Scientific Report

ESF Exploratory Workshop on New Approaches to the Systematic Evaluation of Health Information Systems

Executive Summary

Systematic evaluation of information technology in health care is the preconditions to built better systems. However, evaluation addresses several challenges. The objectives of the workshop were to bring together expert from several disciplines to discuss interdisciplinary and trans-disciplinary approaches to overcome those problems, and to initiate a combined research agenda on the most urgent evaluation aspects.

Overall, 25 researchers from 10 countries took part in the workshop. The workshop was organized around several smaller working group, framed by plenary sessions. It addressed issues such as recent problems, visions and strategies with regard to the future, and concrete implementation plans.

The workshop led to several initiatives with clear responsibilities and time schedules. The most important initiatives are:

1. Adoption of a Declaration of Innsbruck on Evaluation (draft just being discussed, will be published together with the workshop summary in an international journal shortly)
2. Establishment of an Evaluation Portal in Health Care (just being established, launch planned for spring 2004)
3. Development of guidelines for Good Evaluation Practice in Health Informatics (draft just being discussed)
4. Development of Standards for Reporting on Evaluations in Health Informatics (in preparation, to be launched at Medinfo 2004)
5. Foundation of an European Evaluation Research Network (mailing list and website just being established, up-to-now about 60 additional researchers interested in those activities)
6. Submission of an ESF Scientific Network Application (draft just being discussed, will be submitted to ESF end of May 2003).
7. Special issues in a international scientific journal (just being discussed with editors).

We expect from those broad initiatives, which are strongly coordinated with existing evaluation activities and projects, a strong impact on European evaluation research as well as on Medical Informatics as a whole.

Objectives of the event

Information technology (IT) is emerging more and more in health care. It is evident that the use of modern information technology offers tremendous opportunities to reduce clinical errors, to support health care professionals, and to increase the efficiency of care. However, there are also hazards associated with information technology in health care: modern information systems are costly, their failures may cause negative effects on patients and staff, and possibly, when insufficiently designed, they may result in spending more time with the computer than with the patient. Therefore, a rigorous evaluation of IT in health care is absolutely necessary and of great importance for decision makers and users of future information systems.

Various reasons make evaluation of health information systems rather difficult: The complexity of the evaluation object 'information system' comprising technical and human aspects, the complexity of the changing clinical environment, and the low numbers of stakeholders and user willing to perform evaluation studies. In the last years, some individual researchers as well as isolated European research groups (e.g. from the Netherlands, UK and Scandinavia) addressed these complex issues, however, individual as they worked, did not achieve a break-through. A European multi-professional effort seems absolutely necessary to address the urgent questions regarding evaluation of health information systems.

The objectives of the workshop, as stated in the proposal, were therefore

- to bring together experts from informatics, medical informatics, economy, health care, biometry, psychology, sociology, and other evaluation fields, in order to foster discussion and exchange on methodological issues between researchers from different traditions;
- to offer an opportunity for the participating scientists to share their knowledge with the aim of obtaining a profitable cross-fertilization among different fields of expertise and especially between quantitative and qualitative evaluation research;
- to initiate a combined research agenda to develop frameworks and toolkits for information systems evaluation, offering guidelines for an adequate combination of evaluation methods and tools;
- to discuss and clarify the networking needs in long-term evaluation research in medical informatics, and to initiate combined research proposals at a European level.

