A STRATEGY PAPER FROM

CENTER FOR DIGITAL EDUCATION

Teaching and Validating Digital Literacy Skills

How full pathway education can help K-12 students prepare for success in today's economy

SHUTTERSTOCK

The Digital Revolution and New Expectations on Skillsets

Students entering the workforce today face an increasingly complex and competitive world. The pace of business is accelerating to staggering levels. The increase in information and rate of transactions and interactions is exponential. These drivers are causing business leaders to look to technology for a strategic advantage. Today, many businesses say technology is vital to achieving their strategic priorities, including reaching new customers, improving staff productivity and capabilities, reducing costs and overhead, and innovating more effectively. As a result, there is increased demand for skilled IT talent. Businesses need professionals with IT skills and the ability to keep pace.

Although today's digital natives have grown up immersed in technology — proficient at gaming, texting, social media, and using smartphones and tablets — many are not prepared to use technology, such as calendaring applications, business productivity tools and specialty software, effectively in the workplace. Today's employers face challenges finding employees that have general, foundational business technology skills, as well as finding those that have higher-level technical aptitude to manage advanced technologies.

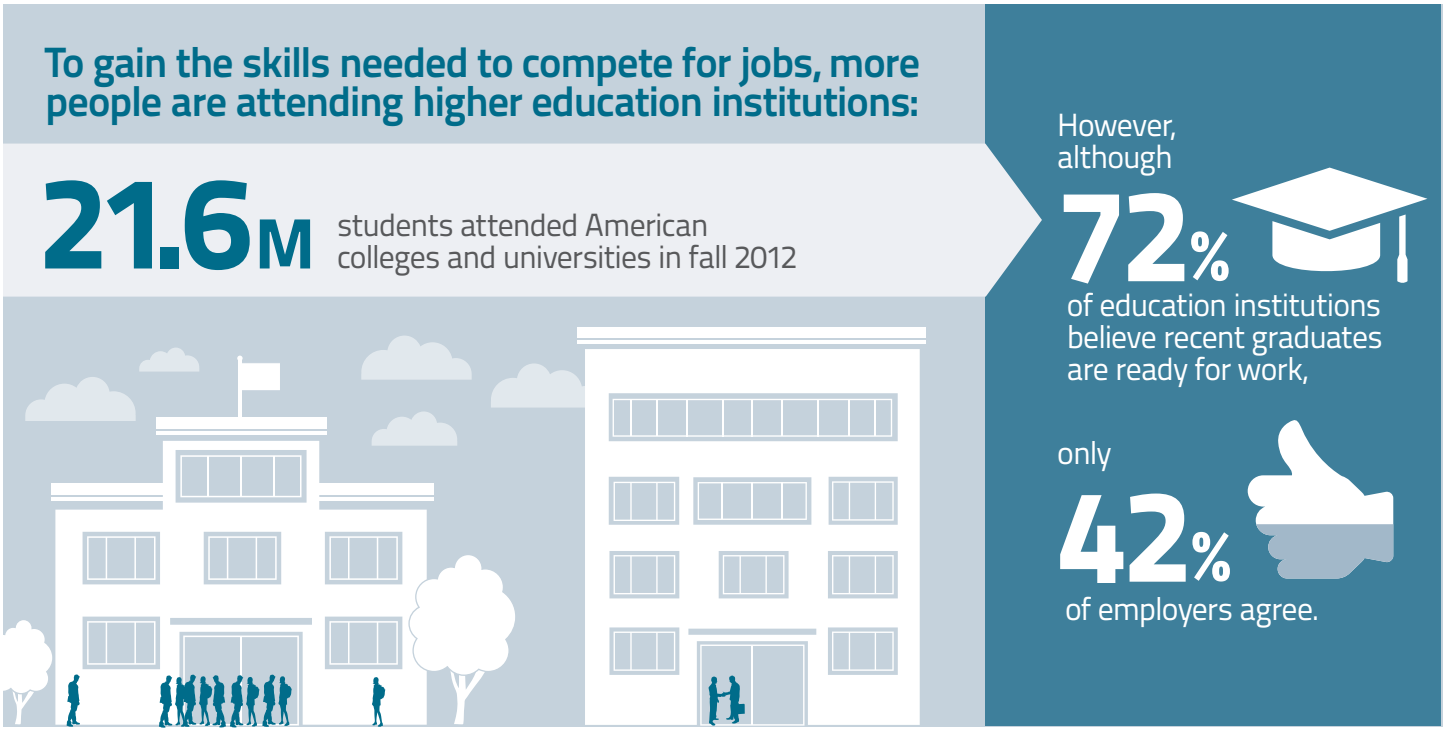
A recent survey of C-level employers by *CIO, Computerworld and Network World*[1] found that more than half of the respondents were "very challenged" to find qualified staff to design, architect and manage game-changing IT concepts like converged network infrastructures and cloud computing.

