MOBILE LEARNING
IN CONTEXT

THE eLEARNING GUILD

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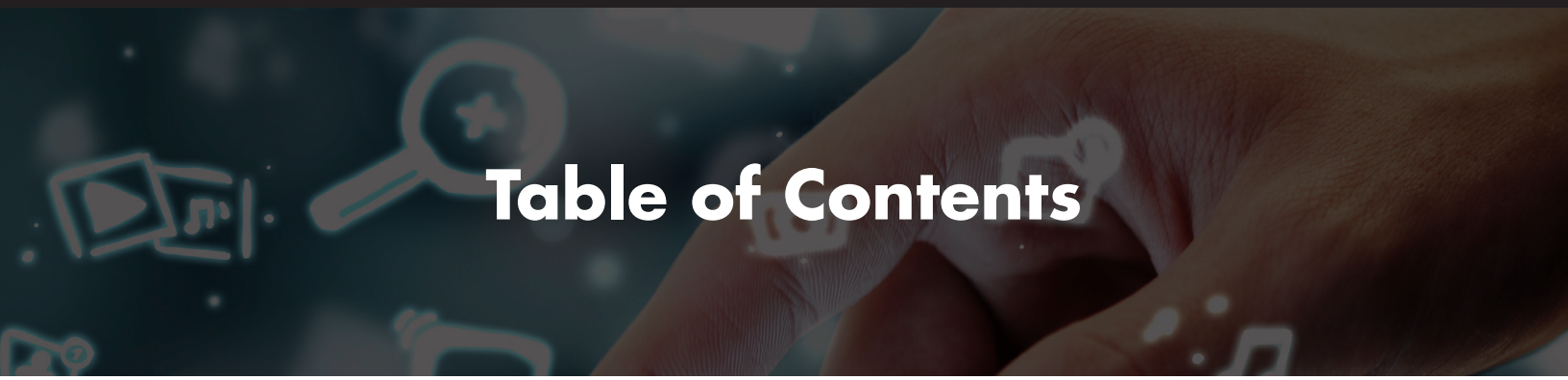

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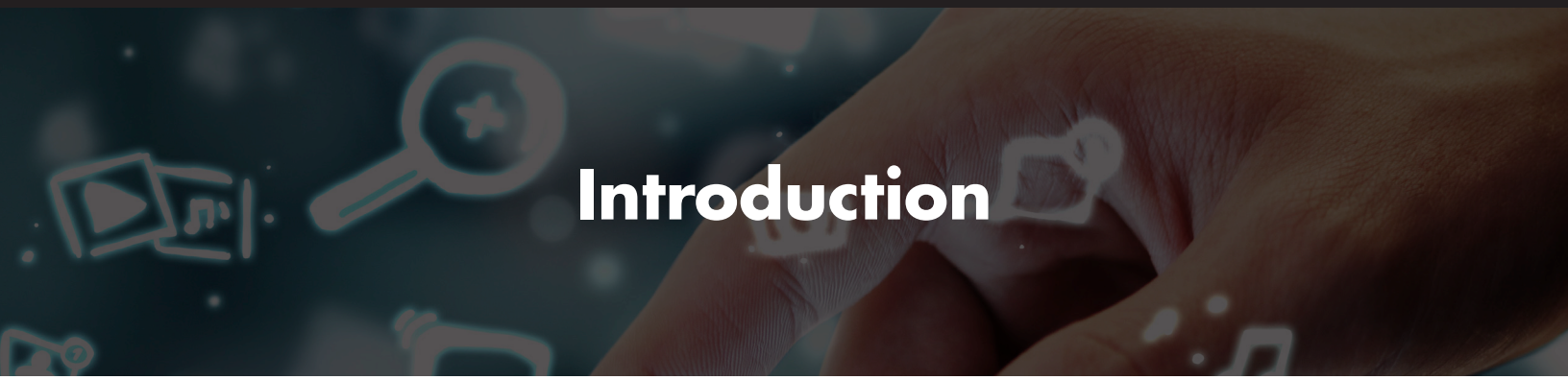

Introduction

When people talk about the customary approaches to eLearning, they usually envision self-paced courses, tutorials, or synchronous virtual classroom training. Still popular after 20 years, these types of eLearning are typically designed and structured as a formal solution. They originated in one-way communication (web 1.0), much like email evolved from traditional mail. Done right, and for the right reasons, this approach works.

Mobile learning originated in two-way communication (web 2.0) and defies the customary approach to eLearning, and shifting the control and responsibility for learning. From a design perspective, mobile forces us to rethink our approach to learning. It forces us to see learners as mobile. Done right, this approach also works.

This eBook contains a collection of short essays from a diverse group of mobile innovators working in the field. We hope reading it will inspire you rethink where mobile learning fits in your existing learning ecosystem.

Brenda Enders, of Enders Consulting, shares her approach for getting started with mobile. She writes about the strategy process used by the American Public Library System for meeting the needs of faculty and student requests for a mobile classroom app. She also discusses an Ebola Training Cards application to train medical professionals on how to recognize symptoms, and treat, prevent, and control the disease.

Helen Crompton, of Old Dominion University, writes from a historical perspective about how mobile learning is creating a shift in the way we teach. She provides the learner-centered progression of pedagogies over the past five decades and a revised Bloom's Taxonomy pyramid that focuses on what students are able to do; it has *remembering* at the bottom of the pyramid and *creating* at the highest level of learning. You will find several links if you want to take a deeper dive.

John Traxler, of University of Wolverhampton, writes about his work on a large European project developing a mobile online environment for professional development for officials in rural local governments. He shares his thoughts on the significant barriers organizations can face in implementing mobile learning solutions, including dealing with the design-decision tension between old technologies and mobile technologies. He presents several different scenarios that capture the possibilities.

Jason Haag, of Advanced Distributed Learning (ADL) Initiative, writes about the use of augmented reality for contextual mobile learning. Using a classing scheme from the Open University, he identifies multiple examples of augmented reality for mobile. You'll find a plethora of links to other mobile augmented resources, including content creation and development platforms. Through his review of this area of mobile learning, he envisions a rich mixed-reality environment.

