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An Interpretive Approach in the Evaluation of Homecare Telematics Interventions

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aim

- give an overview of telecare evaluation approaches
- classify telecare evaluation approaches according to the meaning stakeholders give to telecare
- propose an evaluation approach (framework) for home telecare services
- a case study: evaluating a telecare service for monitoring peritoneal dialysis at home
understanding evaluation

zones of information systems evaluation approaches

(Hirschheim & Smithson, 1988)
understanding evaluation

there is a link between:

- what is to be evaluated (content)
- how it is evaluated (process) and
- who does the evaluation and why (context)

Symons’ evaluation onion
(Symon 1991 & Pettigrew 1985)
understanding evaluation

questions such as:

- what is the system under evaluation
- why carry out the evaluation
- when is the evaluation executed
- where is the evaluation to be performed

are subjective decisions that influence not only the way the evaluation is conducted but also the outcome of it

*(Smithson and Tsiavos, 2004)*
evaluation framework selection

- there is not ‘one best method’ suitable for the evaluation of all information systems (Smithson and Hirschheim, 1988)

- ‘what is to be evaluated’ is a key factor
  - dominated by the meaning attached to the system
  - varies amongst different groups of stakeholders
classification of evaluation approaches

according to the meaning that evaluators and stakeholders attach to telecare applications

- telecare as a 'drug' or 'therapeutic agent'
- telecare as a technical and/or managerial innovation
- telecare as an information system embedded in a clinical/social context
telecare as a drug

- seems to be the most dominant view in literature

- draws on medical tradition of evaluation

- uses Randomised Control Trial (RCT) as the most legitimate and credible evaluation technique

- evaluation schemas based on gold standard of proof
critique

- is telecare a drug? can telecare be prescribed in practice? does it have an immediate effect on patients' health?

- telecare as a drug...
  - in the case of drugs, patients have two options: to obey to the prescription or ignore it
  - in the case of a telecare service, patients interact with it, influence it and get influenced by it

- RCT focuses on predefined outcomes
  - ignores patients' interaction and reaction
  - ...which could answer the 'why' of RCT results in telecare
telecare as technical/managerial innovation

- a slightly more expanded view

- telecare is an innovation that can:
  - reduce cost of healthcare delivery
  - raise physicians’ productivity
  - increase patients’/customers satisfaction

- evaluators draw on economic theory to check cost effectiveness and productivity
critique

- measure whatever is easiest
- measure whatever gives the desired results
- ignore difficulty to measure variables
  - patients’ time and effort
  - value of information
  - physicians’ productivity
- try to quantify variables that cannot be measured
  (e.g. quality of life, cost of human life, etc)
roots of both views

both views draw on positivism (objectivism):

- origins in natural science
- based on the traditional scientific method (formal propositions, quantifiable measures, hypothesis testing, etc.)
- attempt to generalize findings
- attempt to prove
telecare as an IS within a clinical context

- “information systems are social systems whose behaviour is heavily influenced by the goals, values and beliefs of individuals and groups, as well as the performance of the technology.” (Angell & Smithson 1991)

- components of an information system, and, therefore of a telecare service
  - technology
  - people (patients, physicians, administrators)
  - organisation (i.e. context)
telecare as an IS within a clinical context

evaluation draws on interpretivism (subjectivism):

- there is NO objective, single reality
- the social "reality" is constructed by each person according to the meanings and beliefs they hold
- "research becomes more a case of trying to understand the context of the information system, and the process whereby the information system influences and is influenced by its context" (Walsham 1993)

- research methods: case study, institutional ethnography, ...
- research techniques: observation of the different stakeholders groups, unstructured and semi-structured interviews, documentation review and researchers' interaction with the technology used
interpretive approach

- a new school of thought in telecare, but not in information systems research

- current problem: most of telecare researchers do not use any theoretical framework to guide their qualitative research and draw their conclusions

- result: their research is seen as barely credible

- however, doing interpretive research requires adopting a theoretical model in order to
  - present which aspects the evaluator wishes to study
  - to structure the report of stakeholders’ experiences
  - to interpret them in a way that general patterns of interaction can be derived
### Evaluation Framework by Cornford et al

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<td>technical detail</td>
<td>changed work conditions and implied requirements</td>
<td>sustainability, opportunity costs, management needs, skill requirements</td>
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<td>Process</td>
<td>information processing correct and valid</td>
<td>human participation in tasks; social interaction</td>
<td>altered delivery and practice</td>
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<td>Outcome</td>
<td>relevant, applicable, reliable</td>
<td>quality of service and outcomes</td>
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*Cornford T, Doukidis GI, Forster D. (1994)*
adapted the framework for home telecare

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system

- structure
  - what are the real hardware and software requirements
  - does the full set of system components work together in a technical sense?

- process
  - is the method by which the system transforms its data, the information processing, correct and valid?

