

BRINGING LIFE TO LEARNING: IMMERSIVE EXPERIENTIAL LEARNING SIMULATIONS FOR ONLINE AND BLENDED COURSES

John M. Beckem II, Ph.D.

SUNY Empire State College

Michael Watkins

Toolwire Inc.

ABSTRACT

Higher education institutions are under significant pressure to provide affordable, sustainable approaches that will prepare their students with the skills they will need after graduation to achieve success in the 21st Century workplace. Digital Media Simulations are among the new technologies that have emerged with the promise to help institutions better prepare students by providing them with valuable experiential learning opportunities that are easily scalable, reusable, and uniquely suited to enable instructors to assess students while simultaneously providing them with authentic student-centered learning journeys that increase student engagement. This paper shares data from one Digital Media Simulation episode piloted by two cohorts of undergraduate business students at the State University of New York (SUNY), Empire State College. Results from this pilot demonstrate that Digital Media Simulations effectively increased student engagement and promoted deeper learning.

KEYWORDS

simulations/immersive learning environments, workforce readiness, experiential learning, blended learning, student engagement and retention, innovation, decision making, constructivism, asynchronous learning

I. INTRODUCTION: CHANGES IN HIGHER EDUCATION

In higher education, traditional teaching theory has been guided by the belief that knowledge acquisition takes place through the transfer of information from the instructor, the knowledge broker, to the student, the knowledge consumer [1]. In addition, the traditional model has operated on the assumption that institutions' primary purpose was to expose students to a pre-defined body of knowledge. These traditional assumptions, while adequate under different historical situations, do not fully meet the needs of the classroom today.

In a survey of several thousand knowledge workers over the past 20 years, Robert Kelley at Carnegie-Mellon University 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% [2]. In other words, 90% of the skills needed by today's knowledge workers are experiential.

As a result of this shift, educators must begin moving towards more authentic forms of education, which can be accomplished through experiential learning.

The problem is that delivering instructionally sound experiential learning is hard. Providing authentic, "real life" experiences can be time consuming, hard to assess, tough to scale, and expensive. For institutions tasked with serving greater numbers of students than ever before, the task is even more daunting. Immersive learning simulations, therefore, have become increasingly attractive to a growing

number of educators as a means to provide authentic experiential learning opportunities that are engaging, scalable, and provide built-in assessment mechanisms.

II. INTRODUCTION TO EXPERIENTIAL LEARNING SIMULATIONS

Immersive learning simulations (ILS) are instructional products that combine simulation, pedagogy, and “hard fun” to create a truly engaging and behavior-changing form of learning [3]. ILS’ are used to help learners better understand complex concepts and processes. Used since the 1990’s in military and medical applications, simulations first entered higher education around 2003.

The value of simulations is underpinned by learning theories such as social constructivism, which considers each learner an individual with unique needs. According to social constructivists, learners are complex and multidimensional. Social constructivists argue that learners must be actively involved in the learning process and believe that knowledge must first be constructed in a social context and before being appropriated by individuals [4]. The importance of embedding learning in context is also supported by situated cognition theory, a perspective applied in immersive learning design to ensure that students experience learning problems focused on real-life contexts [5].

The common element in each of these theories is the focus on the learner and concern for the learner’s experience to be meaningful, engaging, and transferable to the real world. By integrating this contextual reality with access to hands-on tools, accessible in the moment, learners are able to gain true knowledge transfer through the integration of theory, practice, and context giving relevance to their tasks and meaning to their learning [6].

Simulations empower learners to acquire new knowledge and build upon existing competencies that are entirely driven by their experiences within the environment. Incorporating simulations in education supports the shift towards a student-centered approach where students are more in control of how and when they learn. These experiences enable students to move beyond merely remembering, understanding and applying concepts to a higher order process of analyzing, evaluating and synthesizing information to formulate new knowledge [7].

Their ability to inspire intrinsic motivation makes simulations a tremendous asset to any blended learning program seeking to better engage and retain students. Immersive learning builds upon Flow Theory, Csikszentmihalyi’s theory of engagement used by instructional designers to create experiences characterized by skill/challenge balance, intrinsic enjoyment, loss of self-consciousness, exploratory behavior, and control [8]. If students are hungry for knowledge based on a positive simulated experience that demonstrates how course concepts apply to real life situations, it is much easier for an educator to engage them in more meaningful interactions during other course activities. And by giving students more control over their learning journey, the instructor’s role can shift from that of an exclusive content provider/lecturer to content facilitator that enables a connection among students, people, and learning resources [9].

