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Connected Learning
Transforming Education Through Technology

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Be they kindergarten tots or under-graduates, today's students are heavily exposed to information technology, with a majority immersed in it by way of the Web, which, among other things, offers response immediacy and collabora-tion important to young people.

Such exposure, active use, speed and togetherness, however, is limited in today's traditional learning environment, even though a wealth of data, research and studies show that the use of technology can bring about improved learning outcomes and other benefits.

To more effectively engage today's IT-savvy students and equip them with the skills necessary for success in the Digital Age, educators must utilize technology to improve the teaching environment and enhance the learning experience. For best effect the use of technology has to extend beyond its mere provision, to its integration into the learning process such that the process is not just improved but transformed.

As with all projects that involve technology, such Connected Learning projects have to be well thought-out, with consideration given to the technologies to be adopted, completeness of design, implementation, and subsequent use and management. Then, and only then, can the right technology resources deliver favourable and transformative outcomes for students, teachers, and other stakeholders.

ABOUT THE AUTHOR

Rani S. Burchmore heads the education practice at Dell™ – South Asia. She has 22 years of experience in the education & training sector, bringing a wealth of experience in digitizing learning with a deep understanding of content & curriculum development, assessment & certification, lecturing and managing education institutions.

Today she helps governments & education institutions ranging from K-12 to universities transform education for the Digital Age using the latest technologies and research.

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Educating for the Future

There is a disconnect in education.

Today's students belong to a 'connected generation' that uses technology to communicate and collaborate with friends, family members, and the world around them. Yet many of them are required to drop these connections when entering the classroom, where they are transported back to the legacy system of textbooks, slides, whiteboards and lectures.

For tech-savvy students, being taught in isolation in a traditional setting, rather than in collaboration using technological tools, makes the classroom or lecture hall a less exciting and engaging place. Moreover, for students, the traditional learning model places an emphasis on just being informed and accumulating facts. While core basic knowledge is important, passive learning does not encourage the development of skills that today's students require in the Digital Age. These skills include IT literacy, global awareness, critical thinking, problem solving, task management, collaboration, effective digital communication, creation and use of multimedia documents, data analysis and interpretation.

To engender these skills, teaching methods need to be amended such that instead of being teacher-centric and instructive, they become engaging, interactive and more individualized, inspiring students to research and practice on their own, become more innovative, and collaborate and communicate their ideas. This change to Connected Learning cannot be brought about without integrating technology into the learning process.

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Technology in Education

The use of technology in the classroom is not a new phenomenon, having gained widespread acceptance in the early 1980s with the PLATO Computer for example. Traditionally, schools would have a central computer lab. Student access was limited and lessons taught in the lab were often assignment-based, with very little collaboration. Schools then moved on to having one or several computers in each classroom. While this scheme of things promoted collaboration, students still had limited access to the shared machines. And although availability improved later when PCs became more affordable, for students (and teachers), the digital universe during school hours was limited to the classroom or the school.

Still, early classroom technology did improve the learning experience. As early as 1995, the U.S. Department of Education reported that

"... properly used, technology can enhance the achievement of all students, increase families' involvement in their children's schooling, improve teachers' skills and knowledge, and improve school administration and management."*

Today's students expect to engage with technology in their education, and are beginning to de-value educational mediums which lack such technology engagement. Part of this has to do with technology facilitated learning situations that students enjoy, the immediate feedback that computer technology provides, as well as the sense of accomplishment students gain when working with technology. Together, these greatly increase their interest, motivation, participation and, eventually, performance and achievement.

*The Costs and Effectiveness of Educational Technology
http://www.nsba.org/sbot/toolkit/tiol.html

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Key trends pertaining to the use of technology in education

The New Media Consortium is an international community of experts in educational technology. Its Horizon Project charts the landscape of emerging technologies for teaching, learning, research, creative inquiry, and information management. In collaboration with EDUCAUSE Learning Initiative, a community of higher education institutions and organizations committed to advancing learning through IT innovation, the consortium has published the NMC Horizon Report: 2012 Higher Education Edition. Key trends pertaining to the use of technology in education highlighted in the report include:

- The abundance of resources and relationships made easily accessible via the Internet is increasingly challenging educators to revisit their roles.

- Computers are in the process of a massive reinvention because users increasingly expect media to be touchable and interactive.

- Education paradigms are shifting to include online learning, hybrid learning and collaborative models.

