# Learning Using Smartphones: Analyzing What Current Learners Think and Do

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**Abstract**: Research on mobile learning has given much attention to (a) the affordances of mobility that mobile devices offer, and (b) how these devices are used in classroom learning. Less attention has been paid to how learners perceive and use mobile devices. This exploratory study focuses on developing an understanding of how learners' interpret *learning* using their smartphones, in particular learning that is not initiated by a teacher. The study used a qualitative grounded theory approach to analyze data collected from 28 undergraduates in an introductory educational psychology course. Analysis of the data suggests that the learners' perception of the phenomenon of *learning* with smartphones is impoverished and appears to have three properties: *What* is learned, *why*, and *when*. Each property can be further characterized along one or two dimensions. This study is a first step towards identifying the nature of learning using mobile devices and its varying dimensions.

## Introduction

Smartphones, mobile phones with computing power and Internet access, are providing opportunities for novel ways of communicating and accessing information (Alvarez, Alarcon, & Nussbaum 2011). Their use of an operating system has blurred the line between computers and traditional mobile phones. Smartphones allow users to perform almost all the tasks a computer can perform, such as accessing websites and social networking sites, playing games, watching online videos; as well as making phone calls, sending text messages, taking pictures and recording video. Smartphones are very popular among college-age students, with 66% of adults between the ages of 18 and 29 owning such a device (Rainie 2012).

Since the main advantage of smartphones is their mobility, they create the potential for learning on the go, often referred to as *mobile learning* or *m-learning*. Early definitions of mobile learning were (a) techno-centric, comparing it to e-learning on "mobile computational devices: Palms, Windows CE machines, even your digital cellphone" (Quinn 2000); and (b) focused on its mobility aspect, stating that m-learning occurs while the learner is mobile, not necessarily in a fixed location (O'Malley et al. 2003). Mobile learning, however, is much more complex than using mobile devices as learning tools while on the go. It is personal, collaborative, learner-generated, learner-centered, authentic, situated, context-aware, formal, informal, continuous, bite-sized, portable, opportunistic, spontaneous, and ubiquitous (Cochrane 2010; Traxler 2005, 2007, 2009). In fact, with their small size, popular use, unobtrusive nature, smartphones have arguably changed *how* we access information and possibly, *how* and *what* we learn.

Research on the use of smartphones for learning is still in its infancy (and growing rapidly), as users have just recently tapped into the potential of these devices for learning (Kearney, Schuck, Burden, & Aubusson 2012; Shin, Shin, Choo, & Beom 2011). Studies have focused mainly on the use of smartphones to support classroom-based learning where teachers promote the use of these devices as part of their class curricula (Alvarez et al. 2011; Kukulska-Hulme & Shield 2008; Roschelle, Rafanan, Estrella, Nussbaum, & Claro 2010; Zurita & Nussbaum 2007). The widespread ownership of smartphones and their mobility, however, allow learners to take control and "take the lead and engage in activities motivated by their personal needs [and interests] and circumstances of use" (Kukulsha-Hulme & Shield 2008, p. 272). As a result, there is a need for research on how learners perceive and capitalize on the learning affordances of their smartphones and use them for their own self-initiated learning (Gikas 2011).

This exploratory study is a first step towards gaining a deeper understanding of the affordances for learning that smartphones provide. Its aim it to analyze what leaners interpret as learning using smartphones.

## The Study

As part of a lesson on mobile learning, learners in an undergraduate course on teaching and learning at a large mid-western university electronically submitted a written assignment answering the following questions: (a) *How do you use your smartphone?* (b) *How do you use your smartphone for learning?* and (c) *Look back at the last week or so and recall instances of when you used your smartphone for a learning-related tas*k. There was no word limit for the assignment; submissions ranged from 215 words to 1258 words. The learners were mostly freshmen and sophomores with 20 females and eight males between the ages of 18 and 25. The class is required for acceptance into the university's teacher education program. The author of this paper was the instructor for the course and sought approval from the institutional review board to analyze the learners' written responses.

The author used a grounded theory approach to analyze the content of the learners' written work. According to Creswell (2003) grounded theory allows researchers to derive an understanding of a phenomenon that is grounded in the experiences of participants. The author was then able to (a) examine the phenomenon of interest (i.e., learning using smartphones) from the learners' perspective, and (b) analyze their written reported experiences of using their smartphones for learning. This approach allowed the author to develop a deeper understanding of the learners' interpretation of learning using smartphones that is grounded in their own experiences.

The author first read through the learners' responses and identified the instances of learning that occurred as they reported using their smartphones. An instance of learning was defined as any time learners (a) described smartphone-use activities under the second question asked, (b) explicitly used the word learn or any of its synonyms, and (c) alluded to gaining some type of knowledge by using their smartphones. Afterwards, the author developed a list of learning activities that defined the instances of learning. If a learning activity was mentioned by at least three learners, it was considered for a learning activity. The author wanted to include as many instances of student learning in the initial open coding phase to obtain more data for a thorough and solid theoretical frame.

