ABSTRACT
                Designed to assist educators in planning for
technological changes in secondary schools, this report presents the
findings of a survey conducted in May 1989 to obtain information on
the use of microcomputers in Oregon's classrooms. A 46-item
questionnaire was mailed to the principals, computer coordinators,
and heads of academic departments at 21 junior and 73 senior high
schools throughout the state. Topics of inquiry included questions
about teacher training, computer hardware and software, and computer
use, as well as questions of a general nature. Results of the data
analyses are presented in 28 tables. Based on these analyses, it was
concluded that: (1) although regular expenditures on computer
technology fall between $4,000 and $8,000 annually, school computers
have had a limited impact on instruction; (2) the lack of effective
use of microcomputers, particularly in the area of instruction, may
be caused by the lack of time available to teachers to plan for the
use of software; (3) there is a need for continued formal training
for both computer coordinators and teachers, and increased
opportunities for teachers to borrow school computers for use at
home; and (4) the underutilization of existing hardware and software
promotes the viewpoint that computers are helpful but not important
in the improvement of the learning and teaching process. (9
references) (DB)

Microcomputers in Secondary Schools
Oregon's Coordinators Perspective

THE 1989 STATEWIDE SURVEY
of the
OREGON EDUCATIONAL COMPUTER CONSORTIUM

by

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WINTER 1989

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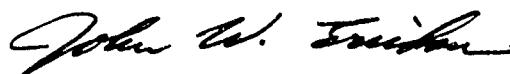
May 16, 1990

Dear Educators:

Microcomputers in Secondary Schools: Computer Coordinators Perspective represents the latest research on the use of microcomputers in Oregon's classrooms. The contents of this document are a joint venture of the Oregon Department of Education, the Oregon Educational Computer Consortium and the University of Oregon. The amount of data which went into this research is amazing. Only a computer could digest it all! I know that technology changes rapidly and that data of this type also change. However, the manner in which this information is presented allows you to predict how changes take place.

The content of this document is written to assist educators in planning for technological changes in secondary schools. Many of you are currently modifying the 1985 five-year-plan. The historical perspective these data provide should be of assistance in that planning. Strategies have changed and microcomputers are now tools for productivity rather than just objects of study. I believe you will find that computers will become even more important in collecting information for students and school personnel during the next few years.

Technology will continue to affect the educational process through innovative applications. As districts plan for the future, much consideration will be given for the role that technology will play in the education of Oregon students.

Sincerely,

John W. Erickson
State Superintendent
of Public Instruction

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~ ACKNOWLEDGMENTS

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INTRODUCTION

Using microcomputers to enhance instruction has almost become a "cliché" to many educators ..... A glance at the variety of publications such as "Electronic Learning,' " The Instructor" and so on, to mention only a few, indicates that the acquisition and the use of microcomputers in the schools and in the homes has increased dramatically, since these technological devices have become more reasonable in price to acquire and since the software has improved not only in quantity and quality but in their sophistication and diversity ...... Both hardware and software have become more powerful and meaningful in meeting the needs of both the school and the students who share the technological advances the school acquired.

Today, the computer "informed or literate" individual will not deny that the potential of the current and future generations of microcomputers, if used effectively and under the appropriate circumstances, will surpass the potential of any other educational media which is or might be used in the instructional process. At the secondary school level, there is no question that at least for the remaining part of this century, the use of computer technology will increase dramatically. If one looks back at the first half of the 1980s, one will find that almost half of all high schools in the United States had no computer at all. In contrast, by the end of the second half of the 1980s, a typical high school now has more than 20 microcomputers, mainly because of the infusion of money for both hardware and software and a growing faculty and staff showing awareness of the new technological advances and an interest in the potential of the computer as a teaching tool. Today any high school student who wants to can have access to an IBM. An IBM "clone" or an Apple computer to word process any document, to study almost any subject area offered in the high school curriculum, or to better understand through the aid of innovative programs the world in which they live.

As we enter the decade of the 90s, educators all over the United States who strongly believe in the role of the computer in education, predict that the microcomputer will become an indispensable element in the precollege classroom. Therefore, looking at the trends in microcomputer usage in Oregon schools, it seems that an increased use of microcomputers in all aspects of the instructional process will force school districts to reevaluate their financial commitment to computer technology and cause them to survey and augment not only the basic computer literacy of their staff and faculty, but the instructional application literacy of all members of their school community. Such literacy will not only insure a cost and education effective selection and use of both hardware and software, but develop a bridge between what is known about the use of microcomputers for instruction and the decisions made by Oregon educational policymakers, teachers and district administrators with regard to their acquisition and dissemination of computer technology for their secondary schools.

But, while many positive claims have been made and are still being made daily for computer-based learning and teaching, one would think that the majority of the secondary school teachers today would be clamoring to have themselves teach and their students learn with computers. Regrettably, the reality however is that this isn't the case. While there is a subtle shift away from the emphasis on

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Side margin notes:

Using microcomputers to enhance instruction has almost become a "cliché" to many educators....