Phil Cowcill and Krista Hildner, both of Canadore College, write about the endowed progress effect to help motivate (and manipulate) learners to complete training by providing rewards with value. The writers borrow examples from marketing and suggest ways to change the perception of learners and increase motivation, retention, and fun.

Inge de Waard, of the Open University, writes about the implementation of her mMOOC design. She discusses practical implementations of eLearning that focus on building mobile-supported eLearning courses that combine contemporary learning solutions and build networked, digitally skilled learner communities. She describes how using the mMOOC design combines the characteristics and strengths of both mobile and eLearning and offers a brief description of mMOOC elements.

Sean Bengry, of Accenture Academy, writes about the increasing momentum of micro-video and different approaches for creating meaningful, relevant micro-videos that are good for your audience. He offers several links to help you gain a well-rounded understanding of micro-video—ranging from why it's important, to what it looks like and to how to build and deploy it.

Enjoy this eBook. We hope it helps you view learning differently—in context.

—Janet Clarey

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Mobile Learning: Getting Started

Brenda Enders

Brenda Enders is president and chief learning strategist for Enders Consulting, a St. Louis, MO-based company. She is a consultant, author, and public speaker specializing in leveraging innovative technologies to improve employee performance. She has 19-years' experience in the learning and development field. Brenda's first book, *Manager's Guide to Mobile Learning*, was published in 2013. Prior to founding Enders Consulting, Brenda was chief learning strategist and learning services practice leader for a custom learning-solutions provider for 12 years, where she led the design and deployment of innovative and award-winning custom learning solutions.

I'm sure we've all heard the buzz around mobile, such as statements that mobile devices are ubiquitous and more powerful than the giant mainframes of 40 years ago, that the millennial generation is demanding mobile-delivery options because they have grown up with the technology, or how mobile is the perfect fit for anywhere, anytime consumption of content. Although none of these statements is incorrect, we do need to dive deeper to determine the best fit within our existing learning environments. Let me share with you my approach for getting started, and allow me to discuss two examples.

The first step is to think about how you use your mobile device(s). Is it the same way you use your laptop or computer, but just smaller? Of course not. So why would we use them within our learning programs simply as an alternative delivery method for our existing curriculums? The organizations that have maximized the impact of mobile technology are creating solutions that utilize the devices in ways similar to how our audience actually uses them in their daily lives. A few examples include two-way communication via a short messaging service (SMS) or a multimedia messaging service (MMS), documenting experiences with pictures and videos via a camera, using notifications to increase awareness, using location awareness or augmented reality to provide just-in-time information, using mobile apps to easily find information, and chunking content into easily accessed and digestible information. Although this isn't a comprehensive list, it should get your juices flowing.

Once you are thinking about the unique experiences and affordances of mobile technology, the next step is to take a strategic look at how it can solve an existing organizational or content-delivery problem. This view starts with a clear understanding of the current problem as well as of how the future state will be improved by incorporating mobile technology. I also suggest that part of this strategic thought process includes exactly which benefits mobile delivery brings to the table—you need to make sure mobile technology is truly the best solution. Also, we need to understand what a successful implementation looks like and how we will measure the outcomes. Only after completing this process can you then define your strategic objectives and start to dive into areas such as technology considerations and environmental and/or situational usage constraints for your program. In some cases, this process may take months; in others, it may take just a day. Let's look at an organization that used this approach.

The American Public University System (APUS) is an online university serving more than 100,000 students and offering over 90 programs across six schools for associate's, bachelor's, and master's degrees. In 2013, in response to requests from students and faculty for a mobile classroom app, and after APUS representatives attended my mLearnCon workshop on building a mobile strategy, APUS began its strategy process. To assist with addressing the strategic questions, the university held a series of focus groups with both students and faculty. From this process, the students identified several mandatory functions, including:

- Announcements
- Forums and/or discussion boards
- In-class messages
- An online gradebook
- Push notification of class activities and grades
- Offline capabilities
- Availability on both tablets and smartphones

The faculty's focus groups identified a similar set of mandatory functions, but with a slightly different spin to fit their unique needs. The outcome was designing a single native application that would function for both groups and creating custom middleware that would allow the app to be plugged in to any learning-management system with little programming. This approach would give APUS the flexibility to change its LMS in the future and quickly revise the mobile app for the new system.

After APUS went through user-acceptance testing and modifying the production environment, the app was released to the iOS and Android markets in February 2015. The feedback from both the faculty and students has been tremendous. Success stories include that students have been able to participate in classes anywhere, anytime and that they enjoy being notified about grades instead of having to log in with a computer to check them, as well as faculty reports that it's easier to respond to student questions and issues, significantly reducing response time.

Let's look now at a very different mobile solution driven by the importance of rapidly educating medical professionals as well as the need for performance support and clinical-decision support during the recent Ebola epidemic.

In one week, and leveraging an existing infrastructure, the University of Central Florida's Mixed Emerging Technology Integration Lab (METIL) designed and deployed the Ebola Training Cards application to train medical professionals on how to recognize the symptoms of Ebola as well as how to properly treat, prevent, and control the disease. The training consisted of study guides, quick reference cards, and quizzes. It also provided checklists to serve as reminders and an aid to navigating complex procedures in order to reduce mistakes. The application is easily accessible using various devices ranging from mobile phones to wearable technologies such as smart watches and Google Glass for hands-off use. In addition to addressing the anywhere, anytime need of the audience, this is also a great example showing how performance support and clinical decision-support systems are advancing through wearable technology.

Mobile Learning: Creating a Shift in the Way We Teach

Helen Crompton

Helen Crompton is an assistant professor of instructional technology at Old Dominion University, Virginia. She gained her PhD in educational technology and mathematics education from the University of North Carolina at Chapel Hill. Her research is focused on mobile learning and the effective integration of technology into K-12 education. Helen has written articles about mobile learning for two divisions of the United Nations (UNESCO and ITU). She also designs courses and teaches for the International Society for Technology in Education. She has worked with district leaders, principals, technology coaches, teachers, and parents across the US and the UK.

