers, there was nothing about college, careers, college roundups, or anything. I was really resentful, knowing how we were treated, because they did nothing other than tell us whether we would make it in smaller or bigger colleges based on our SAT scores. They gave us vocational tests when we were juniors, but we never had the PSAT or other tests to help us with the SAT. [Helen]

### Conclusions

The results of this research suggested that a required careers curriculum is essential to all secondary students and should be comprehensive in scope. The results further suggested that computers are becoming an essential educational and informational tool for students and that a computer-assisted careers program will prove to be an invaluable tool for students. Access to computers on a regular basis and training in their use are essential components to the effective use of computers as educational tools.

A comprehensive careers curriculum would include computer-assisted CIS to provide a complete search and retrieval function for occupational and college information. This function alone is invaluable to students and saves significant amounts of time and energy. The curriculum

should also include instruction in constructing resumé's, filling out application forms, applying for positions, interviewing, and development of the interpersonal skills necessary to succeed in an occupation. Providing CIS access throughout a student's secondary schooling, especially in a small school setting, is a key element suggested by the data.

The CIS program is also seen as invaluable because of the ease of access, the speed of the search functions, and the amount of and type of data generated. This type of information system is essential to students as it reduces the amount of time a student would spend searching for this data in books. It also allows for narrowing the search field and providing for more specific information. Students can match career assessment data with appropriate occupational fields and search for appropriate programs, all within a short amount of time and with an abundance of information available.

The results further suggested that computers are more important and invaluable as an educational tool for students for a variety of applications. Data storage and retrieval is an accepted use of computers, but with the development of more sophisticated and available systems and software, different functions have also been developed. Among these functions are spreadsheets, databases, CAI, graphics, and word processing. The use of the computer for word-processing activities has assumed increased importance

and use in the hands of students who with access to systems and training in their use.

Writing activities utilizing the word processing capabilities of the computer were strongly supported by the data, with all of the students acclaiming the ability to write in greater detail and with greater ease when using the computer. The ability to save written work, retrieve it, and then edit it using full word-processing functions was extremely valuable. The addition of other programs with spell checking, thesaurus, dictionary and encyclopedia functions, served to add another dimension to their writing abilities.

The findings from this research suggest that the computer is an educational tool which should be utilized to its full extent, not only in careers but in all areas of the curriculum. Utilizing the computer for computer assisted-instruction, as does the CIS program, enables students to access information and perform complex search functions with ease and speed, both essential to secondary education.

Using computers for their word-processing capabilities has proven a definite advantage to all students, regardless of their writing ability. Poor writers have improved their ability and production utilizing computers. The data suggests that this is an area that needs serious study. The development and use of the computer as a sophisticated word processor allows for change in the traditional use of com-

puters in the schools. If this tool is capable of turning students into productive writers, then it becomes apparent that we need to adjust our focus on computer education, and at an earlier age.

The uses of computer technology for students is only limited by its availability and the training students receive. If students can be trained at the elementary levels in effective keyboarding skills and computers can be made available to them on a regular basis, then it is quite possible that we could raise the language literacy of all of our students. Schools spend an inordinate amount of money on technology which is designed for computer science purposes when they need to examine the best uses for this technology. Government, business, and school partnerships need to be formed which allow the schools access to adequate word processing and computer technology at a cost which is affordable to the poorest districts and allows all students regular access. Given the rapid development of computer technology and the inclusion of CD-ROM and communication technology, such as the Internet, it is feasible that schools of the future will not have textbooks, but rather issue laptop computers to their students which can connect to communication lines in their homes and at their desks.

### Recommended Areas for Further Research

The intent of this study was to determine perceptions of students, parents and teachers toward using computer-assisted instruction in the careers curriculum. The study accomplished this goal, while also providing further avenues of study regarding computer use by students.

As the research shows, there have been studies involving the use of computer-assisted instruction and its effectiveness as well as studies of the effectiveness of careers curricula. The following are areas which lend themselves readily to further research that will provide further insight into the findings of this study:

- 1) The role word processing plays in improving student abilities to write effectively, which includes complexity, length, structure, usage and creativity, needs further study. The unanimous agreement among the subjects of the present study about the improvement word processing brought about in their writing lends credibility to this as a viable area of research which should be examined, if only with respect to the implications it has for the future of computer use and writing education in our schools.
- 2) Career education programs which are required for students versus schools where they are not required would be a useful area of study. An asso-

ciated area would consist of a study of career programs in Oregon schools, comparing programs utilizing CAI-CIS with programs that do not. Also, comparison of a comprehensive careers curriculum, which includes resumés, interviewing, etc., with program that survey only occupations and colleges could be used to produce significant results.