Organization and structure of the event

In order to achieve those ambitious objectives, we decided not to concentrate on presentations, but on a rather specific organization and agenda:

1. We invited both well-known **senior as well as junior** researchers, in order to include both established knowledge as well as new ideas on evaluation.
2. We invited researchers from **various European countries**, to facilitate establishing of the planned European Network, and to take into account the cultural differences.
3. We invited researchers from **various professional backgrounds**, to support interdisciplinary and even trans-disciplinary exchange.
4. We based the workshop mainly on discussion in **smaller working groups**, to foster direct discussion and exchange. Those working groups partly worked on the same issues (to get results from various points of views), and partly of complementary issues (to be able to work on various items in parallel).
5. The participants of the smaller working groups (each had 4 – 8 participants) **changed each time** the working groups were re-formed. This allowed for further exchange of ideas and helped to establish new contacts.
6. The working groups were framed by **plenary sessions** of all participants where each working group presented its results. This supported transfer of results and allowed intensive discussions.
7. The workshop started with a **keynote** of one well-known researcher, to allow a first discussion on a rather general basis, and to get to know each other better, before going into the workshop.
8. The informal contacts were supported by jointly organized **lunch and dinners**.
9. All **working group rooms** were equipped with beverages and snacks, to generate a relaxed atmosphere.

The three main questions which during the three working groups time slots addressed were as follows:

1. What are **problems and barriers to evaluation** of health information systems? In this first part, the experiences from the various evaluation fields were gathered and structured. The different viewpoints of the various fields were discussed, as well as the value of what evaluation researchers from the different traditions have to offer, and how they can contribute to evaluation studies.
2. What are our **visions and strategies with regard to evaluation** of health information systems? Those part comprised discussions on what the participants want to achieve in the next years in the field of evaluation. The discussion was structured around methods and practice of evaluation.
3. What could be **short-term and long-term activities** to reach those visions and strategies? In this last part, concrete activities were planned, in order to promote theory and practice of evaluation. Discussion was organized in three different working groups, focussing on the establishment of an evaluation portal, on guidelines for evaluation studies and evaluation reporting, and on communication and dissemination.

The complete program can be found in the Appendix. Overall, 25 evaluation researchers from 10 European countries participated in this event (see figure 1). Further pictures of the event can be found at http://bisg.umit.at/hiseval.

Figure 1: The participants of the ESF Exploratory Workshop on New Approaches to the Systematic Evaluation of Health Information Systems (HIS-EVAL) at UMIT, Innsbruck, Austria, 4th – 6th April

Outline of discussions

The main points of discussion will now be shortly summarized. A detailed protocol of the workshop is available upon request or available at http://bisg.umit.at/hiseval. The discussion was structured around the three main parts of the workshop:

Part 1: Problems and Barriers

Various problems and barriers were identified with regard to the evaluation of health information systems. They can be roughly summarized into the following topics:

- Awareness: The Evaluation results often do not inform current decisions. Evaluation is often seen as too academic. The value of evaluation studies (e.g. leading to improved decision making, identifying implementation barriers, supporting development, implementation or procurement of technology, influence user's expectations) is often not sufficiently clear to decisions-makers, users and politics. Doing evaluation studies brings seldom reward to researchers. Evaluation is often more a fig leaf than a contribution to reflective practice, as decisions-makers often do not want their decisions to be questioned.
- Methodological issues: Evaluation is often not sufficiently grounded in theory. Established evaluation methods are often poorly applied. Evaluators are often insufficiently trained to select methods from various disciplines and to apply and combine them adequately. The complexity of the field and its speed of change often make the adherence to a rigid methodology difficult. Various evaluation traditions (e.g. the positivist various the constructivistic tradition) do not sufficiently collaborate to cross borders. A common language for evaluation is missing.
- Practical issues: Evaluation sponsors can have vested and conflicting interests. The audience of evaluation studies is often not sufficiently clear, leading to results which are not used. It is considered difficult to formulate clear and answerable questions. Guidelines for good evaluation practice are missing. It is unclear how evaluation results, which are often more local audits, can generate knowledge for other sites. Funding for evaluation is often insufficient. Social and legal issues make evaluation complex. Registries of ongoing studies, evaluation methods and tools are mostly missing. Evaluation studies are not often carried out during design development, if done, they are done afterwards.
- Dissemination: Evaluation results (especially if the study failed to find benefits) and reports from evaluation studies are not always made available for others. Proven evaluation methods are not sufficiently published.

