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ABSTRACT

During the 1973 convention of the National Association of Secondary School Principals, 12 secondary school "learning how" projects in which educational technology is built into the curriculum were presented. The projects used computers, cassettes, a systems approach, and multiple methods. This newsletter gives brief details of the project machinery and lists a contact to whom requests for additional information should be addressed. Projects are mainly in Eastern states. (SK)

Research
Ideas
Practice

CURRICULUM Report

FROM THE CURRICULUM SERVICE CENTER / NASSP

Vol. 3, No. 4 March 1974

THERE IS EVIDENCE THAT...

Technology Does Help!

Immediately Ahead

This issue of Curriculum Report might have been subtitled, "Second Annual Convention Curriculum Report" since, as in 1973, the programs and projects discussed here are those featured at NASSP's Convention. The reasons for having this issue available at the Convention are the same as a year ago; namely:

- the descriptions provide useful introductions to the Learning Laboratories for convention-goers who visit the Curriculum-Technology Center,
- they cover a major feature of the Convention for those attending the Convention but who may be able to spend little or no time in the Center, and
- since the Report is also mailed to all NASSP members, it gives those not at the Convention some of the ideas and contacts they would have picked up had they attended the meetings. (This explains the use of the past tense in this Report.)

For all readers, though, the purpose of this CR is to provide information about the current status of educational technology by discussing its application in several school situations.

During the past 10 years, the U.S. Office of Education has provided more than $1.2 billion in support of projects that involved educational technology in one form or another; schools and school districts have invested additional millions. Sharing these and related experiences permits others to benefit from the successes--and the failures--of these projects, an especially desirable possibility in these days when developmental dollars are by no means as plentiful as they were just a short time ago.

To Be Taken as Needed

The approach to educational technology on the part of some educators has been, it must be admitted, overly optimistic and minimally analytical. Nonetheless, there is abundant evidence that the products which modern technology has put at the disposal of teachers and students, when thoughtfully selected and applied, can make the teaching/learning process more productive and better suited to individual characteristics. A hopeful-but-cautious attitude toward the application of technology to the solution

NASSP's Committee on Educational Technology helped develop the Curriculum-Technology Center as a major four-day feature of the 1974 Convention, similar in general character and purpose to the Curriculum Learning Center at the 1973 Convention, but different in content and operating details.

The 1974 Center was made up of three main areas:

(1) Learning Laboratories, in which participants had opportunities for "hands-on" experience with (or demonstrations of) a variety of educational programs and projects, for the most part school-based;

(2) Briefing Center, where project personnel made large-group presentations of their work and its supporting technology; and

(3) Display Lounge, a noncommercial area where the materials and information about other new and unusual programs and projects were displayed and where informal talk about the featured programs could be easily carried on.

This Curriculum Report consists primarily of descriptions of ways in which more than a dozen institutions are using modern technology to improve the educational opportunities available to students. These descriptions cover some, but not all, of the school and college programs presented in the Learning Laboratories.

of educational problems was summarized recently by Michael D. Neben of USOE in a talk he gave to the New York State Educational Communications Association. Here are the six points he made:

- ✓ Start with a problem, not with a piece of technology. Then find the appropriate media system to attack it.
- ✓ Don't scatter your efforts. Select carefully those few important objectives which you can achieve. Then make the media work hard toward that goal.
- ✓ Use the new media as a full partner with a serious role to play in the educational process, and not simply as some extra measure to enrich the present process.
- ✓ Integrate media as components in a coherent hybrid system designed to achieve specific and important educational objectives. Do not expect the media to succeed in a stand-alone design or when used for trivial purposes.
- ✓ Use the new media in a context of change to help you do new and vital things that cannot be done by conventional means. This is where the potential for economy exists, not in the present budget.
- ✓ Do not expect the media to serve as a miracle drug for your ailing educational system. Use the new media for what they are--favorable and potential tools for teachers, administrators, and learners. Learn to use these tools appropriately, imaginatively, effectively, and efficiently, and they will help education do more, do it better, and do it for more people.

Some of the Evidence

Each of the following write-ups includes a contact to whom requests for additional information should be addressed. The titles used here to identify the Learning Lab programs were selected to suggest the scope of the presentations to be made in the Convention's Curriculum-Technology Center, and are not in every case the titles by which the enterprises are known on their home bases.