- Increasingly, students want to use their own technology for learning.

- Institutions are increasingly exploring technologies that allow teachers and students to better collaborate.

- Lecture capture, podcasting, and cheap personal video recorders increasingly make it much easier to prepare lecture-style content for students to see/hear before coming to class.

- People expect to be able to work, learn, and study whenever and wherever they want to.

- The technologies we use are increasingly cloud-based, and our notions of IT support are decentralized.

- There is a new emphasis in the classroom on more challenge-based and active learning.

- The world of work is increasingly collaborative, driving changes in the way student projects are structured.

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Outcomes that Technology Make Possible

While technology can help educators meet the challenges they face, it is no panacea. If poorly devised, implemented or managed, it can cause as much pain as it does joy. As Don Tapscott, author, speaker and advisor on media, technology and innovation, said at the ASCD Conference 2010:

"We can't just throw technology in a classroom and expect good things. We need to move away from an outdated, broadcast-style of pedagogy (i.e., lecture and drilling) toward student-focused, multimodal learning, where the teacher is no longer in the transmission of data business; she's in the 'customizing learning experiences for students' business."

When elegantly designed, used and managed, technology can help transform the teaching and learning environment. Specifically, it can help to enhance and evolve teaching practices, facilitate student-centered learning, and make 'anytime, anywhere' learning a reality. These deliver favourable outcomes not just for students and teachers, but for other stakeholders as well.

STUDENTS

Technology is the ultimate carrot for students. It is something they want to master and immerse in. Using technology puts them in an active role, one in which they make choices and decisions, think actively about information, execute skills and share their work, rather than play a passive role as a recipient of information transmitted by a teacher, textbook or media broadcast.

Among other outcomes, such a learning mode increases motivation, promotes collaboration, and facilitates peer tutoring. Students also become better at seeking information, organizing complex information, drawing inferences, recognizing patterns, solving problems and communicating findings. Research also shows that integrating technology into the learning process improves attendance, attitude and confidence, especially for 'at risk' students.

TEACHERS

Teaching paradigms have been shifting from the mere dispensing of information to the facilitation of understanding. Information technology is uniquely placed to bring about this shift and enables teachers to move from instruction to engagement. Using it, teachers also can spend more time advising individual students, better identify weaker students, allow students to

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carry out more independent work, involve students in the lesson at hand, focus student attention, and assess students' understanding and progress in real time.

Besides enabling them to become more effective and productive teachers, research shows that the use of technology by teaching staff results in their staying interested in teaching, becoming more at ease with technology, playing greater roles in school and cluster/district restructuring efforts, and communicating more with their students' parents.

FAMILY

Using today's technology, parents can easily create in the home a continuous learning environment that extends beyond the walls of their children's classroom. By connecting students to schools-based portals, tools, and information around the clock, parents can also more actively monitor student progress and communicate with teachers to inspire good learning ethics and emphasize the importance of active learning, leading to favorable outcomes for their children.