When one looks at typical historical photographs of classrooms, it is clear that the focus of that environment was on the teacher and not the students. These images often depict the teacher lecturing at the front of the room, while the students are seated at neat rows of desks. In those days, students spoke only when spoken to, and interaction with other students was not welcomed. Times have changed; we now understand that students are not empty vessels waiting to be filled with the knowledge teachers impart. This type of learning will bring about only surface-level learning the students forget because they have nothing to connect that knowledge to. The teacher focus has now been swapped to focus on the student—and on the student as an active participant in the learning process.

In the first chapter of the *Handbook of Mobile Learning*, I describe the learner-centered movement beginning with discovery learning in the 1970s through to problem-based learning and socio-constructivist learning in the 1990s. Table 1 shows the learner-centered progression.

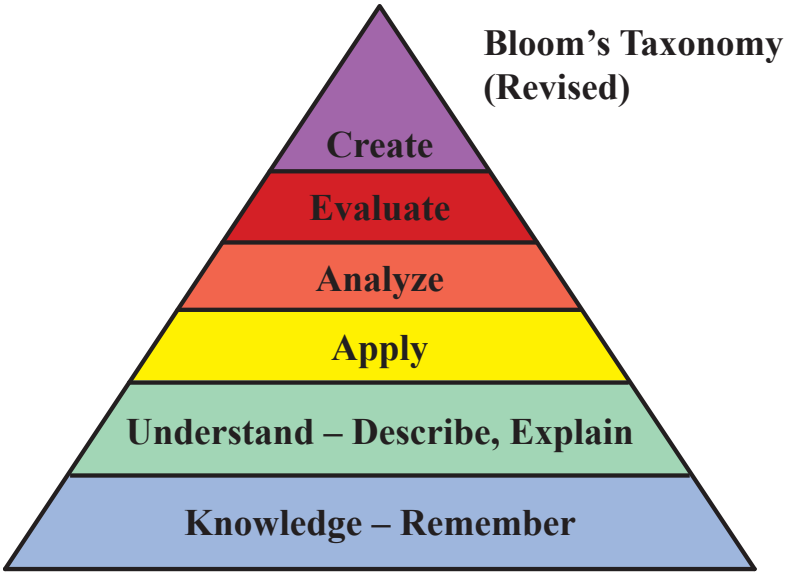
Table 1: Overview of the Revision Process in Learner-Centered Pedagogies and Theories (from "A Historical Overview of Mobile Learning: Toward Learner-Centered Education")

Learner Pedagogies and Theories	Decade	Main Tenets of the Pedagogies and Theories
Discovery Learning	1970s	Knowledge is discovered through active participation in the learning process
Constructivist Learning	1980s	Knowledge develops through interactions with the environment
Constructionist Learning	1980s	Knowledge is gained through actively creating social objects
Problem-Based Learning	1990s	Knowledge is developed through working on tasks and skills authentic to the environment in which those particular skills would be used
Socio-constructivist Learning	1990s	Knowledge is co-constructed interdependently between the social and the individual

In that chapter, I describe how there is also a need for tools and technologies to support these different ways of teaching. Today's students no longer just look to the teacher for knowledge; they now know that the information they seek is in the palm of their hands or just a mouse click away.

Digital technology is developing at an exponential rate. These technologies provide tutors who can give information, strategies, and advice and can grade work; programs that provide different ways to visualize concepts to ensure that students understand in a way that they learn best; and libraries of primary and secondary documents. These features do not replace the teacher, but they enable the teacher to facilitate deep-level learning activities while keeping the focus on the students.

Considering how students should be actively involved in the learning process, the revised Bloom's Taxonomy (Figure 1) focuses on what students are able to do at each level, with *remembering* at the bottom of the pyramid and *creating* at the highest level of learning. It tells us that for students to fully understand concepts, they should be learning by creating products and creating their own understanding for those concepts. This connection to creating fits with the teaching focus of the 1990s (e.g., the socio-constructivist methodology) and continues today with Makers.



Based on an APA adaptation of Anderson, L.W. & Krathwohl, D.R. (Eds) (2001)

Figure 1: A revised Bloom's Taxonomy (source: http://www.apa.org/ed/governance/bea/assessment-cyberguide-v2.pdf)

Technologies develop to meet the demands of users, and mobile learning meets the needs of today's students, who want to use the tools they use outside of school for learning inside school. Mobile learning is defined as learning across multiple contexts, through social and content interactions, using personal electronic devices (see "A Historical Overview of Mobile Learning: Toward Learner-Centered Education in References). This definition makes it clear how mobile technologies can extend teaching further. Learning can take place across multiple contexts; this means that learning can be in a variety of different environments, such as on a bus, at a shopping mall, or by a river. Before, although you could take students on field trips, they were unable to take the tethered desktop computer to help support them in the learning process. Mobile devices provide tools for students to be able to collect and analyze data, shoot video, take photographs, look up information, connect with others, etc., on site, where that information is relevant and meaningful. Social and content interactions describe

the ways students can use the devices to connect with others and with the content they are learning. "Personal electronic devices" describes the technological tools that help students accomplish this anytime, anywhere learning.

One example of mobile learning being used to the full was a study I conducted in 2013 in which fourth-grade students learned about angles in mathematics. After discussing the definition of an angle, the students used iPads and an application called Sketchpad Explorer and an add-on called Measure a Picture to find angles in the real world. As the students found the real-world angles, they then were able to use the dynamic protractor to measure them. Figure 2 shows a student looking for angles on a climbing frame.

Figure 2: A student looking for angles on a climbing frame

In this study, the students benefited greatly from this approach, as they were able to understand angles by connecting to the world that surrounds them.

References

Crompton, Helen. "A Historical Overview of Mobile Learning: Toward Learner-Centered Education." *Handbook of Mobile Learning*. Florence, KY: Routledge, 2013.