A SYSTEMS APPROACH TO EDUCATION Jamesville Dewitt Central Schools, Dewitt, N.Y. 13214. Contact: Olcott Gardner, Director of research.

The Jamesville Dewitt schools take a systems approach to the individualizing of instruction by providing computerized monitoring of pupil achievement of educational objectives, ranging from pretests through curriculum-imbedded tests to post-tests. Primary and secondary instructional diagnosis and prescription activities make individual guidance available to each student throughout the learning process. (At the Convention, this monitoring was demonstrated to participants through guided simulation.)

The school district's Evaluation Center also makes use of New York State's System for Pupil and Program Evaluation and Development (SPPED). Comprehensive achievement monitoring is done on a minicomputer to determine a student's entry level of mastery on each learning objective. Achievement gain is measured following instruction on each objective, and post-instructional retention is monitored to indicate when reenforcement should be provided. This process helps administrators to identify and focus on existing curriculum problems and to assist teachers in revising their teaching strategies and in other ways find solutions for these problems.

INDIVIDUALIZED INSTRUCTION IN ALGEBRA WITH ELECTRONIC MEDIA SUPPORT Half Hollow Hills High School, Dix Hills, N.Y. 11746. Contact: Warren J. Koch, principal.

This program began three years ago as the outcome of a search for a more effective means of teaching algebra to slower students and to others who, for one reason or another need more than the usual amount of time and help in mastering elementary algebra.

In the summer of 1971, four teachers in the mathematics department participated in a school-sponsored workshop to try to put together an individualized program. They divided the traditional algebra course into about 20 units. For each of these the writing team prepared one or more LAPS which permitted the student to move through the course at his or her own optimum rate. The teacher became essentially a tutor who worked with students on a one-to-one basis. But some serious problems emerged that first year. For instance,

- Testing became a huge administrative chore. The setup called for a student to be tested when he had completed a unit, which meant under the 1971-72 operating conditions that the teacher had to stop everything else and get out test materials for the student.

- Even though the intent was to individualize learning completely, some "stand-up" teaching in the traditional manner still seemed necessary.

- Correcting the many individual tests, on which the plan depended so extensively, was also a problem. Arrangements were finally made to have the correcting done by the school's computer, but before this was possible all tests had to be re-written so they could be programed into the computer. This was done in a summer 1972 staff workshop.

A third staff workshop in the summer of 1973 developed behavioral objectives and diagnostic tests for the course, and these tests were used in setting up class groups for the present school year. Several sections were scheduled simultaneously to permit students to move easily from section to section as their progress indicates. Such grouping and scheduling makes it possible for the teacher to work not only with single students but also with small groups of students with similar needs.

This year a separate testing room has been set up. When a student is ready for a particular test the teacher gives him a copy and sends him to the testing room to work on it. From there the student takes it to the computer lab, where it is scored immediately, and then to the teacher. The computer lab is supervised by a teacher aide, while a senior student volunteer aide is responsible for the testing room.

The program has been developed entirely by drawing on local resources; no outside funding, either state or federal, has been used.

INDIVIDUALIZED INSTRUCTION IN SECONDARY SCHOOL MATHEMATICS Shore Regional High School, West Long Branch, N.J. 07764. Contact: Mervine L. Edwards, chairman, mathematics department.

From experimental activities with a handful of students in the fall of 1970, this program expanded to 14 classes in September 1971. And in the current school year, all offerings in Algebra I, Algebra II, Geometry, and General Mathematics--33 sections in all--are operating on a completely individualized basis. In this curriculum design there is no provision for group instruction.

The overall purpose of the project has been to make available learning experiences in mathematics in which students of all levels of ability will be successful. (On standardized tests of arithmetic competence, students range from the 10th to the 99th percentile.) Among the features that distinguish the program are these:

- There is no failure. A student does not progress to the next unit until he has demonstrated mastery of the current one.
- Each student progresses at his own rate; there is no penalty for being slow.
- Grading is not conditioned by time spent; a student's progress is "graded" by the units of work completed, whether this means one month or one year.
- The student competes only with himself.
- Constant review is provided. At the end of every new topic he is quizzed on that topic as well as on every previous topic.
- There is a closer student-teacher relationship in this instructional plan than is possible under the more usual group instruction.

- Students with poor reading and elementary arithmetic backgrounds are aided in many ways, especially by the carefully selected vocabulary of the printed booklets that have been prepared with the needs of such students in mind.