III. DIGITAL MEDIA SIMULATIONS

A. Overview

Cutting-edge simulated environments that are rapidly gaining adoption in higher education today build upon years of experience and leverage the confluence of new technology innovations to enable learning platforms designed to meet the diverse needs of students, instructors, and administrators. These Digital Media Simulations immerse students in authentic, photo-realistic settings with interactive video-characters. Within each self-paced, asynchronous episode, students encounter poignant “teachable moments” that reinforce key learning objectives and require them to apply knowledge that they may have either gathered through class lectures, readings, discussions, or from “virtual mentors” within the simulation. Results from key interactions are captured and sent to instructors at the end of each experience.

Grounded in the work of cognitive learning theorist Itiel Dror [10] and his research on the cognitive

learning process, and benefiting from years of research and practical application, these learning platforms move past traditional forms of e-learning to create a “context” for learning to take place.

Developed by Toolwire, a leading provider of experiential learning technologies, Digital Media Simulations have achieved great success in a relatively short period. In 2010, 100,000 unique students accessed these simulations over 1 million times across multiple universities and content disciplines. In 2011, these numbers increased to over 2.5 million accesses by 300,000 students across an expanding number of institutions. Given the increased usage of currently installed simulations and the introduction of these learning platforms at a number of new institutions, student use is on pace to achieve record numbers in 2012.

B. Natural Assessment Instructional Design

Unlike other forms of simulations developed in the past, Digital Media Simulations developed by Toolwire are built-upon a higher-order prescriptive structure that keeps learners focused on essential course objectives and protects them from getting derailed and wandering around in virtual environments for hours.

Toolwire’s Digital Media Simulations incorporate an instructional design approach known as “Natural Assessment”, which moves beyond current methodologies to embody what might best be described as enhanced, authentic assessments. Each simulation contains a combination of six primary building blocks:

1. **Opening Interactions** set the context for the story.
2. **Supporting Interactions** provide information and context for the learning objectives using engaging video characters and interactive onscreen responders.
3. **Primary Interactions** provide students with key information through “Virtual Mentors”.
4. **Signposts** gauge a learner’s acquisition of knowledge and provide branching opportunities either to remediation or formative assessments.
5. **Remediations** provide subtle reinforcement of key concepts using approaches intended to build the learner’s confidence.
6. **Summative Assessments**, integrated towards the end of each story, test students’ ability to apply their learning. These activities are about much more than testing mastery of a small piece of information. The goal of “Natural Assessment” is to develop learners’ ability to synthesize and apply what they have learned in a contextual, real-world setting. After completion, all information provided by learners in the experiential assessment elements is captured and formatted for delivery to instructors for grading. The inspiration for this innovation in learning came from wanting to give learners the most authentic learning experience possible by integrating experiential learning into both the knowledge transfer process *and* the assessment of knowledge acquisition.

The power of “Natural Assessment” is the way in which it combines content, context, and conversation.

1. **Content** – Identifying course content and objectives is an important first step in the co-creation process of these simulations. Exposing learners to knowledge is only a small part of the learning process. What is critical is how the content is presented and delivered to the learner.
2. **Context** – Building upon learning perspectives such as social cognition theory (Brown, Collins, Duguid), assessments are embedded directly into the learning process. These “Natural Assessments” keep students in the moment while completing tasks encountered in the everyday workplace such as developing a marketing plan for a gaming company, writing an executive brief for a CEO, or delivering the final arguments to a Magistrate during sentencing.
3. **Conversation** – Instead of treating assessments as a chore, which often leads to stress and anxiety, these simulations engage students in ways that spark the quest for knowledge. Building upon, Csikszentmihalyi’s theory of engagement, an essential element of the instructional design process is finding creative ways to engage learners in an ongoing dialogue. These conversations

might involve live meetings with colleagues or speaking with friends via video phones, email, and social media platforms such as Twitter, YouTube, Flickr, and blogs.

C. Advantages and Benefits for Students

Digital Media Simulations provide students with a host of advantages and benefits. Some of these include the following:

- **Personalized:** Simulations provide an engaging student-centered approach to learning.
- **Multi-Modal:** Learning this way enables students to employ multiple modes of learning and “learning by doing” provides the most effective way to transfer short-term knowledge into long-term memory
- **Virtual Internships:** Simulations provide “Virtual Internships” that prepare students for what lies ahead when they must apply for jobs. Theory does not build a skilled workforce; application and long term competency development does. Lifelong learning is a habit, not an event.
- **Plug-n-Play:** Simulations are extremely easy to use, plug-n-play learning tools.
- **On-Demand:** These experiences are accessible around the clock (24 x 7 x 365), around the Globe. Students can access sessions on their schedule, practice at their own speed, and reuse/practice as much as they need.
- **Failing Forward:** These interactions take place in safe environments where the potential for teachable moments is high and the consequences for mistakes are low.