Sketchpad Explorer [computer software]. Emeryville, CA: KCP Technologies. 2012.

Steketee, Scott., and Crompton, Helen. "Measure a Picture." Retrieved 13 April 2012, from the Geometer's Sketchpad Sketch Exchange. 2012. sketchexchange.keypress.com/sketch/view/448/measure-a-picture

Mobile Learning in a European Context

John Traxler

John Traxler, a professor of mobile learning at the University of Wolverhampton, is a founding director of the International Association for Mobile Learning. John is on the editorial board of Research in Learning Technology and of IT in International Development. He has guest-edited three special editions of peer-reviewed journals devoted to mobile learning, co-written a guide to mobile learning in developing countries, and is co-editor, with Agnes Kukulska-Hulme, of the book *Mobile Learning: A Handbook for Educators and Trainers*. He talks and writes frequently on the consequences of connectedness and mobility on learning, knowledge, and societies.

I am working on a large European project called EAGLE, developing a mobile online environment for professional development for officials in rural local governments. EAGLE represents the chance to work at a large scale and deliver a substantial working system and an opportunity to test new concepts against practical constraints and real learners. The system is comparable to a large corporate training system, and in some ways the design decisions represent the tension between the older corporate technologies of learning and the newer mobile technologies of everyday life.

The original concept for the system grew out of a need for appropriate continuing professional development (CPD) for local government officials in rural areas of Europe, specifically in the partner states of Germany, Ireland, Luxembourg, Montenegro, Switzerland, and the United Kingdom. The project proposal clearly shows its origins among the European eLearning community, and two of the challenges are how, and how far, to recognize the significance and impact of mobile technologies among the learners and to what extent to leave behind any eLearning-legacy thinking. The system has to work with different levels of digital literacy among users and different conceptions of learning, and it must allow increasing freedom and reputation within the system as the learners are able to demonstrate increased domain expertise to other members of the learning community.

One of the issues project participants are considering is the extent to which mobile learning systems should address the legacy and expectations of eLearning systems, in the face of learners' expectations increasingly formed by their own pervasive social, recreational, creative, and entertainment uses of mobile devices. As we addressed the place of mobile devices and the meaning of "mobile learning," we were able to identify several scenarios that captured the possibilities.

These include:

- A "conventional" mobile learning design, taking into account the various considerations concerning technology and human-computer interaction and what we know about the motivation of our users (though the design is basically eLearning ported onto mobile devices).
- A "conventional" mobile learning design, but one that uses mass-customization technologies and learner analytics to increase the level of personalization and anticipation.

- A "conventional" mobile learning design, using mass-customization technologies and learner analytics, but also exploiting the specifics of mobile devices and moving away from device independence to mobile-specific implementations such as taking or using geotagged images, audio, and video.
- A design based on a recognition that one's expectations of using mobile devices for learning are not formed by earlier experiences of using computers for learning but are instead formed by one's experiences of using mobile devices for shopping and socializing as well as finding out about, and, in fact, using them for everything.
- A design based on a recognition that any closed system—for example, a college or corporate learning-management system containing the learners and the content—is no longer adequate or appropriate for connecting people. (The abundance of content and communities learners can access to generate, share, consume, transform ideas, get information, express opinions, form identities, and create images is based on the recognition that this access mostly happens on their mobile devices.)
- A design based on a recognition of the different cultures—online, ethnic, and organizational—our learners belong to and the specifics of people who live and work in rural areas and in public administration and how they use mobile devices.

Sadly, as we move down the list, the ideas become increasingly speculative and risky, taking us into territory where few educational models exist to follow. Fortunately, the ideas outlined above are not monolithic, so it is possible to look at piecemeal implementation and testing as a way of reducing risk and exploring learner reactions.

At many points in the project meetings, the word *epistemology* cropped up, hinting at a fundamental change in how information, identities, images, ideas, and opinions could be generated, discussed, reviewed, transformed, shared, and broadcast. This is a change from centralized top-down Web 1.0 systems to flatter peer-to-peer co-creation Web 2.0 systems, and it hints at a change from formal (and institutional) learning to informal (social and personal) learning. These were not purely ideological or theoretical observations, because the intended learners are professionals working with emerging areas of expertise and practice who are able to produce learning for their peers as well as review, evaluate, and consume it. They live in an environment that would encourage the critical and informal discussion of learning activities rather than just the distribution of content from a limited number of authoritative external sources. We are looking at popular systems that might inform learners' expectations and our designs, and we obviously noticed Amazon, Mozilla's Badges, Google, TripAdvisor, and Wikipedia. As we enter the second year of the project, these factors are beginning to crystallize.

Using Augmented Reality for Contextual Mobile Learning

Jason Haag

Jason Haag is the mobile learning team lead and a research analyst for the Advanced Distributed Learning (ADL) Initiative. His interest and background is in learning systems, web technology, and standards. Jason spent eight years supporting the US Navy's eLearning program in both engineering and management roles before joining ADL in 2009. He is currently employed by the Tolliver Group and provides systems engineering and technical assistance (SETA) support for ADL; his primary focus is mobile learning research, including instructional design and performance support, mobile device platforms and technology, interface design for learning, and best practices for implementation.

At *DevLearn 13*, I had the honor of speaking on an exciting topic: augmented reality (AR) and its uses in mobile learning. After the presentation, I heard from a number of attendees who were equally excited about the possibilities and examples I shared, and many were also interested in discussing the technical and pedagogical challenges we often dismiss because of the novelty associated with AR technology.

Although I had collected numerous resources on AR in preparation for *DevLearn*, I wasn't able to share all of them during my presentation. In addition, several attendees and peers have asked for links to the AR examples and resources I covered, so I'm making them available through this article.

Mobile augmented reality

What is augmented reality? AR consists of a live view of a real-world environment ("reality") with computer-generated input (including sound, graphics, text, video, and GPS information) supplementing ("augmenting") the visual elements in the view. In other words, AR provides us with an enhanced view of the real world. In spite of the impression of novelty that eLearning practitioners and their managers may have, AR is not a new phenomenon.