- Home-produced 10-minute cassette TV tapes are available for remedial instruction in some of the more difficult topics.

The traditionally poor math student finds this approach encouraging, for it makes no assumption about the quality of his background in mathematics; he moves on from whatever point he is ready to start from. As for the more talented student, he is not bored by the repetition that often is needed in customary teaching schemes; he can go as fast and as deep as he desires. If he wishes, he can finish two courses in one school year, while a very weak student may take two years to master one course.

An adaptation of these materials has been prepared for commercial distribution by Holt, Rinehart, and Winston, 383 Madison Ave., New York, N.Y. 10017.

HUNTINGTON TWO (Computer Simulation Materials) College of Engineering, SUNY at Stony Brook, Stony Brook, N.Y. 11790. Contact: Ludwig Braun, project director.

The Huntington Computer Project, now more commonly known as Huntington Two, has been working for a number of years on the exploration of ways of using the digital computer in support of learning in all aspects of the secondary school curriculum. Since 1970, the staff has given concentrated attention to the development of computer simulations in biology, physics, and social studies. About two dozen simulation packages, out of a projected 100, have been completed and are available through commercial channels.

Among the 11 simulation packages scheduled for use at the Project's Convention Learning Laboratory are:

- LOCKEY: Lock-and-key model of enzyme action
- POP: Dynamics of sample populations
- POLUT: Pollution of a stream
- MARKET: A two-company competitive marketing game

Each simulation package contains:

(1) A paper-tape copy of the simulation program in BASIC,

(2) A teacher's guide covering such matters as preparing students to use the program and discussion questions for use after the program has been run,

(3) A sample run to give the teacher an understanding of how the program works,

(4) A laboratory manual to help students explore the simulated situation,

(5) A resource manual which discusses such things as the mathematical model on which the simulation is based, ways of modifying the program, and a bibliography of related books, articles, and films.

The simulation packages can be purchased from Digital Equipment Corp., 148 Main St., Maynard, Mass. 01754. A filmstrip and accompanying cassette, "Simulation, An Educational Tool," which explains the nature of simulation and its classroom uses, can be borrowed or purchased from the Huntington Two office at SUNY/Stony Brook.

INDIVIDUAL PUPIL ASSESSMENT AND EVALUATION Caldwell-West Caldwell Schools, Caldwell, N.J. 07706. Contact: Joseph H. Anderson, assistant superintendent of schools.

The goal of Caldwell's Individual Pupil Assessment Program (IPAE) is to provide classroom teachers with additional tools with which to evaluate the learning progress their students are making. IPAE can be characterized as a performance-oriented test-and-evaluation scheme which aids teachers and administrators to monitor the performance of students and to assess the effectiveness of the curriculum and the various instructional patterns that are used. Correspondingly, the student obtains detailed information about his progress, or lack of, so he can monitor his own accomplishments in a given course.

Basic to the program is describing a given course in terms of student-performance objectives. When this has been done, for each objective, a number--usually four or more--of Criterion Referenced Test (CRT) items are prepared. The items in each such groups are equivalent and interchangeable. They can, therefore, be combined to form longer interchangeable tests.

Both students and teachers receive prompt and concrete feedback after each test administration. The student gets a report which, in addition to a total score, lists correct and incorrect responses. More than that, the student report gives him a run-down of his performance on all previously taken tests, objective by objective. The computer provides the teacher with parallel information.

By these and other means, both students and teacher become aware of the sequential and cumulative nature of the process in which they are involved, a process which by virtue of its close relationship to behavioral objectives can be modified at any point depending on individual requirements. Such trend data enable the teacher to follow learning growth or decline for both individuals and a class as a whole.

INSTRUCTIONAL COMPUTING COOPERATIVE Wayne Township Public Schools, Wayne, N.J. 07470. Contact: Henry J. Peterson, mathematics supervisor.

As instructional equipment becomes more sophisticated and more expensive, it becomes more difficult for a single school district, operating alone, to keep abreast of developments and maintain up-to-date machines for student and faculty use. The Wayne schools and others in the area are coping with these problems through its Instructional Computing Cooperative. The Cooperative has five computers located in Wayne, River Edge, and Madison, N.J.

Here are some of the services the Cooperative and its equipment are making available to its member districts.

- ✓ Instructional Uses. Member districts have been using the computer for several years for problem-solving by math and science students, for simulation programs in social studies, and for mathematics drill and practice.

