Experiential Learning: Bringing Knowledge to Life

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Executive Summary

The profound changes created by the Internet over the past 20 years have affected 21st Century knowledge workers more than any other group. The ability of individuals to access massive amounts of information on seemingly every subject presents both benefits and challenges to the learner. While having ubiquitous information at one's fingertips is a luxury unimagined by our forefathers, it also alters fundamentally the way we learn and perform.

Why? Simply put, it means that knowledge is no longer power. Access to knowledge – and the ability to turn that knowledge into action and decisions – has become the new power.

Learning organizations, be they institutions of higher learning or corporate training departments, must now recognize this sea change and adjust to it. Doing so is vital for the preparation of students and employees for successful careers in today's hyper competitive business environment.

In order to succeed in this "brave new world" of information, today's students and the institutions that educate them must broaden their traditional learning methods to embrace new performance-centric skills. The new priority is to develop agile minds of resourceful individuals who can locate and master skill sets or the knowledge they need, not simply memorize learning content. We call it "MindFind" – the development of skills to find data, not the development of skills to store information.

Today's "new frontier" requires fresh approaches to develop these *agile minds*. Among these approaches is "experiential learning," hands-on personalized practice with live Internet-based systems and scenario-based virtual worlds. These remote laboratory-based learning solutions can bridge the gap between education and experience in such fast-growing fields as IT, healthcare technology and business consulting.

State-of-the-art experiential learning solutions enable students in classrooms and eLearning programs to gain the valuable real world experience they need, while providing institutions of higher learning and corporate universities with an arsenal of valuable tools that extend their campuses and engage their students.

This whitepaper explores the impact of today's rapidly evolving Internet technologies on the business of learning, and how both institutions and students must prepare for it. It also discusses how instructional design expertise and unique technology platforms can enable academic institutions and corporate universities to offer cutting edge learning programs that develop agile-thinking, workforce-ready graduates through hands-on experiential learning.

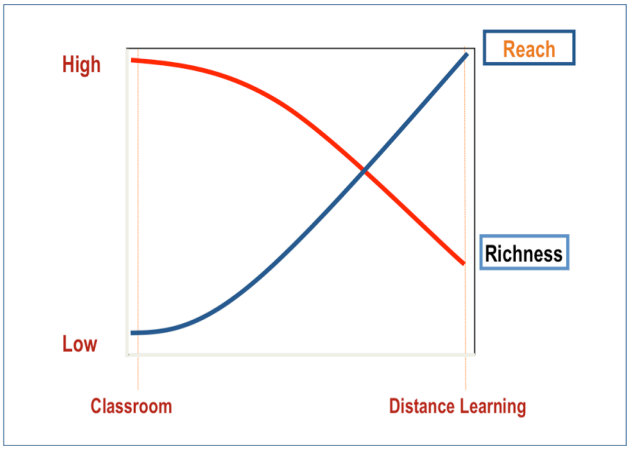
The New Frontier

The rise of technology and the development of the Internet have changed everything. It has changed the way we communicate and interact, the way we transact our business, and the way we learn and develop to enhance our personal and professional lives.

The work of Tim Berners-Lee and his colleague Robert Cailliau at CERN in developing the World Wide Web in 1990 added a super-charger to the potential for the distribution of data, information and knowledge across time and distance in a way that was barely imaginable a decade earlier. This development alone has thrown traditional approaches to learning into the spotlight, under the microscope, and in many instances out the window.

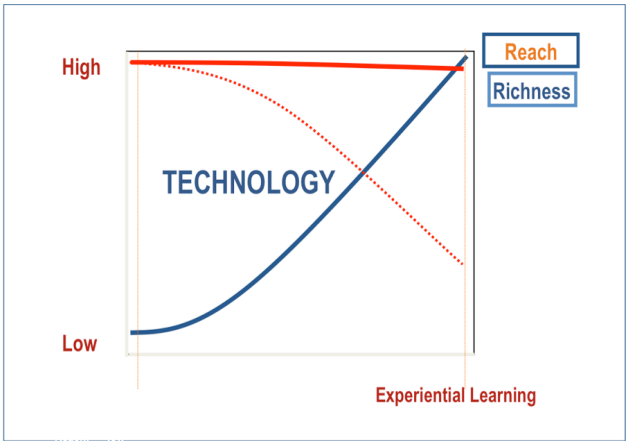
The constraints of time and distance and the trade-off between *richness* and *reach* have all been broken.

