Digital Natives, Media and Learning:
Implications for the Future of Army Training

By Dr. Liston W. Bailey

Introduction

Recruits to the U.S. Army today are likely to be members of the generation of learners commonly referred to as digital natives. Soldiers from this generation have a 21st century mindset and have never known life without a computer. An important consideration and discussion topic for training developers today has to do with the right conditions of learning for this population of soldiers. Arguably, in order to create engaging and useful training for those considered to be digital natives, designers should allow for flexible adjustments in the use of technology and media within lesson contexts, to include both offline and online activities.[1] For digital natives, the features of their learning environment, opportunities to interact socially, and self-efficacy are integral aspects of their lives that support understanding and professional growth.

As described by Bandura (1977), a theory of social learning exists, wherein individuals develop self-efficacy and confidence about themselves through social interaction. Effective learning is not intended to be a static activity and course design should be based upon a situated pedagogy - live or virtual - with learners interacting in teams and groups.[2] This matters because lecture style instruction that has students sitting in rows and listening to a sage on the stage may not be the best way to engage and motivate this generation of learners. Wherever students have an opportunity for sharing knowledge and evaluating different perspectives, socially constructed knowledge emerges and technology can help with this.[3] Moreover, in order to promote learner centric educational goals, a cultural shift is warranted in the way that training is conducted for soldiers. This cultural shift will likely include less reliance on brick and mortar classroom experiences and make greater use of media and technologies that can enable learning at the point of need or learner collaboration at a distance.

Professional military education (PME) in the Army today is often delivered in an antiquated manner, with soldiers seated at desks, listening to instructors who are not trained to facilitate learner centric experiences in the classroom. Lesson plans and training support packages for many courses leave something to be desired and are too often based on a direct instructional model that is more than twenty-five years old. There is nothing wrong with using direct instruction to train tasks; however, there are other instructional strategies that can be used in PME to educate soldiers and to develop the critical thinking and adaptability skills that the Army desires in its NCOs and Officers. Digital natives coming into the Army will more than likely be frustrated if changes are not made to better incorporate the internet, digital tools, social media, games, and simulations into the training environment. To manage change, the Army will need to leverage learning science principles to convert professional military educational experiences into meaningful capstone learning experiences. Training and courses in the Army can easily make use of the mobile learning applications, Web 2.0, and social media tools that digital natives use as a part of their daily lives. A failure to do so might result in a lost opportunity and potentially deal a blow to the motivation of soldiers who are a part of the digital generation.

A Better Understanding of the Digital Generation

Colleges, universities, and the military have of late devoted much attention to documenting the learning attitudes and preferences of those described as Generation Y, iGen, or nexters. Individuals born in the years between 1982 and 2000 generally fall into this category of young adults. Moreover, when it comes to the use of technology and the internet, these individuals have been commonly referred to as digital natives. The Army Learning Model (ALM) suggests that the future learning environment for training must take into account this generation of learn-

ers, whose pre - Army educational experiences, mastery of digital technology, and operational experience will vary considerably.[4]

Although there have been various studies written on the topic of digital natives and their use of technology, very few of these writings have explored causal relationships between this generation's appetite for consuming massive amounts of media and indicators of learning achievement using technology. Instead, many writings in regards to digital natives and their use of media to learn have focused on qualitative aspects of learning or acquiring new information. Writers in this area often use language related to motivation, user convenience and cost related efficiencies. In addition, numerous articles have been written on public school systems across the nation making attempts to include Mobile Apps, smartphones, tablets, and Web 2.0 technologies (i.e., apps, blogs & wikis) into class work.[5]

As a part of its plans for the future learning environment, the Army is beginning to think about the population of soldiers who will join its ranks in the years 2015 – 2020, many of whom are now in either middle or high schools across our nation. It's important to note that the formative educational experiences of recruits entering service will be associated with state standards of learning. New Common Core state standards in public education now replacing No Child Left Behind education legislation of the past fourteen years will require students to demonstrate digital literacy skills for learning.[6] *A key question being asked by developers of training in the Army is: How do you develop appropriate training and education for a generation of young people who have high amounts of digital literacy as a result of living their entire lives with access to massive amounts of technology?*

In 2011 the Army Training and Doctrine Command (TRADOC) commissioned a Study to Establish Levels of Digital Literacy for Soldiers and Leaders in the U.S. Army. Authors of the report reviewed some 150 sources of qualitative insights pertaining to digital literacy.[7] The 150 page report notes few universal standards for promoting digital literacy among groups of learners. In addition, the study included the recommendation that Army develop a sound business case for technology integration that includes a review of outlays, performance, and risks associated with the adoption of various technologies for training. This report also observed little to no digital literacy gaps between Army components based on socio economic or ethnic/culture considerations.

