

COMPUTER AND VIDEO GAME USE AND READING ACHIEVEMENT OF HIGH SCHOOL STUDENTS

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With increased acceptance of computers in our society, examination of high school students' use of computers becomes increasingly important. Many school districts have purchased computers and established courses in computer literacy. More than 40 percent of the high schools in the nation have micro-computers (Computers in the Schools, 1982). As many as 62 percent of secondary schools report computer use (Beck, 1982). Still, little is known about how students use computers, or even to what extent they use computers. Computers may be little used, as Carpenter, Corbitt, Kepner, Lindquist, and Reys (1980) described, "A large majority of . . . (13 and 17 year olds) had neither used a computer nor written a computer program to perform tasks such as solving a linear regression problem, playing games, or analyzing statistical data" (p. 671). Or computer use may be limited to a few subject areas (Maughan, 1982) such as mathematics, science, and business.

While video game playing can be considered to be simply one type of computer use, it is treated here as a separate category to avoid confusion over whether to consider all types of video game use as computer use. In addition, video game use is treated separately because it has been criticized as antithetical to learning. In at least one instance a town ordinance was passed to ban video game playing during school hours (This Town Said No, 1984).

Studies of the usage of computers typically have focused on one part of computer use, instructional computer use.

These studies have indicated that teachers use computers for instructional purposes (Maughan, 1982), that teachers and others thought instructional computer use was a good idea (Computers? You Bet, 1982), and that teachers planned to use computers in their instruction (Trice, 1979). But these studies have not looked at the uses that students make of computers, both in and out of school.

Studies of the relationships between electronic media use and reading achievement have not focused on computers or video games. Instead they have studied the relationships between television viewing and reading achievement (Neuman, 1980) or between use of a wider variety of electronic media (radio, records, and tapes) and reading achievement (Telfer and Kann, 1984). An examination of the relationship between computer use and video game use and reading achievement may be fruitful because of the increasing use of computers and the differences between computers and video games and other electronic media. Computers and video games differ from other electronic media because computers and video games require active physical involvement while television, radio, records and tapes do not. Furthermore, computers require reading. In order to use a computer a student must have reasonably well developed reading skills.

The purpose of this study was to determine the extent and nature of computer and video game use among high school students and to examine the relationship between reading achievement and the use of computers and video games.

Procedures

A survey of computer and video game use was used to determine the habits of 157 11th grade students in a small midwestern town. The survey was administered in English classes by the regular instructors. The survey asked whether students used computers and video games, where they used them, how often they use them, and how much time they spent using them. In addition, those who used computers were asked additional questions about the uses they had for the computers. Responses to the surveys were then tabulated and correlations with reading scores were figured.

Results

The first question asked whether students used computers for purposes other than playing video games. Sixty-three of the students (40.1 percent) said they used computers. These 63 were asked to identify the locations where they used the computers. These responses are shown in Table 1. Students were also asked whether they used video games. One hundred eleven students (70.7 percent) said they used video games and were asked to identify the locations of those video games (Table 2).

Table 1
Numbers and Percentages of Students Using Computers at Various Locations

	Total	At Home	At School	At Work	Other
Number	63	28	37	7	7
Percentage		44.4	58.7	11.1	11.1
Mean Reading Score	21.9	21.9	22.4	21.0	22.0

Table 2
Numbers and Percentages of Students Using Video Games at Various Locations

	Total	At Home	At School	At An Arcade	Other
Number	111	62	3	79	19
Percentage		55.9	2.7	71.2	17.1
Mean Reading Score	21.3	21.2	23.0	20.94	21.63

Additional questions asked students to estimate the number of times per month they used computers and video games and the number of hours they spent each week using computers and video games. The mean responses for these questions are shown in Table 3.

Table 3
Mean Number of Uses and Mean Amount of Time Spent

	Times Used Last Month	Standard Deviation	Hours Used Each Week	Standard Deviation
Computer Users	13.89	10.69	4.52	3.62
Video Game Users	4.52	7.96	1.38	2.28

While the percentage of computer use is considerably lower than the percentage of video game use, the average number of times a computer was used and the average amount of time spent on computers are higher than the average number of times video games were used and the average amount of time video games were used. It must also be noted that the standard deviations are very large, indicating in this case that there were a number of very high scores. Some students indicated that they used computers as many as 50 times a month and for as many as 50 hours.

Students' reading achievement as measured on the reading portion of the district-administered Michigan Educational Assessment Program was correlated with number of times using computers, numbers of hours using computers, numbers of times using video games, and numbers of hours spent using video games. These correlations are shown in Table 4.

Table 4
Correlations Between Reading Achievement
and Times and Hours of
Computer and Video Game Use

	Times Using Computer	Hours Using Computer	Times Using Video Games	Hours Using Video Games
Correlation with Reading Achievement	.16	.14	-.30*	-.28*

* $p < .05$

The correlations between computer use, both number of times and hours spent, and reading achievement are positive, but statistically nonsignificant. Correlations between reading achievement and video game use, though, are statistically significant, but the association is negative. Reading achievement test scores go down as time spent using video games goes up.

