Chapter 4.12
Relevance of Mobile Computing in the Field of Medicine

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ABSTRACT

Mobile information and communication technologies (MICTs) are widely promoted as increasing the efficiency of work practices in many business sectors, including healthcare. There are numerous types of mobile computing devices available that provide users with capabilities that can be applied in a wide range of different work settings. Case studies of the use of different MICT devices by doctors in different hospital settings indicate that while some doctors easily adopt MICT devices and find them a helpful tool, others encounter problems with their usage and, in fact, a majority do not use MICTs at all. This chapter deals with identification of five factors influencing the uptake of MICTs in clinical work practices and proposes a framework for analysing their interactions with the aim of increasing its uptake in medicine.

BACKGROUND

Mobile information and communication technologies (MICTs) are widely promoted as increasing the efficiency of work practices in many business sectors, including healthcare. There are numerous types of *mobile computing devices* available that provide users with capabilities that can be applied in a wide range of different *work settings.* Case studies of the use of different MICT devices by doctors in different hospital settings indicate that while some doctors easily adopt MICT devices and find them a helpful tool, others encounter problems with their usage and, in fact, a majority do not use MICTs at all. This chapter deals with identification of five factors influencing the uptake of MICTs in clinical work practices and proposes a framework for analysing their interactions with the aim of increasing its uptake in medicine.

INTRODUCTION

In most business sectors, including healthcare, it is widely claimed that the use of mobile ICTs, either alone or in combination with existing desktop resources, has the potential to achieve significant increases in the efficiency of work practices (Kelly, 2001; Cox, 2002; Davis, 2002). In recent years, however, a growing variety of *mobile computing devices* have become available—including laptop personal computers (PCs), tablet PCs, handheld PCs/personal digital assistants (PDAs), and PDA-phones/smartphones—which differ significantly in terms of characteristics such as screen size, computing power, weight, or input mechanisms, some of which have been shown to have an influence on ease of use and usage patterns (Dryer, Eisbach, & Ark, 1999; Martins & Jones, 2005). The devices may also vary in whether or not they are connected wirelessly to an existing network. This may be significant since, although when unconnected they are able to provide mobile computing power and support asynchronous communication, for uses requiring synchronous communication or real-time collaboration, wireless capability needs to be in place.

It is not just devices that vary, but also the work settings in which they are used. In the healthcare sector, there are a variety of departments in which hospital doctors' work, often organised according to particular clinical specialities. These departments may be spatially contained (e.g., in wards or intensive care units), or clinicians in certain specialities such as genetics, metabolic conditions, or psychiatric support may work across a whole hospital. Less frequently, hospital doctors may work outside the hospital (e.g., accompanying acutely ill patients in transit from one location to another). In addition to potentially working in different physical settings, hospital doctors—like most highly skilled professionals—engage in several different types of activities over the course of their working day. These spatial and temporal dimensions of the organisation of doctors' work

practices have been shown to influence how they use pen-and-paper and desktop ICTs (Westbrook, Gosling, & Coiera, 2004; Martins, Nightingale, & Jones, 2005).

Achieving the expected benefits from the use of MICTs, therefore, depends not simply on the provision of MICTs per se, but upon the appropriate matching of device characteristics and work settings. This chapter reports on research on the relationship between different types of MICT devices (laptop PCs on a cart or trolley, standard desktop PCs mounted on a cart or trolley, tablet PCs, and handheld/PDAs) and different clinical work practice[1] situations, and how this affects doctors' usage of MICTs.

RESEARCHING MOBILE COMPUTING IN HEALTHCARE

Two broad approaches may be used to study why and how doctors use (or do not use) MICTs in their clinical work practices: surveys across a large number of sites, or detailed studies in particular settings. This chapter largely focuses on the latter approach, presenting case studies of MICT usage at hospitals with different MICT devices and clinical settings.

Data were collected through multiple methods including interviews with doctors and hospital IT staff, observation, questionnaires, and analysis of usage logs for specific systems.

Case Descriptions

Case A: Paediatric Intensive Care Unit (PICU) with Handheld Computers

The PICU at a leading UK hospital had 12 beds, all located in a single ward. The layout of the unit comprised an open-plan central area with six beds and a nursing station (with two desktop computer) and a number of individual patient rooms and doctors' offices (with three desktop computers).

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