What Use Do Multi-Touch Mobile Devices Have in Workplace Learning?

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***Abstract*—Mobile devices have taken the consumer and commercial industry by storm over the past few years. In the workplace, many professionals are equipped with a mobile device that allows them to keep in touch with their work no matter where they are. Multi-touch devices are the latest additions into the mobile device realm. This article primarily focuses on how multi-touch mobile devices can be used to enhance mobile learning capabilities in the workplace.**

***Index Terms*—mobile devices, multi-touch, mobile learning.**

I. INTRODUCTION

Mobile devices such as mobile phones, MP3 players and smart phones, have taken the consumer and commercial industry by storm over the past few years. In the workplace, many business professionals are equipped with a mobile device (namely a BlackBerry™, Palm Pilot™, etc.) that allows them to keep in touch with their work no matter where they are. However, the functions the working professionals perform on these mobile devices largely fall under the same category: productivity. Checking email or reviewing calendar appointments while on the go can help employees become more efficient. But does learning occur on these devices? What are the best ways that one can learn on mobile devices? What are the design considerations for various mobile devices? How can current technologies be leveraged for mobile learning? Multi-touch mobile devices help answer these questions.

II. THE CASE FOR MOBILE LEARNING

Over the past few years, mobile devices have become prevalent in the workplace. It is estimated that more than 25 percent of the global workforce will have mobile devices by 2009 [1]. Companies and organizations across many disciplines have developed services for their workforce to take advantage of mobile devices, primarily focusing on performance improvement and productivity. Mobile learning, also known as M-Learning, is the point at which mobile computing and E-Learning intersect to produce an anytime, anywhere learning experience [2]. For learning scenarios to occur on mobile devices, electronic performance support systems (EPSS) are often created. A well-designed EPSS enables a high level of job performance with a minimum of human support [3]. Technology, financial and consulting companies have introduced mobile EPSS as a supplement to increase job performance and decision making skills [4].

III. THE CASE FOR MOBILE LEARNING

The latest additions into the mobile device realm are multi-touch devices. Multi-touch is a user interface that combines two unique features that have not been widely available on mobile devices before: using the touch of your finger to operate the device and having the ability to use multiple fingers simultaneously to perform specific functions. The technology is not new; the first multi-touch system was developed in 1982 [5]. Recent advances in technology have made multi-touch systems more affordable, with the most recent being on mobile devices.

What are the advantages of using a multi-touch system? We all use multi-touch in our daily lives, although we may not know it. Touch is one of the five senses and we use our fingers everyday to pickup, move and interact with objects. Doing so on a computer screen should not be any different and should mimic reality. Thus, multi-touch interaction is more natural for humans and exhibits a smaller learning curve than learning other user interfaces.

IV. THEORETICAL CONSTRUCT

What does it mean to physically touch an object and move it across the screen? Is this better or easier than using a button or key to perform the same task? Moreover, can this type of direct-manipulation animation be used to increase learning among professionals? A long-standing thought is that animation has not contributed to a learner's knowledge and has just been extraneous information for learning tools [6]. Recent research, however, has shown that direct-manipulation animation can help learners construct mental models and increase learning comprehension [7]. Direct-manipulation animation through a multi-touch user interface can substantially improve the user experience and learning opportunities by allowing for a more natural interaction with the mobile device.

In addition to direct-manipulation animation, a few cognitive theories show a strong relation to multi-touch mobile devices. Embodied cognition describes the sensorimotor capabilities interacting with the environment [8]. Cognitive processes develop when a tightly coupled system emerges from real-time, goal-directed interactions between organisms and their environment. In the case of a multi-touch mobile device, the interaction between the user's finger and the multi-touch device exhibits an embodied cognitive approach. Related to this, the idea of distributed cognition describes placing memories, facts or knowledge on objects in the environment [9]. In other words, learning does not only occur in one's head. The mere interaction between the user and their mobile device demonstrates a distributed cognitive approach.

V. COMBINING MULTI-TOUCH AND MOBILE

Upon release of the first multi-touch mobile device, the Apple iPhone™, many professionals saw opportunity in the unique and intuitive interface. Over 72 percent of organizations received iPhone support requests [10]. Ideal uses for multi-touch mobile devices in the workplace are those that 1) complement productivity by integrating the device into the workflow, 2) leverage visually-based activities such as for the real estate or medical industries and 3) provide training and learning interventions or electronic performance support systems.

VI. SUMMARY

With the growing trend of creating a better experience for the mobile workforce, we are beginning to see the need for multi-touch mobile devices. This article provides you with an introduction into how multi-touch mobile devices can be used in the workplace, including technological and theoretical constructs.

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