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Digital natives: back to the future of microworlds in a corporate learning organization

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Abstract

Purpose – The purpose of this paper is to provide description and an analysis of two worlds colliding where real-world roles or ideas play out in a virtual dimension. Inhabited by digital natives, the virtual world in a learning organization is a journey back to the future of microworlds where the only limitation is one's imagination.

Design/methodology/approach – In 1990, when computer technology flexs its range of useful possibilities, Senge envisions its practical application in a learning organization. He purports the use of computer simulations which he calls microworlds, as a virtual sandbox for learning. His vision, is expanded today, means virtual worlds that co-exist with the real world. *Second life* is an example of that virtual world. The possibilities for learning inherent in this virtual world seem limitless in a knowledge-driven, global society hungry for the next creative and innovative way of transforming the world, real or virtual.

Findings – Digital natives are the drivers of change who will explore the brave new world of computer simulations. As simulations become more technologically infuse with artificial intelligence, its application for education and learning will broaden and expand. Unlike the static interface of a textbook, which shows limitations in content scope and delivery, this virtual world knows no limits in knowledge expansion. Validated course content, formal and informal knowledge contributions from peers and experts alike, networked knowledge coming from Web resources and the internet enrich the learner's ability beyond measure to experience the world and know it better and more intimately.

Practical implications – The emergent technology of virtual worlds utilizing simulations of real life work situations is a throwback to the microworlds of yesterday. They are ideal for conducting thought experiments that deepen with experiential understanding. This technology-mediated form of learning affords the opportunity to experience the results of an action which may take a lifetime to learn in real time. This virtual world allows decision-making but eliminates the risks of serious, unintended consequences. It is a wonderful resource for living vicariously experiences which are unavailable or unlikely in the real world.

Originality/value – Virtual simulations are useful for learning concepts, ideas, and assumptions that are difficult to perform or test in the physical dimension. Digital natives, people who were born in the 1980s, explore *Second Life*, and the paper discusses the value of this virtual world.

Keywords Learning organizations, Computer based learning, Virtual work, Age groups, Simulation

Paper type Research paper

The year is 2012. The corporate world is at an all time high fighting the inglorious war of talents. Now more than ever, as the baby boomers exited their tenures, they leave behind a huge hole to fill. There has never been such a high demand for skilled workers to step up to the vacant leadership spots. Unprecedented in history, the mass exodus of senior leaders,

created a tremendous strain on competitive viability in a global society. Sarabia Markova, a digital native, was logging into the corporate learning management system. She carefully navigated the portal and searched in the voluminous learning catalogs. She clicked on the learning tab, "Conflict Resolution" and mapped her learning goal. She entered the virtual boardroom, which introduced her to the avatar George Meznick, a corporate financial officer. She also met two other participants, virtual collaborators and co-learners in this experiential learning activity. Welcome! It's back to the future of microworlds!

The portmanteau, microworlds, is a fusion of two words coined to mean, a tiny world within which a learner can explore assumptions and test them in order to understand facts that are true about the real world Senge (1990) described this process of learning through the use of transitional objects in a child's play. The playground is the microworld where children discover through experimentation with toys principles that govern the real world. Emergent technology has since led to expansion of that meaning. The sandbox, by which all learning occurs as a child, migrated to the adult world. Here, complex theories, assumptions, principles, mental models are exposed, reflected upon, tested, and challenged in the safe, private, and virtual world of computers. Even more impressive, the technology is used as a multi-modal vehicle for learning by corporations faced with the challenge as well as the golden opportunity to build skills among workers in the twenty-first century.

This paper is an amalgamation of two worlds. The first synthesizes the descriptive concepts of digital natives – their unique thumbprint, characteristics, and competencies in the twenty-first century world. The second is the analysis of microworlds as a conceptual technology of the learning organization. As the culled future of microworlds envisioned more than fifteen years ago, finds a fuller expression in the emergent applications and implications of corporations today, the past meets with its present and seamlessly forms a future more robust than ever imagined. The questions this paper will answer include what and who are the digital natives, what conceptual framework supports their unique characteristics, competencies, and learning experiences, and what are the implications of digital natives in a corporate setting particularly the learning organization.

Digital natives

Prensky (2001a) described digital natives as the "new" students of today, born roughly after 1980. They are the first generation of students to grow up in a technologically enhanced environment. Their precocious technological maturity is the product of thousands of hours using computers, videogames, digital music players, video camcorders, cellular mobile telephones, interactive television, personal digital assistants, the internet, and other tools of the digital age. They are savvy in the use of email, instant messaging, internet, and text messaging. They are different than any other generation because technology is an integral part of their lives. They live, breathe, work, and play with the tools and products of the digital age and they employ these tools quite uniquely.

