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## Optimising Healthcare Supply Chains with Human Factors Engineering



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Healthcare systems face a constant challenge in balancing safety, patient outcomes and financial sustainability while incorporating new products and technologies. Traditional Value Analysis (VA) processes assess cost-effectiveness and clinical benefits but often neglect critical environmental and process factors that can influence successful implementation. This oversight can result in inefficiencies, unforeseen complications and resistance to new technologies. By integrating Human Factors Engineering (HFE) into VA, organisations can adopt a more structured approach that considers human interactions with tools, technologies, tasks and environments. This combined methodology ensures that new solutions align with operational realities, workforce capabilities and patient care objectives.

The increasing complexity of healthcare environments necessitates a proactive approach to evaluating new products. Although VA provides a robust framework for assessing financial viability and clinical effectiveness, it does not always account for the real-world implications of integrating new technologies into existing workflows. By incorporating HFE principles, healthcare organisations can address these gaps, ensuring that newly adopted technologies do not disrupt established processes but instead enhance efficiency and patient safety.

**Related Read:** [Breach of Supply Chains: Assessing the Impact of the Port Strike on Healthcare](#)

### Bridging the Gap Between Theory and Practice

New healthcare technologies are often introduced with high expectations of improved efficiency, safety and patient outcomes. However, their real-world application can present unforeseen challenges. For example, integrating a new device may require additional steps in an already complex workflow, potentially leading to inefficiencies. Staff may struggle with unintuitive interfaces or design flaws, resulting in errors or resistance to adoption. Additionally, training demands, maintenance needs or unforeseen workflow adjustments may diminish the anticipated cost savings.

VA processes typically assess products based on projected cost reductions and improvements in patient care. However, they often fail to address broader operational challenges that arise when new technologies are introduced. The inability to anticipate these challenges can lead to inefficiencies, frustration among staff and, in some cases, adverse patient outcomes. By integrating HFE into VA, healthcare organisations can evaluate not only the direct financial and clinical impacts of new products but also how they fit within the broader healthcare ecosystem. This approach ensures that new solutions complement existing systems and workflows rather than disrupting them.

### Applying Human Factors Engineering to Value Analysis

HFE is an essential discipline that prioritises system design around human capabilities and limitations. Rather than forcing users to adapt to a rigid system, HFE ensures that systems accommodate the needs of their users. This involves analysing user behaviour, workflow integration, environmental conditions and regulatory requirements. By systematically assessing these factors, HFE provides actionable insights that help prevent operational challenges before they arise.

Integrating HFE into VA does not have to be complicated or time-consuming. A range of structured methodologies can be applied to improve decision-making and ensure the successful implementation of new products and technologies. These include:

- **Contextual Inquiry:** Observing and interviewing end users to identify workflow challenges and pain points.
- **Cognitive Task Analysis:** Examining mental processes involved in tasks to highlight potential cognitive overload or inefficiencies.
- **Workflow Mapping:** Creating visual representations of task sequences to detect redundancies or failure points.
- **Usability Testing:** Evaluating ease of use and interface design under realistic conditions.
- **Prototyping and Simulation:** Testing the technology in a controlled environment to predict real-world performance.
- **Error Analysis:** Assessing past incidents and identifying root causes of system failures to enhance future design.

For example, a hospital seeking to implement an automated medication dispensing system to improve efficiency and safety would typically rely

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on the VA to assess financial feasibility and clinical benefits. However, without HFE, the system's practical usability and impact on staff workflows may be overlooked. By applying HFE principles, the hospital can identify challenges such as interface complexity, workflow interruptions and cognitive demands on nurses. Through usability testing, workflow mapping and simulation exercises, necessary design refinements can be made before full deployment. The result is a system that supports nursing staff, reduces medication errors and aligns with operational goals.

Not every procurement decision requires an extensive HFE assessment. The level of investment and potential risks associated with a new product should determine the depth of analysis. In cases where in-house resources are limited, organisations may opt for HFE consulting services, which provide expert assessments without straining internal teams. By strategically allocating HFE efforts based on organisational needs, healthcare leaders can maximise the benefits of new technologies while mitigating risks.

### **The Benefits of a Holistic Approach**

Integrating VA with HFE enhances adaptability, improves patient safety and supports financial sustainability. This combined approach ensures that healthcare organisations make informed decisions that align with both short-term financial objectives and long-term operational goals. Systems designed with HFE principles are more intuitive for users, reducing the likelihood of errors, increasing efficiency and promoting higher adoption rates.

Moreover, this holistic methodology fosters collaboration between clinical, operational and procurement teams. By considering the full scope of a technology's impact—beyond cost-effectiveness and clinical benefits—organisations can build resilient supply chains that support sustainable growth and evolving patient needs. The ability to anticipate and mitigate potential integration challenges ultimately leads to better healthcare outcomes, stronger operational performance and improved workforce satisfaction.

In an increasingly complex healthcare landscape, strategic decision-making is critical. By integrating HFE into VA, healthcare organisations gain a comprehensive framework for evaluating new technologies with a real-world perspective. Rather than focusing solely on cost and clinical benefits, this approach accounts for usability, workflow impact and overall system integration.

By incorporating HFE principles, healthcare leaders can drive sustainable improvements, enhance patient safety and optimise operational efficiency. This ensures that new technologies not only meet financial and clinical expectations but also support the professionals who rely on them daily. Embracing a holistic approach to procurement and technology adoption strengthens healthcare supply chains, fosters a culture of safety and promotes long-term success.

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