According to the Bureau of Labor Statistics, 50 percent of the 9.2 million jobs in the science, technology, engineering and math (STEM) fields will be in computing and IT by the year 2020.[2] That represents 4.6 million jobs. Employers of today and tomorrow need workers that have robust academic credentials and proof that they understand and can use IT productivity tools.

Higher Education Too Late?

In an effort to gain the skills needed to compete for jobs, more people are attending higher education institutions than in the previous decade. According to the National Center for Education Statistics, a record 21.6 million students attended American colleges and universities in fall 2012, constituting an increase of about 6.2 million since fall 2000.[3]

Despite increasing college enrollment, many employers question whether academic institutions are adequately preparing today's graduates for the competitive and dynamic



work environment. According to "Education to Employment, Designing a System that Works," 72 percent of education institutions believe recent graduates are ready for work, but only 42 percent of employers agree.[4]

Today's employers express concerns about whether college graduates have the skills, knowledge and personal responsibility to contribute to a changing workplace and help companies and organizations succeed. Earning a college degree may no longer be enough to compete effectively for today's IT jobs. Instead, the best way to acquire such skills is through a program of continual training and certification, and it needs to begin much earlier than college.

The Value of an Early Start

Technology preparation should ideally begin at the K-12 level, with the goal of arming students with critical technology skills before they enter college. According to a couple of key studies (Adelman, 2006; Oakes & Saunders, 2007), high school curricula need to be rigorous, relevant and engaging to prepare students for successful post-secondary activities. Students who take more rigorous, academically intense programs in high school enroll and persist in postsecondary education at higher rates than similar students who pursue less-challenging courses of study.

Today, however, students' high school experiences too often fail to prepare them for postsecondary education or for the rigors of work in an information-based economy. And despite clear evidence of the need for advanced IT skills, computer science is still not considered part of the K-12 educational core. In 2012, fewer than 3,000 of the country's 40,000 high schools offered the AP computer science exam.[5]

Fortunately, there is recognition that the situation needs to change. In June 2013, U.S. Representatives Susan Brooks (R-IN) and Jared Polis (D-CO) introduced the Computer Science Education Act. The legislation would remove key federal policy barriers and amend the statutory definition of "core academic subjects" to add computer science to the subjects addressed by federal teacher professional development programs. The legislation would also clarify that federal funds can be used to invest in computer science and support local and state educators who want to put computer science curriculum and teachers in schools.

While the legislation is expected to help ensure high school students build a base of technology education and skills, change takes time, and academic institutions will need to update curricula to match changing market needs. Fortunately, there is a more immediate approach to ensuring students are not left behind when it comes to digital literacy: foundational industry certification programs.

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Certification can provide credit for college courses, saving students time and money. It also prepares a student with the digital media skills and knowledge to succeed in fast-paced learning and working environments.

Certification can help students obtain higher degrees of success in their pursuit of higher education or a career in technology. Moving from high school to college is a big step for most students. Certification helps in two significant ways. First, certification can provide credit for college courses, saving students time and money. Secondly, it prepares a student with the digital media skills and knowledge to succeed in fast-paced learning and working environments.

Certification helps ensure that young people grow up knowing how to apply technology in real-world business situations, not just for playing video games or chatting with friends online. Through a K-12 certification program, students master digital literacy skills and key application technologies, and then validate those skills with an assessment that means something to employers.

Certification validates computing excellence, in-depth knowledge and real-world skills, and it differentiates and elevates an individual from the crowd. According to the *CIO, Computerworld* and *Network World* survey, 66 percent of IT

executives said that technical certifications are "extremely" or "very" important considerations in choosing external consultants, resellers and systems integrators.

Meanwhile, a recent study[6] found that 91 percent of hiring managers consider certification as part of their hiring criteria, while 64 percent rate certifications as having extremely high or high value in validating the skills and expertise of job candidates.

Even if a company does not demand or even prefer certification, advantages remain. In today's highly competitive applicant pool, differentiating oneself — especially with a validated industry credential — can set an individual job candidate apart from other generally skilled applicants. Certifications demonstrate not only a deeper level of knowledge in a given area, but the initiative and drive of the person holding them.