For instance, the internet is not only a channel for getting information, but is a social hub for meeting new friends, a fast postal repository for retrieving emails, a medium for sending an instant message or even calling long distance through voice-over-IP technology. It is also a place for posting creative projects and activities through YouTube videos, collaborating with others in playing a computer game, or chatting with a group of strangers with similar interests. Sending and receiving pictures from

friends instantaneously, writing blogs for journal sharing online, devising "encrypted" text messages and feelings through emoticons – all this work and play are easily traceable as thumbprints.

To the extent that what one does characterizes what one is, digital natives are truly the heart and soul of the digital era. They know more about technology than their teachers do. It is evident that past pedagogy is inadequate to address the novel ways by which the new students think and learn. The retro ways of "content delivery, presenting and telling, linear stories, one thing at a time, one size fits all, and in one person" (Prensky, 2007, p. 2) no longer capture the imagination of the digital natives. Engagement of a whole generation of learners leveraging what they already know and expertly use is a challenge to today's educators, and is certainly a major consideration when teaching or training in a learning organization.

When it comes to skills and competencies, digital natives are "adept at multi-tasking, working in groups, and absorbing information rapidly" (Murray, 2007, para. 8). They want learning that is "fast-paced, multimedia, multimodal, interactive, and digital" (Richter *et al.*, 2007, p. 20). A lifetime media exposure of a twenty-one-year-old person for instance, consists of "10,000 hour playing videogames, 200,000 on emails and instant messages sent and received, 10,000 hours on mobile phones, 20,000 hours watching television, 500,000 hours devoted to commercials seen and 5,000 hours spent on book reading" (Forbes, 2006, para. 7). The sheer volume of interaction using technology requires an alternative perspective and paradigm on how digital natives expect to learn.

Conceptual framework to support learning of digital natives

Beliefs, mental models, perceptions, attitudes, experiences, assumptions, values, and opinions influence behavior to some degree. As such, there must be a conceptual framework that supports the unique characteristics, competencies and learning experiences of digital natives. What makes digital natives think differently? What makes them do things differently? What is their worldview that makes them uniquely distinguishable from other generations? Since all behavior stems from a neural basis, an understanding of how the brain develops may provide the answer to these questions.

In the seventeenth century, John Locke (Stanford Encyclopedia of Philosophy, 2007) postulated that the human mind at birth is a *tabula rasa*, receptively malleable to acquire knowledge by experience. The human brain, however, is more complex than the simplified version of a clean slate as it follows a blueprint of pre-programmed activities in its development and maturation. The discovery of stem cells, the progenitor by which all types of cells develop, showed the mutability, malleability and plasticity of cells to change until programmed into a purposeful, structurally contained organ. Thus, the brain as an organ achieved a level of architectural and functional sophistication that allows integration into the physical body system of which it is a part.

The nascent formation of the brain as a primordial neural tube after multiple cell divisions is also chemically mediated. These chemical precursors signal the development and maturation of the brain. "The precisely controlled formation and development of nerve cells begins before birth and after birth, up to four times more nerve cells form and migrate" (Lenn, 1991, p. 40). Thus, the developmental milestones in normal brain maturity follow a programmed sequence of events indistinguishable from person to person.

The difference between one person's brain structures and another's lies in its hard-wiring. Interaction with the environment through sensory and motor cues induces

synaptic plasticity – the ability of the brain to reorganize, connect and form pathways through its axon-dendrite connectivity. The most pronounced brain pathways receive optimal stimulation. The brain cells used often show maximal reinforcement. This process of synaptic formation and elimination occurs continuously throughout life. Those areas of the brain used more often form many more synaptic connections than those areas underserved. This is significant because synaptic connections form the pathways by which electrical impulses travel to and from the brain. Embedded in these electrical impulses are the messages that are sorted out, interpreted, weighed, tossed out or kept, acted upon, and applied. This brain activity of information retrieval and analysis is the fundamental nexus of learning.

Digital natives and their unique brain programming

Digital natives may have had the same pre-determined developmental milestones in the maturity of the brain as most people but the hard-wiring is different. Their exposure to technological tools for learning stimulated areas of the brain and reinforced pathways specific to their experience and sensori-motor integration. Thus, structurally and functionally their brains work differently than those with less exposure and immersion to technologically mediated learning tools.

