Is Mobile Technology an Asset in the Education of Staff Officer’s?

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ABSTRACT
The Norwegian Defence University College (NoDUC) graduates approximately about 120 staff college students every year through the Norwegian Defence Staff College (NoDSC). The extensive syllabus demands student access to a lot of material in forms of books and compendiums in addition to lectures, small group training and traditional education. The NoDSC spends a lot of money every year on buying paper based books and making compendiums for each student. Together with NoDSC and the University’s library, the NoDUC Advanced Distributed Learning (ADL) office has conducted a trail to investigate if a mobile platform can be a useful learning tool for students. The trial conducted early in 2011 looked at how and if iPad’s can replace paper-based books and compendiums and at the same time be a useful tool for the students. This paper discusses lesson learned around the planning, execution, and evaluation of this trial. It focuses on technical challenges, technical solution, student feedback and the outcome of the experiment.

ABOUT THE AUTHOR  
Commander Geir Isaksen is the XO of the NoDUC/ADL office, where he is responsible for Research & Development activities and ADL project management. His military background is from the Navy, serving on Ula class submarines, were he served for 6 years as an electro engineer. Cdr Isaksen spent 2 years as the head instructor in the technical simulator at the Royal Norwegian Submarine School before he started to work at the Norwegian University College/ADL office in 2002. As an ADL Adviser he has been responsible for the development of several e-learning courses and the NoD ADL regulations. In his current position, he is responsible for R&D activities and oversees many of the ADL projects at the University College. Commander Isaksen has a bachelor in electro engineering and different courses in pedagogies, learning styles and Crew resource management. For the last 5 years he has represented NoD in the NATO Training Group, Task Group for individual training & education development (IT/ED) and he was the chairman of the NTG/Task Group IT/ED ADL subgroup until May 2011. He is also responsible for international cooperation thru the ADL Partnership lab network, as the Norwegian ADL Partnership lab point of contact (PoC).
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BACKGROUND

Norwegian Defence University College (NoDUC) is responsible for the higher education in the Norwegian Armed Forces (NoAF) and delivers both an accredited bachelor and a master’s degree in military science. Even though the NoDUC is situated at the very old Akershus Fortress, it’s important to be a modern educational institution that develops and uses effective and flexible learning solutions and methods. Research and development is an important activity at NoDUC and concentrates on areas important for the Defence sector and national and international partners. It is a goal to develop a more flexible and modern educational system and to use more Advanced Distributed learning (ADL) in training and education. As part of the plan to reach this goal, NoDUC will conduct the following activities and projects in 2011:

- Development and implementation of a basic online Staff Officers Course.
- Implementation of a NoDUC Learning Management System (LMS) on Internet.
- Do ADL related experiments for mobile platforms and virtual worlds.

NoD educational system

Traditionally Norwegian soldiers, non-commissioned officers (NCO) and officers’ complete nearly all their education and training at military schools and training centers. This is also the case for pre-deployment training prior to going into operation in Afghanistan, Libya and parts of Africa. In addition to training related to their primary functions it also includes theoretical education and training in areas like foreign language, laws of armed conflict and cultural awareness. Still, the most common training method within the NoAF is the traditional classroom lectures in addition to reading written course material in the form of books and compendiums. The same goes for students attending the Staff Officers course at the NoD Command and Staff College (NoDCSC) every year.

The annual year long Staff Officers Course has about 120 officers attending. The students come from all branches and from all over Norway. Every year the students are issued a number of books and a great number of in-house developed compendiums.

NoDUC spends about 90,000 US dollars every year developing and printing these compendiums in addition to buying books. The compendiums are not reused because the students are allowed to actively use them during the education, making comments and taking notes. Learning methods used during the course include classroom lectures, small group discussions, workshops and exercises.

A big question these days is how can we make it possible for our troops and students to access education, training and learning resources for retention when they are in theatre or remote bases and without a laptop and (maybe) access to the Internet? Studies like the Mobile technologies and learning technology update and m-learning project summary suggests already in 2005 that mobile platforms, such as mobile phones (dumb phones), smart phones and tablet computer (iPad, Samsung Galaxy Tab) can provide more any time any where access to learning and learning resources.

MOBILE TECHNOLOGY

By the end of 2010 the International Telecommunication Union estimated that there were 5.3 billion mobile subscriptions in the world. That is equivalent to 77 percent of the world population. The report showed that the mobile devices were mainly used to do mobile search, reading news and sports information, downloading music and videos, and email and instant messages. This shows that a large portion of people are already used to using a mobile device on a

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3 mobiThinking compendium of mobile statistics and research, 2010
daily basis although they didn’t use it for learning or studying. In the last 18 months the emerging of tablet computers has made an impact on how people are using a mobile device and what they use it for.

