Effects Driven Participatory Design and Evaluation in HealthIT

Sustained[5,13]

Extended & formative[1]

Infrastructures[6,9]

- Large scale pilot implementations[12, 13]
- Ongoing (re-)configurations[2]
- Local competencies in ‘infrastructuring’[3]

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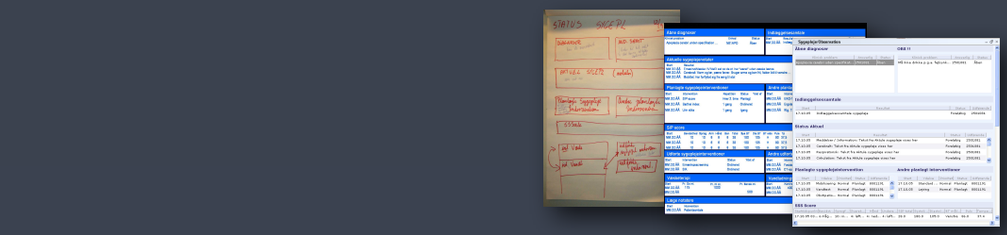
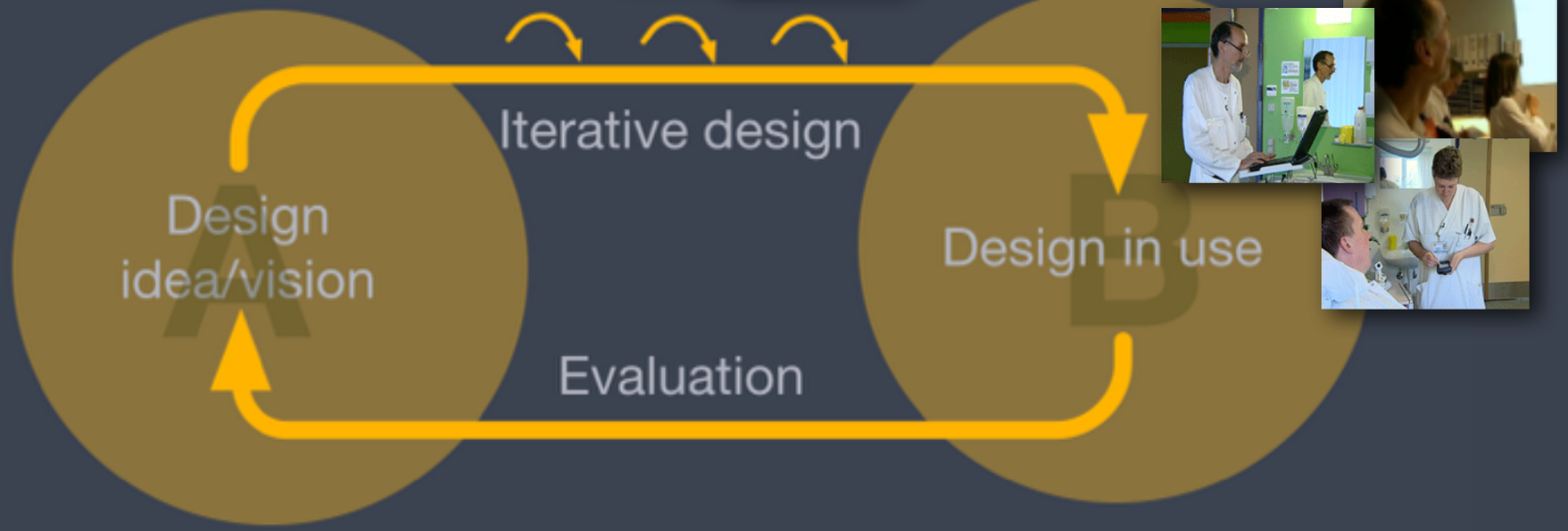
Sustained PD - design as ‘emerging’ change



