

# Stationary Mobility for m-Learning Instructional Design

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## RESUMO

Há muita controvérsia sobre a definição do que é aprendizagem móvel, uma vez que definições propostas encontradas na literatura são baseadas na tecnologia utilizada, outras na mobilidade do aprendiz, e outras na experiência do aluno. Isto resulta em algumas conclusões que causam confusão, como a ideia de não considerar computadores portáteis como sendo dispositivos móveis ou atrelando a definição de aprendizagem móvel à existência de transmissão de dados sem fio. Este artigo propõe uma nova definição para aprendizagem móvel baseado na análise do processo de aprendizagem como um todo e na divisão da definição de mobilidade aplicada ao aprendiz em duas partes: mobilidade total e mobilidade estacionária. A definição proposta independe da tecnologia envolvida e expande o entendimento do que são aprendizagem móvel e dispositivos móveis, o que faz a tecnologia de aprendizagem móvel robusta suficiente para suportar o uso de uma ampla gama de diferentes contextos de processos de aprendizagem baseada em dispositivos móveis. Com esta proposta o trabalho de design instrucional é facilitado por poder definir claramente as condições de entrega de conteúdo, interatividade entre participantes e realização de atividades pedagógicas, ainda na fase de projeto, norteando as tomadas de decisão em design instrucional.

**m-learning; dispositivos móveis; mobilidade; mobilidade estacionária**

## 1 - Stationary Mobility for Mobile Learning

When the literature on mobile learning is explored different concepts are found about the same important factors related to the matter. The definition of mobile learning, for instance, differs from one author to other depending the concept of mobility considered for the context. Traxler (2007) pointed out that some advocates of mobile learning attempt to define and conceptualize it in terms of devices and technologies; other advocates define and conceptualize it in terms of the mobility of learners and the mobility of learning, and in terms of the learners' experience of learning with mobile devices (p. 1), as we can see below:

- “. . . e-learning that uses mobile devices and wireless transmission” (Pinkwart, Hoppe, & Milrad, 2003).
- “...any educational provision where the sole or dominant technologies are handheld or palmtop devices.” (Traxler, 2009)
- "...is learning by means of wireless technological devices that can be pocketed and utilised wherever the learner's device is able to receive unbroken transmission signals. (Attewell & Savill-smith, 2004)
- "To be mobile technology, hardware had to advance to a point at which people would carry and access the device on a regular basis." (Caudill, 2007)
- "...learning environmental based on mobility of technology, mobility of learners and mobility of learning that augments the higher educational landscape" (El-hussein & Cronje, 2010)
- "Any activity that allows individuals to be more productive when consuming, interacting with, or creating information, mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse." ("What is m-learning?," 2011)

More definitions of mobile learning can be found as long as more research papers are published about the matter. The main reason for this situation is the result of the use of the technology as parameter that has a great influence over the concept of mobility. As the technology involved suffer a constant process of evolution, some definitions must be adapted to new reality. It does not matter if the definition is based on the mobility of technology, of the learner/learning or of the learner's experience, once in all cases the technology has a influence. Furthermore, some definitions come followed by controversial statements, as described below.

Mellow (2005) states that, "This would include such devices as mobile phones, portable digital assistants (PDAs) and iPods. It would not include laptops, as while they are portable, they are not mobile . . . Mobile devices should fit in your pocket" (p. 1). "Generally, mobile devices can be defined as electronic devices that are small enough to fit in a shirt or jacket pocket" (Caudill, 2007). As the technology evolves, this statement can be contested because there are laptops that can be used while on the move with full connectivity with metropolitan networks. Moreover the reality imposed by devices like iPads and Android tablets shows that considering mobile devices as being only those that fit in your pocket may be an outdated conclusion.

"Mobile devices are small, portable and compact. They can often fit in a pocket or purse. Unlike laptop computers, which are expensive, heavy and power-hungry, mobile devices are relatively low-cost, lightweight,..." (Learning, 2011). Definitions like "small, portable and compact" depend on the reference of each reader, which still can be changed by new technologies. As you can find light, fine, relatively cheap and power-saver notebooks (with solid state hard drive), it can also be considered a case of mistakenly exclusion of laptops from the list of mobile devices.

"Mobile learning as an educational activity makes sense only when the technology in use is fully mobile and when the users of the technology are also mobile while they learn" (El-hussein & Cronje, 2010). This statement can induce the reader think that full mobile learning experience only can be obtained if the learner be connected anytime, anywhere. Actually this meaning of mobility refers to the capacity to learn while on the move, not necessarily to communication while on the move. However, as some learning processes depend on real time communication to be run properly, they are more demanding about the meaning of full mobility.

Based on these reflections it is noticed that the concept of mobility based solely on the technology, learner mobility or on the learner's experience must be reviewed considering the whole context, what here is called "learning process." [APA] The concept of full mobility must be adapted so that it can support situations

where the prior concept does not differ [in?] a situation which there is with full content access and full communication while on the move, from another where there is not communication anytime and/or anywhere [confusing sentence].