Today, the computer "informed or literate" individual will not deny that the potential of the current and future generations of microcomputers...

....the microcomputer will become an indispensable element in the precollege classroom.

...one would think that the majority of the secondary school teachers today would be clamoring to have themselves teach and their students learn with computers. Regrettably. .

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programming and basic computer literacy at the secondary education level to-
wards tool application, there is also a kind of stagnation in the interest in comput-
ers by the teachers who could use this technology the most in their classrooms.
While computer coordinators and successful computer using teachers do espouse
the benefits and the merits of the use of microcomputers in the secondary schools,
the clear implications found in the findings provided by this 1989 Oregon survey
and the many previous surveys and research studies conducted during the decade
of the 80s (The State of Oregon, Lamon et al, 1983, 1985, 1988; Becker, 1985;
UNISYS/UNC-CH, 1987, State of North Carolina, 1987, etc.) are that:

<div style="margin-left:2em; font-style:italic;">

Teachers do not know a conceptual framework for the use of the micro-computer as a tool for individual or systematic instruction.

</div>

1) Teachers do not know a conceptual framework for the use of the micro-
    computer as a tool for individual or systematic instruction.

2) Teachers do not integrate microcomputers into the actual process of in-
    struction, whether this integration is viewed at the individual teacher or
    student level. Therefore, anticipated or predicted changes in style and
    organization of instruction in secondary schools has not materialized.

3) Teachers do not understand the relationship between the microcomputer's
    capabilities, strengths and weaknesses, and the school curriculum.

<div style="margin-left:2em; font-style:italic;">

Teachers do not integrate micro-computers into the actual process of instruction....

</div>

While it is true that in Oregon, computer usage and the number of computers
has grown significantly during the last five years, it is also true that in light of the
findings of this survey intertwined with the almost daily explosive developments
in the world of "electronic information" technologies and their integration into
new and more sophisticated hardware and software, Oregon will continue to face
a serious technological issue ..... that of what hardware and software to acquire
for instructional consumption. There is no doubt that as time will progress toward
the end of this century, this issue will be aggravated by the fact that the main
issues related to computer usage will shift from those related to how to acquire
knowledge to those related to how to access knowledge ....

Therefore, it was the quest for answers to some of the questions raised by these
issues, which formed the "moving force" for the undertaking of this latest survey.
As any survey requires appropriate funding, the collecting of the data was made
possible through funds provided by the Oregon Department of Education, the
University of Oregon and the Oregon Educational Computer Consortium
(OECC). The dissemination, the collecting and the entry of the data was done by
graduate students enrolled in the Division of Teacher Education at the University
of Oregon, while the design of the questionnaire and the analysis of the data was
completed by the authors.

<div style="margin-left:2em; font-style:italic;">

Teachers do not understand the relationship between the micro-computer's capabilities, strengths and weaknesses and the school curriculum.

</div>

METHOD

The Sample

The 1989 Oregon Microcomputer Survey was conducted during the month of
May, 1989. As of December 31, 1988, Oregon's 21 union high school districts

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and 156 unified school districts operated 62 junior high schools, 34 junior/senior high schools and 185 high schools. In these schools, located in 36 counties, a total of 200,301 students were enrolled and taught by approximately 16,000 teachers. Of these students, approximately 131,328 students were enrolled in grades 9 through 12 and approximately 68,973 in grades 7 and 8. Because the least enrollment in a high school was 19 students (87 for the middle school) and a maximum of 1,924 (925 for a middle school) students, a stratified sample of 94 randomly selected schools (i.e., one-third of the school population) was identified for the survey based upon school population. In other words, the sample for the survey was selected from a school population of which all schools were ranked according to the size of their student enrollment: if a school population was symbolized by "x", then:

Sample Characteristics

    a) a small school was one where $0 < x < 250$
    b) a medium school was one where $251 < x < 900$
    c) a large school was one where $x < 900$

In this ranking, the average school population was approximately 603 students. In the 94 selected schools, the stratification revealed the following distribution: If "x" was the school population, then "x" was such that for:

    a) the small school, $0 < x < 350$
    b) the medium school, $351 < x < 525$
    c) the large school, $x > 525$

Here, the average school population was 461 students.

As there were 62 junior high schools and 219 junior/senior high schools and high schools in Oregon, representing 22% and 78% of the schools, respectively, the sample for the survey contained 21 junior high schools (i.e., 22%) and 73 junior/senior high schools and high schools (i.e., 78%). Among each of these groups of schools an equal number of small, medium and large schools were represented (i.e., seven schools of each type). Although all these schools were selected at random, the size of their district, whether they were urban or rural and whether they had computers or not, was also considered in the stratification process.

> ...the principal of each targeted school received a package which contained 12 questionnaires....

