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ABSTRACT

Rural teachers have few opportunities to learn specific strategies for developing computer literacy among boys and girls in their classrooms. This paper describes an inservice program for rural Kansas teachers that taught skills such as programming, software evaluation, word processing, building a database, and creating lesson plans that involve software. The training was delivered via a statewide audio teleconferencing system and a "traveling" classroom. After basic computer skills training, the teachers designed and implemented gender-equitable computer strategies in their upper elementary and middle school classrooms. During the semester, most teachers improved their students' access to computers, and many became the primary resource person for computers in their schools. Class activities and projects included: (1) an inter-school game of Trivial Pursuit over the electronic bulletin board; (2) cooperation in story writing between learning disabled classes in two schools; (3) computer literacy students teaching older math students to create geometric figures using Logowriter; (4) computer literacy students creating a dinosaur database and teaching younger students to use it; (5) a mother-daughter breakfast and computer session; and (6) a parents' night, with students teaching parents computer skills. Included are examples from a teacher journal on computer uses, and results from a survey of student computer attitudes. (SV)

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HIGH TECH IN THE HEARTLAND:

TEACHERS DESIGNING COMPUTER ACTIVITIES FOR RURAL CLASSROOMS

ABSTRACT

Motivating rural boys and girls to become interested in computers and to learn about computers presents challenges which may be hindered or aided by the acknowledged characteristics of rural America. Less computer access in rural areas and fewer resources for learning about technology will handicap rural students as compared to their metropolitan counterparts. A recent study showed that 80% of the 2000 largest, most financially capable schools used computers for classroom instruction while only 40% of the smaller, poorer schools did. Rural teachers who are interested in computer education have few resources to earn specific strategies to assure quality and equitable computer learning for boys and girls in their classrooms. Teachers are often distant from higher education and other resources, so they have fewer opportunities to learn about computers and computer applications in their classrooms. Computer books, manuals, and software fail to include or address "ruralness" in content as well as in methodology.

This presentation will briefly describe an inservice program for teachers in rural Kansas. The teachers were taught such computer skills as programming, software evaluation, and word processing. This training was delivered via telecommunication and a 'traveling' classroom. After basic computer skills training the teachers designed computer strategies for their classrooms which were gender equitable, high quality, and which generally promoted interest in computers.

In addition, specific activities designed by rural general and special education teachers will be described. These activities included educating parents, involving the community in computer activities in the school, using computers in a variety of activities, and developing programs and databases with rural content. Several teachers utilized a modem and developed telecommunications activities to link rural classrooms together and to link their students with state and national bulletin boards. Because these activities were designed by rural teachers, many will be applicable or adaptable to other rural settings and they will fill the void in computer literature regarding specific suggestions for rural classrooms.

The objectives of this presentation are to provide specific suggestions for rural teachers to develop student interest in and skills with computers and to describe a distance inservice program to teach rural teachers about computer technology. These objectives will be met using descriptions and demonstrations. A rural activities list will be distributed to the participants. Finally, a videotape will be shown which was developed specifically to promote interest in computers for rural girls.

INTRODUCTION

Rural schools comprise most of the nation's schools and a majority of school districts are rural, with rural teachers education 1/3 of the student population. Although transportation and telecommunication have reduced some of the differences between rural and urban areas, there is an increasing gap between urban and rural in areas such as fewer resources, higher poverty rates, lower incomes for women, and lower youthful

aspirations in rural areas. Rural young people remain victims of cultural lag, where home and school continue to condition them to accept a role definition that is no longer valid. The rural young students view of themselves, their lives, and their careers may be partially circumscribed by access to technology and her perception of her role in technology.

Less computer access in rural areas and fewer resources for learning about technology will handicap rural students as compared to their metropolitan counterparts. A recent study showed that 80% of the 2,000 largest, most financially capable schools used computers for classroom instruction while on 40% of the smaller, poorer schools did not (Mathews & Winkle, 1982).

In Kansas, 91% of the schools districts are labeled small, of which 75% are called very small. Providing innovative educational programs presents special problems and challenges of rural areas mentioned by Nachtigal (1982) and Helge (1981) which impact on educational equity and on the utilization of new technology in education.