## **2 -Full and Stationary Mobility Learning Process**

The concept of mobility on the context of mobile learning is here purposed so that it has two types: full mobility and stationary mobility. Each one is explained in details as follows.

### **2.1 - Full Mobility Learning Process**

Educational activity that occurs anytime and anywhere, supported by technology that permits both: real time communication and just in time access to the learning demand, as well as access to learning resources that does not depend on network connectivity to be used, i.e., it just depends on the use of resources stored in the device.

It does not matter what technology is used, since this definition intends to be widely applicable to different contexts and even to currently non-existent ones. What is important is that the learner can access the education resources, interact with other learners and tutors (or any other involved parties), transmit and receive information, all synchronously and/or asynchronously. What is most important is that it can happen anytime and anywhere, at least in a delimited area where the learning process participants will be bounded (neighborhood, city, region, province or state, country, etc.).

### **2.2 - Stationary Mobility Learning Process**

The process that occurs anytime and anywhere supported by technology that lets the learner access learning resources that do not depend on network connectivity to be used, as in the previous definition. However, this technology does not necessarily permit real time communication and just-in-time access to learning . It means that for some reason the learning process cannot count on network connectivity anytime. [not sure what this sentence means]

Some factors can create a scenario that illustrate the stationary mobility situation: inappropriate usability to use the device in the context where the learning

process must happens, lack of network connectivity to give total mobility autonomy to the learner in the learning context boundaries, some policy/environmental restriction for the use of the technology and/or the network connectivity, etc. In fact the factor can be anyone which prevents the use of the mobile device itself or its network connectivity at least partially during the total length of time of the learning process.

### 3 - Analysis of Full and Stationary Mobility

For a better understanding of the definitions of full and stationary mobility it is important to present some mobile learning scenarios that illustrate the application of the proposed definitions. Below are presented three scenarios of mobile learning, each one highlighting different factors that influence the definitions of full or stationary mobility based learning. Some slight change is made in each case to demonstrate how sensitive the concept of mobility is, using the proposed concept.

#### 3.1 - Case 1 - m-Learning Supported by SMS/MMS device

The table 1 shows the description of the m-learning scenario. Based on this description we can determine whether the example is of full or stationary mobility.

| Factor                      | Description  |
|-----------------------------|--|
| Target public               | Oil industry employees.  |
| Boundaries of learning area | Remote areas of Northern Alberta, Canada.  |
| Device/technology           | Ordinary mobile phones.  |
| Media/type of resource      | SMS and MMS.   |
| Network coverage            | Existing coverage in the city, no coverage in some work fields.                    |
| Learning policy             | The employees must perform learning activities where and when available.           |
| Method                      | Text and picture delivery, sms/mms social interactivity and text based assessment. |

Table 1: Description of the m-learning scenario 1.

At first someone could say categorically that this is a case of full mobility, once the user can “walk and learn” with a handheld device that fits in any pocket (ordinary mobile phone). However, when other factors are included in the analysis it becomes clear that the learning process, considered as a whole, does not permit full mobility since the user cannot interact with other parties anytime and anywhere in the learning area boundaries (Northern Alberta, Canada). Thus, this is a case of

stationary mobility, since the user can access the network only when in the city, not when in the oilfield. The concept of stationary is related to the fact that the user is able to access the learning resources, to interact with other course participants and occasionally send some data to a tutor or other people only when he/she is in the city. Otherwise, only data previously stored in the mobile phone will be accessible anytime and anywhere.

In fact, the status of stationary mobility can be changed without changing any technological factor, like network coverage or device. If the learning policy specifies that the employee cannot perform learning activities when he/she is located a workplace, in order not to prejudice the work productivity, the learning process can now be considered a full mobility learning process, since the employees only will have conditions to perform learning processes in the city, where there is coverage for mobile phone communication.

### 3.2 - Case 2 - m-Learning and Policy Restriction

The Table 2 shows a case of a company that delivers courses to its executives using a learning management system to be accessed on the Internet. The executives travel across the country and need to access the learning resources when they are available to do so.

| Factor                      | Description   |
|-----------------------------|---|
| Target public               | Corporate employees   |
| Boundaries of learning area | United States of America urban areas  |
| Device/technology           | Tablets   |
| Media/type of resource      | Internet-based learning management system.                                    |
| Network coverage            | Wifi hotspot only.  |
| Learning policy             | The learners can perform the learning activities as soon as they can.?        |
| Method                      | Web content access, asynchronous forum, audio conferences at scheduled times. |

Table 2: Description of the m-learning scenario 2.

In order to illustrate better this situation, consider the scheme drawn in Figure 1. It shows an executive leaving the building in Los Angeles to go to another company building in New York. During the whole route, which involves taking a taxi to the airport, taking the plane, taking another taxi in the destination city to go to the other company's building, there are some places where he/she can use an Internet WIFI connection to perform learning activities: buildings, airports, and on the airplane.

The executive can perform learning tasks throughout the trip since they involve accessing resources stored in the tablet. Any kind of real-time interaction or just in time resource access depends on WIFI connectivity, which is restricted to some parts of the trip. Therefore, this is a stationary mobility-based learning process.