SOURCE OF SURVEY INFORMATION

During the month of February, 1989, the principal of each targeted school received a package which contained 12 questionnaires: one for the principal, one for the computer coordinator of the building and one for each of the academic departments (i.e., English/Language Arts, Math etc.). The booklet for the principal, when compared to either the one for the computer coordinator or the department heads was different and contained a variety of questions providing detailed information about the use of computers in the school. Four main categories of ques-

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tions were displayed on each questionnaire. These four sections contained,

a) questions of a general nature .... ,
b) questions about teacher training.... ,
c) questions about computer hardware and software .... ,
d) questions about computer use ..... .

Because of the length and sometimes required detail of the 46-item questionnaire, as well as the desire to insure a reasonable and reliable return of each and every-one of these booklets, a variety of incentives for taking the task seriously were provided.

RESPONSE RATE

As this document provides information and data about the RETURNS and FINDINGS submitted by the COMPUTER COORDINATOR and the PRINCI-PAL of each of the targeted schools, the response rate reported here will only reflect that which relates to this document.

Therefore, as of May 15, 1989, the deadline by which all questionnaires had to be returned, as well as telephone follow-ups and sometimes personal visits had to be completed, the response rate by the COMPUTER COORDINATORS was 59% (i.e., 55 returns out of 94 mailings) and 64% for the PRINCIPALS (i.e., 60 returns out of 94 mailings). Although more booklets were received after the deadline, the results presented and discussed here are only based on the data collected up to May 15, 1989.

RESULTS

Introduction

This survey was funded as a cooperative project of the Oregon Educational Computer Consortium; the University of Oregon and the Oregon Department of Education. Therefore, it was designed to gather information on issues of concern to these organizations and related to the following main topics:

a) **Computer Use:** general and specific statistics on when, where, how, benefits and problems as these relate to use.
b) **Computer Hardware and Software:** general and specific information on type, subject, how used, benefits and problems related to acquisition and dissemination.
c) **Teacher Training:** general and specific information on training status, problems, recommendations and issues related to training.
d) **Information of general interest.**

The total student population enrolled in the participating schools is 34,464 secondary and middle school students. The average full-time student enrollment was 618 students, with a minimum enrollment of 69 students and a maximum en-

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roilment of 1,403 students. In these schools, 56% percent of the students were children of factory or "other service" workers, with the balance of the sample evenly divided between children of professional or office workers (22%) and farming families (22%). Furthermore, the percentage of students enrolled in a college preparatory, a general or a vocational curricula was as follows:

STUDENT ENROLLMENT BY STRAND					
	Percentage of Students in Strand				
	less than 10%	10-19%	20-29%	30-39%	≥40%
COLLEGE PREPARATORY	6%	15%	34%	21%	25%
GENERAL	0%	0%	11%	40%	49%
VOCATIONAL	6%	25%	31%	27%	12%
	Percentage of Schools in Range				

Table I

....almost half of the schools stated that more than 40% of their student body was enrolled in a general curriculum.

Hence, of the 59 schools responding to the question of what percent of their school population was enrolled in what curricula, almost half of the schools stated that more than 40% of their student body was enrolled in a general curriculum.

What follows now is the summary of those questions deemed to be the most informative to both teachers and administrators of secondary schools. Because of the sampling procedures and the number of responses yielding the findings reported here, the results may be interpreted as coming from a representative sample of all secondary and middle schools in the state of Oregon.

PERCEPTIONS OF THE COMPUTER COORDINATOR
The Microcomputer and the Secondary School
Questions and Answers

How involved are secondary schools today with microcomputer technology and where were they yesterday? In order to get some perspective on where the Oregon secondary schools are coming from and where they are headed with reference to their involvement with microcomputer technology, the following information is of interest.

Most Oregon secondary schools acquired their first computer in 1980 for instruction.

a) The first year that a secondary school acquired a set of computers for instruction seems to be 1968.
b) Most Oregon secondary schools acquired their first computer in 1980 for instruction.
c) Some schools acquired their first computer as late as 1985.

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Furthermore, the growth in the number of computers over the last few years has been significant. The sample showed:

MICROCOMPUTER GROWTH

	Growth	Min	Max.
January 1990: (planned)	14.9%		
January 1989:	14.6%	7	150
January 1988:	17.2%	6	140
January 1987:	NA	4	100

Table II

Furthermore, forty-three districts (78% of the sample) indicated that over the next 12 months they planned to buy 321 computers for instruction during the 1989-1990 school year. With an indicated maximum of 40 computers, this planned acquisition represents a 15% growth over the 1988-1989 school year. Of interest here is the fact that six districts indicated major purchase plans for 1989-1990. Ranked according to the number of computers they presently owned:

MAJOR PURCHASE PLANS

Current Number	Planned Additional	New Total
46	40	87
48	30	62
50	30	60
15	15	100
10	15	150
95	13	14

Table III

What is the current status of hardware in the schools today?
The issue of ACQUISITION and DISSEMINATION.