In rural areas, there is less access to computers and fewer resources for learning technology (Anderson, 1984). Rural teachers who are interested in computer education and or gender equity have few resources to learn specific strategies to assure quality and equitable computer learning for boys and girls in their classrooms.

This paper will describe a model to train practicing teaches in rural areas to assure computer literacy in their upper elementary and middle school classrooms. Special materials developed to demonstrate computer applications in rural areas, successful strategies and utilization of existing materials are included in the program model. In addition, a unique delivery system which delivers the curriculum to practicing teachers in rural areas will be described. Participants were from all over the state (see Figure 1).

The primary content of the computer training was: LogoWriter, evaluation of software, building a database, lesson plans involving software, the computer language BASIC, and telecommunications. The program also utilized the book, Neuter Computer (Sanders and Stone, 1986), and several research articles. The student requirements for computer applications in their rural classrooms were: parent or community involvement; a research project; a journal of strategies, or ideas used in the classroom; a telecommunications, data base, or cooperative learning project; and a planning book of future ideas. These assignments were purposefully non-specific because of the differences in the students, their communities, and the schools they taught in dictated that their projects would be very different from each other.

The teachers learned about successful strategies from the text, from class, and from each other. During the semester they realized this goal as they developed, adopted, adapted, or invented new strategies that fit their unique situations. The students also shared their ideas with others during class and during regional group meetings. Project participants evaluated their strategies.

The delivery system had to be unique to meet the needs of rural teachers. Project participants were from all over the state. Aspects of the program included moveable training sites, the use of electric bulletin boards, and interactive telecommunications. The interactive telecommunications used was TELENET, a state-wide audio teleconferencing system at 36 permanent sites in Kansas equipped with high quality microphones and public address speakers. The group "met" six times during the year via TELENET. Guest speakers over the Kansas TELENET system included Mary McGinnis of the Women's Action Alliance, the New York State Computer Equity Project; and Kay Gilliland, director of EQUALS in Mathematics and Technology at the University of California, Berkeley.

Access of teacher and students to computers during the school day varied greatly. All teachers had access to at least one computer for part of the school day. Several teachers were allowed to take their students to the high school computer lab, always in a different building. One teacher had her own lab and one teacher had one computer for her class every other week. All teachers except the one with her own lab had improved access by the end of the project, and most became the primary resource person regarding computers in their schools.

Project participants produced a diverse array of projects and suggestions, which included: a class in which computer students taught an older math class to do geometric

.gures using logo-writer, a mother-daughter breakfast and computer session, an in-service
f other teachers, a game of inter-school question/answer tag over the electronic bulletin board, a newsletter produced by special education students, and a parent night with children teaching parents computer skills. A few examples of teacher-devised computer activities are:

Pam Stuewe, Alma, Kansas, used Story Starter for LD students at the two different schools she services. After the story idea was selected, students at one school started the story with one paragraph, proofread the paragraph, and then saved it to a disk. The disk was taken to the other school where students added to the story, proofread and saved it to a disk. The disk was passed back and forth for three days when students were told to finish their story. This was a good experience in cooperation for the LD students.

Betty Penix, Centralia, Kansas, and Julie Strathman, Bern, Kansas used the electronic bulletin board located at Kansas State University to have their fifth and sixth grade students do a cross-classroom project. These two classes played a game of "Trivial Pursuit" via the computer and the technology of telecommunications. On a weekly basis the students at each school try to "stump" the other school with a trivia question from the Guiness Book of World Records, World Almanac, Encyclopedia or other reference sources. When the students are ready to send their answer or a new question, they hook up the modem to the computer and telephone jack. The information is typed into the computer and sent over the telephone lines to the electronic bulletin board at Kansas State University and from there to the computer screen at the other school. Questions could come from any subject area. One question came from a social studies class when one of the students asked a question about when tanks were first used in wars. Besides the facts and information gained from researching the trivia questions, students are learning at a very early age about the role technology will play in their futures.

