




Don't Let Good Data Go to Waste!

Data warehousing allows principals to mine for useful information from a variety of sources.

 **Principal-Web Exclusive** » Volume 84 Number 1, September/October 2004

by James P. Hoover

How does a mail-order company know that if a woman orders a navy blue sweater she is also likely to purchase pillowcases and other unrelated items? It makes the connections by “mining” a data warehouse of purchases by people who have bought navy blue sweaters in the past. Many companies use this type of technology to improve their sales. Which raises the question: Why don't principals and superintendents use this type of technology to create meaningful connections among seemingly unrelated sets of data?

School systems collect an incredible amount of information for internal as well as for external use, such as information on student attendance, test scores, grades, discipline, demographics, ethnicity, special education, and free and reduced-price meal programs. Add all this information with data related to scheduling, personnel, finances, and transportation, and you've got a veritable information smorgasbord. Unfortunately, many administrators feel they do not have the statistical expertise or the analytical processing capability to “mine” this data as a means of improving teaching and learning. Too many school districts tend to be data-rich but knowledge-poor.

In the past, technology solutions for making sense out of data have been out of reach for many principals due to high cost. However, the cost of information technology has substantially declined in recent years. Consider that in 1980 the cost of one (1) megabyte of hard drive storage space was about \$200. Today, a megabyte of storage costs less than a cent. Also, computing power is generally believed to double every 18 months even as costs continue to decline.

Warehousing the Data

The growing interest in data management has led to the development of a number of software solutions tailored to meet the unique needs of educators. Most experts agree that a sensible starting point is to make better use of existing information. Through a systematic analysis of data already collected, principals can discover previously hidden patterns and opportunities for improvement.

In the quest to translate data into useful information, school districts are adopting a variety of techniques. One of the most effective of these is data warehousing. Although data warehousing has been used in the corporate world for decades, the technology is just beginning to find its way into public education.

What is a data warehouse? Simply put, it is “a collection of data in support of management's decision-making process” (Inmon 1991). By gathering and storing large amounts of information from all of an organization's operational functions in one place, data warehouses allow people at all levels of the organization to uncover relationships that would otherwise remain hidden in mountains of unstructured and disconnected facts. Data mining is a process through which quality information is extracted from large volumes of data through the use of statistical modeling. The result: a tool to help teachers and administrators make intelligent decisions based on hard data.

Why Warehouse?

Why should a school district consider a data warehouse when it already has systems in place to collect, organize, and analyze data? The simple answer is that it would lead to improved efficiency, enhanced accountability, augmented decision-making, and reduced costs. Through the use of data-mining software, school leaders have the ability to quickly analyze enormous amounts of data. For example, principals can disaggregate data across a number of variables and perform longitudinal analyses in hours rather than days, weeks, or months.

Probably one of the greatest benefits of data warehousing is its accessibility to a variety of users who are able to retrieve data themselves rather than having to contact someone to do it for them. A principal trying to access all pertinent data related to a specific problem from a variety of isolated systems is faced with a daunting task; however, access to a data warehouse provides an easy way to retrieve the relevant records.

For example, using a data warehouse, a principal can find answers to questions such as: Does attendance correlate with student achievement? How well do scores on our standardized achievement tests compare to scores on the state assessments? What are the costs associated with a particular program? The end result is that principals rely less on instinct and intuition and more on quantitative information.

Data warehousing also plays an important role in staff development. Training teachers to access and use hard data provides them with insights into classroom and individual student progress. Scrutinizing data also provides a good way of assessing the impact of program or instructional changes. As teachers become more adept at mining data, they become increasingly skilled in developing meaningful ways to use it (Trotter 1999).

Finally, data warehousing can be cost-effective. Rather than having to enter and store data on isolated systems, data warehouses enter and store information in one place and make it possible for users to extract enormous amounts of high-quality data and use powerful analytical tools to translate this data into useful information.

The use of effective data management techniques can produce economies in overall school operation as well. For example, school districts can cut costs in non-instructional areas such as transportation, food service, and facilities maintenance by improving efficiency and productivity in these areas.

The “Data-Savvy” Principal

With the growing trend toward accountability, principals need to become “data savvy” in order to make well-informed choices among different instructional alternatives and discover the most effective approaches for serving students and the community.

Principals who can access and quickly explore data can develop insight that will help them create strategies that can lead to improved student achievement and school success. Data plays a prominent role in increasing student achievement and staff productivity, essentially directing the course of action and keeping everyone on track to continuous improvement. By using data warehousing techniques, principals can go beyond cursory examination of data, empowering themselves and their teachers to work collaboratively to achieve school and district goals. The effective use of data is fast becoming the difference between a good school and a mediocre school.

In today's reform climate, the ability to translate an enormous quantity of data about school and student performance into useable information is essential to effective school reform. Through data warehousing technology, schools are able to discover problem areas, identify possible solutions, and track progress toward achieving their goals.

References

Inmon, W. H. *Building the Data Warehouse*. John Wiley & Sons, New York, 1991.

Trotter, A. “Gates Downloads a Proposal for Schools,” *Editorial Projects in Education* 18:25 (March 3, 1999), 1, 24-25

James P. Hoover is principal of McKee Elementary School in Oakdale, Pennsylvania. His e-mail address is jhoover@westallegheny.k12.pa.us.