Part 2: Visions and Strategies

The visions and strategies can be structured around similar topics:

- Awareness visions: Evaluation is considered as of high intellectual and social value. Researcher get sufficient reward for performing good evaluation studies. Duality of evaluation (supporting research as well as local audit) is better recognized. Evaluation results are used to contribute to clinical decisions and actions, and to health policy decisions. Measurement of success and non-success is an integral part of ICT design and development.
- Methodological visions: Evaluators have better knowledge on available evaluation methods, and will be aware of evaluation methods from other disciplines. More research is conducted into development and combination of evaluation methods. A comprehensive meta-

methodology is neither useful nor possible. Instead, methods are chosen solely based on the study questions (and not based on the research paradigm). Methods sufficiently take into account the complexity of health care as well as new paradigms in health care (e.g. new treatments, e-health, disease management etc.). Continuos education opportunities for evaluators are offered and broadly used.

- Practical visions: Sufficient funding for continuos evaluation is available. National Centers of Excellence on Evaluation are founded. Evaluation is supported by central registries of guidelines and evaluation methods, and a database of ongoing evaluation studies. Multi-professional and independent committees guarantee the quality of evaluation studies. Evaluators are independent and shielded from legal actions. A common terminology for evaluation exists. A Cochrane database for ICT evaluation is established. A list of possible effects of ICT is available. Evaluators from multiple disciplines cooperate closely.
- Dissemination visions: Evaluation results are published for various audiences, to make information and knowledge available. Papers on evaluation studies as well as on evaluation research are broadly published, both in specific evaluation journals as well as in broader healthcare journals. The quality of reporting evaluation studies is improved by standards.

Part 3: Implementation activities

The participants agreed on the following hierarchy (in descending order) of implementation activities which should be pursued in the next months:

1. Evaluation portal: Establish a web-based evaluation portal which support evaluators by offering the following material: methods repository, project reports, ongoing studies, validated instruments, evaluation guidelines, general literature, glossary, pitfalls & perils, and educational material.
2. Good evaluation reporting: Develop guidelines on how to report ICT evaluation studies (comparable to CONSORT statement).
3. Good evaluation practice: Develop guidelines for good evaluation practice, create guidelines for dissemination of evaluation results, define standards for evaluation.
4. Organize network: Establish a structured and funded post HIS-EVAL network , establish a Cochrane review group on ICT evaluation, create a center of excellence for evaluation, promote interdisciplinarity of evaluation, organize workshops on evaluation, accumulate and share knowledge on evaluation theory and practice.
5. Create awareness: Have evaluation accepted as a fundamental part of ICT development and introduction, create awareness for funding needs, improve publication possibilities, initiate funding agency for evaluation, promote independence of evaluation studies.
6. Educate the evaluator: Integrate interdisciplinary evaluation into medical informatics curricula, provide continuos training opportunities for evaluators, develop online training material, improve medical informatics professionals understanding of available methods.

Outcome of the event: Action Plan

The expected outcomes, as stated in the proposal, were to set up a European network, to obtain synergy effects, to create a roadmap, and to inform the scientific community. Beside general networking during the workshop, several concrete activities have been discussed. All of them have been put together in a roadmap and adopted by the HIS-EVAL participants. Clear responsibilities have been assigned, and the work on all of them already has started. We will shortly describe the most important of those activities:

1. Adoption of a Declaration of Innsbruck on Evaluation
2. Establishment of an Evaluation Portal in Health Care
3. Development of Guidelines for Good Evaluation Practice in Health Informatics
4. Development of Standards for Reporting Evaluations in Health Informatics
5. Foundation of a European Evaluation Research Network
6. Submission of an ESF Scientific Network Application
7. Organization of a special issue in an international scientific journal

1. Declaration of Innsbruck

To raise awareness on the necessity of evaluation, the participants agreed to publish a **Declaration of Innsbruck**, presenting main points with regard to visions and recommendations for evaluation of health information systems. This declaration is just being further discussed within the participants and will then quickly be published, together with a summary of the workshop and its outcome, in one main Medical Informatics journal (the editor already expressed his willingness to do so).