D. Advantages for Instructors and Institutions

A critical consideration, all too often ignored, is the impact of new technologies on the instructor experience. In order to be used, learning technologies must take into consideration the enormous workload of instructors today and that time is an instructor’s most precious commodity. Digital Media Simulations provide a plug-n-play solution. Although the underlying instructional design and technology behind these simulations is very complex and powerful, Digital Media Simulations are very simple and easy to use.

From an institutional perspective, one of the greatest features of immersive learning simulations is their reusability and scalability. A significant problem in education is that far too many hours are spent developing brilliant lessons that reach far too few students. In contrast, once created, these simulations can be reused anytime, anywhere and can be improved and modified over time.

In addition, the “Natural Assessments” within these experiential simulations enable institutions to measure the ability of students to master course concepts and essential skills such as critical thinking, problem solving, and decision-making. Most learning institutions have a hard enough time providing experiential opportunities for students, much less, the ability to actually *measure* student outcomes from these experiences. Digital Media Simulations open the door to a whole new way of exploring the *science* behind these essential skills while also leaving enough opportunity for students to practice the mysterious and elusive *art*.

These simulations can be integrated into any LMS. In order to access the module, all students have to do is click on a link within the LMS. Delivered via a world-class global Content Distribution Network with thousands of Edge Servers around the world, immersive simulations can be delivered online, on ground, and within hybrid/blended courses. These learning tools also include an automated up-front bandwidth check in order to provide users an optimal experience based on their bandwidth resources.

In addition, these learning tools are both secure and supported. The developer of these simulations, Toolwire, provides support 24 hour/seven days a week via Phone, Chat/IM, Email, and Web Form entries to cover student issues. In order to proactively address any concerns and to provide partners the best service possible, Toolwire created a Learner Advocacy team, which owns and advocates for every aspect of the learner experience including, usability, accessibility, security, and customer support.

IV. PILOT PROGRAM –

DR. JOHN BECKEM, SUNY, EMPIRE STATE COLLEGE

A. Overview

The pilot program at the State University of New York (SUNY), Empire State was spearheaded by Dr. John Beckem within the business course, “Diversity in the Workplace”. Since March 2010, Dr. Beckem has used this course as an incubator to test new technologies with a goal to introduce a more interpersonal, human element to his online adult courses. In his experience, opportunities for personal interactions and experiential learning available in traditional face-to-face classrooms are more challenging to deliver in online courses. Dr. Beckem, therefore, sought to stimulate student engagement and support deeper learning through the use of a variety of online tools.

Before learning about Digital Media Simulations, Dr. Beckem conducted several studies focused on six Web 2.0 tools (Video, Audio Files, Twitter, Facebook, Google+, and Google Docs). Through the use of a course Exit Survey, he captured both quantitative and qualitative student responses regarding the effectiveness of these Web 2.0 tools in his online courses. According to the survey results, the Web 2.0 tools did provide tangible benefits such as increased student engagement. These tools, however, fell short of Dr. Beckem’s goal to help students achieve greater academic success and deeper learning.

Eager to find a new solution that would solve his problem, Dr. Beckem introduced Digital Media Simulations to his ongoing longitudinal study.

B. Pilot Simulation – Making a Successful Presentation

As a final project, students in the “Diversity in the Workforce” course must conduct a diversity audit on a company of their choosing and present their findings. For this pilot, therefore, Dr. Beckem used a simulation titled “Making a Successful Presentation” in order to prepare students for the presentation of their diversity audit. In this simulation, the student takes the role of an intern on Capitol Hill. At the outset, the student is called in to the Senator's office to help solve an emergency.

The Senator has been asked to speak before his colleagues in Congress for the first time and his nerves are getting the best of him. It is up to the student and the student’s boss to calm the Senator's fears and remind him of all of the key elements that make for a successful presentation.

The story/“episode” then unfolds almost as an interactive television show in which the student is immersed in a lead role within a photo-realistic setting. In this role, the student interacts with a variety of characters who communicate with the student through media rich audio and video footage. There are two basic types of characters: “Virtual Mentors” who provide the student with information (based on key learning objectives) and inquisitors who ask the student questions that test understanding.

