Chapter 5.2
Outline of the Human Factor Elements Evident with Pervasive Computers

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ABSTRACT

Pervasive computers cover many areas of both our working and personal lives. This chapter investigates this phenomenon through the human factors impacts, particularly in aviation. This chapter gives a brief introduction to pervasive computers and how they interact with aviation human factors research. Further, it follows the discussion on how pervasive computers have permeated into an integral part of the aviation industry by reviewing the specific issues of cockpit automation and the human-machine interface in the aircraft cockpit.

INTRODUCTION

The promise of human-machine interactivity is quietly, but systematically, undergoing change that will require a lot less activity on the part of the user – and a lot more on the part of the "smart" objects that will eventually populate their lives. According to the promoters of emerging forms of ubiquitous computing, we will not have to remember details of conversations, directions, scheduling, or even our own consumer preferences. Smart devices embedded in our clothing will keep track of them for us allowing the user to get an individualised impression of, and make an individualised impression on, the world. The promise is one of comfort and convenience, which is offered in exchange for the ability to gather instantaneously updated, detailed information about consumers. Smart clothing realises the phantasmagoria of the commodity world – one in which the commodities embark on a life of their own, taking on the active role ceded by the pacified consumer with the digitally encased-

consumers participating in the work of being watched. (Andrejevic, 2004)

Administrators are faced every day with the making of important and pervasive decisions. They have become dependent upon and interdependent with computers in making them. As technology provides decision makers with more information, varied information conduits, access to more information and at higher speed, these same decision makers will increasingly turn to non-rational approaches to decision making. Sellers (2004), maintains that under pressures of time and internal politics, decision-making is most likely to become incremental. Intuitively this makes sense as decision makers are bombarded with information and time constraints require quick responses. Terms like Moogle and Google are now part of our administrative decision making lexicon signifying how information gathering methods and processes have changed significantly. In place of rational decisions about substance, administrators make incremental decisions about substance and rationalise the technologies used to produce those decisions. Under this scenario, the challenge for higher education decision makers is to form a comprehensive strategy for the use and impact of technology on decision-making (Sellers, 2004). Anecdotal evidence suggests that comparable models are needed in other areas with similar decision-making scenarios such as human resource departments and cockpits.

CLARIFICATION OF "HUMAN FACTORS", 'PERVASIVE COMPUTERS' AND THEIR INTERRELATIONSHIP

Human factors … involve … the study of human's capabilities, limitations, and behaviours and the integration of that knowledge into the systems we design for them … (to) enhance safety, performance and the general well-being of the operators of the system. (Koonce, 1979, cited in Garland, Wise & Hopkin, 1998, p3)

Historically a reference to technology meant mechanical inventions such as the steam engine, refrigeration, combustion engine and electricity. When we talk about technology today, we generally mean computers. Increasingly, the technology is experienced in the form of computer-based automation that aids or replaces the operator. Aircraft, motor vehicles and a variety of appliances were mechanical before. Improvement in the human-machine interface protecting the operator and the workings of the machine from the elements presupposed the introduction of instrumentation and from this the computerisation of that instrumentation, wireless operation and miniaturisation.

Pervasive technology, pervasive computing and ubiquitous computing all refer to the phenomena where technology is moving beyond the small portable devices designed for personal use (Satyanaryanan, 2001). The goal of pervasive computing, which combines current network technologies with wireless computing, is to create an environment where the connectivity of devices is embedded in such a way that the connectivity is unobtrusive and always available. Increasingly, all manufactured devices have embedded technology and connectivity as part of their information delivery and data storage capability associated with decision-making. Appliances, tools and toys comprise advanced technology incorporating a digital interface that utilises embedded systems to store discontinuous data (Webopedia) n.d.

One aspect of pervasive computing is the spread of voice recognition software that is now employed to effect financial transactions find telephone numbers, give street directions and book taxis to name a few uses. Voice recognition makes it possible not only to do more things at once but also gives greater access to the disabled. The Internet connectivity of voice recognition increases the amount, accessibility, penetration and transfer of information. Security and privacy issues have prompted the further development to integrate fingerprint and face recognition into the business and personal computing genre.