Kaye Meyer, Liberal, Kansas, discovered that the concepts used in LOGOWriter
orrespond closely with the fundamental geometry concepts taught in the eighth grade math urriculum. After her computer literacy students had some experience with LogoWriter, she approached the eight grade math instructor with a suggestion for cooperation across the classrooms. The math class and computer literacy classes were combined to create geometric figures using LogoWriter. The computer literacy students were advisors in using the program, but all students received "hands on" experience at creating geometric shapes using Logowriter.

The goals for this effort are as follows:

To provide an opportunity for a larger portion of the student body to experience hands on guided computer use in a cooperative learning situation.

To develop appropriate problem solving strategies.

To develop appropriate skills in the use of computers in problem solving situations.

To develop estimating skills specifically with angles and line lengths.

To develop an understanding of geometric terms and concepts and apply those concepts to problem solving activities.

The project involved 33 eighth grade students who each had six hours "hands on" computer time. The first two sessions were used to introduce the LOGO program and t. experiment with the use of primitives and procedures. The last four sessions were used to allow each student lab time to complete the twelve activities to create twelve different geometric shapes. (These worksheets pages are included in the report.) To aid in the problem solving activities a transparency of each geometric figure was provided to each pair of students which they placed on the monitor allowing them to "trace" each of the figures. This proved to be valuable in the development of their procedures.

This was an extremely successful project with even the most unmotivated students tively participating and extremely interested in solving each of the problems.

Dan Brown, Morganville, Kansas, arranged to have his fifth grade class use some of heir reading time to help a second grade class research dinosaurs. This information was sed to create a dinosaur database which fifth graders taught second graders how to search, sort and find information. To accompany the database, students cooperated in making the file into a book on dinosaurs, adding pictures drawn by the students. The end results were most satisfactory, with lots of good results. Students learned: to

cooperate, about dinosaurs, about computer databases, how to research and edit, and best all they developed an interest in reading.

Julie Strathman's fifth and sixth grade class at Bern, Kansas, like to use the program "Odel Lake". To tie computer work to other areas of the curriculum the classes made a twelve foot mural of Odel Lake for Art Class. Students worked in groups to develop the food chain of Odel Lake. The students were proud to display their work in the lunchroom.

Yvonne Lenhart, Riley, Dan Brown, Morganville, Donna George, Paradise, Diane O'Neal, Turon, and Betty Penix, Centralia, each arranged a Parents' Night in conjunction with other programs, such as, music, science project exhibit or a volleyball game, to let parents know what students are learning by students on the computer. Students were the ones responsible for demonstrating to their parents how to use software programs such as LOGO, FrEdBase, Appleworks and problem-solving software. At the end of the programs, parents were presented with certificates and treated to cookies and drinks.

Joyce Crabtree, Brewster, Kansas sent a questionnaire to mothers of girls in the fourth grade class. She then invited mothers and daughters to a breakfast, where each girl student showed her mother how she could use the Appleworks work processor. Daughters taught their mothers different commands and guided them in the correction of a paragraph with numerous errors. A discussion followed on software available, inequities in computer use by boys and girls, and inequities in advertising of computers. Mothers were then asked to complete a second questionnaire. The two questionnaires were different with the first one deliberately omitting any questions concerning computer equity.

An example of an idea journal and the use of telecommunications is found in Figure 2.

To evaluate the program, a study was conducted to assess the effects of participation in the program on the skills and attitudes of the teachers and their students. Project staff visited the classrooms of all the participants and at the same location, visited other classrooms of children at the same grade levels as those taught by teachers in the project (control classrooms). They interviewed two boys and two girls per classroom, asking them two questions, "Do you think you will use computers in the future and, if so, how?" and "Do you want to learn more about computers and, if yes, what?"

Seventy-one experimental children, 5th through 8th graders (36 boys, 35 girls), were interviewed. Also interviewed were 22 boys and 20 girls whose teachers did not participate in the making a total of 42 children in the control group.

In addition, all students in the above classes and completed a survey about computer-related attitudes (Wilder, Mackie, and Cooper, 1985). Six-hundred forty three students completed the survey. Experimental group was 349 and 294 were in the control group.

