ENVISIONING

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BY MARK VAN 'T HOOFT

THE FUTURE OF EDUCATION

LEARNING WHILE MOBILE

We live in a world that is increasingly volatile, uncertain, complex, and ambiguous. Many aspects of our lives are being affected, including our health, physical living environment, communication, economy, and culture. The digital tools we use to access various parts of this world are increasingly pervasive, networked, and constantly changing, redefining the world and how we live in it in profound ways. It is difficult for many of us to imagine life without the Internet, and sites such as YouTube, Flickr, and MySpace have become household names in a relatively short time. Media access at home comes to us in many shapes and sizes. When we're on the go we take our tools and access with us in the form of cell phones, media players, and wireless mobile computers, or we access technologies embedded in our physical environment. These technologies:

- are extremely mobile and connected,
- place an increasing amount of control in users' hands, and
- enable us to access, aggregate, create, and share information in a variety of media formats, anywhere and at any time.

For education, this means that learning is becoming more personal yet collaborative and networked, portable and situated, ubiquitous and durable. It also means that learning and formal education are increasingly at odds, as more and different types of learning are happening outside of the classroom than in it. In sum, as our environment is becoming more unpredictable, so is our learning. (For an excellent overview of societal trends that will affect education in the future, see the KnowledgeWorks Foundation's *Map of Future Forces Affecting Education: 2006–2016.*)

How do we prepare learners for a mobile society that is changing in faster and more complex ways than ever before? What will learning in such an environment look like? This article provides a brief glimpse of what the not-so-distant future of education might bring, including increased personalization and customization, learning in (a global) context, networking, and of course, the role of digital technologies. I do so by focusing on the concept of learning while mobile.

What Is Learning while Mobile?

Mobile learning has been a part of education for about a decade, and is usually defined as learning with a mobile device such as a handheld computer or a mobile phone. But what does it mean to learn while mobile? Learning while mobile takes into consideration aspects of mobile learning such as mobility of the technology and the learner, but it goes a step further by looking at the constant mobility of knowledge and our society. It considers learning as personalized, learner-centered, situated in time and space, collaborative, ubiquitous, and lifelong. Learning while mobile sees learning as happening across contexts, people, and digital tools that are both mobile and static. It focuses not on learners and technologies, but on the *interactions* between them, emphasizing that learning is a social process. As such, two important aspects of learning while mobile are conversation and context.

Conversation does not just mean the exchange of knowledge, but also the ability of learners to talk about what they know and come to understand what their learning partners (teachers, peers, technology) know. It implies that learners are networked with peers, teachers, and digital tools in order to have access to the necessary learning supports and scaffolds. It also points to the importance of developing higher-order thinking skills such as critical self-reflection, analysis, and synthesis. Finally, it promotes active, collaborative, and inquiry-based learning.

Learning while mobile is also learning within and across *contexts*. These contexts can be temporarily fixed, such as a classroom workspace, a museum exhibit, or an ad hoc social network of learners. However, a learning context is never static, because learners move from one location to another, acquire new knowledge and resources, and enter new conversations to create mutual understandings.

Given its characteristics, learning while mobile is geared more toward informal than formal learning, but it provides opportunities to address the tensions and challenges that schools are facing today. For example, learning while mobile provides a bridge between schools and society, and between formal and informal learning. In addition, because learning while mobile involves the use of personalized digital tools, it is also an avenue of merging real and digital worlds, for example through physical environments that are augmented by easily accessible digital information and just-in-time access to information or people.

Examples

So what does this learning while mobile look like in practice? Here are just a handful of examples, based on projects that are limited in scope now but may become more widespread in the future. They illustrate how mobile and wireless technologies put more control in learners' hands; enable us to access, aggregate, create, and share information in a variety of media formats across space and time; and, last but not least, connect schools with the world.

MyArtSpace. MyArtSpace is a service for children to spread their learning between schools and museums. It currently runs in three United Kingdom museums: the Urbis Museum of Urban Life in Manchester, the D-Day Museum in Portsmouth, and the Study Gallery in Poole. It can be used for informal learning, but is best suited for school field trips. The aim is to make a day out at the museum part of a sequence that includes discussing an open-ended question in the classroom, exploring it through a museum visit, reflecting on the visit back in the classroom or at home, and presenting the results. The technology used (mobile phones and personal Web space) provides the essential link across the different settings. Learners use mobile phones to collect multimedia representations of exhibits and store them online; to collaborate with those who have collected the same digital artifacts as prompted by those same cell phones; and to reflect on what they see, hear, and discuss. Students can access their personal collections online after the museum visit, modify them, and create Web-based galleries to share with others at school and elsewhere.