Are our assumptions about digital natives and their learning needs correct? Several authors have suggested that not all millennial youth are technology savvy or have digital literacy skills necessary to learn effectively using technology. Perhaps the assumption that all young people are "born digital" may not be entirely accurate or take into account individual needs of learners.[8] In fact, rather than labeling all young people as digital natives, we need to recognize that individuals grow up with different histories of access to technology.[9] Training developers in the Army will have to also consider individual differences rather than viewing digital natives as a homogenous group of learners. Basic decisions on the right instructional approach for use of digital media in learning design should focus on the training audience, their prior knowledge or experiences, and the nature of the lesson content.[10]

How well do digital natives learn through the use of technology? One recent study of 100 learners found that millennial students described as digital natives showed poorer knowledge application skills while older learners were deemed as more socially reliant and better at knowledge application.[11] Moreover, this study suggested that although younger learners may be capable in using technology, digital literacy and the ability to use those applications to learn is aligned with foundational skills such as reading, writing, numeracy and agentic information behaviors.[12] Agentic engagement on the part of learners has to do with the extent to which they engage in proactive efforts to contribute to the flow of instruction and to energize their own sense of motivation to learn.[13] Ironically, young people coming into the Army routinely use social media and mobile applications for texting, keeping up to date on topics, news, or other information. But these soldiers may not have much experience using these applications and media for use in self-learning.

In what ways may use of simulations and games to train and educate digital natives be of benefit to the Army? From a cognitive learning science perspective, simulations and games support learning by stimulating cognitive

processing through interactivity, which is an important component of effective instruction.[14] Simulations have long been recognized as cost effective ways to train and provide practice for procedures that are costly to carry out in real life. Digital natives are likely to have already invested much of their formative years playing games on smartphones, tablets, and PCs. They are already accustomed to processing information and manipulating interactive objects onscreen. Research in the area of games used for learning suggest that serious games for learning can yield benefits to the student by providing immediate feedback, practice of skills, and the opportunity to correct inaccurate information.[15] Let's bear in mind however that simulations and games are probably best used as an additive within a well conceptualized design of learning. Over the years, some cognitive scientists have argued that media of all types to include games and simulations don't on their own influence better learning, and that media should serve mainly as a vehicle for the delivery of instruction.[16]