Philip Evans and Thomas Wurster, the originators of the *richness/reach* model (shown in the diagram below), described a pre-telecommunications world where there was always a trade-off between the ability to provide rich experiences and to reach large numbers at lower cost. The near-demise of Encyclopedia Britannica in the face of the Internet is an example of the barrier to distribution collapsing and opportunities emerging for rich new information such as Wikipedia.



Equally in education, the rise of the Internet as a rich connectivity conduit has broken the traditional Oxbridge (Oxford and Cambridge) and Harvard/Stanford/Yale dominance where once students needed to attend top-flight bricks-and-mortar universities to have the richest experiences and learn from the top academics. Now the playing field has been leveled. Less prestigious colleges that once operated 'distance education' programs through written materials distributed via the postal system are now able to compete with the top-flight colleges by using Internet technologies to provide both richness and reach.

Technology has played a vital part in this change. The diagram below illustrates the changes that have occurred. The barrier to rich learning experiences has been broken, taking with it the unique selling point of classroom or face-to-face education.



Technology has also played a vital part in the rise of "MindFind". With the rise of Internet technology, information has become ubiquitous and its access simple and straightforward. Holding knowledge in our heads no longer provides the power it previously did.

Today knowledge is not power … **access to knowledge is power**.

Access is Power – the Winners and Losers

We live in a world of rapid change. Data and information are expanding exponentially. Our derived knowledge is becoming increasingly dynamic. It changes rapidly as the data and information building blocks move beneath it. What we understood to be true yesterday is increasingly mired in shadows of doubt today as we discover new 'truths'.

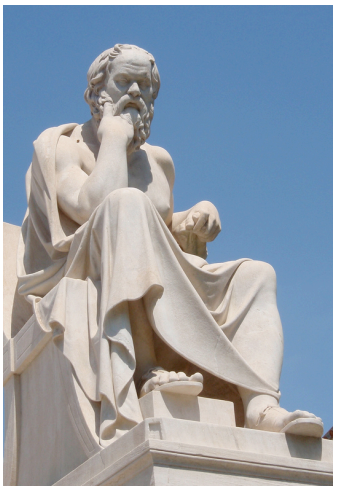
In business, information and knowledge is used to drive critical decisions and create productive actions. The quality of these actions is dependent on the relevancy and currency of the information. In our new 'Internet time' world, the only way to ensure productivity is to find information when we need it, rather than storing it in our heads. 'Just-in time', rather than 'just-in-case', needs to be the new mantra.

A strategy to deal with this problem is to be 'unknowing' until we reach the point of need. Even better is to be *unknowingly prepared* – to be unknowing but to possess the tools and skills to rapidly become 'knowing' at the moment-of-need. When you think *unknowingly prepared*, think of the Zen masters who study for a lifetime to clear their minds, yet are able to bring enlightened thinking to anything that confronts them – without preconceived ideas or historic baggage getting in their way.

The winners in today's sea of information and knowledge will be those who develop "MindFind" skills, the *MindFinders*. These are individuals with the agility of mind and the set of intellectual and technological tools that allow them to locate and process information efficiently and effectively, and then act appropriately in Internet time.

The losers will be those who try to store large amounts of static information in their heads. These individuals will find that they are increasingly overtaken by the *MindFinders* with their greater agility, their ability to synthesize knowledge quickly, make the right decisions and take definitive action.

Rise of the Sons of Socrates



For *MindFinders*, the future is now. Global competition and the world's economic downturn have increased the pressure for all organizations to change the way they operate. Innovation and flexibility are two key skills that individuals need in order to thrive. Work is changing, people are changing and information half-life is shortening. Increasing demands from rising VUCA (volatility, uncertainty, complexity and ambiguity) demand a change in the way that we work, and new ways of working require new ways of learning.

In this new world, learning *is* the work.

The new entrants to higher education and the world of work also bring different behaviors, different experiences and different demands. The dynamics of college and the workplace are changing, and change will be the *status quo* going forward.

Plato's Academy model where teachers teach knowledge and students receive it has been used in formal education for many years. It is still in wide use. More recently an awareness of the role of experience, practice, conversation and reflection in learning has been acknowledged, although only a few institutions have fully embraced this.

However, Plato's Academy is dead as an approach to developing the capabilities required for the 21st Century. The content-centric, rigid, knowledge-focused, 'teaching and assessment' models used in many formal education and training settings will have to change. In their place we need to return to the more appropriate model of Plato's mentor, Socrates.