Why might AR matter to the field of eLearning? Allow me to cite a key point made in a paper from the Open University: "eLearning designers, developers, and educators often lack clarity regarding the impact that a learner's situation has on their learning." (See References at the end of this piece.)

Mobile AR provides learning designers and educators with a new opportunity to start thinking more deeply about the mobile learner's context and situation. In fact, the key thing to remember about mobile AR is that it is about augmenting experiences in real-world environments, wherever the learner happens to be. AR technologies can take any situation, location, environment, or experience to a new level of meaning and understanding. AR is uniquely changing the way people learn with mobile devices.

A note of caution is in order before I go further. Nancy Proctor, head of mobile strategy and initiatives at the Smithsonian Institution, pointed out in her session at *DevLearn* that examples of ineffective AR abound. These often involve applications

that their creators could have easily developed by using more primitive forms of engagement, such as static graphics. I'm in agreement with Nancy about the misuse of AR, and we can expect to see the consumer world exploiting the novelty and commercialism of AR in the coming years. (See the story by Stephen Vagus in the References at the end of this article.)

Having said that, I believe that some the best opportunities to leverage AR technology for learning are during situated activities or contextual experiences—in other words, where a person is, while the person is doing something. How big will this mobile AR opportunity be? According to Semico's report on augmented reality (see References), more than 864 million high-end cell phones will be AR enabled by 2014, and revenues related to AR technology will approach $600 billion by 2016. While still in its infancy, mobile AR is starting to drive innovation within the education, gaming, medical, mobile, automotive, and manufacturing markets.

Classifying AR

There are many forms of AR. (See the sidebar and the Common Craft video listed in References.) My interest for this article lies specifically with mobile AR as one of the most powerful forms of contextual mobile learning. In addition to the many examples of AR that utilize smartphones and tablets, I'm interested in mobile wearables such as Google Glass that will provide us with even more options for contextual learning in the mobile AR landscape.

Augmented virtuality: similar to but not the same as mobile AR

I'd like to point out an important distinction between mobile AR and a similar application. It is possible to augment virtual and real-world environments and to merge them. Doing so, which falls under the category of augmented virtuality, is outside the scope of contextual mobile learning. Much interesting work has been done in virtual reality, mixed reality, and virtual worlds and education; however, as I've probably made clear, I'm most intrigued with how learning takes place in an augmented real world.

While I collected a number of examples of mobile AR during my research work, the paper from the Open University (cited earlier) provided some much-needed clarity and guidance for augmented reality when examining its implications and unique affordances for mobile learning. The authors provided a working definition of AR to include the fusion of any digital information within real-world settings—i.e., being able to augment one's immediate surroundings with electronic data or information in a variety of media formats that include not only visual and graphic media but also text, audio, video, and haptic overlays.

The authors also addressed AR in a broader reality context and provided several important distinctions between virtual reality and mixed reality. However, I found the following four aspects unique to mobile AR worth mentioning. Combining mobile technology with AR fosters use of the following types of information in support of learning:

- The mobility of the user
- The user's geographical position
- The physical place where learning can occur
- Formal learning connections to informal learning

The authors also investigated a variety of device types I don't think of as being truly mobile. However, the classification scheme they presented is well suited for analyzing today's different forms of mobile AR. The authors of the paper classified AR according to these key aspects (Table 1):

- Device/technology
- Mode of interaction
- Type of media used (sensory-feedback method)
- Personal or shared experience
- Character of the experience
- Learning activities or outcomes

Device or Technology Used	Mode of Interaction	Method of Sensory Feedback	Personal or Shared Experience	Fixed/Static or Portable Experience	Learning Activities or Outcomes
• Headphones • Laptops • PDAs • Smartphones • Tablets	• Passive • Active • Constructionist	• Auditory • Mixed • Visual • Haptic	• Personal • Shared	• Fixed/Static • Portable	• Situated inquiry • Collaborative inquiry • Informal learning • Constructivist

Table 1: Classification table for different types of mobile AR

Most of these classification categories are intuitive and don't require much explanation. However, "mode of interaction" warrants some discussion. These modes relate to either providing passive information overlays to the learner, depending on their physical location, movements, and gestures, or engaging the learner in an exploratory mode in which they are encouraged to actively discover or create media nearby in order to solve a problem or meet characters from a story.

The authors pointed out that more modes of interaction could evolve in the future, although some, such as the constructionist mode, may be more relevant to specific knowledge domains (e.g., architecture or structural engineering), while the active/exploratory mode is more relevant to AR games.

Many of the technical and pedagogical challenges identified in the paper are common concerns often associated with designing and developing for mobile technology. However, some of the key AR concerns identified by the authors include the following:

- The novelty of AR technology may detract from the learning experience.
- Using AR technology may require tech support (if it is not easy to use and install).
- The overlay of labels and features could harm observation skills through excessive reinforcement.

This paper helped me to begin thinking about the characteristics of mobile AR and how we as designers and developers might begin thinking about leveraging AR technologies for learning through this classification lens.

Mobile learning AR app examples

The classification scheme presented in the paper from the Open University was additionally useful in identifying the AR examples I wanted to show at *DevLearn*. Although many other examples of mobile AR exist, the following were selected primarily because they provide excellent models of using AR for contextual mobile learning experiences or performance support. I hope this list of examples provides some ideas for those who want to get started using AR for mobile learning. While looking at these examples, consider reflecting on the categories in the classification scheme. What other examples of augmented reality for contextual mobile learning have you seen?