Although libraries within the United States started to distribute free e-books to the public in 1998, it was not until 2009 it was introduced in large scale. In 2009, handheld electronic devices specially designed for reading, so called e-readers\(^4\) were introduced in a larger scale with Amazon’s Kindle and Sony’s PRS-500 as the most popular devices. Today there are more than 60 different e-reader devices on the market.

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Figure 1. E-reader Kindle from Amazon\(^8\)

In April 2010, Apple\(^5\) introduced the iPad, a new type of tablet computer made for accessing audio-visual media including books, movies, music, games, and web content on a personal device\(^5\). Since the first introduction of the iPad several types of tablet computers have hit the market like the Samsung Galaxy Tab, Acer Iconia Tab and Asus Eee Pad Transformer. Different tablet computers have different operating systems (OS) and today the biggest selling tablets are running either Apple’s iOS or Google’s Android. In 2010 17 million tablet computers were sold worldwide and International Data Cooperation (IDC\(^6\)) are expecting 44 millions to be sold in 2011 and 70 million in 2012\(^7\).

Tablet computers add a lot more functionality than the traditional e-reader. The ability to access Internet thru either Wlan or 3G connection, large storage space, possibilities to read and manage different types of documents, do multitasking, check e-mail and run many different types of programs and services makes the tablet computer a more powerful platform.

MOBILE PLATFORM AS A STUDENT TOOL

Thesis behind the experiment

How can NoDUC facilitate a more effective and better education for our students? That is the question the NoDUC ADL Office and the University College library started to address in 2010. The focus was how we could make the courses run by NoDUC, more flexible and more cost effective. One of the areas of interest was mobile platforms. One reason for this was that tablet computers seem to have an obvious potential of storing electronic documents. Course material in an electronic format is also easier and cheaper to distribute in large numbers than a book or a paper compendium. The project group defined the thesis behind the experiment to be\(^8:\)

“A tablet computer will be a more cost effective and effective resource for a student than the traditional study aids like paper and books?”

Important questions NoDUC wanted to address in the experiment were:

1. Will course material in an electronic format be readable on a tablet computer?
2. Will the students take notes and do markup in the electronic text as they do in paper?
3. Can the use of electronic course material save money for NoDUC?
4. Will the use of a tablet computers influence how students learn and how they study.
5. How will the students utilize the other tools available thru a tablet computer?

Selection of platform for the experiment

Figure 2. Tablet computers; iPad vs Samsung

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\(^4\) Electronic devices that uses so called electronic ink optimize the reading experience. The best e-readers in the market reflect light like ordinary paper making it readable even in direct sun light. Retrieved from Wikipedia, 2011

\(^5\) Retrieved from Wikipedia, 2011

\(^6\) IDC is a global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets

\(^7\) www.idc.com

\(^8\) NoDUC EP1168 project plan , 2011
Some studies found no significant difference in the readability between an iPad and an E-reader like Kindle. Even though they both were less preferred than the book, they still were rated high\(^9\) in readability. Because of all the extra functionality like internet access, multitasking and screen resolution the tablet computer was chosen as the preferred platform for this experiment. At the time when this experiment was planned, the only two tablet computers considered were Apple iPad and the Samsung Galaxy Tab (SGT). There were other types of tablet computers out there, but, we chose to look at the latest generation of tablet computers. When we looked at different platforms, the most important factors were size, screen solution, price and readability of e-books. Tablet computers can be used to access e-learning courses from a website or Learning Management System (LMS). Today, this is a challenge for the NoAF when it comes to the iPad, because most of our e-learning courses use flash movies and animations currently not supported by Apple products. Even though this is a clear con for the iPad, this was not among the critical factors for this experiment. Both the iPad and the SGT have a good resolution and affordable prices. The size however is different with the iPad’s 9.7 inches compared to SGT’s 7 inches.