- ✓ Guidance Services. The computerized College Selection System replaces the time-wasting initial searches through college catalogs, because the computer will produce a list of institutions that are appropriate to his academic level and that meet personal criteria.

- ✓ Comprehensive Achievement Monitoring. The Cooperative's computers receive test data, score tests, correlate the results with previously collected information, and return reports within 48 hours.

- ✓ Management Information Systems. Through new and powerful equipment, the Cooperative will be able to furnish management services not previously available. Administrators will now be able to interact continually by telephone with the district's stored data.

- ✓ Administrative Services. Conventional computer services such as grade reporting and attendance monitoring are available. For example, a clerk can load in a day's absentee and tardy information and receive a printout within a half hour.

School districts can be hooked into the Cooperative's communications network at any time over existing telephone lines. Member districts pay a basic fee of $2,000 to obtain access to the computer for instructional purposes. The district is then free to purchase instructional and administrative services at cost from the Cooperative.

■ NEW JERSEY CENTERS FOR EDUCATIONAL TECHNOLOGY Paramus High School and the Graduate School of Library Service on the New Brunswick campus of Rutgers--The State University Contacts: Christine Meurry, director, NJCET (Software), Paramus High School, Paramus, N.J. 07652; and Clifford N. Bohnson, director, NJCET (Hardware), 189 College Ave., New Brunswick, N.J. 08903.

The New Jersey Centers for Educational Technology are a cooperative effort among the New Jersey Department of Education, the Department of Higher Education, and the state's Educational Media Consortium. Two Centers currently are in operation: one is located in Paramus High School and focuses on software evaluation, while the second one is on the Rutgers campus in New Brunswick and specializes in hardware evaluation.

The Paramus Center provides a variety of services, including free consultative assistance for educators wishing help in the selection of software. The over $200,000 worth of materials at that Center afford a client the opportunity to examine and evaluate a wide range of materials at one time. By arrangement, materials may also be borrowed. This Center has been in operation for three years.

The Hardware Center maintains a non-commercial, unpressured setting where teachers, administrators, and librarians can study a great variety of equipment associated with contemporary educational technology. Consultation services are also available to schools before they make purchases of equipment. In its first year of life this Center has been in steady use.

The NJCET have recently begun a new service: a 35-foot media van, supplied by Jersey City State College, is being sent around the state, where it functions as a mobile exhibition and workshop site. Characteristically, the van stops at a local college or a conveniently situated high school to provide a centralized resource for

surrounding school districts. Thus far, the van has been used mainly to show new equipment and new software, but shortly it will also start to provide workshops for teachers and librarians who feel the need to supplement their knowledge in the area of educational technology.

DESIGN AND VALIDATION OF AN INSTRUCTIONAL UNIT Division of Learning Resources, Burlington County College, Pemberton, N.J. 08068. Contact: Fleming A. Thomas, chairman, Division of Learning Resources.

Burlington County (N.J.) College is a public, two-year institution that is committed to the use of educational technology to produce a variety of instructional patterns and settings to enhance the quality of teaching and learning. At the College, technology is employed not only to improve individual learning, but also as one means of obtaining a realistic assessment of teaching effectiveness.

The Division of Learning Resources believes that the individualization of instruction is best achieved by a careful meld of commercially available resources and locally produced components. The most effective learning experience has multiple access points--for instance, laboratory experiments, books, microfilms, video tapes, motion pictures, and other forms of recordings. The level of proficiency reached by the learner is significantly influenced by the way in which he selects the access points for his own use. Fundamental to this, of course, is the ready availability of numerous resources (access points) and a teaching/learning environment which encourages the learner to individualize his learning paths.

MULTIMEDIA APPROACH TO THE SOLUTION OF URBAN PROBLEMS Urban Communications Teaching and Research Center, Livingston College, Rutgers University, New Brunswick, N.J. 08903. Contact: Professor Jerome Aumente, director of the Center.

The Center at Livingston College emphasizes the use of communications technologies in connection with community action programs, education, health services, community development efforts, and urban studies. The Center's presentation at the Convention demonstrated a multimedia approach to the solution of problems in urban planning, information systems development, information analysis, and environmental documentation, with special emphasis on audiovisual techniques.

The approaches and instrumentation used at the college and graduate level have been shown to be readily applicable at the secondary school level as well.