Policy in Practice

To ensure college and career readiness for their students, several innovative schools around the country have implemented IT certification programs designed to enhance the K-12 experience.

Warren County Middle School in Warrenton, N.C., successfully implemented a digital literacy training and certification program for its students. Every student takes digital literacy courses as required electives, including a "Key Applications" course for seventh graders and "Living Online and Computer Fundamentals" for eighth graders. Most of the students achieve the Internet and Core Computing Certification (IC3) at the end of the class.

"The advantage of having the digital literacy certification is that when these students apply for jobs and colleges, they can have a digital portfolio and show proof of their knowledge," says Warren County Business Education Teacher Debra Clayton. "It makes them a little more marketable and tells employers and colleges that they know more about computers than other candidates."[7]

Meanwhile, Florida's Escambia County School District, which includes seven high schools, eight middle schools and over 41,000 total students, has embraced a career academy model that includes certification as a key element. The model enables students to explore and prepare for IT and other careers beginning as early as sixth grade.

"Information technology permeates every aspect of the workforce and most aspects of personal life today," says Michelle Taylor, workforce education specialist with Escambia.[8] "Digital literacy is as basic to today's education as reading and writing and math — it is a type of literacy that warrants not only direct technology instruction, but infusion within academic courses. We offer instruction and certification in our middle schools so students get to begin developing key IT skills and can explore whether they want to continue in the IT field or not."

"Certification puts the rubber where the rubber meets the road. It takes the guesswork out of where a person's skills are. Anyone can say they are good with a computer, but a certification proves they are at a certain level and anyone in the U.S. or even worldwide can see it and know what it means."

Halbert Bynum, Network Manager, CART

Foundational certifications such as IC3 offered in middle school can serve as the building blocks to industry-recognized certifications earned in secondary schools. Those certifications, in turn, lead to greater college and career readiness.

According to Taylor, hundreds of students at Escambia have earned certifications to date. "The students are learning essential skills with respect to the business world. Enabling our middle and high school students to earn a certification is a huge value-add that also allows them to do more project-based learning that simulates the real world," says Taylor.

The Center for Advanced Research and Technology (CART) near Fresno, Calif., has made certification an integral part of their program as well. CART is a comprehensive, state-of-the-art education reform effort that combines rigorous academics with technical, design, process, entrepreneurial and critical-thinking skills. The 75,000 square foot CART facility, designed as a high-performance business atmosphere, is organized around career clusters. Within each cluster are several career-specific laboratories in which students complete industry-based projects and receive academic credit for advanced English, science, math and technology. Eleventh- and twelfth-grade students from Clovis and Fresno Unified School Districts are bused to CART where they attend half-day classes in one of the laboratories taught by teams of instructors from both education and business.

"Our goal is to get these kids ready for college, but we also realize not every kid will go to college," says Halbert

Bynum, who handles network management and computer maintenance for the regional occupational program at CART.[9] "We want to train them for other things in case they want to go another route. We work on setting the standards so when they leave here they have some solid technical skills."

Bynum says the certification program is invaluable at CART because it not only teaches students IT skills, but it provides them the proof to go along with it. "Years ago you could just turn on a computer and you were considered a computer genius," says Bynum. "That is not the case anymore. More and more professions today require certifications. Certification puts the rubber where the rubber meets the road. It takes the guesswork out of where a person's skills are. Anyone can say they are good with a computer, but a certification proves they are at a certain level and anyone in the U.S. or even worldwide can see it and know what it means."

More than Meets the Eye

When K-12 students earn an industry-recognized certification, they become more college and workforce ready, arming themselves to succeed in today's economy. But certification has additional benefits as well.

"Certification not only increases the rigor of their technical instruction, but it teaches students the value of a credential at a very important time in their education," says Taylor. "The eighth-grade year is so important in terms of sending them forward. This is another strategy we have to increase their self-efficacy for earning a credential and succeeding. It has demonstrated our students can step up when asked to and when they see the value. I think there are lessons to be learned there that transcend just technical and career education."

Digital literacy at the lower grades has also been linked to successful progression to upper grades for higher-level skills in programming, design, etc. "Students that earn certifications often get better grades in school and grow up knowing how to apply technology in real-world business situations," says Bynum.

Meanwhile, certifications earned at the high school level help move students forward along the path of preparing for college and the workforce. La Salle private high school in Wyndmoor, Pa., for example, had a robust technology program to teach students valuable skills, but had some difficulty successfully validating those skills with an industry-recognized certification. Some La Salle students took the Microsoft Certified Technology Specialist (MCTS) exams, but many were unprepared for such an advanced certification.