As the present research progressed through the interview stage, an area of further study emerged which was not necessarily related to this study, other than to provide insight into what could possibly influence the perceptions of some of the participants. This area could lend itself to further research via another discipline such as sociology, or a combination of two disciplines such as sociology and education or anthropology. This area of interest is centered upon the perceptions that the composition of the valley population was changing and that this change affected the direction the school was taking as regards curriculum, technology, and other factors. Among some study participants, there was a sense of frustration and fear that the way of life they had enjoyed and were accustomed to was slowly being eroded by the advent of "newcomers." There was also discontent expressed with the teachers and their perceived lack of involvement in the school and the community.

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## APPENDICES

## A. Sample Student Questions

- 1) COMPARE USING THE CAREER INFORMATION SYSTEM (CIS) TO FINDING THE INFORMATION BY HAND FROM BOOKS, ETC.
- 2) WHAT ARE YOUR FEELINGS TOWARDS USING THE COMPUTER TO DO THE FOLLOWING:  
  
CIS  
  
WORD PRO  
  
OTHER
- 3) WHAT IS YOUR EXPERIENCE USING COMPUTERS?
- 4) DID THE CIS HELP YOU IDENTIFY POTENTIAL CAREER AREAS? WHICH ONES?
- 5) WAS THE INFO IT PROVIDED HELPFUL AS REGARDS, OCCUPATIONS, TRAINING, SCHOOL INFORMATION, COSTS, OBTAINING FINANCIAL AID, ETC.
- 6) WHEN DID YOU BECOME AWARE OF THE CIS PROGRAM AND IT'S USES?
- 7) WHAT WERE YOUR ATTITUDES TOWARDS THE CIS PROGRAM AFTER USING IT?  
  
TOWARDS COMPUTERS?
- 8) WHEN SHOULD KIDS TAKE CIS? WHY?  
  
HOW LONG A COURSE SHOULD IT BE? SHOULD IT BE MODIFIED OVER WHAT IT IS NOW? HOW?
- 9) FOR WHAT AGE GROUP OF STUDENTS IS THE CIS DESIGNED?
- 10) SHOULD IT BE ALWAYS AVAILABLE TO STUDENTS?
- 11) HOW LONG DID IT TAKE YOU TO LEARN THE CIS PROGRAM?

- 12) SHOULD THE CIS BE MIXED WITH WORD-PRO INSTRUCTION OR KEPT SEPARATE?
- 13) SHOULD WORD-PRO BE REQUIRED IN ADDITION TO CAREERS?
- 14) ARE COMPUTERS GENDER SPECIFIC?
- 15) DOES KNOWLEDGE OF COMPUTERS/APPLICATIONS GIVE YOU AN ADVANTAGE? IN WHAT WAY?
- 16) WHAT IS THE ADVANTAGE OF ACCESSING INFO/BOOKS ON COMPUTERS?
- 17) WHAT OTHER ACTIVITIES SHOULD BE INCLUDED IN THE CAREERS COURSE; THE CIS SECTION?
- 18) DO YOU SEE ANY ADVANTAGES TO USING THE COMPUTER FOR WRITING; READING?
- 19) WHAT ARE YOUR FEELING TOWARDS USING COMPUTERS AS PART OF YOUR INSTRUCTION?

## B. Sample Parent Questions

- 1) WHERE AND WHEN DID YOU COMPLETE HIGH SCHOOL?
- 2) DID YOU HAVE ANY FORMAL CAREER COURSES IN SCHOOL?
- 3) WHAT DID YOUR GUIDANCE STAFF DO TO PREPARE YOU FOR ANY CAREERS OR COLLEGE?
- 4) DID YOU HAVE ANY EXPERIENCE WITH COMPUTERS IN HIGH SCHOOL? WHEN DID YOU FIRST UTILIZE COMPUTERS OR BECOME AWARE OF THEIR USES?
- 5) DO YOU HAVE ANY COMPUTER EXPERIENCE AT ALL? WHAT?
- 6) ARE YOU FAMILIAR WITH THE CAREERS CURRICULUM AT JEWELL?
- 7) ARE YOU FAMILIAR WITH THE BUSINESS LAB COMPUTER SETUP?
- 8) COMPARE USING A COMPUTER ASSISTED CAREER INFORMATION SYSTEM (CIS) TO FINDING THE INFORMATION BY HAND FROM BOOKS, ETC.
- 10) WHAT ARE YOUR FEELINGS TOWARDS USING THE COMPUTER TO DO THE FOLLOWING:  
  