After the initial open coding phase, the author used axial coding to identify the properties that defined the categories of learning. When a property of learning emerged, the author tested it against the data to confirm whether or not it fit. The data suggested that each learning instance that the learners reported exhibited three defining properties: (a) *What* was learned, (b) *why* was it learned, and (c) *when* was it learned. Then the author focused on each property alone to determine its defining dimensions that were grounded in the learners' reported experiences. Again, whenever a new dimension was considered it was tested against the data. The findings that resulted from this approach are discussed in the following section.

## Findings

### Learning Activities

After identifying the instances of learning, the author developed a list of learning activities in which they all belong to. Table 1 below lists all the types of activities that the learners reported as learning. The author supports each activity of the learners' interpretation of learning with an excerpt from their written assignment that exemplifies each (any mistakes in spelling or grammar are the learners' errors).

| Learning activities | Examples |
|---|---|
| Sending email to and receiving email from classmates and instructors | "I check my email to learn when an assignment is due or any important updates." |
| Checking the course management system | "I use also use the internet to access my ANGEL account to make sure that I am turning things in on the correct date and at the correct time." |
| Reading or reviewing class-related material | "I can go on my phone while sitting on the bus heading to class and go the reading assigned for my TC 101 class because the textbooks are e-texts which mean they are all online." |
| Looking up school-related information | "The other day while writing a paper I used my phone to look up dates that marked the women's rights movement." |
| Taking or recording class notes | "Sometimes if a professor is going to fast I can a picture of the slide and it |

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|---|---|
| | will show up very clear on my phone." |
| Performing mathematical calculations | "I used the calculator when shopping to add prices and to do simple math in class." |
| Checking social media websites | "I use the discovery button on twitter to stay updated with trending topics and events happening around the world." |
| Checking the weather | "Checking the weather using the weatherbug application" |
| Checking the news | "I read the New York times in the past week to learn about recent stories on foreign affairs, politics, and the economy." |
| Checking dorm cafeteria website | "I checked the 'Eat at State' website from my dorm room to learn and find out what they were serving for dinner… to make sure that they were serving food that I liked." |
| Looking up word definitions, synonyms, spelling, translation, etc… | "I used my smartphone to look up a word my writing teacher put on the board that I was unfamiliar with." |
| Checking movie times | "As we were driving form store to store I used my phone's movie app to determine movie times." |
| Checking store hours | "My smartphone has seen a lot of days where we don't know when a store opens or closes." |
| Checking the time | "I use my phone every day after a class period to look at the time as opposed to reaching up my sleeve to look at my watch." |
| Looking up directions | "Last weekend, my roommate and I were looking for a goodwill and we were already out shopping. I used my phone to search for the nearest location and once we found the location, we then used out maps app to get directions." |
| Looking up song lyrics | "After hearing a song on the radio, I wanted to know what the lyrics to the song were, so I went on my smartphone's browser to Google the lyrics." |
| Looking up information of personal interest or need | "The other day I was trying to think of stuff to ask for Christmas, and I thought of a rap album called My Beautiful Dark Twisted Fantasy, but I couldn't remember the artist, so I pulled out my phone and looked up who it was." |
| Looking up information regarding a topic of current conversation or debate | "I was having a discussion with my horn professor about a piece that he had never heard of, so I pulled out my phone and had all the information about that piece ready to go at a moments notice." |

**Table 1.** Excerpts from learners' responses of the different learning activities

**Properties and Dimensions of Learning**

Each of the above learning activities (see Tab. 1) has three properties that define it. These properties are presented below along with the dimensions that characterize each property.

***What Was Learned***

This property describes the type of information that the learners acquired knowledge of. After looking for patterns regarding *what* the learners reported learning, two dimensions became apparent.

The first dimension that characterized the type information gained during the learning instances ranged from *scholastic* to *non-scholastic*. Scholastic information refers to information that is school-related. During these instances learners report using their smartphones to seek information related to their class. While on the other end of the spectrum, non-scholastic information refers to knowledge that is recreational or leisurely and learners report seeking information that is in no way related to their schoolwork.

The second dimension that emerged ranged from acquiring knowledge about information that *remains unchanged* to information that is *in constant change*. Information that remains unchanged refers to information that is static and undergoes no changes. Information related to vocab, spellings, facts, and so on fall in this category of pieces of information that do no undergo any updates or changes. On the other hand, information that is in constant

change refers to information that is constantly updated. Emails, social media sites, and so on change almost by the minute.

As such, findings suggest that the information learners acquire as they learn using their smartphones has two dimensions: (a) scholastic and non-scholastic, and (b) information that remains unchanged or that in constant change. The type of information can be represented as seen in the figure below (Fig. 1).