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As of June, 1989 the STATUS of computers available for instruction of the sample schools is summarized as follows:

SUMMARY OF HARDWARE PER SCHOOL

DEVICE	Average	Max.
Microcomputers	41	150
Computer Printers	15	50
Terminals in Student Use	2	26
PC Viewers	1	11
Large Monitor	1	6
Modems	1	4

Table IV

Looking now in more detail at the peripherals, including the special computer-connected equipment for physically handicapped students, the following information can be provided:

PERCENT OF SCHOOLS WITH PERIPHERALS

Hard Disk Drive	37%	Bar Code Readers	16%
Joystick or Paddle	65%	CD Roms	12%
Voice-Synthesizer	22%	Modem	55%
Optical Scanner	20%	Graphics Pad/Tablet	53%
Plotter	41%	Midi Interfaces	8%
Laser Printers	43%	Letter Quality Printers	69%
Dot Matrix Printers	98%	Other Peripherals	16%

One school, no perhipherals

....both the number and the type of computers vary significantly.

Table V

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While the number of computers used both for instruction and for administrative tasks in secondary schools has dramatically increased during the last few years, this 1989 census revealed that in these participating schools, both the number and the type of computers vary significantly. Table VI below displays these results:

TYPES OF COMPUTERS IN SECONDARY SCHOOLS
(pie chart)

	Percent
APPLE II computers	57.7%
IBM or compatible computers	21.2%
MACINTOSH computers	9.6%
COMMODORE computers	7.1%
OTHER	4.3%

Table VI

The majority of these computers distributed mainly in three different locations. Table VII displays the total number of computers per site:

LOCATION OF COMPUTERS IN SCHOOLS

	Percent	Average Number
Computer Laboratory	56.7%	26
Individual Classrooms	34.8%	18
Library/Resource Center	8.5%	4

Table VII

....the Apple IIe computers are being used most in the secondary school laboratories....

....the Macintosh and the IBM or one of their "clones" which is the most prevailing microcomputer in the secondary high school classroom....

While the Apple IIe computers are being used most in the secondary school laboratories, it is the Macintosh and the IBM or one of their "clones" which is the most prevailing microcomputer in the secondary high school classroom in Oregon.

When computer coordinators were asked how they would distribute computers, if they had twice as many as they had today, their responses were as follows:

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WHERE TO PUT NEW COMPUTERS

Augment the number of computers in the existing lab and
spread the remaining balance among several classrooms 37.0%

Augment the number of computers put into classrooms 33.3%

Establish another computer lab 24.1%

Some other arrangement 5.6%

No lab and all computers in classroom 0.0%

Table VIII

Unfortunately, some of these computers are not being utilized as they should. Therefore, computer coordinators were asked to list how many of each of the computers listed below were not used or were hardly used:

COMPUTERS NOT REGULARLY USED

	%	Min.	Max.
Number of IBM	0.4%	1	1
Number of Macintosh	0.4%	1	1
Number of Apple II+ and IIe	2.9%	1	10
Number of Radio Shack	15.0%	1	8
Number of Commodore	21.7%	1	1
Number of Others	26.0%	1	10

Table IX

As we all know, the acquisition of hardware is dependent upon a variety of factors. "People" and "available funds" are probably the most important ones. As schools obtain computers through the effort and influence of different people, this survey deemed it important and appropriate to ask the computer coordinators who among the people listed below we. the most important in accomplishing their most recent acquisition of hardware. Table X reflects their responses ranked in order of importance:

MOST IMPORTANT PURCHASING PERSON

Responsible Party	Percent Concurring
The school principal	33.9%
A single teacher, department chair or computer coordinator	29.0%
A group of teachers and other staff members	11.3%
The school district	11.3%
Other (describe)	9.7%
Other administrators at the school	4.8%
ESD/county unit	0.0%

Table X

What are schools willing and able to spend on Computer Technology today? The issue of BUDGETARY commitment.

Although more than 60% of the schools spent more than $4,000.00 on hardware, in contrast 60% of the schools spent less than $1,000.00 on software. So, in order to get a better idea of the money school administrators were willing to allocate for the purchase of hardware and software, Table XI displays such expenditure.

....more than 60% of the schools spent more than $4,000.00 on hardware....

COMPUTER SPENDING

HARDWARE		SOFTWARE	
Dollars Spent	Percent	Dollars Spent	Percent
less than $500	8%	less than $50	0%
$500 - $1,000	6%	$50 - $100	4%
$1,000 - $2,000	10%	$100 - $150	4%
$2,000 - $4,000	16%	$150 - $200	4%
$4,000 - $8,000	24%	$200 - $300	8%
more than $8,000	38%	$300 - $500	8%
		$500 - $750	14%
		$750 - $1,000	16%
		more than $1,000	42%

Table XI

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When computer coordinators were asked who provided most of the funds for the acquisition of software, their responses could be summarized as follows.

WHO PROVIDES FUNDS?

Source of Funds	Percent of Total Funds
Regular school or department funds	70%
Special funds from the school district	16%
Other school district monies(describe)	6%
PTA or other contributions or school fund-raising drives	9%

Table XII

The Issue of Computer Use: Who does what, where and when?