Frequency 1550. This project is a good example of merging formal with informal learning and the real world with the digital. It takes learners out of the classroom as they take on the role of pilgrims in medieval Amsterdam in the year 1550, competing to find a special relic. Students roam the city, using GPS-equipped cell phones to download challenges, complete location-based media assignments on the city's history, and create their own knowledge. They are supported by other groups of students at a central location who can see the overall picture and work out the team's strategy in order to outwit their opponents. Their tasks include collecting the pilgrim's multimedia artifacts, checking out historical references, providing players in the field with relevant information, and figuring out ways to slow down the other teams' progress. At the end of each day of playing, all teams gather to see not only who did the best, but also to collectively reflect on the media produced, the answers given, and the strategic decisions taken during the game.

National Museum of Natural Science. An example of more informal and personalized learning while mobile is the

context-aware guiding service in the National Museum of Natural Science in Taiwan. Before going to the museum, visitors can log onto its Web site, create an itinerary that fits individual needs and interests, and save these preferences in the museum's database. At the NMNS, visitors are then equipped with Internet-ready wireless handheld devices, giving them three options: following the individually prepared plan, joining a recommended learning tour, or freely exploring exhibits. The context-aware system automatically determines the visitors' location and delivers corresponding content and relevant information to their mobile devices. After the visit, the Web-based system provides additional learning content and recommends further resources according to the individual's onsite learning behavior and preferences.

Challenges

Although these three examples show some of the potential of learning while mobile, they also bring a host of challenges to bear for teachers, administrators, and learners alike. An increasingly participatory and mobile culture has created a need for policy and pedagogical interventions to deal with various challenges:

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Participation Gap. The unequal access, not to technology, but to opportunities, experiences, skills, and knowledge that will prepare youth for full participation in the world of tomorrow is broad. Although students may be adept at using digital technologies for entertainment, the literacy demands that are placed on them when using these same technologies for learning are very different.

Transparency Problem. The challenges young people face in learning to see the ways in which media shape their perceptions of the world are many. This is a tricky proposition in a society in which media use increasingly aggressive and biased methods of advertising, news coverage, and distribution of information.

Ethics Challenge. The breakdown of traditional forms of professional training and socialization that might prepare young people for their public roles as media makers and community participants in an increasingly global, digital, and connected world poses ethical concerns.

Fear Factor. The unknown as related to technology developments, what youngsters do with this technology, and potential negative sides effects are fears held by adults. These fears are often fueled by media coverage that borders on the sensational; an example of this is Dateline NBC's controversial show *To Catch a Predator*.

Recommendations

How can the concept of learning while mobile help us meet these challenges as we try to prepare our students for a mobile and connected society with an unpredictable future? Although personalized digital tools can provide a bridge between informal and formal education, students need to learn how to navigate their world (as well as their technologies) in safe, ethical, and productive ways. Consequently, schools need to spend more time not only teaching students how to become more literate, do good research, and think critically, but also new literacies that come with increased collaboration and networking when using mobile and connected tools. Examples of these new skills include creative thinking and problem solving, interacting with technologies that expand one's mental capacity, collective intelligence, navigating information across various media formats, and metacognitive thinking about one's own learning.

These are demanding times for schools, and the added strain that new media literacies place on educators is not making life any easier. However, initiatives such as the Science Leadership Academy in Philadelphia (as described by Chris Lehmann in the April 2007 issue of *Learning & Leading with Technology,* pp. 16–19) show that the challenges can be successfully confronted.

To learn more about the concept of learning while mobile, consider attending the SIGHC forum at the upcoming National Educational Computing Conference in San Antonio on Monday, June 30, 2008 (10 a.m.–noon).

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Resources

Boyd, D. (2006, February). *Identity production in a networked culture: Why youth heart MySpace*. Paper presentated at the annual conference of the American Association for the Advancement of Science, St Louis, MO.

D-Day Museum: http://www.ddaymuseum.co.uk

Frequency 1550: http://www.waag.org/project/frequentie/

Jenkins, H., Purushotma, R., Clinton, K., Weigel, M., & Robinson, A. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century.* Chicago, IL: The MacArthur Foundation: http://www.projectnml.org/files/working/NMLWhitePaper.pdf

KnowledgeWorks Foundation. (2006). *Map of future forces affection education: 2006–2016:* http://www.kwfdn.org/map/map.aspx

Lehmann, C. (2007). School 2.0: The Science Leadership Academy. *Learning & Leading with Technology, 34*(7), 16–19.

MyArt Space: http://www.myartspace.org.uk

National Museum of Natural Science in Taiwan: http://www.nmns.edu.tw/index_eng.html

The Study Gallery: http://www.thestudygallery.org

Tally, B. (2007). Digital technology and the end of social studies education. *Theory and Research in Social Education, 35*(2), 305–321.

Urbis Museum of Urban Life: http://www.urbis.org.uk

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