1. Dow Day, one of the most widely known AR examples for mobile learning, was developed using the open source Augmented Reality Interactive Storytelling (ARIS) platform. (ARIS video)
2. Word Lens builds on the flash cards concept, providing real-time word translation using AR technology. (Word Lens video)
3. Fun Maps for Kids augments a world map to provide more contexts when learning about the continents, geographical landmarks, and animals. (Fun Maps video)
4. Star Walk, an AR astronomy guide, provides a real-time view of the sky's stars, constellations, and satellites by pointing the camera at the sky. (Star Walk video)
5. Leafsnap, a free electronic field guide for trees, provides leaf-shape recognition and has thousands of photos of several species of trees' flowers, fruit, bark, and more. (Leafsnap video)
6. Anatomy 4D, which allows learners to explore the human anatomy, was built using Qualcomm's Vuforia platform. (Anatomy 4D video)
7. DASH Smart Instrument Technologies is a portable surgical navigation system designed to assist orthopedic surgeons in performing procedures to replace knee and hip joints. (DASH video)
8. HP Support's performance-support app helps you change ink cartridges in select HP printers. (HP Support video)
9. Audi's augmented owner's manual app, developed using the Metaio platform, shows the range of functions the car offers without requiring owners to read the manual. (Audi owner's manual video)
10. Volkswagen's Mobile Augmented Reality Technical Assistance (MARTA) app, developed using the Metaio platform, provides service support. (MARTA video)
11. Aurasma's AR app can be used to create auras for augmenting any object by triggering and loading a 3-D object, image, or prerecorded video, and it is ideal for creating learning opportunities for training or performance support. Check out the two examples using Aurasma below:

Combat Medic is a card game augmented by Aurasma and created by the University of Central Florida's METIL for the US Army Research Laboratory. (Combat Medic video)

This video captured by a mechanic while using Aurasma shows how this AR technology, combined with prerecorded videos, could be used to train novice mechanics as well as to provide performance support to more experienced ones. (Aurasma demo: mechanic)

Mobile AR content creation and development platforms

In some of the examples above, I shared links to the AR creation apps or development platforms their authors used. During my presentation at *Devlearn*, I also concluded with a list of the AR creation apps, tools, and development platforms I've been exploring.

- ARIS (www.arisgames.org)
- Aurasma (www.aurasma.com)
- Junaio (www.junaio.com)
- Layar (www.layar.com)
- Metaio (www.metaio.com)
- Vuforia (www.vuforia.com)
- Wikitude (www.wikitude.com)

Mobile wearables and the future of AR

Although many of the examples in the paper from the Open University addressed more than just mobile AR, the paper provided a good foundation for thinking about the attributes of new mobile-device types such as wearables like Google Glass.

Many AR concepts are already under development for Google Glass. In fact, Junaio, a well-known AR platform, recently announced support for Google Glass at the InsideAR conference. In terms of contextual mobile learning with Google Glass, there is Field Trip App, which is also available on iOS and Android mobile devices. One of the most recent examples of contextual mobile learning I've seen on Google Glass utilizes a new feature called Vignettes, a Word of the Day App that evolved out of combining the Glass app with social media.

The potential uses of Google Glass for performance support have been a hot topic this year, but it's compelling to see actual proof of concepts being developed for real-world situations. But what do wearables hold for the future of AR and contextual mobile learning? While looking for wearable AR examples like Google Glass, I found a conceptual and futuristic video on Space Glasses. Future solutions like this seem to suggest a direction toward a contextually rich mixed-reality environment. Although mixed-reality AR examples such as Zspace are available today, they don't allow for mobility as wearables do. With the advent and adoption of wearable mobile devices, the future of AR could evolve into something I previously thought only Hollywood movies might portray.

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Note: Originally published in *Learning Solutions Magazine*, 25 November 2013.

Motivating Learners to Complete Training

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Phil Cowcill is the coordinator of mobile application development for Canadore College. Phil started in multimedia development in 1985 when he was part of a team that developed Canada's first Level III interactive videodisc, and he has been working full-time in the multimedia field since then. In 1995, Phil joined Canadore College where he set up, coordinated, and taught the interactive multimedia post-graduate program. Thompson Publishing released Phil's first academic publication in 2004, and he joined Macromedia/Adobe in 2007 as a quality assurance engineer. Phil travels and speaks at a variety of educational and multimedia conferences all over North America.

Krista Hildner

Krista Hildner is a full-time mobile application developer at Canadore College who slants towards building educational applications. When Krista isn't developing mLearning or mobile applications, she teaches part-time in Canadore College's mobile-application development department.

Have you ever worked on a project in which the client wants you to create a rich and engaging course but you have been given a page-turner budget to work with? (It may not be a matter of whether this will happen, but when.) How do you engage users and retain their interest? As a professional developer, writer, subject-matter expert, or instructional designer, you're often tasked with creating a learning environment that will ensure that the learner retains as much of the information as possible.

The endowed-progress effect could be an answer. The term may be new to some, but it is something most educators have been doing in bits and pieces. When properly planned and thoughtfully implemented, it can help motivate (dare we even say manipulate?) your learners to complete the assigned training. Most learners are not aware that you are manipulating their motivation, but those that do may thank you.

What is it?

One of the best ways to describe the endowed-progress effect is to use a common marketing activity as an example: Imagine going to your favorite coffee shop one morning. When you arrive, the cashier presents you with a coffee card. If, on subsequent visits, you buy nine coffees, the 10th one is free. So you continue to visit your coffee shop until you get your free coffee. Each time you buy your coffee and get your card stamped, you feel that you're making progress toward an attainable goal. That is essentially what endowed progress is.

Tips on implementing

Properly implementing endowed progress as a tactic does require some thought and planning at the start. Considerations to keep in mind follow:

- Give something away at the start.
- Give something to the learner that requires a minimal effort.
- Build momentum and offer prizes or rewards quickly.

For example, recently, we built a time-based app for a client. The learner could answer only so many questions in a day and had to come back the following day to answer the next set of questions. To get them started, we gave them a "ribbon" when they filled out their information. After they finished entering their personal information, we provided them with a second ribbon for filling out their personal budget. So, before answering any questions, they had already received two ribbons that would eventually lead to their final certificate. Simply put, they are motivated by their perception of how far they had come and they can see the end. Perception is key.

