Lucy Dwyer[1], Louise Moody[1], Friederike Schlaghecken[2] and Louise Wallace[1]

[1]Coventry University, [2]University of Warwick, UK

Design of a safer Radiotherapy interface

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100,000 people undergo radiotherapy in the UK annually (WHO 2008). Errors are estimated to occur in 40 out of 100,000 courses in the UK, and can be fatal (Donaldson 2007). Research indicates that there are a range of human factors issues affecting the safe delivery of radiotherapy, including the design of the linac machine interface (Chan et al. 2010).

Immediately prior to the delivery of a radiation dose, two radiotherapists working together check that the parameters displayed on the linac's graphical user interface (GUI) correspond with the patient's paper prescription to ensure that the dose is correct . Research indicates however, that not all errors are prevented, and that the checking process is error prone (Toft 2005).

This research aims to identify the causes of radiotherapy checking errors; of particular interest is the role of the GUI design. Semi-structured interviews were conducted with radiotherapy staff and students to understand the checking process, determine likely sources of errors, and identify design features of the current GUI which may impede effective checking.

Thematic analysis of the interviews indicated a number of usability issues with the current interface designs. There are 3 main software packages used in the UK which have similar issues in terms of dense presentation of information, and limited grouping or highlighting of key information. The interviewees also highlighted that the checking process can quickly become routine and automated leading to lapses of attention.

The findings have been translated into a design specification which makes recommendations regarding a simpler and more intuitive layout. It is suggested that the GUI design could invoke a more active checking process to increase operator attention and the likelihood of error detection, thereby increasing patient safety. The next stage of research will experimentally compare alternative interface designs to determine the optimum design for patient safety.

References

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