As microcomputers are being used both by teachers and by students, computer coordinators were asked who on their school staff was directly responsible for coordinating or supervising their use by teachers or by students. Their responses are summarized in Table XIII:

SCHEDULING/COORDINATING USE OF COMPUTERS

A full-time regular teacher, who also serves as a computer coordinator	42%
The school principal or another administrator coordinates use	15%
The school librarian or media specialist coordinates computer use	13%
No one directly responsible.	11%
Full-time computer coordinator whose only teaching relates to computers	6%
Computers are used by a few teachers who work out their own arrangements	6%
Another person (describe)	6%
A district-level computer specialist or shared computer coordinator	2%

Table XIII

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While several high school teachers might have a computer at home, many do not. As many teachers might venture to learn more about computers if they had access to a computer at home, the thought of possibly loaning a computer during the summer months had crossed many computer coordinators' minds. Therefore, in the survey coordinators were asked in what ways their school's computers were used last summer. Their responses are summarized in Table XIV:

....many teachers might venture to learn more about computers if they had access to a computer at home, the thought of possibly loaning a computer during the summer months had crossed many computer coordinators' minds.

SUMMER USE OF COMPUTERS

Teachers borrowed the computers for use at home 32%

Locked up for the summer.. ....28%

Teachers used the computers at school for school related
activities 18%

Computers were used by school or district for teacher
training 9%

Used for summer school or summer camp 8%

Other (describe) 4%

Students used the computers for non-school related activities 2%

Students borrowed the computers for use at home 0%

Table XIV

....during the summer months, 50% of the teachers in the surveyed schools did use their school computers.

Of interest in these findings is the fact that during the summer months, 50% of the teachers in the surveyed schools did use their school computers. While the question was not asked, no one reported a problem because of the summer use of computers that were used.

WHERE are computers primarily used and by WHO ?
The issue of the COMPUTER LAB versus the CLASSROOM.

The majority (85%) of the high schools in Oregon have a computer laboratory. These laboratories average about 43 hours a week in usage, with a maximum of 50 hours. For a typical week (i.e., 40-hour-week), these labs are either:

12   20

COMPUTERS AVAILABLE AND NOT IN USE

Average	12.28 hours
Minimum	0 hours*
Maximum	39 hours

* Three schools reported that their labs are always in use.

COMPUTERS IN USE BY TEACHERS ONLY

Average	4.8 hours
Minimum	0 hours
Maximum	35 hours

There is still time left for using computers during a forty-hour week.

Students seem to be the biggest users of the computer laboratory. While they attend these labs, they are supervised by a variety of people. Asked who predominantly supervised the students in the laboratory, the computer coordinators stated that the most prevailing practice was that of advanced students supervising the others. Ranked according to predominant supervision, the following table could be provided:

TECHNICAL SUPPORT FOR STUDENTS

Advanced level students 27%

Full-time computer coordinator or
supervisor (professional level) 17%

School librarian or media specialist 13%

Parent volunteers 11%

Classroom teachers or department chairpersons 10%

A paid adult aide 10%

School administrator 7%

Other (describe)... 5%

Table XV

13

Because these computer labs are operated in a variety of ways, questions related to their use and general operation were also presented to the computer coordinators. Table XVI summarizes their responses:

COMPUTER LAB PRIORITIES

	Yes	No	Some-times
Can students reserve time by signing up in advance?	56%	27%	17%
Do students have a time limit for using a computer if others are waiting? If so, how many minutes?	5%	77%	18%
Do teachers have priority over students ?	17%	64%	19%
Do programming students have priority over other students?	13%	69%	18%
Do Computer-Assisted-Instruction users have priority over other student users?	15%	67%	18%
Does another group of students have priority? (Who____?)	18%	72%	9%
May students play noneducational games (their own or the school's) if no one else needs the computer?	24%	38%	38%

Table XVI

What is the current status of school acquired software?

Most educators will agree that the instructional effectiveness of computers varies greatly in light of the type, the quality and the quantity of available software in the school. Therefore, computer coordinators were asked a variety of questions, all geared at issues of concern to those responsible for making decisions as to what type and how many computer programs should be acquired for students' and/or teachers' use. The tables which follow summarize some of these responses. Table XVII displays the SUMMARY of their responses to the question as to how many programs of a certain type were available to students and to teachers.

....CAI most prevalent software in schools....

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SOFTWARE GROUPINGS

Number of Programs	None	1-10	11-20	21-40	41±
Computer-Assisted-Instruction: drills, tutorials, problem solving, simulations, etc.	0%	34%	28%	20%	18%
Applications: word-processors, spreadsheets, databases, graphics, telecommunications.	0%	14%	42%	24%	20%
Programming Languages:	6%	90%	4%	0%	0%

Table XVII

As a follow-up to the software grouping question, computer coordinators were asked to estimate how many teachers and others on the professional staff of their school, regularly used programs of the type listed below. Table XVIII displays the number of teachers and other staff members who regularly use the listed programs.