2. Evaluation Portal in Health Care

The Evaluation Portal in Health Care (EP-HI) will support knowledge dissemination within the research community by being a comprehensive source on validated evaluation methods/instruments, existing evaluation studies reports/publications, literature on evaluation and on ongoing evaluation studies. The development of this Evaluation Portal will be co-ordinated by colleagues from the University of Maastricht and University of Rotterdam, which already are working on similar initiatives. They will be supported by groups e.g. from the U.K. (working on evaluation reviews) as well as from Austria (working on questionnaire pools and evaluation study inventory). The official launch of the Evaluation Portal is planned for March 2004.

3. Good Evaluation Practice in Health Informatics

The guidelines for Good Evaluation Practice in Health Informatics (GEP-HI) should provide guidance for planning and execution of evaluation studies. The work is coordinated by colleagues from Finland and supported e.g. by groups in U.K., Netherlands, Finland and Austria. A strict time schedule and an organizational procedure have already adopted by the participants. The idea of GEP-HI has already been presented at Medical Informatics Europe (MIE 2003) in St. Malo at the beginning of May 2003. The first draft of the guidelines is scheduled for Medinfo 2004 (in September 2004).

4. Standards for Reporting Evaluations in Health Informatics

The Standards for Reporting Evaluations in Health Informatics (STARE-HI) should provide a structured framework for reports on evaluation studies. The development is coordinated by colleagues from University of Maastricht, supported e.g. by groups from Finland, Denmark, Netherlands, U.K. and Austria. The idea of STARE-HI has already been presented at Medical Informatics Europe (MIE 2003) in St. Malo at the beginning of May 2003. It is planned to adopt STARE-HI at the beginning of 2004. It is then planned to organize a panel at Medinfo 2004 (in September 2004) with the editors of the main medical informatics journals in order to promote the idea of STARE-HI. We already have the support of a major publisher for this idea.

5. European Evaluation Research Network

To keep on the driving energies and impulses which have been pushing towards those results of the Innsbruck HIS-EVAL Workshop and to create higher awareness of the importance of evaluation studies in health care, further dissemination activities where planned. The creation of a European Evaluation Research Network, as a center of excellence which supports knowledge exchange and builds the framework for the above described steps, was envisioned. The first steps towards such a network was to get in contact to other European researchers who are interested to join this Network. We have contacted well-known researchers and also organized a workshop during Medical Informatics Europe (MIE 2003) in St. Malo at the beginning of May 2003. The list of interested researchers contains now about 60 additional names. A listserver is just being established to allow the efficient communication and exchange within this Network. The network also closely interacts with the Working Group on Assessment of Health Information Systems of the European Federation for Medical Informatics (EFMI WG EVAL, http://www.umit.at/efmi).

6. ESF Scientific Network Application

To support the described activities as well as further initiatives of the Network, the network will apply for a ESF support. We already have established contact for several other researchers from all our Europe which support this idea. The application will be submitted at the end of May 2003.

7. Special issues in a international scientific journal

We are just discussing to publish an international journal of a major Medical Informatics journal around Medinfo 2004, focussing on evaluation methods and practice. Participants from HIS-EVAL will largely contribute to this special issue, but an additional open call is just being discussed. We already have the agreement of the editors of one major journal for this plans.

Assessment of the results

The workshop comprised multiple novel aspects. It was to our knowledge the first initiative on a European level to bring together top researchers as well as junior scientists from different information system evaluation fields and traditions in order to improve theory and practice of health information systems evaluation. It was also novel with regard to the idea to built up an enduring evaluation research network for health information systems on a European level, with own further activities such as research proposals, conferences, workshops, and publication activities.