The core of the Socratic approach is helping (not teaching) students learn critical thinking and analytic skills rather than specific content. It is focused on helping them develop the tools and techniques they need to thrive in the real world.

In the Socratic world knowledge is important, but it is held in the library and not in people's heads. This is echoed in our new "MindFind" world. Knowing where to find the right knowledge and advice, and knowing how to apply it to practical situations, is the objective.

When we overlay the 21st Century Socratic approach (the '*Sons of Socrates'*) with the tools provided through the World Wide Web and social computing, we have a powerful combination that works for our current era. The Millennials will drive our return to the Periclean Golden Age!

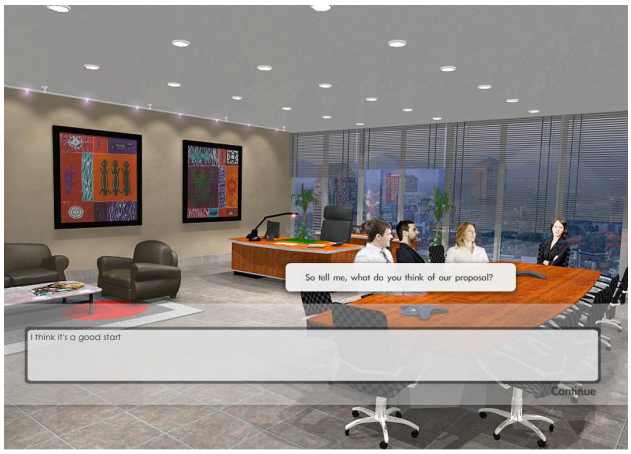
Millennials – Return to the Periclean Golden Age

One can only imagine what Plato or Socrates would have thought of the Internet. But about one subject they surely would have agreed: Today's Internet technologies enable students to achieve true learning by experiencing first hand the skills they seek to master. And by directly experiencing success and failure at important tasks, students can develop skills and retain competencies at a far higher level than they would have through traditional classroom instruction alone.

Robert Kelley at Carnegie-Mellon University shined a bright light on this accelerating evolution in a study conducted over the past 20 years. In a survey of several thousand knowledge workers, he asked a simple question: "What percentage of the knowledge you need to do your job is stored in your own mind?" In 1986, the average percentage was 75%. In 2008, 10 years after the rise of the Internet, that percentage dropped to 8-10%. This means that 90% of the skills needed by today's knowledge workers are *experiential*.

Companies are in fierce competition to hire, retain and develop resourceful employees who possess the ability to ferret out critical information from disparate sources and utilize it to their advantage. Businesses look to corporate universities and academic institutions for these *MindFinders* who are eager to take new approaches. They are workforce-ready graduates who have learned to utilize the growing array of Internet-based technologies including social networking tools to research hidden data and make valuable connections.

Fortunately, many of today's millennial generation students are Internet savvy and adroit at networking with their peers. They welcome the smorgasbord of innovations offered by Web 2.0 technologies, immersive virtual universes, and experiential learning tools that provide instant access to knowledge for decision-making. They know the importance of learning through practice and through others.



Many Millennials also understand the importance of performance over knowledge. Performance is the tangible output that drives organizations. Knowledge is simply one of the inputs that lubricate its cogs. And if knowledge can be accessed more easily and efficiently than committing to and relying on memory, then Millennials will use alternative approaches.

Yet sadly, much of education is still focused on content – the demand that students learn content, hold it in their heads, and then replay it to "prove" learning. That, of course, is not learning at all. At best it demonstrates ability to recall from short-term memory.

Instead of simply making incremental changes to what has always been done – "perfecting the irrelevant" – corporations and universities must extend beyond Plato and embrace the sons of Socrates. The key to creating productive 21st Century knowledge workers lies in a focus on "Hire Education" and state-of-the-art experiential learning. Millennials and experiential learning may hold the key to a return to the Golden Age.

Performance and productivity are the cornerstones of achieving business results, innovation, and return on investment (ROI). The most effective learning is 'Experiential Learning' (aka, just-in-time, on-the-job, technology-assisted apprenticeships).

What is Experiential Learning?

The movie *The Matrix* provides an exceptional example of experiential learning in action. In this case, it is literally a matter of life or death. In a scene towards the end of the movie, our heroes – Trinity and Neo – find themselves trapped on the roof of the Agents' headquarters. Their only escape is via a military helicopter.