Intrinsic motivation to learn with technology may also be increased when the digital learning tasks are meaningful to the learner's goals. M. David Merrill proposed in his writings on instructional system design (ISD) that within the design of instruction, having students work with realistic situations informs schema development and later transfer of skills into practice.[17] Thus, a gratuitous use of technology and media in the design of courses should be avoided, if it does not either help to replicate the operational environment or in some way support application of new knowledge and skills.
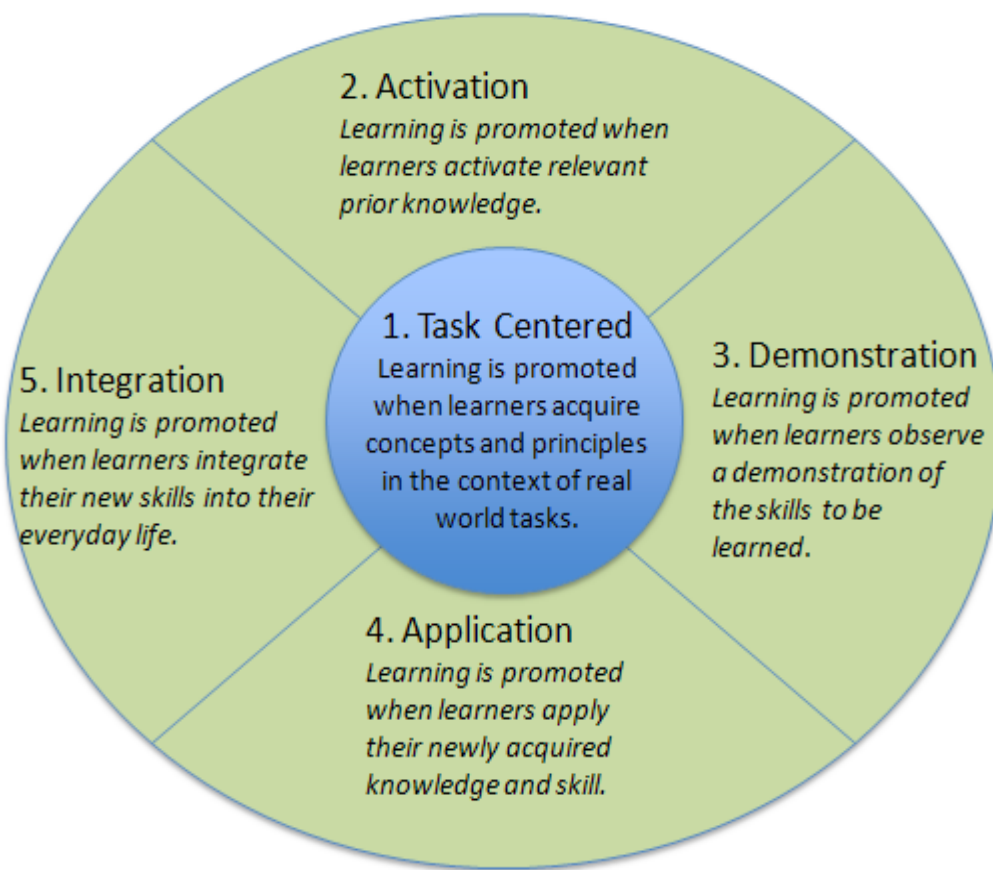
Merrill's First Principles of Instruction

In the future, Army training developers who decide to make use of mobile applications, media, or internet based learning platforms should also include help for learners in the form of support, appropriate instructional strategies, and guidance. Cost benefits realized as a result of using digital tools and media (i.e., games, simulations,

MMOGs, MOOCs) in courses should not come at the expense of providing appropriate scaffolding to learning and resources to ensure that learners can confidently understand what learning successfully looks like. In addition, technology and media may not always be appropriate for training novice learners on ways to solve ill-structured problems if foundational skills have not been taught first (i.e., concepts, processes, procedures).[18] For this reason, proper feedback and guidance in the learning environment still matters, regardless of whether the training is over the internet or presented in an offline mode. In addition, meaningful learning requires that instructional designers observe design principles that avoid cognitive overload in learners through poorly designed use of media and applications within instruction.[19]

Using Social Media and Mobile Learning Tools for Instruction

When we use the terms media and technology for learning this includes a broad range of communication tools to include high-tech to low tech solutions for face-to-face and virtual instructional settings.[20] The main goal is for the selected media or technology to deliver the instructional content to the learner at the point of need. There now is the possibility to develop Mobile Apps, social media sites, and blended learning tools to support learning in Army PME courses. For example, iTunes U can be used to develop instructional content in the form of PDF documents, e-books, videos, and other media. These materials can be easily accessed by learners via the internet on Windows or Macintosh operating systems. Current Army courses that make use of commercial wireless services could in theory develop protocols to host such materials in the cloud. The Army should also consider ways to create restricted social media sites as networking platforms to support collaboration in courses. Ways to incorporate these types of digital tools and other instructional technologies into courses and training should be outlined within present instructional development policy and guidance. A few examples of various digital applications and media that might be used as instructional technologies in Army courses are shown in the table that follows.