The conceptual framework that supports the singular skills, competencies, and learning experiences of digital natives is directly related to the hard-wiring of their brain structures. "Children who grew up using computers develop hypertext minds" (Prensky, 2001b, p. 4). The process of learning is not linear but web-like. It does not proceed in a neat, systematic, sequential fashion but more helical and convoluted as they leap around concepts and ideas. Ergo, they think differently.

The areas of the brain stimulated by their repeated exposure to computer games and other digital media also make them behave differently. Naturally, they gravitate towards activities that allow them to use these strengthened areas of the brain. For instance, digital natives prefer activities that employ "multi-dimensional visual-spatial skills, mental maps, mental paper folding, inductive discovery, attentional deployment and responding faster to expected and unexpected stimuli" (Prensky, 2001b, p. 4).

Finally, digital natives operate on a different worldview. They are driven to interact, immerse themselves and become part of the electronic world they come to know so well. And here lies the challenge as well as the opportunity for engaging the new students by using and building on their strengths through the bridge of technology.

Implications of digital natives in a corporate setting

Sarabia Markova chose to role-play a Federal Mediator in a simulated online program. She interacted with two co-learners who assumed characters in dispute. The avatar George Meznick was the virtual coach, seamlessly posing wisdom accessing questions that facilitate resolution of the conflict. After an hour of role-play, Sarabia Markova posted the learning goals she achieved. She learned the different styles of conflict resolution. She noted her increase in negotiation skills. She realized an increase in knowledge of emotional quotient as she dealt with different personalities and preferences in thinking and behaving. She felt more confident that she will be able to utilize these new found knowledge and skills into her workplace.

The scene that just played out virtually is an atavism of microworlds as conceptualized by Senge in a learning organization. The twenty-first century learning capability

framework of corporate organizations supports both individual and organizational learning. In this setting, many effective learning solutions and approaches incorporate the traditional with the novel forms. The on-the-job learning is therefore a mixture of both formal and informal elements. The formal modes of learning are objective specific and follow the more stringent process of instructional design. The informal modes of learning are self-directed and therefore, objectives are learner specific. Hence, instructional designs are not prescriptive.

Perhaps, digital technology and its use for learning is central to the human experience. As such, the tools of technology mediate purposeful activity. According to Prensky (2009), technology use not only makes us smarter but also wiser. Using technological tools enables a person to access cognitive power beyond the body's physical limitations. It also enhances our capabilities to make informed decisions because of the range of data that we are able to gather, sift through and evaluate.

The exploration of invented worlds in which technological tools imbue life as experienced in the real world enables a person to acquire knowledge and understanding beyond limitations of time and other natural physical laws of nature. "Technology can be used to support knowledge flows, hence, can be associated more closely with learning" (Nissen, 2005, para. 3).

For instance, in a simulation on coaching activity, an employee can recreate many problem-solving scenarios leading to various solutions without committing mistakes that may be difficult to undo and rectify. The person therefore learns about systems and processes in the organization through trial and error but avoids the unintended consequences of real mistakes. The use of simulation technology to duplicate performance of organizations using multiple approaches enhance knowledge flows. Such learning is accomplished before precious resources are committed toward a decision. The data gathered through simulation also promote informed decision-making.

Corporate Darwinism in an age of knowledge expansion

These learning solutions are an important form of corporate adaptation. In the bid for survival, a new paradigm of how organizations continuously thrive in a constantly changing environment began to shape the context and delivery of work. Now more than ever, organizations position themselves strategically to proactively embrace change. They probe deeply into their mission of achieving the status of true learning organizations.

In this milieu, the workplace transformed itself into a global market where the prime commodity is no longer goods and services but learning itself. Organizations now assume amorphous, permeable, reconstructing, adaptable, and renewable structures. This allows the organization to receive and transmit information vital to its very existence with speed and agility. It predicates acting purposively to meet emergent needs and issues and charting its navigational course within nanoseconds. The desired vision is knowledge harnessed at the time desired, deployed where it is opportune in just the amount congruous to accomplish organizational objectives. The shrinking response time to generate solutions and act with full intentionality requires continuous learning. Therefore, the organizational values focus on supporting continuous learning where knowledge workers work to learn and learn to work all the time. The demarcation between working and learning is blurred and superficial. In this corporate setting, the students are also the drivers of knowledge change.

Tenets of knowledge construction

How do you engage a classroom of students both of past and current generations that will not only increase their knowledge and skills base but also reinforce and strengthen the retention of newly acquired competencies? The key is to construct knowledge by designing and incorporating real life learning experiences. Simulating reality provides the context by which learners develop and apply competencies. It requires the learner to become intrinsically involved in a situation by directly interacting with the inputs (tasks, data, and people) in a real life work environment. This first person involvement conducted in a real life context is powerful in developing and retaining learned competencies.

