

The Computer as a Tool in Curriculum Management

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THE computer hardly has begun to show signs of use in the area of curriculum management—all those activities of school personnel under the direction of a curriculum leader, which supply data for the processes of curriculum decision making and implementation. The computer as a tool permits development of a large, rapid access retrieval system and has potential to make rapid comparisons and analyses of large quantities of data faster and in greater detail than would otherwise be possible.

For example in 1972, using a UNIVAC 9300, the Scottsdale (Arizona) public school system with 30,000 students was able to produce a report on spring testing involving 10,000 students in 19 elementary schools. This comparison consisted of student results, teacher, school, and district composites, plus an extensive analysis of a problem area which prompted a curriculum review; these results were obtained faster (two weeks) and less expensively (by 25 to 30 percent) than by commercial analysis.

Thus far, it appears the limitations of the computer in curriculum work have been not only unavailable hardware and computer programs, but also curriculum leaders unaware of computer capabilities.

Potential Applications

The most publicized curriculum management applications of the computer have been in individualizing instruction. There are, however, immediate possibilities more readily available to school districts because of less need for sophisticated computer programs. These feasible uses of the computer in curriculum management are in the areas of:

1. Curriculum planning—what do we need and when do we need it?
2. Curriculum implementation—what progress are we making?
3. Curriculum evaluation—what cognitive and affective objectives have we met?

In each of these areas, use can be made of accumulated data to make comparisons and analyses. In curriculum planning, the information may have been obtained externally from business and community sur-

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veys of career/educational needs or internally through assessment of student needs for subsequent courses or areas of study. The computer with programming adaptations of Program Evaluation and Review Techniques (PERT), Programming, Planning, Budgeting System (PPBS), network analysis, as well as other approaches, can compare and analyze data so as to assist the curriculum leader in developing optimum paths for meeting identified needs and supplying alternative routes when goals cannot be met. Textbooks, materials, and equipment which have been categorized in terms of contributions in meeting specific objectives can be matched by the computer with the particular objectives in a curriculum decision.

Before a curriculum decision becomes an implemented reality, the computer can analyze physical facilities, supplies, teaching staff, and student characteristics to determine if they adequately fulfill specified conditions for implementation. Data banks

containing this information with appropriate computer programs can supply such information in seconds, and, more important, can permit immediate modifications and reanalysis by the curriculum leader. An integral aspect of curriculum implementation is process monitoring. Rapid computer analysis of monitoring data makes ongoing alterations of the process possible.

Curriculum evaluation determines if the objectives planned and implemented have been met. A West Coast testing company is producing objective-based tests. Similar tests could be generated by a school district that has purchased or produced a computerized data bank of objective referenced questions. Analyzing various combinations of objectives, the computer could generate many tests in seconds.

Since such data banks take quite long to develop, the immediate application is rapid and detailed analysis of cognitive or affective data from existing tests. It would take a

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Some initial answers to these questions are furnished by Professor Ira J. Gordon, whose research and developmental work at the University of Florida with young children and their parents is widely recognized.

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curriculum leader months to obtain manually analyses that the computer can supply in a day. This difference means that it is possible to determine curricular strengths and weaknesses together with their causes that would be undiscovered without the computer feedback.

Possible Problems

Before a school district makes a final decision about data processing, there are several problems that should be solved. Some school districts contend that they do not have sufficient finances to afford computing facilities. However, can they afford *not* to obtain the benefits of the computer? With the increasing responsibilities of the schools for accountability in education and with increasing demands by teachers for relief from menial tasks and additional freedom to teach, as well as the continuing need for data for critical decision making, the computer can more than justify its expense.

School leaders must beware of obtaining computing equipment and/or services without really knowing what is needed, wanted, and in fact being obtained. Very often they get equipment too small to do the job—the machine memory is not large enough to handle data immediately necessary for problem resolution; or not the proper type of equipment to do the job—delays are created by manually keypunched data which could be remedied by an optical scanner. It is under these conditions that the question arises as to the effect of the restrictions imposed by selection of equipment.

Another problem which must be resolved early is the contention which arises between the central office business and educational interests of a school district. Often systems which can afford computing facilities justify expense first by considering business management applications, and second by applications for curriculum management.

Business-oriented administrators and business-oriented data processors can limit severely the use of the computer as a tool in curriculum management if they establish priorities for computer usage. There must

be definite commitment as to the availability of computing facilities for the priorities held by those concerned with curriculum management. When the central office business agency of a school district acquires higher priorities, the curriculum leader is confronted with the need to obtain external assistance; meeting this need is expensive.

Computers are of little value without appropriate computer programs. Therefore, a curriculum leader must consider whether computer programs are available to do the desired curriculum task. If not, there is a need for a programmer, and a new issue is confronted: do this person and his data-processing supervisor have both curriculum and data-processing background? School districts which hire data-processing personnel who do not understand curriculum problems inadvertently yield a curriculum leader's decision-making power to the data-processing staff because of supposed, interpreted requirements of the computer. The place of the computer is distorted so that it, together with the programmer, dictates rather than assists in the resolution of curriculum concerns.

Suggested Solutions

Technological developments are making it possible for the curriculum leader to obtain more computing facilities for the dollar. Mini-computers, costing less than \$25,000, permit school systems to do many tasks which a few years ago were only dreams. Access to large systems via time sharing is an immediate possibility. Small school districts should consider sharing joint facilities, or a district could sell computer time to lower its cost.

Before the selection of hardware, expert advice should be obtained from other school districts or state departments of education that have had experience with data processing. Computer science departments in universities are another excellent source. According to Miller,¹ the type of information

¹ William G. Miller. "Selection Criteria for Computer System Adoption." *Educational Technology* 9: 71-75; October 1969.

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that should be obtained pertains to hardware, software, cost, and performance.

If there is not enough computer time in an 8- or 16-hour computer day for both business and curriculum management, the computer operation should be extended to 24 hours. Most business applications are routine and could run during the night hours. If the computer runs on a 24-hour schedule and there still is insufficient time for both business and curriculum management, those who set priorities must reconsider and place each agency of the school district central office in proper perspective as it contributes to obtaining the ultimate goals of the *educational* organization. It should be noted, however, a computer that is turned on for 24 hours may not always be operating for 24 hours or even for 70 percent of the time. The presence of a computer does not imply efficient use; man must carry that responsibility.

To maintain his decision-making powers, the curriculum leader should select, and recommend for employment, only personnel who are educational data-processors. He also should update his knowledge of computer science through reading, formal study, and communication with experts on computer science applications. For most curriculum leaders this approach to professional development is imperative as well as feasible.

In conclusion, the failures in school district computing ventures usually are blamed on the computer. However, the personnel who select the equipment, the personnel who run the equipment, and/or the person who has the responsibility for supervising the data-processing department of the school district must be held accountable. In the near future it will be possible for virtually every school district to have access to computing facilities. An optimum relationship between time and size will make most applications possible to most school systems.

If the curriculum leader does not know definitely that he is master and the computer is slave, the use of the computer in curriculum management will be fruitless. If these roles are reversed, it soon will be found that the problems created by the computer are greater than the ones which it solves.

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