The problem is neither of them knows how to fly a helicopter … yet. So what does Trinity do? She calls her Learning Management System (LMS), of course. In this case, the LMS is represented by a phone operator named Tank.

Trinity requests a specific learning object – Helicopters for Dummies! – and Tank downloads the skills directly into her brain. You can appreciate the experiential learning significance here. Once Trinity has received the skills, she and Neo fly the Helicopter to safety and continue saving the world!

This is a perfect example of just-in-time, context-sensitive experiential learning delivered exactly when the student needs it … in 30 seconds!

So, where do you get all of this great experiential learning content? The good news is … it is all around us! Each student holds hundreds of experiences inside them that can be used to improve the performance of everyone in the class. We just need to figure out how to tap into those experiences.

Experiential Learning is proving to be the fastest, most effective way to teach students rapidly changing knowledge and skills in technology, healthcare and business. It is considered by many professionals to be ideal for learning practical skills where students need the freedom to experiment, test their current expertise, and gain competencies far beyond theory.

Experiential learning provides students with a "technology apprenticeship" -- hands-on, real world experience while they are still in school. From an instructional perspective, live practice closes the kinesthetic learning loop, thus enhancing cognitive encoding and improving skills retention.

Experiential learning enables students to step through a series of guided actions, work through real-world scenarios, and actively control live equipment. Unlike simulations, which limit the ability of students to fail within a closed and facilitated environment, live laboratories enable learning-by-doing in a true "trial and error" fashion much like learning to ride a bicycle.

Tour of Experiential Learning

Yet experiential learning is not easily delivered. Live online labs and interactive virtual worlds require anytime access to real hardware and software via the Internet, no easy task. They must provide a centralized data center, 24x7 virtual learning environment, always-on customer service, installation and maintenance staff, dynamic hardware deployment platforms, software licensing, and other elements. Such costly infrastructure and expertise requirements are beyond the core competencies of most learning departments, colleges or universities.

Fortunately, corporate universities and/or academic institutions can source all such lab-related responsibilities today to deliver state-of-the-art experiential learning for students. Doing so provides several benefits:

- Lower lab delivery costs
- Avoid lab installation and maintenance overhead
- Innovate curriculum with engaging real-world experiences, and
- Standardize hardware and software platforms across all campuses and locations.

The power of experiential learning comes from three delivery platforms; each designed to enable students to achieve "technology apprenticeship":

1. Student Desktops
2. LiveLabs
3. Interactive Scenarios

For universities that provide information technology education, the Experiential Learning initiative developed by Toolwire, Inc., Pleasanton, California, offers one of the most innovative approaches available: a college degree plus something you might call an "IT pilot's license." In the time it would take a student to receive on-the-job training, they can earn a degree and as much as 100 hours of hands-on IT experience.

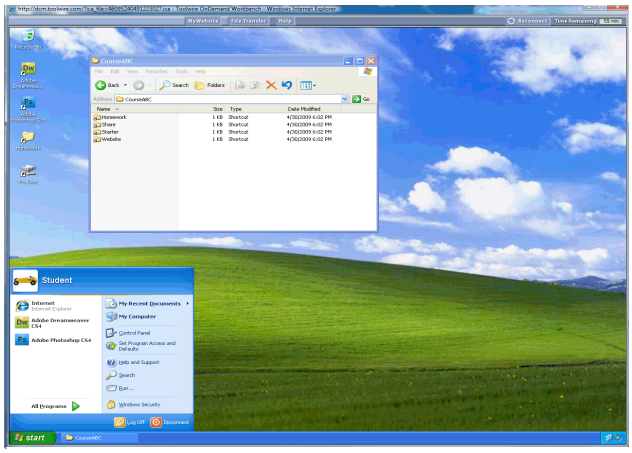
"Day-in-the-Life" Scenarios and the Student Desktop are vital experiential learning tools for Information Technology programs. Students matriculate further in the degree programs because they are engaged at a more personal level. Not only do they gain greater IT skills through enhanced cognitive encoding and practice, but they graduate fully prepared for valuable IT industry certifications: MCSA, CCNA, A+, and CIW.

At the same time, university clients enjoy IT enrollment growth due to greater career relevancy and the competitive advantage of experiential learning, avatar-based scenarios, and online access to live technology.

Let's take a closer look at Toolwire Student Desktops, LiveLabs, and Scenarios.