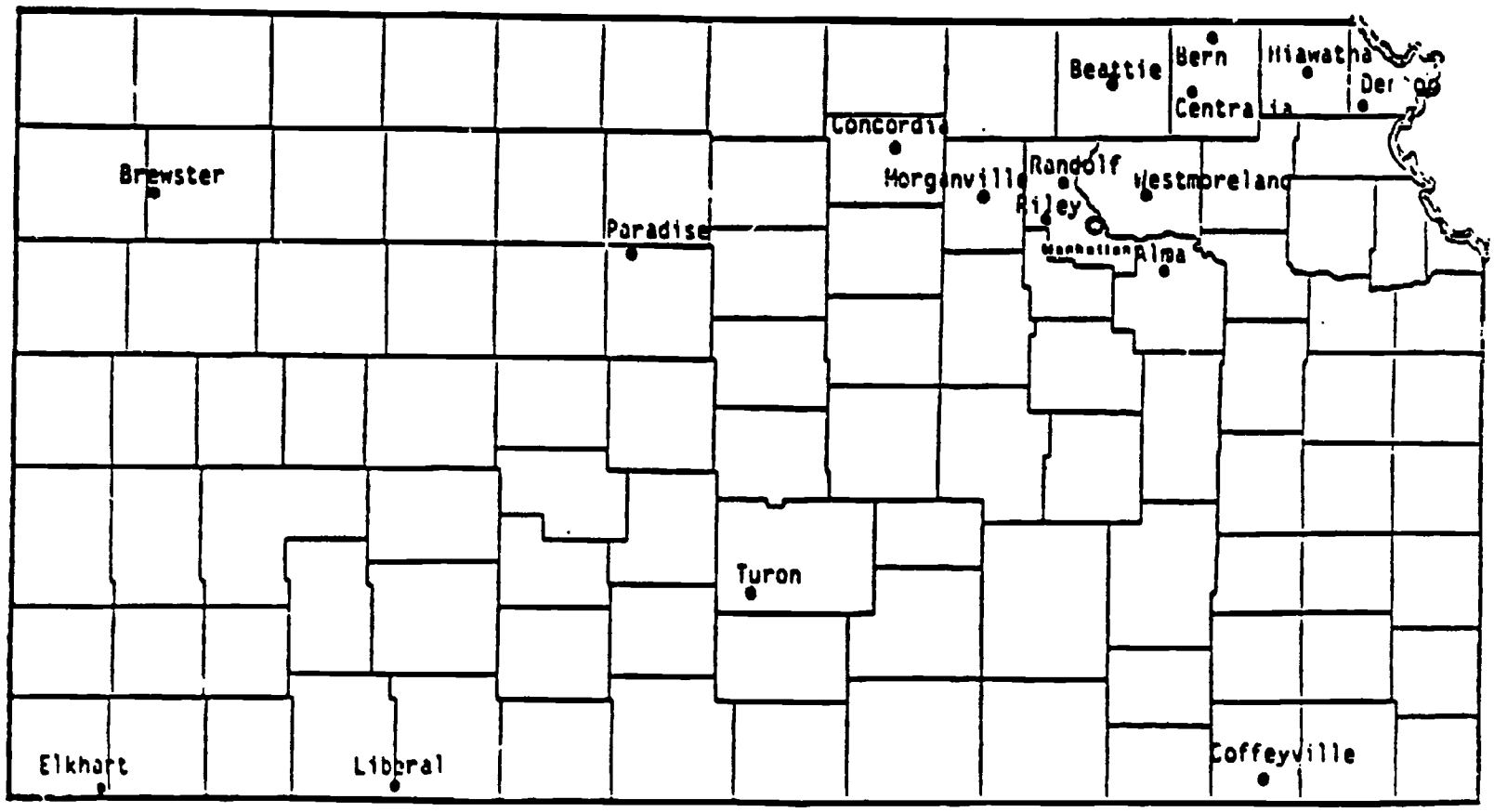
The survey of 643 students asked for ratings of 1-9 for likes and dislikes related to school subjects or computer activities. This survey was used for a study of guide differences in school and computer interests done with 1,600 urban children and published in 1985 (Wilder, Mackie, and Cooper, 1985), and to compare participant and non-participant student responses. The results of this survey of 349 participating students and 294 non-participant students are found in Figure 3. Ratings are 1 = likes a lot and 9 = dislikes a lot.