The workshop can be seen as very successful in two points of view:

- **Networking on a European level**: The HIS-EVAL participants are now serving as a nucleus to further promote evaluation in Europe. The number of other interested researchers is already around 60 and will surely further rise. By broadening the basis of the network, we expect lasting impact on medical informatics as well as concrete projects and initiatives. Initiatives such as workshops, tutorials, conferences, mailing lists, and special journal issues will support this Networking.
- **Initiatives on a European level**: Networking is important, but similar important is that concrete activities arise. Several projects such as a Declaration of Innsbruck, an Evaluation Portal, Good Evaluation Practice Guidelines and Standards for Reporting on Evaluation Studies have already started directly after the workshop. The number of motivated colleagues is high, so that we expect most of these initiatives to come to a success. Those activities will help to inform the scientific Medical Informatics community and to improve the quality of evaluation studies.

By the Evaluation Network which is just being established, and by the various initiatives and especially the guidelines which are just being developed, we expect a direct contribution to the future direction of the evaluation field and thus also to medical informatics in general, leading to a new dimension and collaboration on further research on information system evaluation.

Appendix: Final program

Friday, 4th April 2003

18.30 – 21.00 Informal get-together

Saturday, 5th April 2003

9 – 10 **Welcome**

Welcome by organizers and by an ESF representative
Introduction to workshop organization and program

10 – 11 **Introduction to the field**

Keynote: Evaluation and Research in Medical Informatics (Jeremy Wyatt)
Discussion of problems and barriers
Organize morning working groups 1.1 – 1.4

11 – 13 **Working groups 1.1 – 1.4: Problems and barriers to evaluation**

Topic of all working groups:
What are barriers to evaluation?
What is the value of what we have to offer?
WG 1.1: chaired by Christian Nohr
WG 1.2: chaired by Ulrich Prokosch
WG 1.3: chaired by Michael Rigby
WG 1.4: chaired by Nikki Shaw

14 – 16 **Plenary session 1: Problems and barriers to evaluation**

Presentation and discussion of working group results by WG chairs
Discussion of future visions and strategies on evaluation
Organize working groups 2.1 – 2.4 for the afternoon

16 – 17.30 **Working groups 2.1 – 2.4: Visions and Strategies**

Where do we want to be in 10 years?
What can be done to improve evaluations?
Two WG on methodological visions and strategies:
WG 2.1: chaired by Michael Rigby
WG 2.2: chaired by Jeremy Wyatt

Two WG on practical visions and strategies:
WG 2.3: chaired by Thomas Bürkle
WG 2.4: chaired by Jan Talmon

17.30 – 18.30 **Plenary session 2: Visions and Strategies**
Presentation and discussion of working groups results by WG chairs

19.30 – 22 Tyrolean Dinner

Sunday, 6th April 2003

9 – 9.30 **Plenary session** to organize working groups 3.1 – 3.3

9.30 - 11 **Working groups 3.1 – 3.3: Implementation**
Define and organize concrete activities to achieve progress!
Define responsibilities and plan details!
WG 3.1 on Evaluation Portal, chaired by Arjen Stoop
WG 3.2 on Evaluation Guidelines, chaired by Jeremy Wyatt
WG 3.3 on Network Communication, chaired by Martin Denz

11 – 13 **Plenary session 3: Implementation schedule**
Presentation and discussion of working group results by WG chairs
Final discussion on what to do next, and whether objectives have been reached
Farewell

Appendix: Final list of participants

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Appendix: Statistical information on participants

Country structure

The participants came from 10 ESF countries. Unfortunately, colleagues from Spain, Greece and Slovenia were not able to attend.

Austria	5
Netherlands	5
Denmark	2
Finland	1
France	1
Germany	4
Norway	1
Sweden	1
Switzerland	1
United Kingdom	4

Age structure

< 40 years	14
> 40 years	11

Research experience structure

Based on their experiences in evaluation research, the participants can be roughly divided into junior and senior researchers:

Junior researchers	11
Senior researchers	14