Further analysis was done by assigning each student to one of three groups based on computer use (non-users, light users, and heavy users) and to one of three groups based on video game use (non-users, light users, and heavy users). This placed the students in nine groups based on a combination of computer use and video game use. Mean scores were then figured for each of the nine groups. These mean scores are shown in Table 5.

Table 5
Mean Reading Achievement Test Scores for Three Computer Use
Groups
Crossed with Three Video-Game Groups

	Computer (Non-Users)	Computer (Light Users)	Computer (Heavy Users)	Total
	(n = 51)	(n = 9)	(n = 16)	(n = 76)
Video Games (Non-Users)	21.37	22.44	22.19	21.67
Video Games (Light Users)	21.65	20.67	23.25	21.90
Video Games (Heavy Users)	18.54	18.13	22.44	19.66
Total	21.12	20.48	22.59	21.32

As was indicated by the correlations in Table 4, there seems to be a pattern of decreased reading achievement scores as video game use increases. This shows quite clearly among computer non-users and light users. This pattern does not hold for heavy computer users; instead, heavy computer users seem to be on the average skilled readers. It is also interesting to note that the mean reading achievement scores of students who use neither computers nor video games are almost identical

to the scores of those who do (21.37 for non-users, 21.30 for users).

Students who used computers were asked additional questions about how they used them. Five categories of use were identified and students were asked to indicate whether they used computers for schoolwork, job-related activities, word processing, programming, and communicating with others. They were to identify any uses they had. Table 6 contains the numbers and percentages of computer users who checked each category.

Table 6
Numbers and Percentages of Users and Mean Reading Scores
for Five Types of Computer Use

	School- work	Job- Related Activities	Word Processing	Program ming	Communi- cating
Number of Users	30	14	14	43	6
Percentage of Users	47.6	22.2	22.2	68.3	9.5
Mean Reading Score	22.13	21.79	22.14	22.09	20.17

Students who indicated that they used computers for the purposes listed in Table 6 also identified the specific uses they had within each category. Table 7 shows the numbers of students checking each specific use and the average amount of time those students spent weekly with each activity.

Table 7
Numbers of Students Checking Each Use and
Mean Hours Spent With Each Use

Use	Number of Students	Mean Hours Spent
Schoolwork	30	
Word Processing	13	1.4
Programming for Computer Class	15	2.8
Mathematical Calculations	15	1.9
Practice Exercises	6	3.8
Other Schoolwork	4	2.3
Job-Related Activities	14	
Teaching Someone Else	3	.7
Working as a Clerk	7	5.1
Other	11	4.3
Word Processing	14	
Writing Papers	13	2.2
Writing Letters	8	1.5
Word Processing		

for Others	3	2.7
Learning Word Processing	8	1.1
Programming	43	
Learning to Program	34	2.1
Programming Games	17	1.2
Mathematical Programs	7	1.4
Educational Programs	7	2.9
Learning Languages Other than BASIC	5	.7
Communicating with Others	6	
With Other Computer Users	6	.7

Discussion

The results of this study suggest that computer use and video game use are common among these 11th grade students. Although video game use is more widespread among the students, video games tend to be used differently than computers. Video games tend to be used by more students, but less often and for shorter periods of time.

Heavy computer use is relatively common. Among those who use computers, more than half use computers every third day or more often. And these uses tend to be outside of school as well as in school, most commonly at home or at a friend's house. Computer use at work is relatively unusual among these students.

Although the relationship between computer use and reading achievement suggests a positive association, with reading achievement increasing as computer use increases, the correlations are nonsignificant. This finding may indicate that computer users span a wide range of ability groups, rather than being primarily among the most academically able students.

As a contrast, the relationship between video game use and reading achievement is statistically significant, though modest, and negative. Reading achievement decreases as video game use increases. Possibly the types of high school students who use video games frequently may be students with lower ability levels or lower motivation levels. Or it may be that video games take time away from academic activities.

The relationship, however, between video game use and reading achievement seems to be different for heavy computer users, suggesting that the heavy computer users may be quite different from the other students. There seems to be little relationship between video game use and reading achievement for heavy computer users.

Finally, the major categories of computer use are programming, word processing mathematical calculations, writing papers, and writing letters. Emphasis on these categories seems to suggest that computers are indeed most often used in a relatively few subject areas, but that the uses are broader than just computer class and

math class. Also, computer use is clearly not limited to school time. As an example, nearly two-thirds of those who use computers for programming do it outside of school.

Implications

Implications from this study can be drawn in two areas, recommendations based on these results and suggestions for future research. Recommendations based on this study must be viewed with caution because the study looks at just one grade level at one school. Still, the results suggest that video game playing is a factor associated with lowered reading achievement scores. Perhaps students should be encouraged to limit video game playing.

Suggestions for further research are several. First, the survey can be expanded to look at a larger sample, perhaps examining the computer and video game use habits of randomly or systematically selected schools with a state or region. Second, the study could be made to look longitudinally at computer and video game use and reading achievement. The question of whether changes in computer or video game use are reflected in changes in reading achievement could be examined. Finally, older and younger students' computer and video game use habits could be examined, to see if there tend to be age-related differences in those habits.

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