NUMBER OF TEACHERS USING TYPES OF SOFTWARE
Percent of Staff Using the Indicated Types of Programs

	Number of Teachers Using*					
	None	1-5	6-10	11-16	17-27	28-38
• Instructional programs (DP, Tutorial etc.)	8%	64%	23%	6%	0%	0%
• Utility programs (WP, DB, SS, except grading)	0%	43%	39%	7%	7%	4%
• Programs for recording student grades, including data management programs	4%	52%	25%	15%	4%	4%
• Programs for instructional management (for example IEP reports)	17%	74%	6%	2%	2%	0%
• Programs for storing and retrieving test questions	13%	65%	17%	2%	2%	0%
• Information retrieval programs for career guidance	20%	78%	0%	2%	0%	0%
• Other administrative and management programs	12%	73%	12%	2%	0%	0%

Average school has 39 teachers.

Table XVIII

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Consistently, the majority of coordinators stated that from one to five of their teachers used the categories of software listed in Table XVIII. On the average this translates to be from 2.5% to 12.8% of the staff.

Because many software companies charge a school the same amount of money for each copy of their program that the school buys, while some companies offer discounts for multiple purchases, the question was asked what would be a fair price to charge schools for ten copies of a program which usually would sell for $50.00 for a single copy: The average fair price, as seen by the computer coordinators, was approximately $177.00, with a minimum of $5.00 and a maximum of $ 500.00.

As with hardware, sometimes schools obtained software that they were unable to use. Because this was a serious issue to many schools, an attempt was made in this survey to get some data on the question. Hence, in light of the computer coordinators' responses it can be stated that on the average, approximately twelve (12) commercially bought programs are being wasted. The minimum was five (5) and the maximum was fifty (50). More than 50% of the respondents stated that the major reasons for such waste were because:

1) The software has been superseded by better product, or

2) Poorly written either by today's standards or poorly written in the first place.

Lesser reasons, if ranked according to prevalence of usage were:

3) Lack of time by teachers to investigate whether the programs are useful (16% of the respondents).

4) The perception by teachers that the software was fine, but no better than traditional methods (11% of the respondents).

5) The perception by teachers that the software while useful was inappropriate in a classroom or school setting (11% of the respondents).

Only about 12% of the wasted software was Minnesota Education Computer Corporation (MECC) products, the most common software product in the state. To conclude the software questions, coordinators were asked whether their school district had a written copyright policy. Surprisingly, 31% of the participants did not respond to the question, half of the remaining balance answered in an affirmative manner. Of that number, 68% stated that their school followed the guidelines as prescribed by the International Council for Computers in Education (ICCE). It is not known whether those not responding to the question did not know if their district had a copyright policy or if they were afraid to answer the question due to perceived legal reasons.

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Are teachers "Computer Literate?"

In order to get some "insight" into how teachers feel about the use of computers by themselves and by the students in their school, about their literacy and some issues revolving around computer technology in general, computer coordinators were asked a variety of questions directly or indirectly related to teacher education.

First of interest is the fact that only 27% of the respondents owned a home computer. Of these respondents, 75% stated that their home computer was of the same brand as the computer they used in their school. When asked how many hours per week they used their home computer, the following Table XIX of responses could be constructed:

WEEKLY HOURS OF HOME COMPUTER USE

Average .... 9 hours
Minimum* .... 0 hours
Maximum ....25 hours

* Two coordinators reported 0 hours of weekly home computer use.

Table XIX

On the other hand, when asked how many hours per week they spent working with the school-owned computer, their replies averaged to about 9.76 hours, with a maximum of 35-hours-per-week.

As most teachers acknowledge the fact that the extent of one's computer literacy is proportionate to the degree of one's computer use, a five statement question related to this issue was presented to the participants. Table XX summarizes the results of their responses.

FREQUENCY OF COMPUTER USE BY COORDINATORS

	Never	Daily	Monthly	Weekly
• Use a word-processing or other program for preparing student tests or assignments	9%	9%	47%	34%
• Use a word-processing program for other professional needs (describe)	15%	4%	43%	39%
• Use a program for entering or calculating grades. (What program?)	8%	27%	50%	15%
• Try out a program in preparation for students using it.	47%	6%	40%	8%
• Use other kinds of programs	27%	11%	27%	35%

Table XX

While most teachers will tell you that computer use does require from them constraints on personal time, these results show that most teachers are willing to "make" the time and that their most predominant use of the computer is for word processing of some type.

As a follow-up then to this question, coordinators were given a sample of a variety of possible tasks which could be accomplished on the computer, and then asked whether or not they ever encountered these. The responses provided by Table XXI below is a summary of their replies.

COMPUTER COORDINATORS HAVING DONE THESE TASKS

	% Yes
Retrieved administrative information directly from a computer.	67%
Written a memo, letter, or report using a word-processing program.	98%
Tried out an instructional program that might be used by students.	95%
Written a computer program in Basic or another computer language.	84%

Table XXI

As could be expected, the task instructional computer coordinators encountered the least was that of administrative information retrieval, while again tasks involving word processing enjoyed the greatest popularity.

What are the expected and actual outcomes of using computers in the secondary school ?