<table>
<thead>
<tr>
<th>Table 1. iPad vs Samsung GT</th>
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<tr>
<td><strong>Technical data</strong></td>
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<tr>
<td>Screen size</td>
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<tr>
<td>Screen solution</td>
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<tr>
<td>Operational System</td>
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<tr>
<td>Internal storage</td>
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<tr>
<td>External storage</td>
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<tr>
<td>Processor</td>
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<td>RAM</td>
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<td>Multitouch screen</td>
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<td>Camera</td>
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<td>GPS</td>
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<tr>
<td>Bluetooth</td>
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<tr>
<td>Battery life</td>
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<tr>
<td>Multitasking</td>
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<tr>
<td>Weight</td>
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<tr>
<td>e-book client</td>
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<tr>
<td>Support Flash(^1)</td>
</tr>
<tr>
<td>Dimensions</td>
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<tr>
<td>Prize (NOK, US $)</td>
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Since readability and studying was the main objectives for this experiment, the first generation iPad was chosen as the platform. The total cost of buying the iPad’s, keyboards and chargers for this experiment was NOK 55,000 or 10,000 US dollars.

**Students participating in the experiment**

Ten NoDCSC students were selected among 30 volunteers. The students agreed to replace any written course material normally provided in paper format with electronic versions in PDF format. One additional student who owned his own iPad also volunteered to take part in the experiment, giving a total of 11 students. An iPad was also issued to the teacher responsible for this course. It was important to choose a generic group of students that represented the general adult military staff college student.

The students participating in the experiment were nine men and two women between 35 and 50 years old and they were from all the three services in NoAF. Six out of eleven students owned a Smartphone prior to the trials and five out of eleven were users of social media like twitter and Facebook. All of the students were used to using a laptop on a daily basis, both professionally and in private life.

<table>
<thead>
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<th>Table 2. Student demographics</th>
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<tbody>
<tr>
<td>Age</td>
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<tr>
<td>Branch</td>
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<tr>
<td>Gender</td>
</tr>
</tbody>
</table>

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\(^10\) Hours of video playback
\(^11\) Equal to 1.5 pounds (US)
\(^12\) Equal to 0.84 pounds (US)
\(^13\) Adobe flash player

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\(^14\) Price converted from Norwegian retail prizes.
The participating students were issued their iPad 3 weeks prior to the start of the experiment and were given a one (1) day course on how to set up, synchronize, manage, and use an iPad by the NoDUC ADL office.

STUDYING WITH A MOBILE PLATFORM

The experiment was led by the NoDUC library, supported by the NoDUC ADL Office and the NoD Command and Staff College (NoDCSC). Funding was provided through NoD’s Concept Development & Experimentation (CD&E) program for 2011. Each student was issued the following hardware:

- 1 32 GB standard Apple® iPad
- 1 extra dockable keyboard
- 1 extra charger and an iPad cover

Technical solution

All electronic course material was made available for the students through the application “Dropbox®”. The Dropbox® application is installed on a personal computer (PC), mobile phone or tablet computer15. Once a Dropbox® user is logged in from an available device (PC, tablet computer, mobile phone) the software allows you to store and/or access a file in a specific folder in Dropbox®. The shared folder can then be made available for any other users that have been given access. Dropbox® has developed Apps16 for iPhone, iPad, Android, and BlackBerry platforms allowing you access to your Dropbox® on the go. This means that any file you save to Dropbox® also instantly is saved to your computer, phone, and tablet and shared with fellow students or co-workers. Dropbox® is free to install and comes with 2GB of free storage space.

A recommendation was made to the students to use the application “ReaddleDocs” for reading and managing documents and notes. “ReaddleDocs” supports the reading of documents in several formats like Pdf and MS Office word, Excel and PowerPoint. It is possible to synchronize ReaddleDocs with your Dropbox® account, giving an instant access to the documents available from your Dropbox® folders.

Although the use of Dropbox® was mandatory for this experiment the students were allowed to use any other app’s they saw fit and encouraged to explore and install all types of app’s and programs they felt were useful.

During the experiment

The experiment started in early April 2011 and lasted through the 10 week long course in Resource Management18. Together with the library, the assigned teacher was responsible for uploading course material to the folder and managing the shared Dropbox® folder. Any technical problems and questions were handled by the NoDUC/ADL office throughout the experiment. Every student registered their own personal iTunes account that they used when managing the iPad and setting it up with their personal profile.
It was not possible to convert all course material into electronic format for this experiment, but enough examples were provided. No books where available due to the lack of distribution rights from the publishers. The test period went without any big technical issues and it seemed that the students managed to apply all needed settings and install apps themselves.