Carrot and stick

This type of motivation is a very soft version of the carrot-and-stick metaphor. The stick is that you have to perform some sort of activity. If you perform that task successfully, you get a carrot. Although this strategy is effective, keep this question in mind: What does the learner consider a carrot? If you offer a reward that has no value to users, they are less likely to complete the task.

You can take steps to ensure that your learners are more likely to complete the tasks given to them. In a marketing study done on behalf of a car wash company, customers were handed one of two cards. On one card, there were eight icons, one of which was stamped during each visit (the ninth car wash was free); the other had 10 icons (the 11th wash was free). Both required the same number of stamps; however, on the 10-icon cards, as a thank-you gesture, the first two icons were already stamped. The result of the study was that cards with two free stamps were redeemed twice as much. People worked for the carrot.

How to use the stick in your projects

It's usually pretty easy to keep the carrot in mind, but what about the stick? This approach needs to be taken gently. You have probably heard the phrase "Don't go to bed angry," which is related to the Zeigarnik effect. Bluma Zeigarnik, a Russian psychologist, found that people often remember unfinished tasks more than they remember finished tasks. If you go to bed still angry at a person, that's an unfinished task that stays with you. If you resolve the issue, it tends to melt away. In a study Zeigarnik conducted, she found that servers managing a number of tables tended to remember customers that had not paid their bills versus those who had settled their bills.

To apply the Zeigarnik effect, remind the learner of unfinished tasks. Once the task is completed, reward the learner.

Moving forward

If you're relaxing at home, take the time to play a game. While playing your game, look to see how that game employs the endowed-progress effect. Look for the carrot and stick and how it motivates you to action. Looking at how games motivate us to action can show us ways to motivate our learners to action. Borrowing lessons from the theory of motivation inherent in the endowed-progress effect, and combining it with what we already know about gamification, can help us change the perceptions of our learners and increase motivation, retention, and fun!

mMOOC Design: Providing Ubiquitous eLearning

Inge de Waard

Inge de Waard is a researcher and consultant at the Open University. An international speaker, she has consulted for eLearning start-ups in South Asia, Africa, and Latin America in addition to eLearning projects within the Institute of Tropical Medicine (ITM). Working frequently with partners from developing countries, she is involved in mobile and web-based learning projects in different low-resource regions throughout the world. Involved in eLearning since 1999, Inge has a background in pedagogy and IT and she combines both spheres to ensure optimal technology-enhanced learning for all stakeholders. She is also an active member of several international learning organizations

The mMOOC design model (see Reference) is based on the learning and teaching experiences of two massive open online courses on mobile learning organized in 2011 and 2012 that resulted in a practical implementation of eLearning options. At its conception, the design was associated with MOOCs, but by now many educators, including me, use this design as a broader eLearning design format with a special mobile focus. The design focuses on building mobile-supported eLearning courses that combine contemporary learning solutions and building networked, digitally skilled learner communities.

Design elements

The mMOOC design consists of seven elements, each of them focusing on one particular eLearning concept; See Figure 1.

Figure 1: The seven elements of mMOOCs

Implementation of the design

First, I answer some basic questions below to provide insight into the complexity and options of the design in relation to existing eLearning options:

- *Do you need to develop or program parts to the design yourself?* No, this design can be used with existing web-based and/or social media elements.
- *Can you implement mMOOC design elements in a learning management system?* Yes, if the LMS allows social media embedding and interactions.
- *Must all the eLearning elements be available in the cloud in order for you to create this mobile design?* No, you can use cloud options at your own discretion or in relation to what your learners prefer.

Brief description of mMOOC's seven elements

1. ***mMOOC in the cloud:*** Providing content and interactions in the cloud enables access no matter where or when: This can be an open- or a closed-cloud option—e.g., an internal corporate cloud-based solution.
   To achieve this: Provide a course environment accessible from all locations.
   Example: Provide a one-button login that can be installed on or accessed via mobile devices, with direct links to mobile-enabled spaces.
2. ***Central agora:*** This central meeting place is where all dialogues (peer-to-peer discussions, learner-to-instructor conversations, etc.) take place. This key feature needs to be intuitive and mobile accessible and requires a minimum of digital and/or mobile literacy from the learner. Dialogue is at its best when conversation can take place swiftly and be ongoing to create location- and time-independent learner communities. When learners are able to follow dialogues from any location and at any time, this strategy increases sharing views, enhances expertise, and builds closer communities with others inside the course network.
   To achieve this: Plan small, meaningful interactions on content that stimulate dialogue and knowledge production by sharing authentic learning experiences.
   Example: Create a conversational discussion forum with mobile access. (All short questions or brief discussions start at this location.) You can either send out instructor-based questions or emphasize questions launched by the learners—e.g., "In the last online module on sales, a new approach was suggested (approach X). If you tried this approach, what were your experiences? What worked, and what didn't?"
3. ***Adaptable course overview/syllabus:*** This element of the design should inform the learner about the content or topics covered and whether these topics are mobile accessible.
   To achieve this: Provide indicators on content size, format, and time needed.
   Example: If you provide multimedia content, indicate file size, because size affects downloading and streaming; that way, learners know whether they can access the content through a specific mobile device (e.g., they can use a tablet rather than a smartphone for larger files). Identify format as well (e.g., complex data sheets are rarely good mobile material). In addition, indicating how much time content will take to view lets learners plan their learning (e.g., they can quickly view a snippet of content as they wait in line somewhere).

4. ***(Un)known learner audience:*** Target audience and learner characteristics are at the center of instructional design for online learning. But not everyone in that audience has similar digital skills, and you need to teach those digital skills.
   To achieve this: The course needs to provide help in facilitating or scaffolding the necessary digital skills for both web and mobile formats.
   Example: Provide links to existing digital skill support (e.g., help files and recordings).
5. ***Supporting self-regulated learning:*** This eLearning concept is reflected in mobile as well as in web-based courses.
   To achieve this: Ensure authentic learning, or sharing of real-life experiences.
   Example: Provide a clear overview of the full course and guidance in terms of study and viewing time needed, and use real-life content examples.
6. ***Mobile Social Media toolkit:*** Most social media are mobile enabled and "social," supporting interactions.
   To achieve this: Embed existing social media in your LMS or central eLearning course environment.
   Example: Use the content and discussion options from Facebook or YouTube with their mobile options.
7. ***Mobile Multimedia:*** A lot of today's online content is multimedia, but multimedia is a more demanding form of content in terms of size.
   To achieve this: Ensure cross-platform formats for multimedia files.
   Example: Convert media to mobile formats such as mp4 or mp3.