When La Salle's Chief Information Officer Peter Sigmund attended education technology conferences, he found that the certification path was lacking the basics. "It is very difficult to teach kids MCTS classes at this level when the certification path doesn't teach network or server fundamentals," says Sigmund.[10]

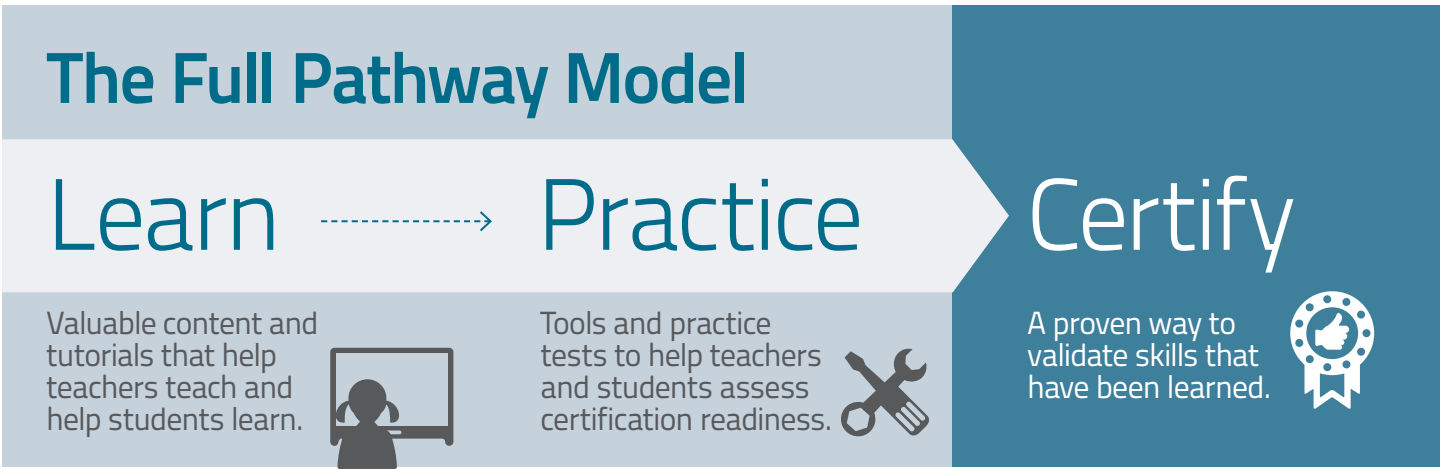
Ensuring Certification Success

The proof of knowledge a certification provides establishes value and gives the institution offering it a reputation for preparing students to be college and career ready. But passing a certification test is often a rigorous endeavor for students.

Interactive test preparation tools can help. Unlike textbooks, interactive test preparation tools are designed to help students better prepare for a certification exam using a full pathway model that includes learning, practice and certification.

Interactive preparation tools are designed to test a student's ability to use technology to his or her benefit, not the ability to memorize the answers to multiple-choice questions. The best tools offer both a learning mode and a "live application" testing environment that map directly to certification exam objectives. The learning mode allows students to enhance their studies and receive feedback and step-by-step instructions for each question, while the testing mode presents timed practice tests and scenarios to perform just like an actual certification exam.

Teachers can also benefit from interactive test preparation tools, as such programs can provide them access to individual and group performance reports to discover areas for improvement. And students that utilize interactive test preparation tools become familiar with the testing environment, approach their certification exams with confidence and are better prepared to pass their certification exam.



Sigmund attended another education technology conference and heard about the new Microsoft Technology Associate (MTA) certification. MTA was developed to fill the gap La Salle was experiencing, as the first step on the technology certification roadmap. Today, the MTA exams provide a basis for La Salle students to pursue a career in technology and validate a variety of basic IT and development technology knowledge prior to earning more advanced technology certifications.

Certification also boosts confidence, a trait that carries over well as students become job applicants. It is one thing to get an A in a class, but it is another thing to earn a certification.

Not only can certification help a candidate stand out, research from the Foote Research Group indicates it may equate to a higher salary as well. According to the group's "2013 IT Skills Demand and Pay Trends Report," more and more companies are holding out for the IT pro who has the perfect skillset, and "people with certifications that match those skillsets are getting paid a premium over what others in the same role without the certification are receiving."[11]

Taylor has found similar evidence among Escambia's graduates. "We've found that not only are the students who achieve certifications getting good jobs, but the certifications and the skills that come with them eventually lead to higher paying jobs as well," she says.

