The Internet of Everything (IoE). It, and the technologies that drive it, are having an impact on higher education in ways never dreamed of just two decades ago. In this age of data and endless information, it is even causing your institution to rethink the very basics of teaching. And for the tools to do so, they are turning to you, their IT leaders, to ensure their success. Are you prepared?

The Internet of Everything (IoE) is bringing together people, processes, data, and things to make networked connections more relevant and valuable than ever before. It is turning information into actions that create new capabilities, richer experiences, and unprecedented economic opportunities for your students. But until recently, few educational institutions actively incorporated technology in learning. And even fewer teachers shared data, except for research projects. But educators and institutions can no longer rely solely on their core competences and teacher knowledge. Instead, they must embrace the many devices that students bring in to the classroom that help them capture intelligence faster.

Connectivity is leading this revolution. For educators, the proliferation of mobile devices allows the wholesale collection of data that they can use to interpret students' behaviors and activities. Used intelligently, such data can produce personalized learning targeted to individual needs, learning styles, and aspirations. But this is just the beginning; the first thoughts in a story that will cover the coming decades. IoE will birth a revolution in education, one that connects people, processes, data, and things. And as an IT leader, now is the time you must prepare.

The Four Pillars: People, Process, Data, and Things

IoE in education is in the early stages, but some institutions are leading the way in showing how it can be used effectively in educating young people and the public at large. At Cisco, we believe the IoE is built upon four pillars:

1. **People:** Your student's future is a hyperconnected one. They must have the capability to connect with others at multiple levels. This includes peer-to-peer, communities of practice, and distance learning opportunities. But they are not alone. Teachers also face the same future. IoE will drive educators further towards community. This will likely include connectivity as the primary source for professional development, student feedback, overall achievement, and on-demand video recordings. The value of connectivity even extends to higher education administrations, which can use it to help determine teachers' strengths and weaknesses or to define learning methodologies.

2. **Processes:** Connectivity requires efficient processes. These processes allow your team to better evaluate the outcomes of interactions among the people you affect through IoE. Streamlined and cohesive processes also empower your users to make better informed decisions related to a multitude of daily impacts including efficiencies, costs savings, energy savings, and management. This may include the processes involved in tracking attendance, purchasing books, collecting data on study habits, or managing physical access to various areas of campus. So the impacts can be significant and long lasting.

3. **Data:** As things connect to the Internet and evolve, they will become more intelligent, and thereby provide more useful information. Rather than just report raw data, connected things will soon send higher-level information back to machines, computers, and people for further evaluation and quicker decision making. This sharing of data sets will enhance and extend both student and educator experiences. IoE takes data-driven decision making in education one step further, encouraging innovation that motivates and excites learners, turning passive learning into active learning, informing educators about students' lifestyles, and helping teachers develop better curriculum and assessment structures.

4. **Things** - Things are physical items that can be connected to both the Internet and people through sensors. Sensors give things a "voice." By capturing data, sensors enable things to become context aware, providing more experiential information to help people and machines make relevant and valuable decisions. Imagine if things can talk to each other, forming a community of things.- Objects can then exhibit certain behaviors based on stimulus from their surroundings and improve their functionality.

Successful Implementation of IoE in Education

IoE has huge potential for your institution or educational jurisdiction. But as an IT leader, you must address three key areas to ensure widespread and successful adoption by your leadership, staff, and students:

1. **Security:** Without assurances, pervasive development of IoE will not take place across educational institutions. Your team must ensure information is available, yet confidential, when needed, with the owner of the information deciding which people, groups, or organizations may have access to it. Your security approach to embedded devices must take into account the complex networks of people and things in both the public and private sectors. Such devices will likely create new relationships among people and computers. As you begin discussing IoE with your institution's leadership, you must maintain a balance between the positive impacts discussed earlier and generating awareness about the risks to both privacy and security. Both educators and learners will need to have a better understanding of ethical issues and the risks of IoE, as well as ways to mitigate those risks. Personal and communal data will need to be treated differently, and the individual's privacy will have to be respected.

2. **Data integrity:** Integrity of data must also be assured, as well as its accuracy, authenticity, timelines, and completeness. Success will be predicated on an open platform that allows all partners working together to use the same baseline technologies. Educators will need to work closely with government to ensure the development of IoE in education. At the same time, government must preserve the safety and security of its citizens.

3. **Education policies:** Policies that encourage adoption of technology in the classroom and its effective integration into curricula are crucial. Such policies must include sound change-management practices among educational institutions to reduce the barriers to technology adoption and increase its scale. Professional development programs for educators should incorporate IoE tools to encourage early adoption and help educators develop innovative methodologies and appropriate pedagogies for the learning environment. As an IT leader, you may have to step outside your comfort zone. If so, after discussing IoE with your institution's leadership, we encourage you to go straight to the front lines, the teachers. It is here where the true success of your IoE approach will be determined.

Next Steps

IoE has tremendous potential to make education more relevant, to engage and motivate students and staff, and to increase speed of learning. But to realize the benefits from connecting people, processes, data, and things, your IT department must provide reliable connectivity and continuous access. And for IoE to be accepted, both leadership and educators must be well-versed in its benefits while understanding and accepting its potential risks.

For more information about the IoE, visit:
http://www.cisco.com/web/about/ac79/innov/IoE.html

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IoE: Tomorrow Starts Here

Education and the Internet of Everything

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