Most teachers have expressed some reservations about the possible impact of computer use in education. Most of the concern surrounding the possible outcomes of computer use is based not only upon the limited evidence available about the effectiveness of computer use on learning and teaching, but upon the many positive claims which over the years have been made by computer devotees and never materialized. Therefore, it was decided to include in the survey, a few questions whose answers might reveal the current perceptions of the secondary school computer coordinators on this issue. The question which follows then asked the participants FIRST to state what they perceived as the computer's most useful application when their school got its first computer.

Then the participants were asked to assess as they saw it, the level of importance of the computer in certain educational tasks or instructional goals in the years to come. Table XXII and Table XXIII which follow summarizes their responses.

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FOR THE SCHOOL'S FIRST COMPUTER WHAT WAS ITS MOST IMPORTANT TASK?

As a resource for students to learn more about computers 50%

I don't know—I was not present 26%

As a method of improving student's basic skills
in mathematics or language. 13%

As a tool for students to use whenever and wherever
appropriate (no specific task). 7%

As a tool for students to accomplish an academic task—
such as in writing, analyzing data or problem solving 4%

Table XXII

HOW IMPORTANT WILL COMPUTERS BECOME FOR TEACHING STUDENTS?

	Essential	Helpful	
	Important		Little
• Proficiency at doing arithmetic problems...2%	21%	65%	12%
• The ability to apply mathematics to solve practical problems 4%	29%	65%	2%
• Proficiency in the mechanics of English language usage 0%	38%	52%	10%
• The ability to write readable and thoughtful essays and reports.....10%	65%	23%	2%
• Having some competence in a foreign language.............................0%	14%	62%	24%
• Knowing facts in subjects like science and history 2%	18%	75%	6%

Table XXIII

For the school's first computer what was its most important task...as a resource for students to learn more about computers.

How important will computers become in the future for teaching students...the ability to write readable and thoughtful essays and reports.

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Looking at these results, it seems apparent to many readers that teachers after all these years of computer use, still hold some skepticism about the instructional effectiveness of computers in schools. These participating computer coordinators concur to the fact that while computers might be a great asset in tasks or activities requiring word processing, in other facets of the educational process they are only a HELPFUL tool.

In light of their anticipated responses, these participants were also asked if their school obtained several additional computers and what in their opinion would be the main use for these computers. Table XXIV displays their reactions ranked from the most popular use to the least popular one.

What are the most important uses for your new anticipated computers?

ANTICIPATED USES FOR NEW COMPUTERS

Students doing writing with a word processing programming 35%

Teacher using it for classroom preparation 18%

Computer literacy for most students..15%

Remedial work for students performing below grade level 12%

Other (describe) 8%

Practice in math or language skills for most students. 6%

Instruction in computer programming for the more
advanced students 4%

Table XXIV

As can be noted from Table XXIV above, if and when the acquisition of micro-computers will augment, their most popular use will remain word processing. While this popularity might not be overwhelming, their responses to the above statements certainly indicate that the computer as a utility tool will remain the focus of most computer uses.

Finally, to conclude these questions on the computer coordinators' perceived outcomes of computer usage, these participants were asked whether they had heard any reservations expressed about schools buying or using computers for instruction. Ranked from the most often heard to the least, Table XXV displays these reservations:

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RESERVATIONS REGARDING USEAGE BY TEACHERS

Teachers do not have time to plan for
integration of computers into their lessons 27%

The school has too few computers for students
to get enough time to learn 17%

The computer programs cost too much in the
quantity we need 13%

I have not heard any reservations about
computers at this school 11%

There is not enough classroom time to fit
computers into instruction. 10%

Teaching programming is not that important
for children of this age 10%

There are better ways to provide instruction
than using computers 7%

Other reservations you have heard 5%

Table XXV

Looking at the above statements of concern, it is interesting to note that the least concern expressed is that there might be better ways to provide instruction than using computers.

How well trained and literate are secondary high school teachers in the overall use of microcomputers in their school?

Dr. Peter H. Wagschal, acting Associate Dean for program planning and development in the School of Education at the University of Oregon once said that, "The key to efficient use of computers in education is to place the machines in the hands of the individual teacher." While it is true that to be effective in using computers in instruction or administrative tasks, one must be well informed and to be trained to such a degree requires special consideration and constraint on both one's personal and professional time. Most teachers acknowledge that whether they like computers or not, whether the software they see meets their standards or not, or whether they have the time to fit computer generated activities into the

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curriculum, this new interactive electronic technology will continue to play a "steadily augmenting" influential role in their daily school life. As most educators will agree that as teachers they are the most likely ones to determine, in a sensible and realistic manner, how best to use these devices to help their students learn and improve their own teaching practices, teachers must have ample hands-on experiences with computers. Therefore, in order to obtain some information on current teacher literacy as well as on the status of Teacher Training in the Use of Computer Technology, the questionnaire contained three questions related to these issues.

How many staff members, including yourself, would you say are competent in the following types of computer use?