Ultimately, students must apply their knowledge about successful presentation delivery by providing the Senator with advice. In this discussion, the student helps the Senator to overcome anxiety, eliminate the use of fillers in his presentation¹, and understand concepts such as appropriate pacing. The assessed element in this activity is a series of questions the Senator poses on key presentation concepts and a brief essay on presentation best practices.

C. Research Approach

In order to gauge student reaction, Dr. Beckem delivered an Exit Survey to collect both quantitative and qualitative feedback and received a total of 98 student responses. The students participating in the “Diversity in the Workplace” survey were roughly representative of Empire State’s diverse student body as a whole. SUNY Empire State College students are busy adults with jobs, families and real lives that simply won’t accommodate the conventional college experience.

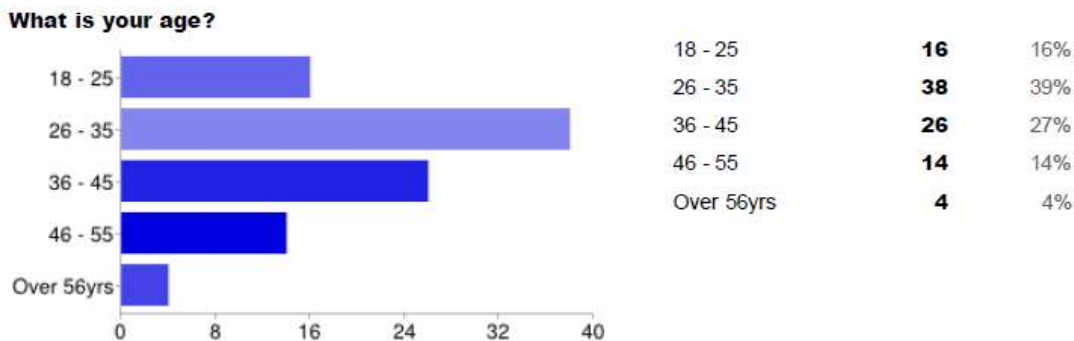


Figure 1. Age

As indicated above, several students in this class were over 56 years old and a sizeable number of these students were between 46-55 years old. For some of these learners, getting up to par with the Angel LMS was a significant undertaking in itself, an important consideration that Dr. Beckem had to take into account.

As part of this survey, students were asked about their learning style. As demonstrated below, 20% of the students described their primary learning approach as Kinesthetic (hands-on/experiential) and 53% described their predominate learning style as a blend of one or more of the provided learning styles, a data point that supports Empire State’s constructivist approach and focus on blending learning. These findings also supported the merits of introducing experiential learning simulations.

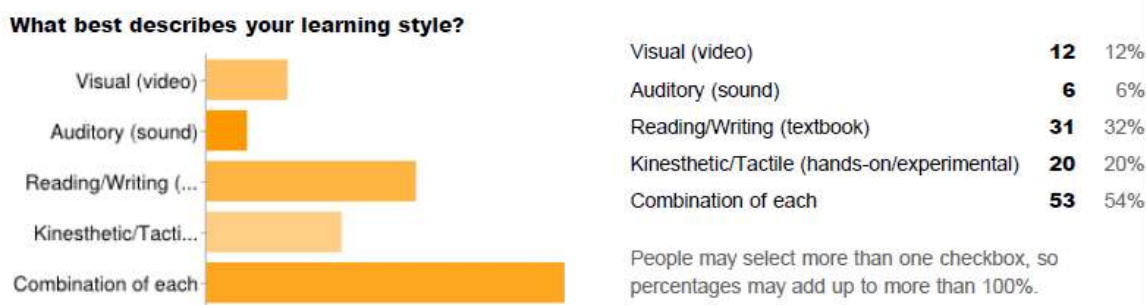


Figure 2. Learning style

D. Student Evaluations

Of the data collected from students, the qualitative data were particularly revealing. As indicated below, the student evaluations of the Digital Media Simulation were very positive:

- “I thought this was an awesome activity. I enjoyed watching and learning the steps of writing a good presentation. The actors did a good job of explaining the process.”
- “I enjoyed the exercise and thought it was an effective means for providing a tutorial for the basics of constructing a speech. I think that this technology should be employed frequently, if for no other reason than many people have different preferred learning methods (other than reading) and this type of exercise offers something for everyone else.”
- “This assignment has helped me to understand how to write a better speech. I think this approach to training is very interesting and could be used in offices as well as classrooms. I think there are other things that this type of learning could be used for, i.e. how to write a term paper, how to do research, how to write professional emails, memos and letters. It was fun and a nice break from regular studying.”
- “I wanted to let you know that I thoroughly enjoyed participating in this assignment. It was very informative and also very enjoyable at the same time. It gave me a new perspective to presenting

a speech and some points that I am not likely to ever forget after taking part in this assignment.” These statements were among some of the most positive that Dr. Beckem has encountered since his evaluation of online learning technologies several years ago. Students commented on the effectiveness of this approach for supporting their knowledge and understanding of a critical skill (delivering a presentation) and, at the same time, emphasized their enjoyment of learning this way.

V. ROADMAP

Through this pilot study, Digital Media Simulations proved their value as powerful learning tools that could be extremely valuable to the State University of New York. An important next step is to decide which courses might benefit the most from these simulations and make the greatest impact. Courses that touch the most students generally make the best point of entry.

Co-creating simulations involves two costs: an upfront fee and a per student fee. Simulations used within programs that have many students incur lower upfront fees. As a result, a natural next step would be to target courses touching the most students and to consider courses addressing skills that would make an immediate impact on the long-term success of Empire State College students.

A. Supporting Career Development and Success

One area of interest is co-creating simulations to help students develop critical thinking skills such as interviewing, networking, career management, and negotiations. After considerable time, effort, and financial investment in their education, many extremely talented students struggle to find their niche because of deficient skill-sets and lack of practice in these critical areas. As detailed below, this approach would help contribute to program sustainability at Empire State in a number of ways:

Improved Program Competitiveness and Sustainability

For administrators, implementing scalable, proven ways to help students improve soft-skills such as interviewing, networking, and career management is a smart way to improve a program’s sustainability and competitiveness.

Competitiveness: Improving School Rankings

Two important metrics used by polls to rank schools include how quickly students find jobs after graduation and how high their salaries are. Investing in ways to help students find the right job (networking and career management simulations), land that job (interviewing simulations) and earn a decent salary (negotiations simulations), therefore, makes practical sense for administrators focused on boosting their school rankings.

Sustainability: Graduates with Jobs = Loyal Alumni

Students that transition successfully into jobs after graduation are likely to make appreciative, dedicated, and generous alumni. Graduates stranded with debt and no job after graduation can hold serious grudges. Students sacrificing a lot of time and money for their education expect that their program is sparing no expense to do whatever it can to help them translate their educational investment into a personally and financially rewarding career. In this day and age of social media, disgruntled students are also a liability to an institution’s brand that cannot be ignored.

B. Simulations for Interviewing

Teaching interviewing through role-plays and mock interviews is challenging at best. At worst, the experience for students can be very inconsistent. Perhaps even more relevant, lessons are often delivered in a “Just-in-Case” manner at a predetermined time. To be effective, instruction needs to be available to students “Just-in-Time” at the moment of need and students must have the ability to practice multiple times (this could particularly be beneficial for English Language Learners) in preparation for an important interview.

Another traditional way to teach interviewing is through one-on-one counseling. Doing this well, however, takes a lot of time and financial resources. The demands on career counselors today continue to

grow. As a result, they have become increasingly interested in supporting their current efforts through a blended approach that includes both high-touch, high-quality, face-to-face interaction with online solutions that reinforce key concepts.

C. Simulations for Business Programs

Another logical next step would be to develop additional simulations for the business program at Empire State and, potentially, other SUNY schools. Typically, business programs have high enrollments and are important to the sustainability of large institutions that offer a spectrum of courses, including specialized offerings with lower enrollments. These programs, therefore, are natural incubators for innovating simulations that could later be modified to support other programs. Again, after the initial investment of time in co-creating these simulations, the reuse factor of these experiential learning tools is an undeniable advantage. The following are two simulation applications for business school programs to consider that make practical sense:

1. The Case Study Method of the Future

Case studies are invaluable learning tools for business programs. However, the case study method does have limitations. Across all business management content areas, there is a need to take these cases to the next level by truly immersing students in contextually challenging situations within diverse occupational settings.

At Auburn University, for example, the school achieved encouraging success with case studies in its engineering program. A research study, however, indicated that students wanted their cases to be even more interactive and engaging. In order to bring these cases to life, the school piloted illustrated experiential scenarios as a quick, affordable way to develop a proof of concept. Student surveys provided strong support for this approach to learning. At the same time, students made some excellent observations such as the need to incorporate new elements typically associated with gaming.

