

A 5 year snapshot of education, research and publications about ergonomics in Irish Healthcare

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SUMMARY

Healthcare Human Factors / Ergonomics (HF/E) involves the rigorous application of multiple academic disciplines (e.g. engineering, psychology) with the aim of improving patient safety, quality of care, efficiency, and staff wellbeing.

This paper discusses the establishment of a research collaboration of interested HF/E researchers, academics, frontline staff, quality and patient safety (QPS) practitioners and patient and public partners (PPP) and reports on a snapshot of the HF/E different activities being undertaken in the Irish healthcare system over the past 5 years (2018-2023).

KEYWORDS

Human Factors/Ergonomics, Implementation, Healthcare

Introduction

HF/E has enormous potential to transform how healthcare is designed and delivered (Leape, Berwick & Bates, 2002; Sujan et al., 2021). The WHO in its Global Patient Safety Action Plan 2021-2030 (WHO, 2021) similarly recognises that HF/E is essential “to the creation of high-reliability, resilient health care systems and organizations” (WHO, 2021p.24). The Irish Health Services Executive (HSE) in its Patient Safety Strategy (2019-2024) under Commitment 2, “Empowering and Engaging Staff to Improve Patient Safety” commits to enhancing HF/E and to ensuring that each staff member has an understanding of HF/E in order to work effectively with others for safety (HSE, 2019).

The international literature would suggest that the need for HF/E in healthcare has been recognised since the inception of the profession and discipline, but development and growth have been slow (e.g. Hignett et al., 2013). Norris (2012) noted that HFE needs to be widely applied and integrated into the design, implementation and change management of socio-technical systems in healthcare. The healthcare system is complex and interdependent. Therefore, there is a need to take a systems perspective to understanding and improving performance - as opposed to only considering issues within a particular isolated part of the healthcare system (see e.g. Carayon et al., 2020; Ward et al.,

2022). Carayon et al. (2018) advise, for example, when developing and implementing a patient safety practice, such as preoperative checklists, the entire system needs to be considered where the checklist is viewed as a tool that positively or negatively affects other system elements such as team communication and workflow. A research collaboration to explore what taking a systems perspective to HF/E implementation in the Irish healthcare system would look like was established. A first step in this programme was to explore what was happening in relation to HF/E in the Irish healthcare system.

Methods

Development of the HF/E collaborative research group and research questions

Since the publication of the *Introduction to Human Factors for Healthcare Workers* (HSE, 2021) the HSE National Quality & Patient Safety Directorate (NQPSD) have been linking with individuals and groups across the health system with an interest in HF/E. In 2022 it was agreed to bring together these stakeholders to begin conversations about building HF/E capacity and capability in the health services. Stakeholders consisted of interested HF/E researchers, academics, frontline staff, quality and patient safety (QPS) practitioners and patient and public partners (PPP). Conversations took place during October 2022 with stakeholders in person (n=23) and online (n=9). A human-centred approach was adopted during these conversations with a clear purpose, intended outcomes and process (PIP), and underpinned by the person-centred facilitation principles of collaboration, inclusion and participation (CIP principles) (McCormack & McCance, 2017). One of the outcomes of the conversations was to begin mapping out what activities were already happening in the Irish healthcare system in relation to HF/E.

Survey to gather information

To explore what HF/E work has been carried out in Ireland over the past five years, an Excel-based survey tool was co-designed with some members of the research collaboration with the aim of capturing a snapshot of activity in relation to HF/E in healthcare in Ireland over the last five years. The IEA definition of HF/E was employed for this purpose (IEA, 2000). The survey consisted of two sections; HF/E education, training and dissemination activities and HF/E research activities.

Section 1 consisted of HF/E education, training and dissemination. Education was defined as theoretical learning in the classroom about HF/E and its application either at undergraduate or postgraduate level. Training was defined as sharing and instilling specific HF/E skills to healthcare practitioners. Dissemination was defined as spreading ideas in a formal setting about HF/E e.g. conferences or online or in person talks, webinars, reports, books, journal articles, etc. The participants were asked to complete details on the following.

- Name of the course/ activity/ dissemination activity
- Duration of the course/ activity/ dissemination activity
- Profile of the healthcare participants (e.g. management / administrative, nursing, medical, health and social care professionals (HSCP))
- Number of attendees
- Details on accreditation for course/ event, if applicable
- Was the course/ event repeated? – e.g. monthly, annually.
- Details on funding source of course/ event, if applicable.

Section 2 asked participants questions about different HF/E research activities.

- Name of the research project
- Purpose of the research

- Duration of research project and partners involved
- Healthcare setting/ context and research population
- Research methods
- Research outcomes e.g. change in way working; narrative review published
- If research resulted in a change in healthcare, what was the nature of the change?
- Were there any barriers to the change implementation? If yes please describe briefly.
- Was the impact of the change measured? If yes, how?
- Has the change been sustained? If yes, is measurement ongoing
- To provide a link to any publicly available reports or publications on your research outputs

The survey was sent to the research collaboration team (21 participants). Snowball sampling was used to recruit two more participants. In total the survey was sent out to 24 participants from 12 different organisations.

Results

15/23 participants responded to the survey. Among the survey respondents, there were 3 respondents from hospitals, 4 from other healthcare settings and 8 respondents from universities (figure 1).