Conclusion

The mMOOC design model combines characteristics and strengths of both mobile technology and eLearning. By using emerging technologies and pedagogies, the course design allows learning to take place in the cloud across location and time.

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Micro Video for mLearning

Sean Bengry

Sean Bengry manages the development of all eLearning aspects at Accenture Academy, including delivery models, visual and graphic design, instructional design, process design, compliance with accessibility, and needs assessment. Sean started his career as an instructional designer, gaining skills in both instructor-led training and eLearning delivery.

As my son jumped gleefully into our swimming pool on a beautiful 80-degree day in July, I thought back to how this all happened. I had recently purchased a new home, and with it came a brand-new swimming pool. This resulted in an unbelievable amount of anxiety on my part, given that I had never owned a swimming pool before, and in late May, I was faced with the task of "opening the pool." After consulting the owner's manual, and looking at the equipment, I did what every graduate degree holder in instructional design would do—I looked it up on YouTube. And, wouldn't you know it, there were dozens of videos on how to open a pool. I was able to walk step by step through the process, and surprisingly, it worked!

Now, isn't this a testament to today's learning and development? A man with no previous knowledge about how to perform a task can complete it with relative success in little to no time simply by a watching a micro-video demonstration. It wasn't about watching a video on my desktop, remembering the steps, and going outside to perform the task. No, it was about looking up a quick definition of what an object is, or it was about taking my smartphone out and completing each step as I watched the demonstration. Mobile learning experiences in the form of micro video can be embedded within the workflow, leading to immediate new knowledge transfer or task support at the point of need.

Google's multiscreen world report (now more than few years old) and its early thoughts about mobile development still resonate with me. In understanding its users, Google defined three use modes: Repetitive Now, Urgent Now, and Bored Now. Yes, we all have been in the Bored Now state when we access videos on YouTube, mostly for entertainment or to feel serendipitous wonder, but when we are in the moment of need, we're most certainly in the Urgent Now state. In fact, you can probably even subcategorize this state (as it applies to learning) with Gottfredson's Five Moments of Need. Are you learning to do something the first time? Yeah, a short video can help with that. Learning something more? Applying what you've learned (i.e., my sick pool-opening skills)? Yep, you can do that easily with a short video.

If you didn't need to be sold on the benefits of micro video and you glossed over the first half of this article, you can probably start reading here, because you're not interested in why's it's so important. Rather, what concerns you is "What does it look and feel like?" or "How do I build and deploy it?"

What does good micro video look and feel like? Well, there isn't only one way to do it right. If it is reaching your audience, is meaningful, and is solving a business or other problem, looks don't matter that much. I've seen the talking-head approach; the key here is to capture the passion and power of the presenter's presence by displaying his or her expressions and

gesticulations or other movements. Another option is the full-on telestration approach, in which audio is overlaid on top of conceptual graphic animation. Yet another approach is to record a demonstration of whatever task you're trying to support (this could be anything from a software simulation to solving a quadratic equation to changing the oil in your car). Many other presentation options exist, and you can always combine these approaches; it all depends on your outcome and what you're trying to achieve. For example, you can watch an inspirational video from Sir Ken Robinson, or you can watch an animated overlay of the same presentation. Both are valuable, but for different modes.

Of course, we haven't even talked about interactive video—basically, video with interactivity built in. If you've taken a MOOC from a popular system, you've probably seen something like this by watching a video, then taking a quiz immediately within that same experience. Although you'll either need system-specific tools to build this interactivity or you'll have it built around the HTML of the video player, interactive video is definitely growing in popularity.

To nail down the learning aspect, it's good to focus on "What is (blank)?" and "How do you (blank)?" Yes, inspiration and interest has its value, but if you're attempting to embed micro video into the workflow, it's best to remember that simplicity and single-concept learning is key.

So, how short does a video have to be to be considered micro? As short as possible, and as long as necessary. There is no time limit, as long as you can successfully answer "What is (blank)?" or "How do you (blank)?" In fact, Vine and Instagram are proving that micro video for learning can be even shorter than you think.

Fortunately for us, video capturing, editing, and deployment technology has become crazy awesome. Heck, most of us have unbelievable video recorders in the form of our smartphones, and if you want to edit right from your phone, just search for "video editor" in your native app store. I guarantee there are tons more options than your simple (but powerful) iMovie fallback. (For example, TouchCast is popular at my organization right now.) If you're looking for something on your desktop, you have tons of options now that make it easy to not only capture but also streamline, from Articulate Replay (to capture you and your screen at the same time) to Adobe Captivate (to capture your screen, one action at a time). Of course, I'm mentioning just two. At the Accenture Academy, we went the conceptual-animation approach and developed our Spotlight Video library (100-plus micro videos and counting) using Adobe Flash published into mp4.

Even deployment is unbelievably easy, as accessibility becomes an afterthought. You can get your own YouTube channel if you don't mind being public, or go for a private Vimeo account. Enterprise options are starting to grow with companies like Limelight, Kaltura, and Brightcove. Video can be truly accessible from any device (and embedded not only in the workflow but in other learning objects as well).

Micro video is gaining momentum at all levels. There are a lot of options, and one of the best approaches is to determine what's good for your audience. Don't try to do it all—just find one or two authoring tools, think about one or two design methodologies, and go from there. Providing meaning and delivery, at scale, is key.

Oh, by the way, if you find yourself building a better "close your pool for the season" video, let me know. I'll need that soon.