Face to Face	Online & Web 2.0	Mobile	Blended Combination
-Smart Boards -Desktop Computers, Laptops, Mobile Devices (phones and tablets) -Google Books -Presentation software (i.e., PowerPoint, Prezi) -Projectors and sound systems -Online Games (MMOGs) -Electronic documents (pdf handouts) -Clickers (student response systems), Polls and quiz systems -Simulations and Immersive training applications -iTunes, music streaming services -Video Conferencing software -Productivity software -Google Maps and GPS tools -Plagiarism detection tools -Communication technologies (testing, email, listservs)	-Video (i.e., Vimeo, Youtube) -Learning Management systems (Blackboard, Moodle, etc) -Webinars and Podcasts -Group Blogs and Wiki's -Social media tools (i.e., Facebook, Twitter) -Online Games (MMOGs) -Simulations and games -Electronic journals and portfolios -eBooks, eTextbooks, audio books -iTunes, music streaming services -Personal Learning Environments (PLEs) -Video Conferencing software	-Mobile phone texting -eBooks, eTextbooks, audio books - Mobile planning tools, calendars -Google docs -Clickers (student response systems), Polls and quiz systems -Social media tools (i.e., Facebook, Twitter) -Google Maps and GPS tools -Smartphone cameras -Online Games (MMOGs) -Authoring tools for Mobile phone apps -iTunes, music streaming services	-Group blogs and Wiki's -Digital university libraries -Google docs -Learner analytic tools for tracking of learners and their usage of instructional content -Video Conferencing software -Presentation software -Google Hangout -Plagiarism detection tools -Electronic documents (handouts) -Communication tools (email, digital dropboxes) -Learning Management systems -Video -*Broad combination of digital technologies to include online and mobile tools*

Various Instructional Technologies and Platforms

In addition, Bloom's learning taxonomy can be applied to digital learning experiences in the classroom. In terms of strategies to design learning, it's possible for an instructional designer to align the intended use of digital applications in the classroom to desired learning outcomes.[21] See Appendix A of this article for a layout of Bloom's Digital Taxonomy to include as higher order and lower order thinking skills associated with digital learning experiences in the classroom.

Massively Open Online Courses for Army Education

The birth of massively open online learning opportunities present some options, as well as potential challenges in their use for Army training and education. Within the civilian sector, most colleges remain undecided as to the benefits of massively open online courses (MOOC) with only about 2.6% of institutions currently engaged in experiments with these learning formats.[22] MOOCs have attracted many learners to try this way of learning; however, the courses have large dropout rates with fewer than 10% of students completing full courses[23] and may not be suitable for all types of learners. Individuals likely to succeed in this learning format will typically have already developed skills associated with self-learning strategies and have an immediate need for the training in order to apply knowledge directly to their jobs. As the Army seeks to redefine ways to more effectively train soldiers it must also weigh risks associated with MOOCs if they are poorly designed as a one-way teaching pedagogy that is expository in nature.[24] For example, within a MOOC of 40,000 students, how often would a learner be able to discuss their understanding of the course content with the instructor? MOOCs are not necessarily collaborative learning experiences. A recent study by the Army Research Institute concerning NCO self-learning found that soldiers are drawn to social interaction with peers and help and feedback from an expert as a part of their personal learning strategies.[25] An Army MOOC if designed correctly should also incorporate performance-oriented learning with feedback to the learner on how well they addressed a problem or completed personal goals.[26]

Interestingly there are some potential benefits to be considered in creating open online collaborative courses for educating and training future soldiers. A combination of videos and other forms of media within an Army MOOC might be a useful vehicle to allow Soldiers access to learning content at the point of need. Unrestricted access to open online courses within an online Army university would break down stovepipes to information that soldiers now face and allow NCOs and Officers to shape their own professional development paths. Chat rooms or restricted social networking forums in courses can support information sharing, co-creation of knowledge, or assumption checking among students. If the Army chooses to create such courses it should make strategic investments in research, consultations with experts, and also develop a comprehensive strategy to make the courses meaningful to soldiers. Army MOOCs would represent self-directed learning and an investment of time for soldiers, who will be motivated to attend courses by the expectation of professional certifications and credentials they can use for their lives following military service.