Figure 1. Stages of the logistics involved in m-learning with stationary mobility.

If the network connectivity conditions are changed, adding metropolitan network connection capability to the mobile device, the context presented in Figure 2 becomes a full mobility-based learning process, once the learner can access both stored and online learning resources anytime, anywhere.



Figure 2. Stages of the logistics involved in a learning process with full mobility.

Notice that even though there is a device with metropolitan network connection capability, it involves full mobility because the learning area boundaries are restricted to urban areas of the country. Thus the network connectivity can be considered completely covered in this context.

#### 4 - Importance of Distinguishing Full from Stationary Mobility

The concept of stationary mobility is very important for instructional design decision making, because it clearly defines some important guidelines, like those

presented in Table 4. Based on these guidelines and others we can extract from the analysis of the learning process context, the instructional designer can have a systematic way to analyze the scenario of mobile learning and make his/her decision making easier during his/her learning task. Thus, once the definition about what kind of mobility the learning process will count on is determined, the instructional designer already has important decisions defined for his/her work.

| Full Mobility  | Stationary Mobility  |
|--|--|
| Mobile learning process.   | Mobile learning process.   |
| Content access anytime, just in time.  | Downloadable content for further anytime access  |
| Synchronous and/or asynchronous interactivity.   | More likely to be used asynchronous interactivity.                                       |
| Deadlines without restrictions, based on shorter terms.                                  | Deadlines with some restrictions, based on longer terms.                                 |
| Portability and mobility always come together.   | Portability and mobility do not always come together.                                    |
| Video conference is feasible.  | Recorded video is more feasible.   |
| Shorter transactional distance, more dialog, less structure and less autonomy is needed. | Greater transactional distance, less dialog, more structure and more autonomy is needed. |
| Anywhere, anytime.   | Anywhere, anytime with restrictions that must be specified.                              |

Table 4: Guidelines for instructional design decision making based on full and stationary mobility.

Furthermore, it is important to distinguish total, complete, full mobility from partial, restricted, stationary mobility, for instructional purposes, while remembering that stationary mobility also satisfies the paradigm of mobile learning. Therefore the importance of identifying the difference in the type of mobility is that by doing so we can include devices (e.g. laptops), context (e.g. policy restrictions to use mobile devices), and learning experiences (e.g. the intermittent use of mobile device during a trip) to the mobile learning scenario. Depending on the definition of these elements used, scenarios might or might not be considered as being part of the universe of mobile learning. Thus, this differentiation between full and stationary mobility can expand the meaning of mobile learning in relation to other definitions, without infringing on the common understanding of its meaning: a learning process that happens based on the use of mobile devices.

#### **4.1 - Mobile Learning Based on Full or Stationary Mobility**

Since we have defined what stationary mobility is, and have understood the its meaning in terms of expansion of the possible contexts in which mobile learning is considered, we can have a new approach to m-learning using these



concepts. This approach leads us to the following definition: mobile learning is any type of learning that obtains flexibility in time and/or place, based on the use of technology that depends upon full or stationary mobility.

As you can see, although the definition above mentions technology as an important element for mobile learning, it does not have any further influence on the meaning proposed. It can be applied to a learning context where a Walkman plays tapes with education content, to one where full interactivity and just in time learning resources access can be performed by a smartphone connected to a high speed Internet connection. We can even do an exercise of futurology, applying the definition in a context where a still non-existent technology might allow us to connect to the network through chips installed in our brains, giving us direct access to learning resources without using the five senses we have.

It is very important to consider that technology constantly evolves and changes some established concepts which to be properly used. We can consider, for instance, the case of the laptop, which is not considered a mobile learning device by some definitions (like Mellow, 2005, and Caudill, 2007). However, this paper presented a case that makes it difficult not to accept this device as mobile when considering the whole learning context. It must also be considered that currently some of the models of laptops are made to be used as tablets, what reinforces the need of definition for mobile learning independent of the technology involved. Therefore, when using the proposed definition it does not matter what device or technology is considered for the mobile learning process, what avoids listing items which should or should not be considered mobile devices.

In fact, more than the technology and/or device used in the learning process, the whole learning context is the basis for the robustness of this definition, including factors like: device usability in the learning context, device use autonomy (battery and environmental limitations), type of media involved, network connectivity quality available, extent of network connectivity, learning context boundaries, user profile, pedagogic goals and learning policy and/or environmental restrictions.

## 5 - Conclusion

The definition of mobile learning proposed, based on the concept of stationary mobility, includes all the main variables that influence the learning process as a whole. It will lead to a better understanding of the learning experience and decision making for instructional design, and content production and delivery. This idea is supported by Traxler (2007), who states: “so, mobile learning is not about ‘mobile’ or about ‘learning’ as previously understood, but part of a new mobile conception of society.”

As shown in this paper, stationary mobility justifies the inclusion of some learning scenarios of mobile learning that might be excluded under some current definitions, which make no distinction between full and stationary mobility. It expands and standardizes the meaning of m-Learning, making easier its learning context analysis and comprehension for instructional designers and educators.

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