Human Factors in Health Technology
Working with Different Stakeholders

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

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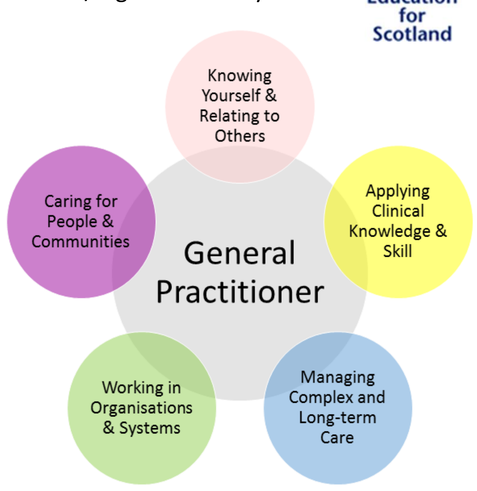
User Requirements of GP Training Human Factors in Education development and provision[a)]

A review of existing GP training, within the West of Scotland region, to understand how human factors/ergonomics may benefit the existing programme.



One of the outputs of this project has been to represent these findings in a comprehensive format that can be expanded upon and verified during future work within this area. NES is NHS Scotland's education and training body ensuring the quality of education and lifelong learning.

Ref: 1)

HFRG work with a wide range of users Including but not limited to;

- Patient Populations
- Clinicians
- Other Healthcare Professionals
- Healthcare Technology designers, developers and engineers
- General Public
- Carers
- Naïve users of technology

Human Factors Considerations in Infection Prevention and Control and Medical Equipment Design in Neonatal Care[b)]

Chantal Trudel[1,2], Dr. Sue Cobb[1], Dr. Kathryn Momtahan[3,4], Janet Brintnell[3] and Ann Mitchell[4]
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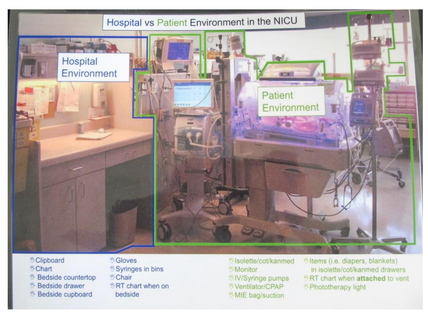
There are disconnects between equipment design, work processes and best practice in infection prevention and control (IPAC).



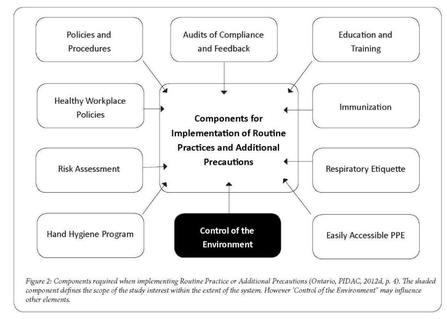


Figure 2: Components required when implementing Routine Practice or Additional Precautions (Ontario, PIDAC, 2012d, p. 4). The shaded component defines the scope of the study interest within the extent of the system. However "Control of the Environment" may influence other elements.

Pathogen transmission risks specific to design of medical equipment:
- crowding and covert transmission
- high touch surfaces (issues with disinfection due to complex design, exertion)
- lack of clarity regarding transmission risks or how to support IPAC
- best practice workflow not supported (e.g. hand hygiene, supply use)
- high human computer interaction ties health care worker to patient environment
- design taxes an already demanding job design, drawing attentional resources from IPAC (e.g. moving, disinfecting equipment)

Ref: 2)

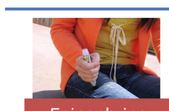
User Requirements Capture and Evaluation with Industrial Partners [c)]

MATCH Multidisciplinary Assessment of Technology Centre for Healthcare

Previous projects have worked with a wide range of industrial companies – including but not limited to 3M, DePuy, Ethicon, Merck Serono, HeartSine and Moor Instruments.

Formal HF work has also been commissioned by NICE, CEP, and NUH NHS.

These projects have involved individual product evaluations and systematic evaluations of large scale technology deployments.