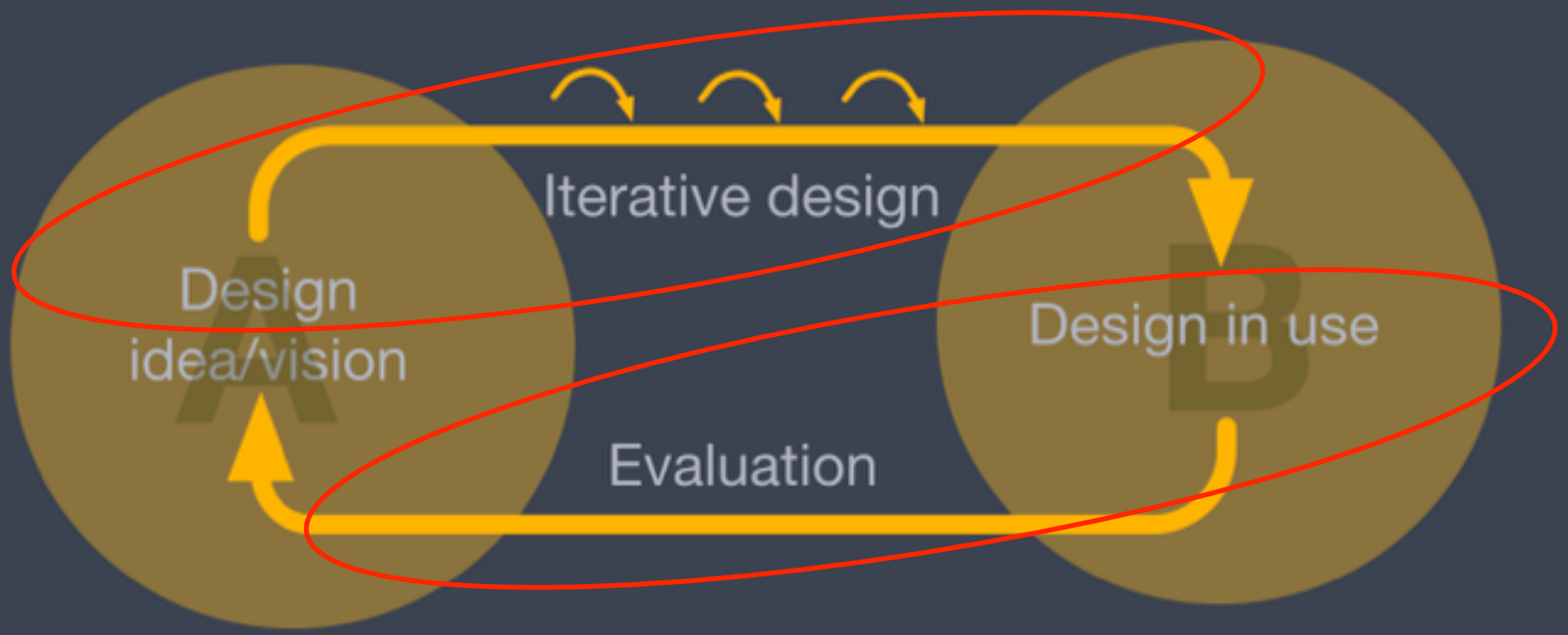


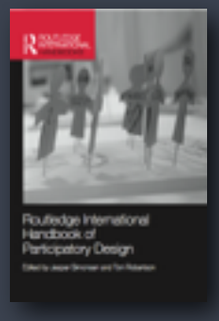
Design Research, Routledge (2010), Figure 14.3, p. 207

(Orlikowski and Hofman, 1997)

Sustained PD - design as ‘emerging’ change

Traditional PD focus





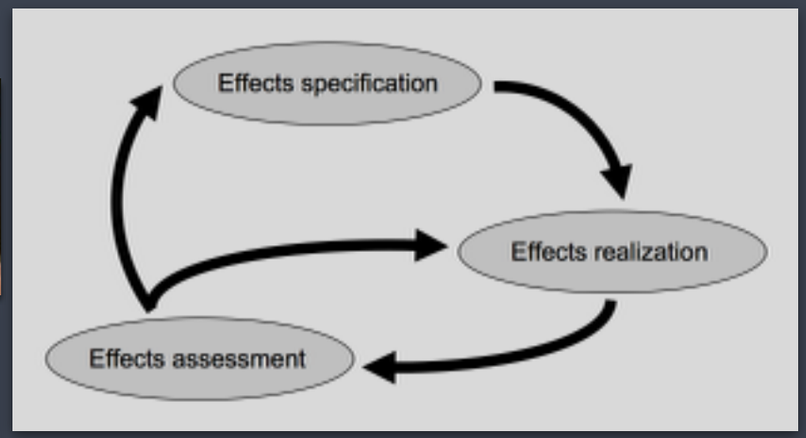
‘Design in use’