With support from an NSF SBIR/ STTR Directorate Phase I award for Use of Serious Games to Improve Learning Outcomes in Engineering Programs by the National Science Foundation, Auburn is now developing the next generation of rich media immersive learning simulations.

2. Developing Ethical Leaders – “Sew an act, reap a habit. Sew a habit, reach a character. Sew a character, reach a destiny.”

For quite some time, learning institutions, especially business programs, have been under pressure to produce more ethical graduates and better leaders. During the recent recession, the spotlight was particularly focused on business schools whose graduates were responsible for a variety of unethical practices that contributed to our country’s economic collapse. Immersive learning simulations are specifically designed to give students repeated practice making decisions in contextually complex situations. Lectures, discussions, visiting speakers etc. can be inspiring. In a room of smart students, the rhetoric around ethical issues can be very idealistic and reaffirming. True growth and development, however, result from opportunities to put these principles to the test and practice them repeatedly.

Immersive simulations promote ethical behavior one act/decision at a time much like the saying, “Sew an act, reap a habit. Sew a habit, reap a character. Sew a character, reach a destiny.” Simulations take the teaching of ethical principles beyond the theoretical level to the level of practice. If practiced enough, these habits can become a part of a student’s character. If practiced in real life situations beyond business school, these small habits have the power to shape an individual’s destiny.

Immersive simulations are exactly what business programs have been looking for to help reinforce ethical behavior as part of a blended learning model that is authentic, structured according to those beliefs that each an institution believes makes its graduates unique, scalable, repeatable, and measurable. Simulations, which contain both “virtual mentors” to provide students guidance and “virtual peers” that test student knowledge and decision making skills, are the perfect solution to provide students the decision making practice that they need to become wiser, more ethical leaders.

VI. SUMMARY

The goal of this study was to provide empirical evidence of the benefits of Digital Media Simulations. As part of an ongoing study in a business course since 2010, simulations demonstrated their ability to both increase student engagement and promote deeper learning. Understanding the impact of these learning solutions on student engagement and performance will require future study; however, the initial results of these learning solutions yielded promising outcomes that warrant ongoing investigation.

VII. ABOUT THE AUTHORS

John M. Beckem II, Ph.D. is an Area Coordinator, Assistant Professor, and Mentor in Business Management and Economics (BME) at the Center for Distance Learning (CDL). Prior to his current position at SUNY Empire State College, Dr. Beckem earned a Ph.D. in Educational Leadership and Higher Education from Oakland University in 2009. His dissertation was entitled: “A Phenomenological Study of African American Administrators at For-Profit Institutions of Higher Education.” In addition to his doctoral work, Dr. Beckem earned a Master of Divinity from Ashland Theological Seminary in 2008 and a Master of Science in Administration from Central Michigan University in 2001. At the undergraduate level Dr. Beckem earned a Bachelor of Science in College of Engineering from Lawrence Technological University in 2006, a Bachelor of Business Administration from William Tyndale College in 2000, and an Executive Certificate in Strategic Planning from Michigan State University in 2000.

Dr. Beckem has a military background in the United States Marine Corps and the United States Army Reserve. He currently serves as Captain at the United States Army Reserve at the 413th Combat Support Sustainment Battalion in Schenectady, New York. His previous professional experience includes several positions as supervisor, manager, and engineer. Further, he held several adjunct positions at Madonna University, Henry Ford Community College, and the University of Phoenix. His previous teaching experience as an adjunct in blended and online learning environments, and his interests in technology, informed his emphasis on the use of emerging technologies in his online teaching at CDL, in his conference presentations, and in his service responsibilities.

Michael Watkins is a noted author, speaker, and experiential learning visionary; he brings over 16 years of educational innovation to his role as Director of Client Solutions and Technology for Toolwire, Inc. As a technologist, Watkins holds over 20 industry certifications and has helped hundreds of thousands of learners achieve success through his lectures, books, workshops, and experiential learning solutions. For his work developing immersive learning environments for clients such as the University of Phoenix and the University of East London, Watkins was awarded the 2011 Gold Medal for “Instructional Designer of the Year” by the Institute of IT Training. Prior to Toolwire, Watkins created and delivered learning solutions for companies such as KnowledgeNet, NETg, and SkillSoft. He has also consulted with organizations such as Kraft Foods, Johnson & Johnson, Raytheon, and the United States Air Force.

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