CURRICULUM ARCHITECTS & SCHOOL ADMINISTRATORS

The Digital Age we live in is one of constant change and there is a corresponding need to keep courseware up to date. While historical facts are important, today's students relate better to recent events and newer information, just as they do in personal technology (mobile phones, social media, etc). Technology can help curriculum architects and school administrators make changes to courseware and instructional strategies and keep them current and relevant.
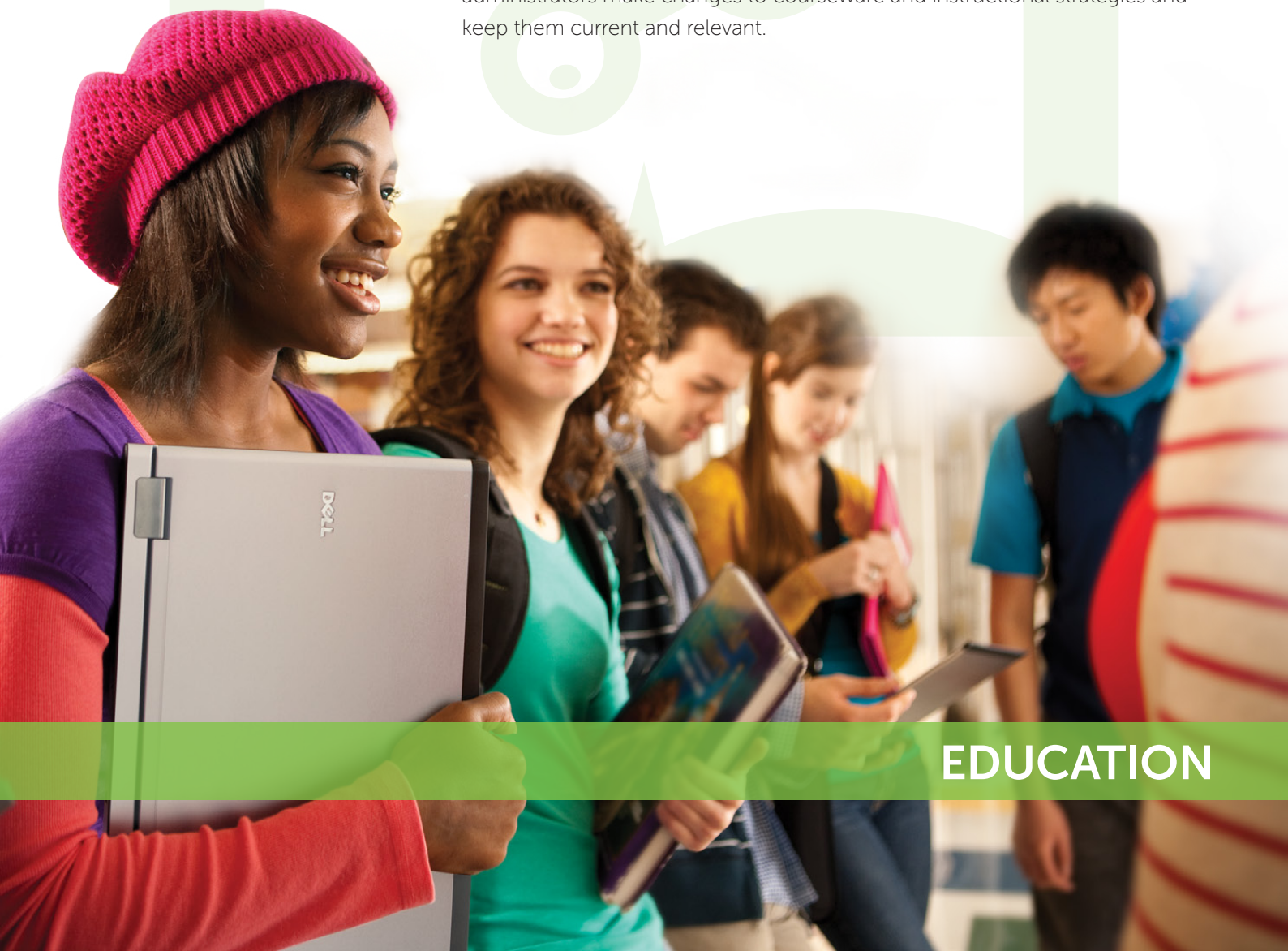
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Technology Considerations for Connected Learning

Technology alone is not a cure-all for the challenges faced by educators.

Careful consideration has to be given to the types of technology that are to be used, the overall design, the implementation of the design, and its use and management. The IT components for Connected Learning need to be assembled and managed holistically such that they work well on their own, together, and with other systems under the guidance of an overall vision of the intended outcomes for all stakeholders.

IT infrastructure determines what can be done in the Connected Learning classroom/lecture hall and beyond so it has to be well thought out. It includes servers, network and storage systems at the back end, classroom computing devices for teachers and students (typically PCs, netbooks or tablets), and complementary classroom assets (interactive whiteboards, projectors, student response devices, etc.).

For the various bits to work properly together, it is best to use infrastructure assets that are based on flexible and adaptable open system technologies.

By avoiding protocols, components, or systems that may require custom work to hook together, educators can expand infrastructure easily and minimise the risk of expensive technology barriers that must be overcome later, as well as large-scale replacements in future.

Educators would also do well to implement virtualization technology, which dramatically reduces space and energy costs while providing enhanced levels of performance and flexibility. Virtualization also lowers the IT management overhead, which can be further shrunk by using similarly (ideally, identically) configured computing devices and complementary assets used in the classroom.

Connected Learning requires that administrators, teachers and students store their documents, curriculum content, assignments, research projects and notes online so that they can be easily shared and accessed. A centralized, secure storage system combined with replication technologies aids in

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keeping data continuously available and mitigates risk of downtime. It also simplifies data scalability as student populations and digital content grow.