Project children rated writing as neutral (4.9), computers as likes (2.2), science as neutral (4.8), math as between neutral and likes (4.6), and video games as like a lot (2.0). Non-project students reported liking all subject areas more than did project students. They liked computers a little more (2.6 versus 2.2) and video games a little more (1.9 versus 2.0).

We asked all experimental and control children to tell us their favorite school subjects, after experimental children's teachers had been in our project. Results of these responses are found in Figure 4. Although none of the groups said "computer" was their favorite subject, it was more popular with girls than boys in both groups, and with experimental than with control students.

The results of the student interviews can be seen in Figure 5. Both boys and girls in classrooms of participating teachers said they would use computers in the future (girls - 94%, boys = 78%). Also both genders said they wanted to know more about computers (97%,

Figure 1


Beattie
Bern
Centra
Hiawatha
Concordia
Brewster
Morganville
Randolf
Riley
Westmoreland
Manhattan
Alma
Paradise
Turon
Elkhart
Liberal
Coffeyville

94%). Although control group students also wanted to know more about computers (90%, 86%) they did not respond positively at the rate that experimental students did. They also showed much less agreement that computers would be part of their futures, with 80% of the girls and 59% of the boys responding positively. Group means for "computers in the future" were 86% for experimental and 69% for control students. For "wanting to know more", 96% experimental children and 88% of control children wanted to know more about computers. Figure 6 shows experiential students comments and Figure 7 shows control children's responses.

Twenty-three percent of all interviewed students said they had a computer at home this included 19% of the girls and 26% of the boys. Fifty-six percent of those who had computers at home were in project classrooms. Students who had computers in their homes reported using them for 15 minutes to 48 hours a week. Participant students used the computer at home for an average of 5.3 hours per week (range = .25 to 40) and non-participant children used their home computers an average of 6.7 hours. per week (range = 1-48). When students were asked who used the computer most at home 31.1% said they did, with father next at 26.9%, brother at 18.5%, mother at 16.8% followed, with sister and all at 3.4% each. It seems that having and using a computer at home had minimal impact on likes and dislikes of computers at school.

In summary, rural teachers are very creative at gaining access to computers and utilizing computers in their classrooms. They are able to adopt and adapt programs, ideas, and curricula to fit the needs of their students and the unique situations inherent in their rural settings.

Figure 2

JOURNAL ON COMPUTER USES

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January 14, 1989

We will begin a special project after school to look at direct training of elementary students in computer applications. We started with the three girls we see and asked each of them to pick a peer to work with. This bases was designed to service two factors: computer use and social applications.

Parental support and student interest is very high but the biggest problem is administration support. Perhaps next year we can approach the District administration about setting up this type of program during study periods.

January 20, 1989

Keyboarding should be formally taught to young students. The "Computer Club" members seemed to enjoy several of the key-boarding activities. These could be both on computer and off computer. Increased speed in data entry will increase the student's proficiency with computer use. We copied disks for the club members and let the students take them to their own classrooms. Perhaps next year we could work with the regular education teachers to allow peer tutoring on specific software applications.

January 25, 1989

We used a packaged data-base in Social Studies based upon the Presidents. This activity showed the students how data can be organized. The use of data-bases could be expanded to include numerous students' inputs.

February 1, 1989

This week we made each student their own FrEdWriter disk. We have begun a daily log activity in English and with several of the students who are having some serious emotiona problems, they were unwilling to express their thoughts on paper but were very willing to enter these same concerns on computer. The problem now is security. Somehow we need to make access secure so others are not able to gain access without permission.

February 6, 1989

The "Computer Club" worked on word-processing this week. We again made FrEdWriter disks for them to share with the other classrooms. The limitations of this program are many but for this age of student it makes a very good beginning.

Perhaps next year we can issue each classroom a disk and can use as a building pen-pal activity. This could also be done with the use of modem.

February 13, 1989

We had a student move away this week, we used some of the graphic programs, i.e. Print-Shop to make a card for her. The students really liked doing this. We could use on a building wide situation to recognize special days, these should be student constructed. Perhaps include this as a classroom job which would be included in the classroom token economy.