CIS  
  
WORD PRO  
  
OTHER
- 11) WHAT IS YOUR EXPERIENCE USING COMPUTERS?
- 12) WHEN SHOULD KIDS TAKE CAREERS; WORD-PRO; CIS? WHY?
- 13) HOW LONG A COURSE SHOULD IT BE? SHOULD IT BE MODIFIED OVER WHAT IT IS NOW? HOW?
- 14) FOR WHAT AGE GROUP OF STUDENTS IS THE CIS/WORD-PRO DESIGNED?

- 15) SHOULD IT BE ALWAYS AVAILABLE TO STUDENTS?
- 16) SHOULD WORD-PRO BE REQUIRED IN ADDITION TO CAREERS?
- 17) ARE COMPUTERS GENDER SPECIFIC?
- 18) DOES KNOWLEDGE OF COMPUTERS/APPLICATIONS GIVE YOU AN ADVANTAGE? IN WHAT WAY?
- 19) WHAT IS THE ADVANTAGE OF ACCESSING INFO/BOOKS ON COMPUTERS?
- 20) WHAT OTHER ACTIVITIES SHOULD BE INCLUDED IN THE CAREERS COURSE; THE CIS SECTION?
- 21) DO YOU SEE ANY ADVANTAGES TO USING THE COMPUTER FOR WRITING; READING?
- 22) WHAT ARE YOUR FEELING TOWARDS USING COMPUTERS AS PART OF INSTRUCTION?

## C. Sample Teacher Questions

- 1) WHERE AND WHEN DID YOU COMPLETE HIGH SCHOOL?
- 2) DID YOU HAVE ANY FORMAL CAREER COURSES IN HIGH SCHOOL?
- 3) WHAT DID YOUR GUIDANCE STAFF DO TO PREPARE YOU FOR ANY CAREERS OR COLLEGE?
- 4) DID YOU HAVE ANY EXPERIENCE WITH COMPUTERS IN HIGH SCHOOL? WHEN DID YOU FIRST UTILIZE COMPUTERS OR BECOME AWARE OF THEIR USES?
- 5) WHAT IS YOUR COMPUTER EXPERIENCE?
- 6) COMPARE USING A COMPUTER ASSISTED CAREER INFORMATION SYSTEM (CIS) TO FINDING THE INFORMATION BY HAND FROM BOOKS, ETC.
- 7) WHAT ARE YOUR FEELINGS TOWARDS USING THE COMPUTER TO DO THE FOLLOWING:  
  
CIS  
  
WORD PRO  
  
OTHER
- 8) WHEN SHOULD KIDS TAKE CAREERS; WORD-PRO; CIS? WHY?
- 9) HOW LONG A COURSE SHOULD IT BE? SHOULD IT BE MODIFIED OVER WHAT IT IS NOW? HOW?
- 10) FOR WHAT AGE GROUP OF STUDENTS IS THE CIS/WORD-PRO DESIGNED?
- 11) SHOULD IT BE ALWAYS AVAILABLE TO STUDENTS?
- 12) SHOULD WORD-PRO BE REQUIRED IN ADDITION TO CAREERS?
- 13) ARE COMPUTERS GENDER SPECIFIC?

- 14) DOES KNOWLEDGE OF COMPUTERS/APPLICATIONS GIVE YOU AN ADVANTAGE? IN WHAT WAY?
- 15) WHAT IS THE ADVANTAGE OF ACCESSING INFO/BOOKS ON COMPUTERS?
- 16) WHAT OTHER ACTIVITIES SHOULD BE INCLUDED IN THE CAREERS COURSE; THE CIS SECTION?
- 17) DO YOU SEE ANY ADVANTAGES TO USING THE COMPUTER FOR WRITING; READING?
- 18) WHAT ARE YOUR FEELING TOWARDS USING COMPUTERS AS PART OF INSTRUCTION?