Simulation performed virtually affords the learner the ability to engage with the content using the first person as opposed to the third person perspective. Instead of watching on the sidelines, the learner takes center stage and experiences first hand the content and the context of the learning that takes place. This is a potentially highly charged and creative experience that goes beyond conducting "thought" experiments and "what if" scenarios.

SimuLearn's Virtual Leader (Li, 2007) is an example of a three dimensional simulation training game for developing leadership within a corporate setting using learning concepts related to leadership development such as communication, team building, creativity, project management, group dynamics and personal effectiveness. As a learning tool, the simulation posits to modify people's attitudes, behaviors and motivations by allowing learners rehearse appropriate behaviors, motivate them to target desired behaviors or adopt another person's perspective thereby experimenting with a behavior different from their own.

Compelling simulated experiences allow people to explore cause-and-effect relationships safely. It provides vicarious experiences that may be motivational to the learner. It also shapes attitudes and behavior by tying the causal effects of a particular behavior exhibited and experienced vicariously. For instance, experiencing the cause and effect of employing different styles of conflict resolution create not only an awareness, an increase in self-knowledge and understanding but also a responsibility to change or modify a preference. In this setting, learners are free to explore and experiment in a safe environment sans the consequences of real world demands and expectations. Learning from mistakes is permissible and commendable.

Simulations used by organizations as platforms for learning have the added benefits of:

> […]creating new tacit knowledge pertaining to the organization and its dynamics, sharing such knowledge by distributing copies of the simulation model to enhance the learning of others and applying such knowledge to organizational decision-making such as workflows and business operations (Nissen, 2005, para. 13).

Thus, this type of learning platform is beneficial to both the individual and the organization.

Digital natives and the role of virtual simulations

Digital natives will take to this medium effortlessly. Their preference for technology-mediated forms of learning supports their unique way of thinking and behaving. They will explore this virtual world with ease and expand its utility beyond what is possible today. The holodeck of the science fiction StarTrek, a virtual laboratory

for action learning, may no longer appear as strange and as far removed from reality as it becomes a possibility to embrace. As artificial intelligence becomes integrated into the learning technology, the seeds of futuristic technology will be as enduring, ubiquitous, and ever more viable projections and extensions of the physical world.

In a corporate setting, digital natives are highly independent, resourceful, flexible, team-oriented, and technology driven. They value their work and seek opportunities for self-improvement and self-growth. Engagement of digital natives for knowledge creation and expansion is the prime impetus that will transform a true learning organization to its fullest capability. Today's students will be the architects of this future world wielding technology as its transformative tool. One of the corporate learning tools for optimal engagement and motivation is the use of virtual simulations.

Virtual simulations used for learning not only focuses on building on their preferences and their strengths but leverages performance development in the organization. Recent research (Cameron and Wijekumar, 2003) shows that online simulations foster improved performance by learners in comparison to learning by students in identical courses lacking online simulation. Again, supporting individual learning enhances the organization's bottom line, its return on investment through performance or process improvement.

The use of simulation is only a part of the learning approach in a corporate environment. Several considerations have to be taken into account when mapping out a learning plan for the individual and the organization. Combining online simulations with classroom lectures may meet the need for both static and interactive skills. The intensity of teacher participation in guiding the learners to their desired learning objectives balances the students need for free play. Coaching, mentoring, feedback, and actively sharing cultural beliefs are useful conduits in tacit knowledge expansion and expression. Venues that incorporate in-person and live interaction collaborate synchronously with online and virtual simulation. Finally, virtual simulation is not a panacea but another valuable tool that is highly useful in constructing real life experiences for optimal individual and corporate learning.

Conclusions

The emergent technology of virtual worlds utilizing simulations of real life work situations is a throwback to the microworlds of yesterday. They are ideal for conducting thought experiments that deepen with experiential understanding. This technology-mediated form of learning affords the opportunity to experience the results of an action which may take a lifetime to learn in real time. This virtual world allows decision-making but eliminates the risks of serious, unintended consequences. It is a wonderful resource for living vicariously experiences which are unavailable or unlikely in the real world.

Digital natives are the drivers of change who will explore the brave new world of computer simulations. As simulations become more technologically infused with artificial intelligence, its application for education and learning will broaden and expand. Unlike the static interface of a textbook, which shows limitations in content scope and delivery, this virtual world knows no limits in knowledge expansion. Validated course content, formal and informal knowledge contributions from peers and experts alike, networked knowledge coming from Web resources and the internet enrich the learner's ability beyond measure to experience the world and know it better and more intimately.

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