**EVALUATION**

Prior to the last week of the experiment, the students received a link through an e-mail giving them access to a questionnaire. The questionnaire used open ended questions to allow the students to express their experience in more detail. The questionnaire addressed the following areas:

- The readability in the iPad?
- The readability compared with paper?
- How often did they use the iPad?
- What they used the iPad for?
- What were their most used App’s?
- How accessible were the course materials?
- How did they use the iPad while studying?
- How was the technical challenge?
- Their overall impression of using an iPad

In addition an evaluation workshop was conducted on June 15th, 2011, to summarize the experiment and to give the project group the opportunity to go into their experience and recommendations in detail. All the students completed the questionnaire prior to the workshop.

**Findings**

All the students reported to have used the iPad on a daily basis. Even though only half of them owned a Smartphone prior to the experiment and none of them had any experience with a tablet computer, ten out of eleven thought it was easy to learn how to use the iPad. All distribution of the course material was done through an open Dropbox® folder by the teacher; the students reported that this solution worked fine. However, some of the students experienced some trouble when they wanted to transfers existing notes and course material from their own PC to the iPad. The students also used the open Dropbox® to share their own notes from every lecture. Most of the lectures in this course were based on large and detailed PowerPoint presentations and the students found it very useful to get a copy of the presentation thru Dropbox® prior to the lecture. It allowed them to prepare for the lecture and gave them the opportunity to zoom in on details in the slides hard to see on paper or on the screen. The 7 most reported activities on the iPad were:

1. Reading
2. Taking notes
3. Collecting and managing course material
4. Access to Internet, web searches
5. E-mail
6. Calendar
7. Games

Several students reported that they actually had read more after getting the iPad. The reason for this was that the course material was much more available and it was much easier to read when they had some extra time on their hands. The students also reported to install numerous types of apps giving them access to services like weather reports, radio, banking services, news, social media, and map services and even in one case the Bible app. Overall, the students had a very positive experience using an iPad as a student tool. Even though not all of the course material could be distributed electronically for this experiment, they felt relieved to have a reduced stack of paper they had to carry around. The students felt more effective and were able to share course notes among each other. It was much easier to access Internet on the fly and they were more available and would check and send e-mail more often. Based on their experience from this experiment, every one of the eleven students recommends using a tablet computer as

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19 Fitje, Riege, Isaksen (2011), NoDUC Mobile platform experiment evaluation report
a resource/student tool at the NoD Command & Staff College.

IMPLEMENTATION AT THE NoDUC

Cost-effectiveness

Today NoDUC spends about 90,000 US dollars on developing paper based course material for the NoD University College. This also includes costs of printing paper and maintaining a large number of printers. A cost saving could also be made if more books were bought in electronic versions instead of paper every year. To buy 120 iPad's will generate a cost of 110,000 US dollars based on the prices today. With the estimate that an iPad will last for 3 years the cost savings will be approximately 160,000 US dollars.

Table 3, iPad cost savings

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost (US $)</th>
<th>Savings (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>110,000</td>
<td>90,000</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>90,000</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>90,000</td>
</tr>
<tr>
<td>Total</td>
<td>110,000</td>
<td>270,000</td>
</tr>
<tr>
<td>Total saving in 3 years</td>
<td>160,000</td>
<td></td>
</tr>
</tbody>
</table>

Challenges

To make a potential implementation of iPad's as cost-effective as possible for the NoDUC, a number of things must be in place and/or addressed:

- All course material must be available in an electronic format and available for distribution
- Develop a “get started” training package, with relevant information for new tablet computer users
- Change NoDUC faculty attitudes towards new technology and education methodology
- Appointment of a person at the NoDUC, responsible for uploading course material and managing the Dropbox® account.
- The possibilities of buying books in electronic versions at cost effective prices
- The rights to distribute copyrighted material to NoDUC students and employees.
- Establish a “Helpdesk” that can help the tablet computer users with any technical challenges.
- Support from the NoDUC leadership on introducing tablet computers as an important part of the learning system at NoDUC
- Although you can access the NoDUC LMS from an iPad, flash based e-learning courses cannot be played on an iPad today.

The biggest challenge will be to actually get faculty and students to stop using paper and start to actively use a tablet computer for reading and taking notes. This will issue demands good planning, involvement from the target group and a clear implementation strategy.

Way ahead

The first step will be to address some of the challenges that must be solved before we can have a full cost effective implementation and use of tablet computers at the NoDUC. If the NoDUC succeeds with the first step, the second step will be to implement tablet computers for both students and faculty late in 2011 or early 2012.

ACKNOWLEDGEMENTS

The project group has consisted of members from the NoDUC library and the ADL office. We acknowledge the effort both from the Command and Staff College faculty and not least the students that committed to this project while participating in the time consuming Command and Staff Officers course.

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