February 17, 1989

Discovered an I.R.V. video program,"Computer Literacy", which does a very good job in covering the basics of computer applications. I think if we make this with "Computer Break" we could provide a great video background to systematic instruction of skills in a pleasant format.

(this project was down-loaded from an electronic bulletin board)

Figure 3

Means

likes/dislikes
1 = likes a lot
5 = neutral
9 = dislikes a lot

	Writing	Computers	Science	Math	Video games
Boys	5.731	2.180	4.689	4.392	1.589
Girls	3.540	1.623	4.286	3.935	2.345
P	4.917	2.153	4.851	4.560	2.009
NP	4.395	1.626	4.073	3.701	1.864

Figure 4

Favorite Subject in School

Experimental Girls (N=162)

Math = 29%
Science = 13%
English = 10%
Spelling = 9%
Social Studies = 6%
Computer = 4%
Reading = 5%
PE = 3%
Music = 3%
Art = 1%

Experimental Boys (N=187)

Math = 32%
PE = 13%
Science = 11%
Social Studies = 6%
English = 5%
Spelling = 4%
Art = 3%
Reading = 3%
Computer = 2%
Shop = 2%
History = 2%
Band = 5%
Music = 0%

Non-Experimental Girls (N=147)	Non-Experiential Boys (N=142)
Math = 35%	Math = 33%
Science = 19%	Science = 18%
Spelling = 12%	PE = 12%
Art = 7%	Spelling = 10%
PE = 5%	Social Studies = 7%
Social Studies = 4%	Art = 7%
English = 3%	Reading = 2%
Reading = 3%	English = 2%
Computer = 1%	Computer = 0%
Music = 1%	Music = 0%

Figure 5

STUDENT INTERVIEWS

	Participating	Non-participating
Girls	1. Will use? Yes 94% No 3%	1. Will use? Yes 80% No 5%
	2. Know more? Yes 97% No 3%	2. Know more? Yes 90% No 0%
Boys	1. Will use? Yes 78% No 17%	1. Will use? Yes 59% No 23%
	2. Know more? Yes 94% No 3%	2. Know more? Yes 86% No 0%
Total	1. Will use? Yes 86% No 8%	1. Will use? Yes 69% No 14%
	2. Know more? Yes 96% No 1%	2. Know more? Yes 88% (95%) No 0%

Figure 6

EXPERIMENTAL GIRLS

How will use?

- Like taxes and stuff
- Financial problems
- Do college work
- For financial stuff
- Teaching
- For checks or as a teacher
- To be a lawyer
- To be a scientist
- Lots of stuff, probably about everything
- Accountant
- To be an astronaut
- For work & stuff, I will be a lawyer
- Mess around with
- I want to manage a business
- To organize
- Write reports

What know more about?
- How to start it and put programs in
- Go fast on keys
- How to program
- How to make big posters

EXPERIMENTAL BOYS

How will use?
- Carpentry
- Architecture
- Farm work
- To figure out cures for sickness
- To keep track of farming inventory and thing like that
- To keep stuff and like dad does
- Talking with others on national computer system
- Keep track of taxes
- To cheat on math
- Just to play

What know more about?
- How to solve problems
- How to be an accountant or banker
- Learn how to play the really hard videos and to work for the government
- To see what's going on in the world.
- Everything

Figure 7

Control Girls

How will use?
- prob. everything
- record keeping
- college writing
- financial problems
- to college work
- to write stuff
- mess around
- to organize
- for checks
- as a teacher
- office work
- type letters
- taxes and stuff

Know more about?
- more games
- how to write new games
- what the keys do & stand for
- type better
- how to program
- write something & publish it
- different parts, disk lines
- how to find things easier
- how to work it better
- do fast on keys
- put my hands right

Control Boys

How will use?
- farming inventory
- figure out cures for sickness
- job - accountant
- help me work
- architecture
- write programs
- carpentry
- to keep stuff like Dad does

Know more about?
- how to be an accountant or bank
- how to solve problems
- see what's going on in the world
- to do your homework
- make pictures on screen
- how to play hard video games
- play games
- everything
- whatever a computer can do

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