Epinephrine Auto-injector
- Conflicting views of what is 'correct use'
- Manufacturers and Regulators concerned with device's ability to deliver drug
- Patients and Healthcare Professionals also concerned about whether device is carried
- Factors that influence carrying:
  - Design (size, weight, look)
  - Risk Awareness
  - Social stigma
  - Expiry dates
  - Effect on leisure activities: refused entry to sports matches/ concerts


Acapella™
- Physiotherapy device for Cystic Fibrosis
- Adolescents are a user group with poor adherence
- Not used as often as it should be
- Not used correctly (with correct posture)
- Device design identified as factor:
  - Lack of feedback
  - Slow and difficult to use
  - Social stigma of carrying device
- Users expressed desire for:
  - Control and Independence
  - Customisable device


Glucose Meter
- Investigated testing behaviours of Type II diabetics
- Conflicting goals for testing:
  - Once-a-day reassurance check (healthcare profs)
  - To understand and control disease (patients)
- This leads to poor communication and deception
- Training provision is variable: "take a box on your way out"
- Older patients given inappropriate devices – 1 patient using 10 year old device as new device is too small


Telemonitoring
- Home-monitoring device for COPD/CHF
- Aim: to identify deteriorations in health to enable earlier intervention
- Clinical trial halted due to use issue: low uptake and use of device due to reluctance of community matrons to recommend trial.
- CM were not involved in trial design and planning, leading to reluctance due to:
  - Concern that their role would change from caring to 'office-monitoring'
  - View that they were rationing healthcare (by randomising patients to trial)

Dementia Video reminder
- Proactive reminding technology to prolong independent living
- 2 user groups with distinct needs:
  - Patient – need for social contact
  - Partner – reduced care burden
  - Both – reassurance
- Simplicity key to usability = 1 button
- Use issues:
  - Bad experience with the technology resulted in drop out (important to refine design before involving users)
  - Acceptance of device is acceptance of disease: "I don't have Alzheimer's"

Ref: 3)

The Tradition of Anaesthetic Rooms: Best Practice or Patient Risk? Working with Anaesthetists [d)]

This study focuses on the current use of ARs and the rationale for their inclusion in new theatre design. It investigates decision-making and prioritisation of competing factors in clinical choice.Mixed methods were used to explore perspectives of anaesthetic clinicians and perioperative managers.

1. Anaesthetic Room

2. Operating Room

3. Recovery Room

The research findings question the motives for using the AR for standard anaesthesia provision, as both the daily use of, and design considerations for ARs, seem driven by perception and experience, rather than clear and compelling evidence.

Ref: 4)

Medical Device Design for Adolescents: CF Physiotherapy Devices[e)]

Participatory Design

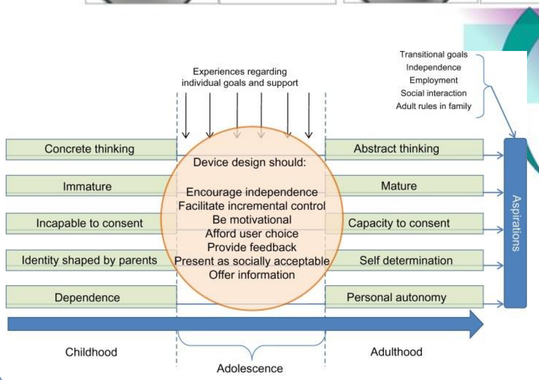
PROXY USERS HEALTHY ADOLESCENTS

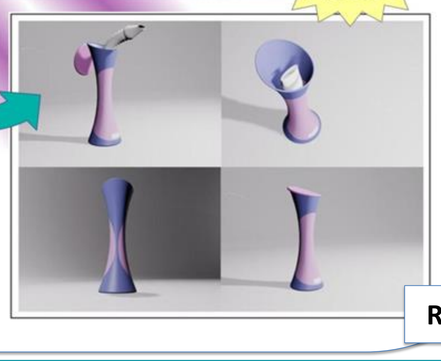
Adolescents important patient group because….

- development of negative health behaviours cause poor behaviours in adulthood
- poor health outcomes in the short and long term
- increased economic cost of healthcare provision

USERS OF THE ACAPELLA® ADOLESCENT CF PATIENTS

Co-Design Process





Ref 1. Fig 3. Medical devices as facilitators for achievement of adolescent goals and adherence

Ref: 5)

Product Design for Older Users HF collaboration with elderly users and development teams [f)]

Many developers are young and therefore often naïve of the type of barriers faced by older people when using technology. Age-related impairments mean that the arena of technology may become less accessible over time due to sensory, cognitive and even physio-motor constraints. We employ co-design methods to make the design process accessible to elderly populations and inform more effective design

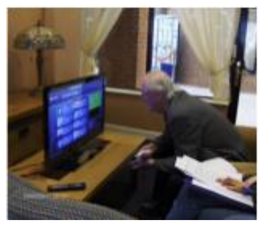
COSPATIAL Communication and Social Participation: Collaborative Technologies for Interaction and Learning


Student experience #2: feedback from users on design concepts


Users tested foam model prototypes


Users could give specific feedback on comfort, fit and usability of designs


Concept boards were used to elicit user opinion on style details



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