A COMPREHENSIVE MEDIA CENTER Moorestown High School, Moorestown, N.J. 08057. Contact: Donald R. Smith, media coordinator.

The media center at Moorestown High School, which contains over 18,000 visual and more than 6,000 audiovisual items, is the hub of activity in the school for both teachers and students. The center's staff includes a media specialist, a librarian, teacher supervisors for class periods, a full-time secretary, two full-time adult aides, and 39 part-time student aides. The center can accommodate a quarter of the school's 1,380 students at one time.

A simple listing of some of the services and facilities available to teachers, students, and other members of the community will give the clearest evidence of the innovative ways one school's media center is going about meeting the wide range of responsibilities given it in the school's educational plan.

✓ Services

- Media production (all phases)
- Film coordination and film study
- Learning-package development
- Instructional development program
- Adult education services
- Making and using video programs
- Individualized reading programs
- Special programs in career education, health, earth science, etc.
- Preview evaluation of materials
- Student production of mediated instructional materials
- Self-instructional packages for teacher in-service development
- Internship training in media and library services
- Development of communication arts courses in media production

✓ Facilities

- Listening-viewing carrel
- Closed circuit television
- Computer center
- Typing room (10 typewriters)
- Large-group multimedia instructional theater
- Display gallery
- Small-group conference rooms
- Integrated shelving
- Sound-proof audio-taping room

GUIDANCE INFORMATION SYSTEM Westfield High School, Westfield, N.J., Joseph Muzas, (supported by Time Share Corporation). Contact: Charles A. Morrissey, executive vice president, Time Share Corporation, 630 Oakwood Ave., Suite 638, West Hartford, Conn. 06110.

The use of the computer in secondary school guidance services continues to grow because, among its other values, it can free guidance personnel and other faculty members of the tedious task of researching manually the thousands of post-secondary educational and occupational opportunities available to students. It can do this, of course, only if the computer is tied into a data bank that contains a large store of information about colleges and jobs, a resource an individual school is quite unlikely to be able to develop on its own.

Time Share's Occupational Information System is a computerized data retrieval system which can provide students and counselors with instantaneous access to information about more than 2,000 two- and four-year colleges and about financial aid in such institutions. Furthermore, it can draw on a data base of information representing a cross-section of the 20,000 entries in the Dictionary of Occupational Titles. In the more than 300 high schools now subscribing to GIS, a student with little or no help from a counselor can give a computer a few simple instructions through a teletypewriter and quickly receive a printout giving him the information requested.

In creating and extending the Guidance Information System, the intention has not been to provide matching or placement services, but rather to close the communications gap between the facts and those who need the facts for effective decision-making.

By using the computer as a "data disseminator," the Counselor is able to play the more important role of "data interpreter" and to deal with the personal and academic problems of students.

Recently, GIS has developed an alternate design which can be operated on a school's own time-sharing computer system if it has one. This involves leasing the GIS data files and searching them locally rather than employing the GIS communication network for that purpose. This latter approach can be less expensive on a per-pupil basis.

A SCHOOL DISTRICT'S USE OF CATV Willingboro Public Schools, Willingboro, N.J. 08046. Contact: George Brandau, secondary director.

The Willingboro school system was one of the pioneers in instructional television. Hence, the schools were quick to sense the additional instructional and informational potential of cable television and moved to establish a working and mutually beneficial relationship with Cable Television of Burlington County when it was franchised locally in 1967.

Each school building is internally wired for television reception, but no interconnections between buildings were available until the advent of CATV in the area. The local company's franchise contains the provision that all schools in the township would be provided CATV service free of charge.

The cable company is a source of incoming commercial and educational broadcast signals for school use. But equally important, it also provides a means for distributing videotaped instructional and informational programs to the homes in the community.

The earliest use of the cable television facility was to send informational programs to homes relating to both curricular and extracurricular activities in the schools. Now, school-to-home instruction is probably the most significant feature of the cooperative relationship between school and company. For example, a special series of taped lessons for the pre-school education of children with hearing handicaps is now going into homes over the cable system.

Initially, much of the programing was supported by special federal and state grants, but now most of the videotapes are being developed solely by local efforts and funded from the school district's own budget.

Recently the cable company installed a cable from the school district's TV studio to the company's "head-end" facility, which permits both live and taped instructional telecasting directly from the district's studio to all schools in the district.