How many staff members, including yourself, would you say are competent in the following types of computer use, and—of this group—how many, if any, are experts who could train other teachers? (Give estimates in both columns below for each type of computer use. If none, write "0.") The responses to this question are summarized in Table XXVI which follows :

HOW MANY STAFF ARE COMPETENT OR EXPERT?				
	Competent		**Expert**	
		Min.- Max.		**Min.- Max.**
Using some instructional computer programs with at least one type of computer	34.2%	2 to 70	10.9%	1 to 20
Knowing about a wide variety of instructional computer programs useful in teaching	22.69%	1 to 50	9.31%	1 to 15
Using word-processing, record-keeping, or similar professional tools	35.46%	1 to 60	12.33%	1 to 25
Writing useful programs in a computer programming language	6.87%	1 to 10	4.64%	0 to 8

Table XXVI

In order to get a better "appreciation or understanding" of these responses, co-ordinators were asked to state how many teachers in each department of their school were able to use computers in instruction without any further training. The summary of these responses can be found in Table XXVII.

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TEACHERS NEEDING NO MORE TRAINING

Department	Computer Using Teachers	Difference* w/Librarian
Library/Media	81.89%	
Agriculture	77.27%	4.62%
Business Ed	74.07%	7.82%
Vocational Ed	53.33%	28.56%
Mathematics	50.42%	31.47%
Science	48.76%	33.13%
Fine Arts	41.74%	40.15%
Language Arts	37.25%	44.64%
English	37.17%	44.72%
Physical Ed	27.34%	54.55%
Social Studies	27.01%	54.88%

*Difference between this department and the librarians.

Table XXVII

How many teachers in each department of their school were able to use computers in instruction without any further training?

Looking at these above findings, it is interesting to note that the more "utilitarian" or "tool" oriented subjects seem to have the most computer literate individuals. In contrast, subjects which require computer integration into the curriculum, seem to have the least computer experienced teachers.

Finally, to conclude the inquiries on teacher training, the participants were asked approximately how many hours in the past three years they had spent in formal classes, training or workshops on computer related topics. Table XXVIII displays their responses.

FORMAL COMPUTER COORDINATOR TRAINING IN LAST THREE YEARS

Less than 10 hours	16.4%
10 to 19 hours	9.1%
20 to 49 hours	32.7%
50 to 100 hours	23.6%
More than 100 hours	18.2%

Table XXVIII

Assuming that a two-day, all day workshop is about 12 hours and a 3-unit college course is about 45 hours of class time, more than 50% of the secondary school computer coordinators spent less than 50 hours in formal training.

As teacher training continues to be a major issue in the use of computers, coordinators were asked to conclude the completion of the questionnaire by expressing their opinion on two critical issues. The first question is addressed to which of the following two options for training would be most preferable:

a) To give as many teachers as possible some training, or
b) To give a few teachers extensive training

The results to the first question can be summarized as follows:

a) 66% concurred to give many teachers some computer training
b) 18.5% concurred to give a few teachers training
c) 14.8% had some other solution

The second question asked whether or not computer related competencies should be required for recertification.

As to the issue of recertification, the majority of the computer coordinators (63.8%) responded negatively.

CONCLUSION

This report summarizes the perceptions and opinions of Secondary School Computer Coordinators about the status of microcomputers in their sch ol. The sample size is approximately 20% of all the junior and senior high schools in the state of Oregon, and is viewed as a reliable representation of these schools. While the results provided by this survey should be viewed and analyzed with prudence, especially when one is tempted to make generalizations in light of them, these findings might be viewed as an accurate reflection on how secondary schools in Oregon acquire and use their computer hardware and software.

The highlights of these findings to the forty-six questions, revolving around a variety of issues of importance to those administrators and faculty who are responsible for the planning of the future of computer technology in the secondary schools, can be summarized as follows:

1. While the regular school or department expenditures on computer technology falls between $4,000 and $8,000 a year, with the majority of these in the more than $8,000 bracket, school computers have had a limited impact on instruction.
2. If the educational effectiveness of microcomputers, especially in the area of instruction, is observed as being insignificant, it might be because of the lack of spare time for teachers to plan for the general use and integration of computer software.
3. While the majority of computer coordinators are full-time regu-

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lar and competent computer using teachers, they see a need for
more formal training for themselves and their colleagues, and the
opportunity for teachers to borrow school owned computers for
use at home.

4. The underutilization of existing hardware and software imparts
the view that computers are only helpful and not important in the
improvement of the learning and teaching process.

This survey provides more relevant, factual and pragmatic information of significance to the decision makers based in schools and school districts at large.
Surveys of this nature are the least costly and the least complex if one is looking
for information based upon the observations, feelings, attitudes and perceptions of
those who use computers daily. When added together, the answers provided by
these human attributes describe what is really going on in the typical secondary
school, and they define issues which have been left unexplored by the typical research studies found in the traditional state, national and international journals on
computers in education. Therefore, it is hoped that the findings provided here will
not only be helpful and informative to the decision making audience, but when
viewed collectively with the already existing amount of literature on the issues
discussed in this document, will yield a better profile of what has happened and
what is to come or should be coming.

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