Media and Technology in the Army's Future Learning Environment

Within the future learning environment, the necessity of soldiers learning faster, learning to deal with uncertainty, and training for adaptability will be paramount. At the same time military leaders must not default to thinking that randomly inserting educational technology into professional military education and training is an antidote for all training and learning effectiveness challenges. An enthusiasm for meeting the needs of the next generation of soldiers must be tempered, so as to not lurch from one fad to the next, since use of technology for training should be based upon relevant research and evidence from the field of learning science. As a practical consideration, Army leaders seeking to integrate Mobile applications, media, and online experiences into training should first consult with experts in order to determine best practices and risks associated with certain technologies in the learning environment. This includes a discussion of factors beyond training costs, and should also touch upon such things as learning objectives, avoiding cognitive overload, and opportunities to create personalized learning experiences for soldiers.[27]

One major challenge associated with implementing games, media, and Web 2.0 technologies into Army courses will be educating the training development (TD) workforce on how to integrate them into the design of learning. Some strategic investments must be made to upgrade the skills of people who will write the training support packages and operate the robust learning management systems that will enable new ways of teaching and learning in support of digital natives. TD practices in the Army must by necessity keep pace with developments in the field of educational technology, to include use of learner analytics, streamlined instructional design techniques, and use of media and digital applications for learning. Moreover, regardless of whether the Army uses an agency approach to contract out many of these functions, or chooses to do in-house development, it will need talented instructional designers to create the future learning environment that incorporates more technology and media.

The Army learning environment of the future will also require that soldiers cultivate the technology related ed skills needed in both training and operational environments. Today, young people (digital natives) coming into the military are likely to find themselves working with technologies that support network integrated systems. Take for example the Army's Joint Battle Command Platform (JBC-P), a networked mission command tool, used for tactical communications on the battlefield.[28] Or consider a modern Army Stryker brigade combat team (BCT) that is digitally equipped and networked and that can rapidly accomplish identification of friendly, neutral, and enemy forces.[29] Technology advances will continue to shape the Army's operational environment, where soldiers will require more cyber and digital literacy to manage the networked integrated systems, unmanned vehicles, robotics and other technologies that will influence future kinetic motion on the battlefield. Army training must also support Network Integration Evaluation (NIE) goals to include Army Battle Command System (ABCS) tools and protocols. Soldiers will likely benefit from using digital applications, media, or

> *The future Army learning environment should incorporate technology and platforms to improve the digital literacy of soldiers, who will need to collaborate and make use of technical skills to complete tasks within a networked systems environment.*

courseware in the classroom that replicate the fluidity of the battlefield and the concept of mission command on the move.[30] This is in line with the idea that the type of learning emphasized in training impacts subsequent transfer of skills to the work environment.[31]

As the Army contemplates ways to more effectively train and educate the next generation of soldiers, it must thoughtfully incorporate digital applications and media into training, which helps them to learn and adapt technology rapidly. We will also need to consider that members of iGen or digital natives are not so unlike previous generations of adult learners, in terms of their desire to learn, meet personal goals, and complete tasks, and develop self-confidence while being engaged in the process of learning. Military trainers should also pursue the use of technologies in the classroom and at home station that provide opportunities for digital natives to self-pace through content, to take responsibility for their own learning, and to learn on their own at the point of need. In addition, digital applications, media, and courseware designed for future Army professional military education courses should include adequate scaffolding, to provide the learner with structure and communication tools that facilitate collaboration at a distance.[32]

The Opportunity

The Army is working to create more effective ways to train and educate soldiers. Digital natives coming into the service will already be familiar with using media and Mobile applications to find information at the point of need. Since soldiers of this generation are likely to have spent literally thousands of hours in their formative years using Mobile apps, and media for entertainment, why not use these platforms to support collaboration and more relevant learning opportunities? Today, some professional military education courses for NCO and Officers in the Army still incorporate a heavy reliance on PowerPoint slides, which is often the only technology used in the classroom. The Army will not be able to provide meaningful learning and training experiences for personnel in the years to come if it does not begin to aggressively implement change. By leveraging Mobile applications, social media, and Web 2.0 technologies, we will go a long way towards realizing better ways to engage digital natives in

learning. Using media, Mobile, and networking tools as a part of teaching and learning is simply a way to help learners to rapidly gather information about the world, in ways that digital natives view as a routine and necessary part of their daily lives.

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Appendix A. Bloom's Digital Taxonomy