As for in-classroom learning technologies, essential functions include intuitive use by both students and teachers and enablement of instant responses from students (and teaching staff's feedback on correctness of responses) and quick adjustment of task difficulty in relation to student responses. The technologies should also make possible opportunities for individualized problem solving and performance assessment.

As technology reaches further into the classroom, it is essential to minimize or prevent classroom disruptions that a technology issue may cause. A customized set of support services for IT administrators and end-users (students, teachers, and staff), as well as proactive systems management can reduce the IT management burden and free up resources (time, money, and people). These resources can then be deployed to bring the right technology into the classroom environment where it can have the great impact on student achievement.

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How Dell™ Can Help

To help educators prepare their students for success in the 21st Century, Dell™ offers a range of technology solutions that integrate technology into the learning process and make Connected Learning a reality.

Dell™ Connected Learning solutions are divided into two groups: Connected Infrastructure solutions and Connected Classroom solutions. Connected Infrastructure solutions address the IT infrastructure and strategy for the education system as a whole. They include:

- A variety of laptops for various levels of student usage
- Advanced touchscreen laptops for teachers to manage classroom devices, coordinate content delivery and demonstrations, and prepare lessons
- Wireless network
- Open-standards, high-performance servers
- Smart storage systems
- Applications and devices that facilitates Virtual learning environments and management of the entire fleet of ever increasing devices

Dell™ Connected Classroom solutions, that address the various environments in which teaching and learning take place, include:

- World class interactive teacher and student resources which brings traditional subjects to life
- Interactive whiteboards that display interactive computer content and then interact with a wireless stylus, finger or mobile slate/pad
- Response devices and software that enable students to respond and review learning in real time and be more involved in lessons, and that provide teachers with instant feedback
- Short-throw projectors that display teacher and multiple students computer screens on most walls.
- Mobile laptop cart that provides storage, security and power charging for laptops in between use
- Digital presenters/cameras that display live demos, hardcopy or printed material direct to the projector
- Audio-visual equipment (DVD players, speakers, large screen displays, etc.)
- Classroom control systems for managing the various devices and systems in the classroom

The Dell™ Connected Infrastructure and Connected Classroom solutions are complemented by a suite of services (consulting, deployment, cloud, support) that give schools and teachers the confidence and tools to deliver effective education that meets every student's needs.

Together, these solutions and services helps educational institutions and teaching staff adopt individualized, collaborative, and project-based learning practices while enhancing traditional teaching methods, ultimately increasing student engagement and promoting mastery of content.

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Connected Learning in Northern Marianas Islands

One example of how the right technology can be employed to make Connected Learning a reality is the Commonwealth of Northern Marianas Islands Public School System (CNMI PSS). With about 11,000 students under its wing, CNMI PSS wanted to ensure that living on remote islands was not a barrier to their learning opportunities and examined how best to mix technology and Web connectivity such that students could access knowledge that would globalize their learning experience.

"We knew that the students needed to have the world come to them. The more technology we can put in their hands, the better prepared they will be when they venture outside of the islands,"

said Craig H. Garrison, principal of Marianas High School, which is located in the main island of Saipan. He envisioned a notebook with state-of-the-art technology for each of the 6,000 students in grades 7-12.

After an extensive selection process, the CNMI PSS IT Department worked with a Dell™ partner to provide students with Dell™ Latitude™ netbooks. Just 90 days after the students began using their netbooks, they were observed to have achieved a 63 percent improvement in language arts subjects, a 33 percent improvement in mathematics, and a 16 percent improvement in their science grades.

CNMI PSS collects data on where students go after school hours to stay connected, and found that students use their notebooks inside and outside classrooms with the same enthusiasm. Furthermore, students now present their assignments with a greater level of creativity, with the use of multimedia in presenting coursework up by 32 percent.

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Easy Web connectivity has also changed students' learning habits; a number access online courses offered through the University of Nebraska-Lincoln Independent Study High School and others similar to it, either collaboratively in the school lab or at home at night. Incorporating Dell™ technology into the classrooms has also made an impact on teaching methods.

With the Dell™ wireless short-throw interactive projector, teachers can transform any wall into an interactive interface. This has significantly changed the way teachers teach in the classroom, said Mr. Garrison. In addition, Connected Classroom technology allows teachers to use software to grade tests, scan documents, and email or transmit through Bluetooth to students' notebooks. This has resulted in greener classrooms, with paper usage down by 35 percent.

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