School board meetings in Willingboro have long been popular local attractions, with audiences frequently overflowing the hearing room space. To enable more of the citizenry to keep in touch with Board activities, arrangements were made a year ago to air all meetings over the cable system. The cable company donates channel time while the equipment and staff available in the high school's TV studio take care of the actual televising.

The school district's own TV-related facilities are extensive. The production area, which is located in a junior high school where space for this purpose was provided in the building design, consists of a studio area, control room, tape and general storage area, a dial access retrieval system, and office space. In addition, portable equipment--mobile console unit, three videotape recorders and portable cameras and a van--make on-site recording easily managed.

■ A SCHOOL DISTRICT MICROWAVE HOOKUP Union Township Schools, Union, N.J. 07083. Contact: George Pruitt, studio manager.

Union Township was the first school district in New Jersey to tie all of its schools together by means of a microwave broadcast hookup. The nine schools in the system all have antennae, converters, and internal distribution facilities. The district's TV studio (channel 8 VHF), which is located in the high school, can originate live or taped programs, broadcast film from its extensive film library, and videotape and rebroadcast at more convenient hours commercial programs from a local commercial VHF station (by agreement with that station).

The schools use the microwave network in many different ways. For example,

- ✓ All students in a given grade in all of the elementary schools can enjoy a special program developed by one class instead of the showing being limited to the one or two other grade groups in a particular building;
- ✓ A teacher or student with a special skill or background can reach all interested students rather than only those in his or her own classes;
- ✓ Demonstrations can be taped in laboratory or shop or classroom as given and then be broadcast when and as needed by other class groups;
- ✓ The experiences of a group of students on a field trip can be videotaped with portable equipment for later sharing with other students anywhere in the school system;
- ✓ A visiting lecturer can reach students or teachers in all schools in one presentation--simultaneously or through taping and rebroadcasts--rather than by bringing the audience to one location or, more frequently, by having the lecturer repeat his presentation several times.
- ✓ In-service programs for teachers can be put out over the network (and discussion is possible through telephone connections).

From Union Township's experience, it appears that there is almost no limit to the number and variety of ways in which a microwave network can be put to good use by a school system.

■ LARGE-CITY INSTRUCTIONAL USES OF THE COMPUTER School District of Philadelphia, Instructional Computer Center, 5th and Lucerne Sts., Philadelphia, Pa. 19140. Contact: Sylvia Charp, director, Division of Instructional Systems.

More than 60,000 Philadelphia public school students this year are participating in 17 different programs in which the computer is used for instructional purposes. Here are notes on a number of these.

- Every junior high school in the system offers a Computer Literacy course which introduces students to the cultural, technical, career, and problem-solving potential of the computer.

- Computerized gaming and simulations are being expanded in many curriculum areas--biology, chemistry, earth science, social studies, and business education, to mention a few--through the use of the time-sharing computer system now available.

- About 500 young people in one senior high school are learning first-year algebra and general mathematics with the help of a cathode ray tube terminal and a slide projector. (The classroom contains 32 terminals.) In the same school, a data processing course, a pre-calculus mathematics program, and an English grammar-usage course are available on an after-school basis.

- In one school district, Computer Assisted Instruction (CAI) in reading is available in all of the junior and senior high schools, which frees teachers from many routine teaching activities. The computer follows the individual student practically word by word and keeps him or her constantly informed about how far and how well he has progressed. The computer selects for each student the "next lesson" that is just right for him.

- CAI programs are also available in mathematics and biology.

- In all 24 high schools a student can stop at his guidance counselor's office for a "chat" with VICS--Vocational Information through Computer Systems. The computer bank contains information on over 400 occupations. The student can select as many as he wishes from a list of 15 questions to put to the computer about any of the jobs in which he is interested. Through VICS the student who is not certain about his career plans can obtain information related to his interests. Lists of local employers and other specific job-related data are also available for the asking.

- In Computer-Managed Instruction, most of a student's work is performed away from the computer. But the computer takes over the task of diagnosing pupil needs, assigning instructional sequences, utilizing a wide variety of instructional materials, and evaluating pupil progress.

The school system's Instructional Computer Center is the base for the development of all computer-related instructional programs. The Center also is the central agency in the extensive time-sharing arrangements that provide computer time to all junior and senior high schools and many elementary schools. Cooperative agreements also make computer time available to several nearby suburban school districts and to a number of church-related secondary schools in Philadelphia.

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