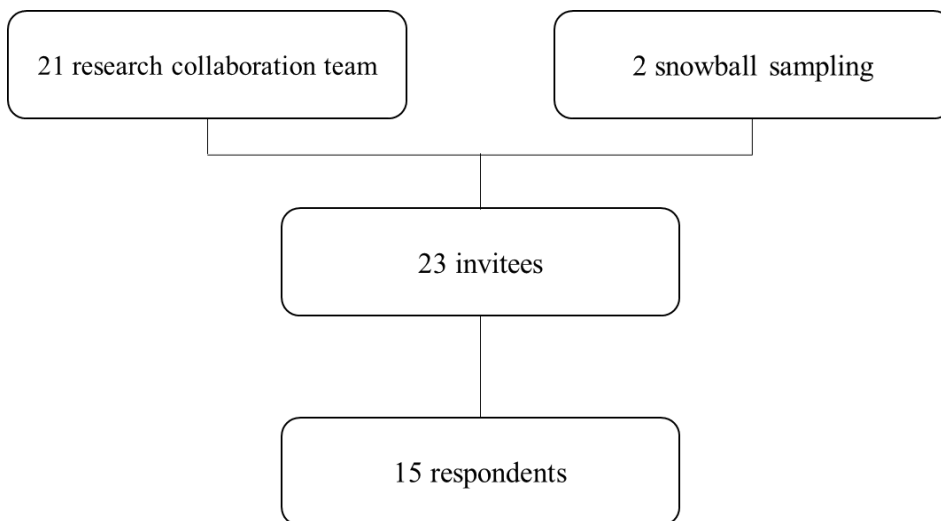


Figure 1: Invitees and participants to the survey

Table 1 presents the number of HF/E education programmes available in 2023. As can be seen the majority of these are focussed at the postgraduate (PG) level. Table 2 presents a number of HF/E related training events from 2018-2023.

Table 1: Number of HF/E education programmes available in 2023

Type of HF/E education programme	Number of HFE education programmes
Masters programmes in Human Factors (where healthcare is a focus)	4
Post graduate programmes where HF/E is a component	8
Undergraduate programmes where HF/E is a module	2

Table 2: Number of HFE training events from 2018-2023

Provider of training events	Number of training events
Universities	8
Healthcare organisations other than hospitals	4
Hospitals	4

A number of HF/E dissemination events also took place (10). Table 3 presents number of HF/E publicly available webinars, podcasts and public reports and white papers.

Table 3: Number of webinars, podcasts, public reports and white papers from 2018-2023

Type of HF/E activities	Number of HF/E activities
Webinar series	6
Podcasts	4
Guides / reports / white papers	4

Funded Irish HF/E research projects or projects with HF/E components to them were noted from 2018 to 2023. These projects related to for example how HF/E can support safety practices like safety huddles; hand hygiene; learning about safety from patient experience and complaints; using socio-technical systems understanding and artificial intelligence (AI) to inform risk management including from healthcare associated infection and the risk of Risk of retained foreign objects across surgical and maternity settings. Academic publications arising from these and other projects related to HF/E in Irish healthcare over the last 5 years were categorised into eight themes as shown in table 4.

Table 4: Publication themes

Publication themes	Number of publications
General patient safety research	5
Patient experience feedback and safety	4
Simulation in healthcare	6
Measurement and monitoring of safety	3
Systems analysis / systems improvement	7
HFE tools and approaches in healthcare	11
Medical device design	43
Digital health technology, AI and HFE	4

The full details of the survey results can be found in a report published by the HSE on the survey findings (Sharafkhani et al., 2024).

Discussion

This paper summarises a range of HF/E activities across Irish healthcare from 2018 to 2023. The results demonstrate multiple training and research activities happening across diverse areas that include applying HF/E tools and approaches to patient safety problems, involving patients in patient safety, simulation, systems change and the application of HF/E in digital health and AI.

Despite the interest in HF/E in healthcare in recent years, education has been focused at the post graduate (PG) level with limited courses at undergraduate level or for existing healthcare staff. In a recent systematic review, Sheehan et al. (2022) found that barriers to HF/E education at the

undergraduate level included a lack of shared safety language, lack of faculty expertise in safety as well as the lack of appropriate HF/E based competency framework to guide curriculum development. The HSE is investing in developing a competency framework for HF/E for staff working at all levels the healthcare system. The HSE has begun to address the gap in education, by developing a short eLearning 'Introduction to Human Factors' programme and an in-person one-day workshop for healthcare teams to build a foundational knowledge in HF/E. There has been limited dedicated funding for HF/E research in healthcare in Ireland. The HSE and the Health Research Board (HRB) have recently funded a five-year programme to develop an Evidence-based QUality Improvement and Patient Safety (EQUIPS) network which will support both an appreciation of the need for HF/E research funding and the development of a strategic HF/E research agenda in the Irish healthcare system.

Limitations

This study presents findings from a small cohort of people who are interested in HF/E in Irish healthcare. The results presented here are based on the awareness and knowledge of the members of the Research Collaboration and people interested in HF/E and HF/E activities that members of the research collaboration were aware of and may not be fully inclusive of all the HF/E activity happening in the Irish healthcare system.

Next Steps

The next steps of the overall research programme are to explore and build an evidence-based to inform how to best implement HF/E strategically and sustainably in the Irish healthcare system. This will include a systematic review of HF/E interventions in healthcare with reported outcomes and evaluations. It will also include exploring how integrating the HF/E work already being carried out in the health system including that in relation to service design, translational simulation, systems thinking informing learning from adverse events, developing a just culture of psychological safety could enhance the implementation of sustainable patient safety improvements.

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