Technology and Productivity in K12 Schools

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TECHNOLOGY AND PRODUCTIVITY IN K12 SCHOOLS

In the past two decades there has been a massive investment of technology in K-12 education.

- U.S school systems are spending $12 billion per year on hardware, software, and networking and have a ratio of 1 computer to 1 student.
- The E-rate program has provided every school district with access to the Internet, has spent $2.5 billion per year, and is being increased to $4 billion per year.
- The dollars spent on digital curriculum and assessment materials are now $18 billion per year, as there are no longer required textbooks and there has been a massive increase of digital instructional materials.

The increase in productivity of management systems, such as student information systems, finance systems, special education systems, human resource systems, and gradebooks, has resulted in cuts to the number of personnel needed, increased accuracy of data, and more efficient operational processes. With the increasing use of cloud-based systems, there is less of a need for local IT staff.

The big question: Does technology improve teaching, learning, and outcomes?

Technology in offices, 1975-1998

Before tackling the complexities of technology-enabled productivity in K-12 education, I want to put the productivity issue in perspective. Computers were deployed on a large scale in offices beginning in the late 1970s, but it was not until 1998 that measurable productivity gains were demonstrated by administrative and knowledge workers. It was a challenge to define productivity, and there were a large set of organizational variables—including required policies, support, network dependability, training, ease of use of the application, and the time required to learn to use computers and applications after working manually for many years. The office work example provides insight on the issues impacting the increase of current educational productivity.

Productivity in schools

In conversations with teachers and administrators, the intuitive response to the question—“Is technology increasing productivity in your schools and classrooms?”—is most often “yes.” Still, standards-based test scores have not yet improved, state school performances on the National Assessment of Educational Progress (NAEP) have not increased nationally, and high school graduation rates remain low. So why are educators saying yes and investing a fortune in digital software, 1:1 computer devices, and similar technology solutions? The definition of productivity has not been defined in precise terms: Is it engagement of students? Ease of use of teacher tools and processes, such as gradebooks, parent communication, student collaboration, or improved rate of learning?

Defining productivity

For purposes of this piece, productivity will be defined as improvement in the rate of learning.
We have chosen improvement in the rate of learning because it is the key to improvement of American education and our ability to produce graduates for the 21st century world of higher education and work.

Two districts that have improved productivity

Two Eagle River Alternative School – Montana

The Two Eagle River Alternative School is a tribal school in Pablo, Montana, that supports 120 Native American students. Students have either chosen not to attend public school or have been forced out due to behavior, poor attendance, or low-performance problems. The average student enters with a two- or more year deficit in reading and math scores.

The technology at Two Eagle is basic: desktop computers, a reading lab utilizing Read 180, NWEA MAP, and other curriculum adaptive assessment software.

The Two Eagle River Alternative School had the highest reading recovery rate for any BIE Indian school in the U.S. and graduated more Native American students than the seven public school districts it draws from.

The main difference between Two Eagle and area public schools is significant professional development in curriculum and instruction. Teachers are trained using the diagnostic "Descartes," the analytic part of NWEA MAP, which identifies the skills students are missing. Once diagnosed, teachers develop individualized prescriptive instructional plans.

The superintendent attributes the high rate of student productivity to professional development as an integral part focused on the use of data and adaptive assessment, skill development, and individualized instruction.

Middletown, New York

In 2008, Middletown, New York, was the lowest-performing school district in New York State, with none of its schools meeting the NCLB standards. It had a dropout rate of 30%, and 70% of its students received free and reduced-price lunch. Currently its graduation rate is at 92%, and all of its schools are at least proficient.

Middletown's approach is much more sophisticated than Two Eagle's**,** though there is commonality in the emphasis on pedagogy, staff development, and data analytics.

In 2013, Middletown received a Race to the Top grant for $22 million, with an emphasis on data analytics, procurement, and professional development. Some of the primary things that Middletown is doing are:

- Outsourcing its procurement of digital instructional materials and professional development to a third party (Education Elements), as the district does not have the time to sort through all of the new materials to decide what are appropriate instructional materials. They also have a full-time teacher coach in each school.
- They are a 1:1 district.
- They are utilizing blended learning—books and digital materials with an emphasis on a large amount of materials necessary to personalize instruction.
- Middletown makes considerate use of data analytic tools

Identifying the elements needed to create faster rates of learning

In discussion with the BLEgroup members who have achieved productivity gains defined as increasing the rates of learning, they have identified the elements that are needed to increase rates of learning, why only a few school districts have achieved it, and why it will take time for productivity in schools to increase.

- **The most important element is a focus on pedagogy.** Pedagogy is defined as providing the appropriate teaching methods and materials for each student. If the pedagogy is inappropriate, none of the technology will make any difference. Until recently the iPads or laptops have been viewed by some as silver bullets, but it is not the device but pedagogy behind it that creates productivity.

- **The advent of adaptive assessment and adaptive instruction is making it easier and more effective for teachers, as the adaptive assessments identify missing skills and point teachers to the appropriate materials every student needs to move forward.** Think of products such as Fishtree, i-Ready, NWEA Measures of Academic Progress (MAP), myON reader, and DreamBox.

- Adaptive instruction is in its infancy and not yet fully developed. These materials are based on identifying a granular level of student understanding and performance and identifying the learning style and level of materials that an individual student needs. **There will have to be an increase in the granularity of metrics,** such as lexiles, for adaptive instruction materials to be effective.

- There needs to be a very broad range of materials for teachers to utilize to meet the individual needs of students. The days of one-size-fits-all are over. **School districts do not know how to find and identify the quality of the vast amount of new digital material.**

- **Professional development has to be ongoing and combine knowledge of the materials, use of data analytics, and use of technology**. The majority of districts are under-utilizing professional development and limiting it to a half day every three weeks and not integrating the technology, assessment, and materials into pedagogy.

Old dogs learn new tricks slowly

Returning to the example of office productivity at the beginning of this piece; we believe that productivity defined as an increase in rates of learning will occur. But it will be a lengthy very gradual process.

About Us

The BLEgroup is a network of 200 leading-edge superintendents, CIOs, and curriculum directors, whose work includes both planning and integrating technology in small districts and assisting EdTech firms in market research and development of products. Contributors to this article include:

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