- outcome
  - are the results relevant, applicable and reliable?
  - does it meet the requirement specifications?
# adapting the framework for home telecare

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- **structure**
  - what are the changes to working conditions and practices, in terms of the physical, environment and skill requirements?

- **process**
  - how is the user's mode of operation changed?
  - are these changes seen as desirable to the user as an individual, and in general to the user's organizational role?

- **outcome**
  - is the overall effectiveness of the clinician within the health care system enhanced?
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patients

- **structure**
  - Are patients required to modify their behaviour in any way?

- **process**
  - How is the patient’s experience of health care altered at the point of contact with the system/service?

- **outcome**
  - Does the use of the system result in changes in the quality of service and better health for the patient?
adapting the framework for home telecare

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administration

- structure
  - is the system a reasonable, cost-effective alternative to existing tools or materials in use?

- process
  - does the system imply change in the health care delivery activities for which the administrator is responsible?
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- outcome
  - does the system improve specific health provision on a reasonable metric?
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organizational context

- **structure**
  - could such technology be sustained and supported within the organizational context?

- **process**
  - could such a system function within the confines of broader health policy?

- **outcome**
  - could such a system improve the health status and potential of the population it serves?
a case study – monitoring peritoneal dialysis

CAPD – continuous ambulatory peritoneal dialysis

APD – automated peritoneal dialysis
peritoneal dialysis

A dialysis fluid is inserted in the peritoneal cavity, after a period of time becomes saturated with waste and then it is exchanged with new fluid

- ~4 exchanges per day
  (or a number of exchanges during the night)

- Requires a catheter in the peritoneal cavity & a special mobile unit for fluid exchange

- Performed at patient’s home

- ~1 scheduled hospital visit per month
peritoneal dialysis

- effectiveness of the method depends among else on the specific dialysis scheme, which depends on:
  - patient's weight changes
  - type and amount of fluid inserted and exerted
  - blood pressure, heart rate, (ECG, blood glucose, ...)
  - general health condition, and co-morbidities

- easy to implement - difficult to deal with complications

- 10-30 % of dialysis patients internationally

- declining in some countries, increasing in others
supporting APD & CAPD

- patient telemonitoring
- intelligent alarms
- archiving, processing and management of patient telemetric data
- statistics and data mining

telemetry of

- peritoneal dialysis schema data
- patient weight
- blood pressure
- heart rate
- ... other clinical information systems
PERKA main features

- main features
  - web based system
  - data transfer via mobile telephony
  - web service architecture
  - dynamic, personalized measurement set-up by clinician

- current deployment
  - region of East Macedonia and Thrace, Greece
  - [https://portal.perka.gr/](https://portal.perka.gr/)
  - status: experimental clinical protocol (currently: 10 patients, 7 months)
server application - patient data
server application - measurement definition
server application - measurement definition
server application - PD prescription
server application - telemetry data view
patient unit - PDA
patient unit - PC
patient unit - PC
evaluating PERKA - phase 1

why

- efficiency & understanding
  - assess user satisfaction and include this in the design
  - understand system interaction with stakeholders

when

- during design, development and prototype pilot implementation
  - 18 months of design, development, lab testing (Oct. 06 - Mar 08)
  - 3 months of pilot implementation (Apr 08 - Jun 08)

where

- in the lab & in a controlled environment
# evaluating PERKA - phase 1

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evaluating PERKA – phase 1

most interesting results

- positive attitude of physicians & patients

- expressed fears:
  - patients: computer illiteracy and digital exclusion
  - physicians: monitoring only, questioned patient data entry reliability

- efficiency issues:
  - patients: PDA too small – netPC preferable
  - physicians: terminology issues
Μέτρηση: Βάρος Σώματος

9 8 , 5 0 0

Ανεβείτε στην ζυγαριά και εισάγετε το βάρος σας.
evaluating PERKA - phase 2

why

- effectiveness & understanding
  - assess user satisfaction in the real environment (service)
  - understand service interaction in the organizational context
  - assess clinical outcome

when

- deployment as experimental clinical protocol
  - 12 months of experimental deployment (Dec 08 - Nov 09)

where

- real environment
### Evaluating PERKA - Phase 2

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evaluating PERKA – phase 3

why

- effectiveness & understanding
  - clinical outcome
  - sustainability & potential in the organizational context

when

- deployment as experimental clinical protocol
  - 24+ months of routine deployment

where

- real environment in more than one deployments
## evaluating PERKA - phase 3

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- “PERKA: Telecare Service for Peritoneal Dialysis”, Regional Operational Programme, East Macedonia and Thrace, Ministry of Development, Greece & the European Regional Development Fund

- “Novel System for Monitoring Renal Failure”, Desmi 2008, Republic of Cyprus & the European Regional Development Fund
References