The Full Pathway Model

Fundamental IT certification programs are easy and affordable to implement. But to be successful, schools also need a "full pathway model" that guides students through the process from beginning to end. The full pathway model includes learning resources, skills practice and assessment, and validation through certification exams. The three key elements are:

1. Learn

The right materials set the stage for success. Good content tools and step-by-step tutorials help teachers teach and help students learn. Schools need resources (lesson plans, curriculum materials, etc.) to help manage the student along the way and to help the teacher implement activities and milestones to validate that the content is sticking.

2. Practice

Students need the ability to assess skills/certification readiness. An assessment tool and practice tests allow teachers to see where they did not convey material well or where the student did not grasp the content completely or absorb all the necessary details. The best practice tests are set up to be nearly identical to the certification exam experience.

3. Certify

Certification testing that has "in application testing," and is not just multiple choice or theoretical in its approach, goes much further in preparing students to validate that skills have been learned. As an added benefit, the typical technology classroom can easily become approved as an authorized testing center, with the ability to administer the tests and issue certifications to qualifying students.

To ensure a certification program is set up correctly and follows the full pathway model, many schools choose to collaborate with industry experts.

"I knew I had to get started offering industry certification, but I didn't know how to start or what it would entail," says Taylor. "I turned to an experienced industry partner for help, and they were able to provide me the steps I needed to take to make the program a reality. They provided the protocol, the structure and the support that enabled me to begin transforming our high schools into testing centers. Doing so has changed the way we do business in Escambia County School District."

Bynum also works with an industry partner, which he found exceptionally helpful when CART surveyed local employers about emerging employment needs. "We surveyed local businesses to see what they were looking for and then we went back to our industry partner with that data," says Bynum. "The partner was able to tie the certification and training programs back to the local employment needs to try to fill some of those gaps."

Bynum says parents of CART students have begun asking to use the testing center as well. "We had so much demand that we are opening the testing centers one day a month for adults to come take the tests," he says. "With the economic downturn, many parents have had a career change or just want to get certified so they have more to offer an employer."

Conclusion

Earning a degree to demonstrate IT competence is not enough anymore. Workers have to prove they have specific skills to fill job openings. Certification validates computing excellence, in-depth knowledge and real-world skills. Certification programs help educators effectively teach and validate IT skills while providing students with credentials that demonstrate real-world prowess to prospective employers.

"Over time, I think certification will become as common as getting a driver's license," says Bynum.

But college is too late to start implementing in-depth IT skills training. Students need to begin learning these key skills at the K-12 level. Fortunately, industry partners are helping K-12 schools implement full pathway learning models designed to help students master digital literacy skills and key application technologies easily and affordably.

Endnotes

1. Note to CIOs: Train and Certify Your Way Out of the Skills Gap: How to Ensure Your Staff Has the Skills it Needs, Hewlett Packard, 2012, http://h41156.www4.hp.com/education/upload/de/de/IDC_ExpertOne_whitepaper_Nov12.pdf
2. Federal Science, Technology, Engineering, And Mathematics (STEM) Education 5-Year Strategic Plan, Report from the Committee on STEM Education National Science and Technology Council, May 2013, www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf
3. National Center for Education Statistics, 2013, http://nces.ed.gov/fastfacts/display.asp?id=372
4. Education to Employment, Designing a System that Works, McKinsey Center for Government, 2012, http://mckinseyonsociety.com/downloads/reports/Education/Education-to-Employment-exec-summary_FINAL.pdf
5. Supporting the Computer Science Education Act in the 113th Congress, Computer in the Core, 2013, http://f9c2f2a9517a073e3a66-4905f4819032f494f944d6d0a32dcd10.r60.cf1.rackcdn.com/CSEA_One_Pager_FINAL_6-26-13.pdf
6. Microsoft Certification Program Satisfaction Study, Microsoft, April 2012.
7. Warren County Middle School Adds IC^3 Certification to Required Electives to Validate Key Digital Literacy Skills, Certiport, www.certiport.com/portal/common/documentlibrary/IC3_SS_Warren_County_Middle_School.pdf
8. All information from CDE interview with Michelle Taylor conducted on August 27, 2013.
9. All information from CDE interview with Halbert Bynum conducted on September 3, 2013.
10. La Salle College High School Adopts Microsoft Technology Associate Program to Start Students on Technology Path, Certiport, www.certiport.com/Portal/desktopdefault.aspx?page=common/pagelibrary/MTA_success.html#LaSalle
11. 2013 IT Skills Demand and Pay Trends Report, Foote Research Group, 2013, www.footepartners.com/2012TrendReports.htm

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