

Electronic Procedures – will they work for you?

Adrian Wheatley

Assystem / Wheatley Consulting Ltd

SUMMARY

A literature review and Learning from Experience study was undertaken to draw key themes and topics associated with the design, development, implementation and use of Electronic Procedures. The output report is intended to be used to develop ONR guidance on the topic.

KEYWORDS

Procedure design, Electronic Procedures, Computer Based Procedures, Electronic Instructions

Introduction

Formal, written procedures are applied where it is important that people adhere to a specific method or process in order to ensure consistency and to reduce the likelihood of error. This is particularly important in high hazard industries, where human error could lead to the initiation of a fault sequence, a failure to recover from a fault, or mitigate risk with potentially severe consequences.

Safety critical industries have a long tradition of using paper-based procedures. However, with the advancement of technology, there is a growing trend toward the implementation of Electronic Procedures. The intention is to reduce or eliminate some of the key drawbacks associated with paper-based procedures, and to take advantages of some of the key benefits that the implementation of Electronic Procedures may bring.

Recognising that the design, development, implementation and use of Electronic Procedures may be a significant Performance Shaping Factor (PSF) in the context of high hazard industry safety justification, the Office for Nuclear Regulation (ONR) commissioned a study to draw out key learning across academic research and industry. The output of the study was presented as a report, which will be used by the ONR to develop further guidance in support of safety assessment.

Method

The work was undertaken in three key phases as outlined in the following sub-sections.

Literature Review

A literature review of research undertaken in the context of Electronic Procedures.

The Rapid Assessment Technique was used in order to define the key research questions and establish the key search parameters (scope).

Artificial Intelligence and Machine Learning tools were applied to help identify the key themes and topics within the research.

Learning from Experience

The capturing of 'Learning from Experience' (LfE) from both the literature review and a number of industry stakeholder engagement activities.

A number of key industry stakeholders with experience in the development of Electronic Procedures were interviewed.

Guidance

The output from the literature review and the LfE phases led to the development of guidance associated with the key themes and topics drawn from the research and stakeholder engagement. The results were compiled into a database of information (in Excel format).

A report was produced as a final deliverable to the client.

Results

It was established early in the process that there is a significant amount of research and guidance associated with the ‘ergonomic’ design of procedures. The vast majority of usability principles that have been developed in support of paper-based procedures are directly applicable in the context of Electronic Procedures.

Similarly, the decades of research associated with the design and development of computer-based or Human-Machine Interfaces (HMI), especially in the context of mobile devices, are also directly relevant and applicable in the context of Electronic Procedures.

Consequently, the research was deliberately *not* geared toward duplicating or repeating the already well established and good guidance associated with the design of procedures and human-machine interfaces.

The research did however acknowledge the importance of procedure design and HMI usability as a key PSF associated with the potential for human error, and any significant recurring lessons or research findings were brought to the fore.

The research identified a significant number of key themes and topics as presented within the main report. Each theme is discussed in terms of:

- Identified potential benefits
- Good practice and guidance
- Potential challenges and concerns

Throughout the report, any significant issues or key learning points are summarised as ‘guidance for inspectors’, which may equally be considered as guidance for any person seeking to design, develop, implement, and use Electronic Procedures. The report is freely available on the ONR website: https://www.onr.org.uk/media/v4ce3lxa/electronic-procedures-guidance-for-inspectors-issue-1-final_redacted.pdf

Summary

The research has identified a broad set of learning and key issues to be considered in the design, development, implementation, and use of Electronic Procedures.

The output will be used to develop ONR guidance.

The main report, and the supporting database of information is considered to be a valuable source of information for any organisation considering the implementation and use of Electronic Procedures.

Note: This research, whilst conducted on behalf of the ONR, does not represent any formal regulatory positions on this topic.