

# Mobile Devices in eLearning

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## Abstract

*This paper explores how Mobile Devices such as Smartphones, Personal Digital Assistants (PDAs), and Pocket PCs can be used for educational purposes, with special emphasis on eLearning in particular. It is sometimes called mLearning. Mobile devices are examined in terms of their desirable and undesirable characteristics towards eLearning.*

**Keywords:** eLearning, mLearning, Smartphone, Personal Digital Assistant, PDA, Pocket PC, PPC, Mobile Devices.

## 1. What is eLearning?

There have been numerous definitions proposed for the term *eLearning* most of them have been associated with the art and science of education, applying computers, telecommunication, and information technology to enhance the method of instruction to finally enhance effective learning. If we are to explore the evolution of eLearning might explain it more clearly to us what it really is.

It is quite evident that computer assistance in education has been here for a long time since it was invented, known as Computer Aided Instruction (CAI), Computer Assisted Learning or Computer Aided Learning (CAL), Computer Mediated Learning (CML), where the computer is used in the classroom by the teacher to assist teaching, and outside the classroom as teaching contents or communication on

computer accessible for the student to study individually.(Brinkley 1999). Computer software that provides tutorials on a CD as a self learning help to create a website or learn marketing techniques, provide guidelines for using certain equipment, all have utilized the computer as means of presentation, but cannot yet be called eLearning. They have of course inspired their use to be included as components of today's eLearning. Some educational researchers (Darby 2004) have separated eLearning into three generations: *first generation eLearning*, analogues of conventionally delivered courses porting to a new delivery medium (the Internet), it is compared to "the horseless carriage era in the evolution of the motor car"; *second generation eLearning* has the components (texts, audiographics, online discussions, questions, etc) are chosen to provide a balance of different types of learning activity and reflect the pedagogic principles that have been adopted; *third generation eLearning* is a learning system that can provide for each student a "course" that is tailored for their needs.

Bersin & Associates, a corporate training provider company posted a web-based article proposing a very short definition of eLearning: "*eLearning refers to the use of Internet technologies for delivery management, and measurement of any form of corporate training*" (Bersin 2006).

A very controversial quotation of eLearning was found at a website [www.managersforum.com/eLearning/](http://www.managersforum.com/eLearning/) stated - "One of the most confusing aspects of eLearning is that nobody knows what it is.

We do know the “e” doesn’t stand for “electronic”. The “e” in eLearning would be better defined as Evolving or Everywhere or Enhanced or Extended”. They defined eLearning as: “*A learning environment supported by continuously evolving, collaborative processes focused on increasing individual and organizational performance*”.

The web-based encyclopedia Wikipedia have defined eLearning: “*.. an approach to facilitate and enhance learning through both computer and communication technology. Such devices can include personal computers, CDROM, Television, PDAs, M3Players, and Mobile Phones. Communications technology enables the use of Internet, email, discussion forums, WIKIs, collaborative software, classroom management software and team learning systems.*”

eLearning can be summarized as the highly efficient technique of delivering training or education using Information Technology most importantly computers integrated with Internet Technology and their infrastructures. The course content is delivered via the Internet, intranet, extranet, audio or video tape, satellite TV, and CD/DVD ROM.

## 2. Components of eLearning

Wachholz (2004) identified components of eLearning as: (1) Strategic Planning and Vision Statements, (2) Curriculum and Content, (3) Use of the Internet and Acceptable Use Policies, (4) ICT and Education Reform, Managing Change, (5) Quality Assurance and Accreditation, (6) Connectivity, Infrastructure and Network, (7) Professional Development, (8) Intellectual Property and Copyright, (9) Intragovernmental Issues, (10) Costs, finance and partnerships. In Thailand, Chaiyong (2005) defined the eLearning components a little it differently into two main

components; the Psychological Component and On-Screen Presentation Component. The latter requires that the presentation of the courseware is to appear on the students computer screen with 12 components; Homepage, Learning Center, Knowledge Center, External Learning Resources, Laboratories, Audio-visual Center, Evaluation Center, Web-board, Chat Room, Electronic Communication, FAQs, and Personal Profile. Chaiyong (2005) also lists requirement of technical characteristics; (1) File Transfer and Data Exchange, (2) High Speed and Links, (3) Two-Way Communications and Interactivity. Mobile devices do have potentials with respect to their technological characteristics outlined above; being able to transfer files, exchange data, have high speed wireless links, and two-way communications. However, which component in eLearning can they be used for is to be investigated. Using them to access the courseware at the schools’ websites instead of a PC is deemed to be highly feasible.

## 3. Mobile Devices

There are several categories and versions of mobile devices, but this paper will concentrate only on those that can be potentially applicable for eLearning; Smartphones or Smart Mobile Phones, PDAs - Pocket Digital Assistants, and PPCs - Pocket PCs. Recent research has identified handheld computers as an ideal tool to promote effective teaching and learning. Researchers at University of Michigan found eight great reasons why handhelds are desirable for effective learning, two more are added by other educators:

- (1) **Accessibility:** Each student has a handheld, no need to schedule time in a lab or split up class into groups, there is enough devices to go around.