A Closer Look at the Student Desktop

The Student Desktop is a fully functional *Windows* desktop built specifically for each student. The Desktop is available anytime, from anywhere via an Internet-connected web browser. The web-based Desktop includes all of the software applications, lab tools, and central storage required for a given course or an entire degree program (see the diagram to the right).



The Student Desktop includes a safe, personal, centralized online data storage facility. Each student will be able to carry their projects, programs, websites, and technology reports with them throughout their degree. In addition, students build experiential skills portfolios (or Gallery) to take with them after graduation.

The data storage capabilities of the Student Desktop are especially useful for IT related studies. A feature called "My Briefcase" allows students to maintain a centralized e-Portfolio of their projects, programs, websites, and IT-oriented reports. This portfolio is available for the duration of a student's AAIT degree program and for 90-days thereafter.

The Student Desktop data storage structure consists of:

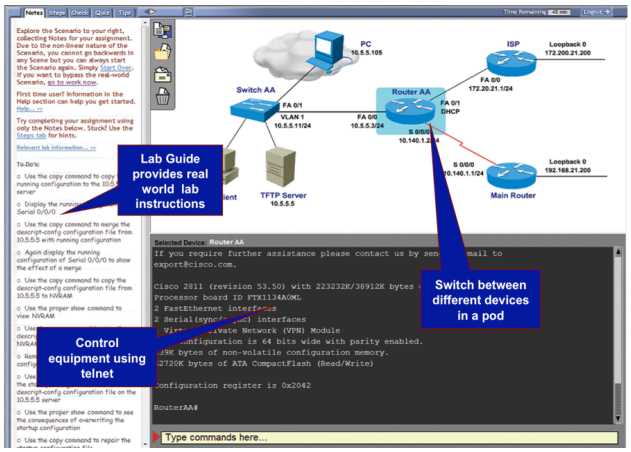
- **MyFiles**: This is the primary, private, directory for all IT related student files. Students have read-write control, can make sub-directories, and upload and download to and from their client machine via the File Transfer Tool.
- ***ClassFiles***: Class directories are private directories created when students log in to a class for the first time. Students have full read-write control. The *ClassFiles* folder contains several course subfolders: Homework, Share, and Website.

A Closer Look at LiveLabs

LiveLabs are remote hands-on laboratories with live equipment via a web-based anytime, anywhere interface. “Live” Labs are advanced experiential learning activities in which students step through a series of guided actions, work with real-world case studies, and actively control real equipment and applications in a distributed data center.

LiveLabs include case studies to develop the logic and troubleshooting skills necessary to solve day-to-day IT challenges. For example, they may include:

- **Live Hands-on Access to Real Devices –** a Flash-based interface uses one browser window to access a lab guide, the custom-configured topology or desktop, and multiple device Telnet consoles (see the diagram below).
- **Challenging Lab Guides –** students will enjoy engaging lab guides that help build experience by presenting them with real world challenges and performance-based assessments.
- **A Compelling, Personal, and Safe Online Experience –** full administrative control of host servers, routers, switches, and applications. LiveLabs are firewall-friendly and globally accessible.



In the complex and sophisticated world of networking hardware, practice is very hard to achieve. Toolwire has pioneered an “on-the-fly” automated lab configuration platform called the Dynamic Switching Matrix (DSM).

DSM technology can efficiently and cost-effectively deliver complex multi-device networking experiences anytime, anywhere.

A Closer Look at Interactive Scenarios

Interactive Scenarios are “day-in-the-life” experiences that combine the instructional power of LiveLabs with the engaging authenticity of virtual worlds filled with virtual people. This virtual world conveys to students that the skills they are learning have real world implications and real world applications.

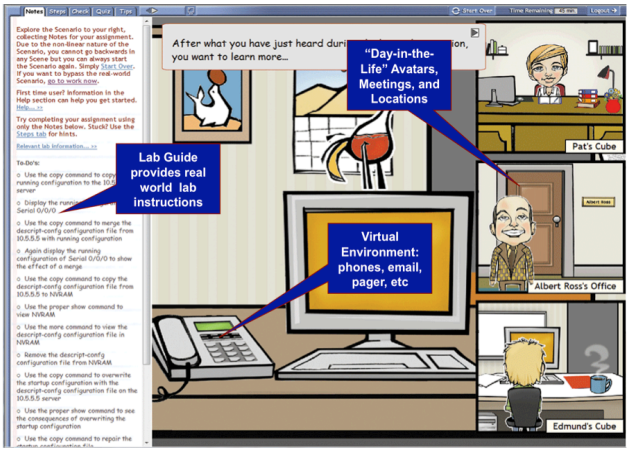
In these virtual worlds, students get to live the life of an IT professional, healthcare technician or business consultant. Within the Interactive Scenario, intelligent avatars engage with students using everyday office tools such as mobile phones, email, meetings and onsite visits. Students gather critical scenario data, solve business problems and interact with avatars through interactive responders.