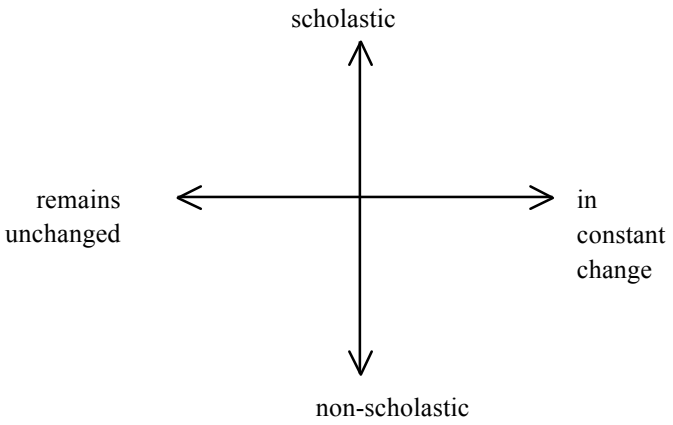


**Figure 1.** Dimensions for the property of *what* learners learned

Table 2 below provides two examples of each of the types of information learned that fall along each combination of dimensions.

| Information | Scholastic | Non-scholastic |
|---|---|---|
| Remains unchanged | "I used my smartphone before going to TE class to look at the power point posted and review before the quiz that day"<br><br>"I have a thesaurus app to help me when I am writing my papers to get a variety of words" | "I also learn on pinterest a recipe for mosaciolli that I've been wanting to make"<br><br>"I wasn't feeling well so I 'googled' my symptoms, in which had me surfing the web on my phone learning about signs and symptoms of certain diseases" |
| In constant change | "I used my smartphone for learning by looking at my grades on angel"<br><br>"I check my email in bed to see if I received my grade on my Criminal Justice exam" | "I checked the 'Eat at State' website from my dorm room to learn and find out what they were serving for dinner… to make sure that they were serving food that I liked"<br><br>"checking the weather using the weatherbug application" |

**Table 2.** Excerpts from learners' responses of the different dimensions of the instances of learning

***Why Was It Learned***

This property describes the reasons why the learners choose to learn and it ranges from *needing* to seek knowledge to *wanting*. Needing to seek information refers to when learners had no other choice but to use their smartphones for some learning purpose. The following quote exemplifies this dimension: "Sometimes if a professor

is going to fast I can take a picture of the slide and it will show up very clear on my phone". Wanting to seek information refers to when learners had a choice in whether or not they wanted to seek information. The following example shows a learning instance where it was the student's choice to engage in the learning activity: "While discussing movies with my family we were talking different quotes in movies. I grabbed by phone and used my IMDB app which is a movie app with quotes, characters, episodes, etc. Having this application on my phone I was able to learn more quotes from movies that I had not previously known." This dimension that ranges from *needing* to *wanting* to seek information can also be represented as a spectrum (Fig. 2).

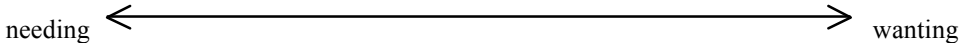


**Figure 2.** Dimensions for the property of *why* learners learned

***When Was It Learned***

This property describes the location of the learners as they were engaging in the learning process. The learners reported as either being *stationary* or *mobile.* Being stationary refers to the learners being in a specific location such as in class or at their dorm when engaging in the learning activity; for example, "Last weekend when I was home, my professor emailed the class about homework he forgot to mention in class, and that we were to finish it by last class time. I received the email on my smart phone." Mobile refers to the learners moving between locations such as on the bus or while driving; for example, "As we were driving from store to store I used my phone's movie app to determine movie times".

## Conclusions

Learners interpret learning using their smartphones in many different ways. The findings in this study suggest that each instance of learning has three properties: *what* learners learned, *why*, and *where.* Each of these properties has its own dimensions. *What* learners learn can be plotted along two dimensions: (a) *scholastic* to *non-scholastic* information, and (b) information that *remains unchanged* and that which is *in constant change*. The reasons *why* learners seek information fall along the dimension from *needing* to learn to *wanting*. *Where* learners are engaging in the learning activity can either be in a *stationary* location or *mobile* and on the go.

This study was a first step towards identifying the nature of learning using mobile devices. It seems that learners had interpreted learning simply as access to information with the device being a tool allowing such access. Is the device then changing how learners perceive learning? Is the device leading to an impoverished view of learning? Is it acting as a short cut to access knowledge rather than a cognitive tool to scaffold learning or allow for the synthesis of knowledge? How can we educate on the learning affordances of mobile devices that go beyond access to information?

According to Kearney et al. (2012), "mobile learning is a relatively new phenomenon and the theoretical basis is currently under development" (p. 1). In past literature, the *mobile* aspect of mobile learning has received much attention with emphasis on the devices' affordances for learning on the go. Mobile learning, however, seems to be multidimensional and not only limited to learning that occurs while the learners are mobile. In fact, there were many instances of learning using smartphones where the learners were stationary. As such, and in conclusion, perhaps there needs to be a shift in focus from mobile learning to learning using mobile devices.

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