- (2) **Immediacy:** Handhelds are with students all the time, they can be used to get information and work anytime and anywhere.
- (3) **Convergence:** With a handheld, students can accomplish almost everything they used to do with a desktop or notebook PC.
- (4) **Permanency:** Student's work is saved automatically on a handheld and transfers easily to a desktop PC for permanent storage.
- (5) **Malleability:** Handhelds can do so many things.
- (6) **Simplicity:** Handhelds are simple to use, no complex skills needed.
- (7) **Pleasurability:** Students enjoy using them, and develop a bond with their handhelds.
- (8) **Collaboration:** Students construct meaning by beaming.
- (9) **Invisibility:** With a touch of a button or a tap of a stylus and the handheld is ready to go.
- (10) **Add-Ons:** Software, keyboard memory card, other devices can be added.

[www.k12handhelds.com/101list.php](http://www.k12handhelds.com/101list.php) an American education website lists 101 great educational uses for handheld computers; 56 teaching and learning applications, 20 communication and collaboration applications, and 25 administrative applications. There are truly massive number of teaching and learning uses for mobile devices.

**Smartphones** are the third generation mobile phones (3G) mostly use Symbian operating system, Linux and Windows Mobile are few exceptions. Their main objective is telephone use, and therefore, mostly characterized with the 12-key numeric keyboard with possibility for alphabets input via the same keys. The screens are mostly color, normally small (1"-

2" diagonal), only big enough to accommodate mp3, phone usage and few other organizer functions and a digital camera. Their memory are quite small, from kilobyte range to some megabytes. They are very simple to use requiring no technical or computer skills. The battery capacity is also very small, only enough to facilitate phone operation and other simple functions for a day or two.

**PDA or Personal Digital Assistant** was originally developed as a computerized handheld diary or organizers, capable of collecting notes, contact information, addresses, telephone numbers, calendar, day/date with a clock that reminds your appointments, tells the time. They were originally called Organizer running their own proprietary operating systems. New Palm PDAs use powerful versions Palm OS which are not Windows compatible but compatible with Microsoft Office applications, including Word, Excel, Outlook, and Power Point. Palm OS are more memory efficient and more user friendly than Windows Mobile. The PDA use pressure sensitive screen 2.8"-3.7" diagonal, hi-res color. They do not have the 12-key numeric keypad, but use stylus to write letters or tap the virtual keyboard on the touch screen to input command and data.

**Pocket PCs** Ankut (2548) claims that the term Pocket PC was used when PDAs started using Microsoft's operating system Windows CE, then Windows Mobile 2002, 2003, 2003SE and finally 5.0. They include mobile MS office software such as Outlook, Excel, Word, and Power Point. Compaq and HP were among the first to introduce them. The Pocket PC are the most expensive group of mobile devices. the cheapest HP iPAQ 6365 is 22300 baht, the middle is around 30000 baht (O<sub>2</sub> Xda Atom/IIMini /Iii/IIs) to the costliest 47900 baht for the Dopod 900. Their features surpassed that of the other groups: Windows mobile 5.0 OS running all

kinds of software and applications, battery that can standby up to 400 hours, TFT 640 x 480 64K color screen, Intel CPU running up to 520 MHz, large internal and external memory, have all the highspeed wireless capabilities.

#### 4. SWOT Analysis of Mobile Devices

The SWOT analysis will not be done on individual device but as a group directed to eLearning.

##### Strengths

**Smartphones:** Extremely large number of users, Always on the person, Very easy to use, Very Low purchase cost, Excellent GPRS coverage, most have camera.

**PDAs:** Large number of users, Always on the person, Powerful OS, Complete wireless connectivity, Large Screen, Large internal memory, Very large external memory(SD cards), Long battery capability, Office programs with multimedia capability, Excellent GPRS coverage, WiFi capable with speed up to 54 Mbps, Bluetooth capable, Infrared capable, Can sync with PC, All have camera. .

**Pocket PC:** Large number of users, Always on the person, Very Powerful OS, Complete wireless connectivity, Large Screen, Long battery capability, Large internal memory, Very large external memory(SD cards), WiFi capable with speed up to 54 Mbps, Bluetooth capable, Infrared capable, Office programs with multimedia capability, Excellent GPRS coverage, Can sync with PC, All have camera. .

##### Weaknesses

**Smartphones:** Very small screen, small internal memory, small battery capacity, no keyboard

**PDAs:** High purchase cost, not small, not light, Difficult to use, Small screen,

**Pocket PC:** High purchase cost, Difficult to use, Small number of users, bulky, heavy

##### Opportunities

**Smartphones:** Users need no technical skill, Can study anywhere there's cellular phone coverage, not restricted to office or home

**PDAs:** Can study anywhere there's cellular phone coverage and WiFi hotspots, not restricted to office or home

**Pocket PC:** Can study anywhere there's cellular phone coverage and WiFi hotspots, not restricted to office or home

##### Threats

**Smartphones:** Normal phone usage deteriorate

**PDAs:** Users needs technical skills, increase network vulnerability

**Pocket PC:** Users needs computer skills, increase network vulnerability

##### Desirable Properties

The strongest features of mobile devices must be their very large number of users. Furthermore, they are always on the person with their users no matter where they go.

##### Undesirable Properties

The Smartphones is the only one that has some critical weaknesses with respect to eLearning. Its small screen (130x130) tops the list which limits its usefulness to present reasonably amount of information at a time and readable in size. The memory is very small from a few KB to 32MB is not enough to store and show course contents downloaded. Input of text is difficult with the 12 numeric pads of the phone or some with very tiny keyboards. Short battery life when using multimedia features (1-2 hours).

#### 5. Conclusion

(1) PDAs and the Pocket PC have very high

potential for use by students in eLearning.  
 (2) Smartphones are not suitable for use in eLearning.

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