Interactive Scenarios include performance-based assessments to track student progress. Some assessments require students to enter a live data center, while others involve consultant reports or ROI calculations. These experiential learning scenarios go a long way toward helping students attain a higher level of skills retention by making the learning experience as "real" as possible (see the diagram below).

Here's a typical IT scenario: It's your first day as ACME Inc.'s junior network administrator. You have just been promoted from the Help Desk. Your phone rings. It's the Sales Director in Chicago with several new employees who need your help. During several virtual months, you will solve innumerable network problems presented in varying scenarios. Along the way, you will receive a promotion, move to Chicago, make new friends, and gain valuable experience in ACME's live server room.

Other virtual world scenarios, students gather critical scenario data using playbooks, policy manuals, file folders, and conversations.

In addition, students attend meetings in conference rooms with co-workers and provide interactive feedback to them via an intelligence responder. The information they gather is delivered in "business speak" and dynamically translated into IT tasks as "Notes" in their Lab Guides.



In Summary…

Experiential Learning is teaching "action" not information. The place to store vast amounts of information is in libraries, not in heads. In the 21st century, those libraries are increasingly virtual. Mind Find, Socrates, and Toolwire fuel today's productivity machine by developing agile-thinking, workforce-ready graduates via hands-on LiveLabs and Interactive Scenarios.

State-of-the-art experiential learning solutions offer a "technology apprenticeship" for students seeking real-world experience while still in school. As students gain practical skills in an authentic and safe learning environment, organizations can focus on their core competencies and avoid the distractions of complex experiential learning development and delivery. This is definitely an area where outsourcing makes a lot of sense.

Toolwire's mission is to sharply increase student productivity and skills retention by co-creating innovative learning programs "*brought to life*" with hands-on experiential learning in virtual job worlds.

About the Authors

David James Clarke IV is Founder and Learning Architect of Toolwire, Inc., Pleasanton, California. Clarke is an industry expert in the education and e-Learning industries. Prior to Toolwire, he taught at the University of California, Berkeley and developed one of the very first Multi-Sensory learning systems for students in Management Information Systems.

Prior to Toolwire, Clarke founded the Computer Telephony Institute, and served as Director of systems integration at the Walt Disney Company. He has designed and built data networks worldwide, and is a noted author with over 34 books in publication. Clarke has a bachelor of sciences degree in Genetics from the University of California, Berkeley, and an MBA, M.I.S. from California Polytechnic.

Charles Jennings is the CEO of Duntroon Associates, a UK-based Learning and Human Capital consultancy firm. He is a former Chief Learning Officer for Reuters, the global information company, where he had responsibility for developing learning and performance strategies and leading the global learning organization.

His career also includes roles as head of the UK National Center for the development of network-based learning, as an academic working in learning innovation and as a Professor at Southampton Business School in the UK. In 2008 he was honored with the UK World of Learning '*Outstanding Contribution to the Learning Industry*' award in recognition of his work on performance improvement and informal learning.

About Toolwire

Founded in 1998 as an extension to the University of California Berkeley MIS Computer Lab, Toolwire is a rapidly growing learning solutions provider specializing in products and services for experiential learning. The privately held company provides solutions that bridge the gap between education and experience. Toolwire also assists with crafting custom blended solutions, centered around skills-development via labs, which leverage multiple training assets to best meet the dynamic needs of the learner.

To date, Toolwire has delivered more than one million hands-on LiveLabs worldwide, more than 100,000 student-days of learning, and more than 1,000 securely served sites. Its higher education clients include for-profit universities as well as private and public universities including community colleges. Corporate clients include learning organizations within the world's largest global companies, including Thomson Reuters, British Telecom, HSBC, EDS, Sprint, and EMC.

Toolwire is the Institute of IT Training's Gold Winner of the 2009 "Innovation in Training Services" award. The award celebrates the most effective implementation of the year in learning technology and IT Training delivery. For more information about Toolwire, please visit www.toolwire.com.