



Human Factors and Ergonomics in Health and Social Care

Inefficiencies associated with health care and hazard and harm to patients have been identified as worldwide problems that result in thousands of patient deaths and billions of dollars waste every year (Bagian, 2012). Human factors and ergonomics are regarded as having a strong part to play in identifying safe and efficient healthcare system design to improve these outcomes. The vision of a more efficient and targeted healthcare system is the reason why members of the Human Factors and Ergonomics Society of New Zealand (HFESNZ) are seeking greater involvement with health and social care organisations in New Zealand.



What is human factors and ergonomics?

Human Factors and Ergonomics (HFE) creates systems which help people to intuitively do the 'right thing'. In practice this means designing to ensure desired outcomes. This is achieved by removing or reducing exposure to factors that can lead to mistakes or physical and psychosocial stress or harm. In this way the potential for harm or making mistakes is reduced – which means it is harder for people to 'get it wrong' or have their health and wellbeing negatively impacted by the workplace. HFE is characterised by a unique combination of fundamental components, which focus on the optimisation of a system through consideration of two closely related outcomes, which are performance/quality and individual/organisational well-being whilst adopting a collaborative approach with the active involvement of relevant stakeholders.

HFE is a distinct discipline with its own theories, models and practices, but combines elements of psychology, anatomy and physiology, engineering, design and statistics, to better understand the nature of human interactions with the world and its complex systems. It is solutions focused and should not be confused with behaviour-based safety solutions, such as training where people are required to adapt their behaviour to accommodate poorly designed systems. Other terms associated with Human Factors/Ergonomics are: human factors engineering, human-centred design, user-centred design, usability, and user experience.

Human factors and ergonomics in health and social care

HFE brings a considerable depth of understanding to health and social care issues. It has methods and approaches that are highly suited to the challenges that currently exist in the

sector, for example: workplace accidents; musculoskeletal discomfort, pain and injury; workplace health concerns (such as mental health issues and fatigue); quality improvement and workplace productivity issues. Examples in NZ where HFE has been applied include the identification of musculoskeletal risk factors among medical radiation therapists employed in breast



screening which found contributing factors to include work organisational issues due to screening targets and the appointment booking schedule, inadequate training and repetitive and awkward postures adopted by staff (Edwin & Alexander, 2009). Another case study involved identifying manual handling hazards in a clinical records department where poor layout design resulted in awkward manoeuvring of trolleys, double handling and excessive carrying and holding of files. Other examples include the design of a hospital pharmacy, and usability testing of ambulance stretchers.

Adopting a system's approach

Understanding and applying a systems approach is a fundamental concept in HFE. Systems can be defined as a set of inter-related activities or entities such as hardware, software, buildings, spaces, communities and people, that all have a common purpose. Systems range from micro-systems e.g., people performing single tasks or using tools; through to meso-systems e.g. people working as part of a team or organisation; to macro-systems e.g. complex sociotechnical systems. HFE may focus on one small micro system before considering how it fits within the larger macro-system. It is through understanding the interactions that occur and by taking a system's approach that effective solutions can be found.

The benefit of an HFE approach

When embedded in a system, HFE provides effective integration of human, technological and organisational capabilities, and makes the best use of human capabilities – physical, cognitive, psychological and social. It utilises people in ways that maximise system safety and ensures people's skills are used cost-effectively to greatest benefit. HFE recognises and provides for human needs thereby safeguarding against factors such as high workload, fatigue and stress. Where some might see 'human error' or 'user error' as the cause of an incident, an HFE professional takes a wider view to encompass multiple root causes and most likely uncover a range of factors such as poor product design or organisational factors which may have contributed to an accident or near miss event - rather than identifying one factor as the root cause.

How to apply HFE

HFE is relevant to all stages of the lifecycle of a product or service, from early stages of planning and design, right through to implementation and evaluation, and re-design. Initial approaches should define the scope of the project or intervention, establishing the high-level values and



goals relevant to the specific context. Why, what, when and how HFE should be applied requires specialised knowledge, skills, training, experience and expertise if approaches are to be used effectively and appropriate interventions found. HFE involves the creation of a holistic approach to safety and health improvements.

Qualified Human Factors/Ergonomics Professionals

It is unrealistic for clinical leaders to be trained sufficiently in HFE to ensure effective system wide improvements, whilst remaining clinically competent. Specialists in HFE are needed to lead and help facilitate system improvements. HFESNZ Professional Members abide to a Code of Conduct, have met standards set and are assessed by the Human Factors and Ergonomics Society of New Zealand (www.hfesnz.org.nz). Certified HFESNZ Professional Members have met requirements for education, supervised training and experience and can be listed on the HASANZ Register. Contact details for Professional Members can be found at <https://www.hfesnz.org.nz/find-a-professional/>. General Members of the society are those who have an interest in the field but no assessed level of competency.

Contact

The Healthcare SIG aims to facilitate the integration of HFE into Health and Social Care in New Zealand. Please reach out if you would like to get involved or discuss how our members may be able to assist your organisations.

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References

Bagian, J. (2012). Health Care and Patient Safety: The Failure of Traditional Approaches – How Human Factors and Ergonomics Can and MUST Help. *Human Factors and Ergonomics in Manufacturing & Service Industries* 22 (1) 1–6.

Edwin, M. & Alexander, S. (2009). Musculoskeletal discomfort risk factors for medical radiation technologists performing breast screening, *Human Factors and Ergonomics Society of New Zealand Conference Proceedings*.