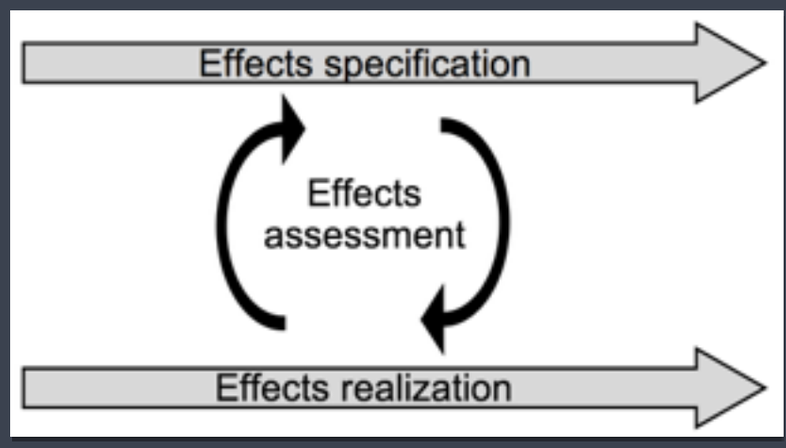
Designing for ‘design after design’

Typical technology evaluation (STS) focus

Sustained PD must embrace: +

Effects-Driven Participatory Design





- Result- and user-driven instrument (approach) for technology supported improvement of (clinical) work practices [1]
- Developed through action research projects since 2004 [2, 3]
- Effects are *specified locally* by clinicians — can be related to hierarchies [4]
- Effects are *realized* through local experiments and interventions [5, 6]
- Effects are *assessed* from available data (formative vs. summative) [7, 8]

Effects specification hierarchies

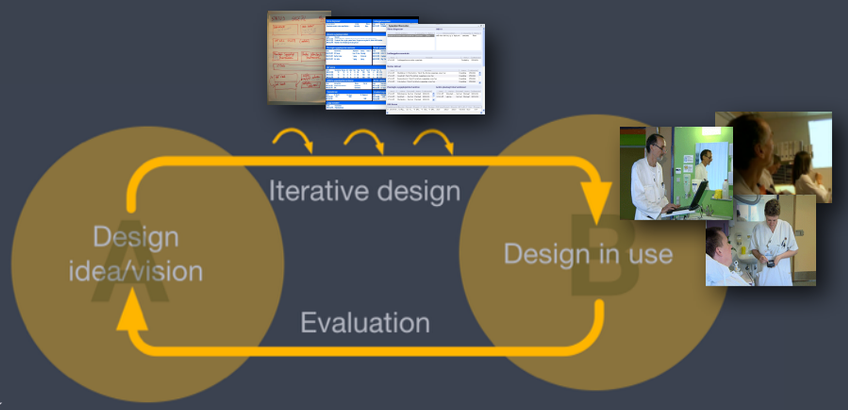
Means/end	St. plans [5, 8]	Emergency Dept. [1, 2]	Fasting and new quality model [9, 10]
National level (Environment: Political demands, organizational culture, national standards, legislation, etc.)	Shared care Knowledge sharing	Emergency department as central entrance to new "Super" hospital structure	Porter's Trippel aim Value = outcomes / cost per patient
Regional level (Business Strategy: Relation/ function/response to environment)	Standard plans	Increasing the citizens sense of security when reducing # of emergency departments	Patient-experienced value (less thirst) Fewer complications Shorter recovery time
Clinical process (Business Processes: Recurrent, familiar input-output relationships)	Well documented patient trajectories	Safe phase transition between primary and secondary sector (moving the ED to patient)	Pre-medication Pre-operative care Operation
Clinical activity (Work Process: Critical with regard to IT support)	Emergency department with patient in need of an acute operation	Communication between paramedic and emergency department	Coordination regarding the patient to be operated
Technology support (IT requirements: Functions, information, categories, computations, GUI, standards, etc.)	Templates with checklists	Ambulance system reports to emergency departments - e.g. ECG (apoplexy)	Sharing data between emergency- anesthesia- and operation departments

Given (stable) consistent demands and requirements

Local (agile) quality goals, Interventions & experiments

Case: EPR - large scale pilot implementation

- Fully integrated EPR (243 screens, 300K patients, 26M records) configured in workshops with clinicians
- EPR in real use 24 hours a day in one week
- All Clinicians used EPR (no paper records used)



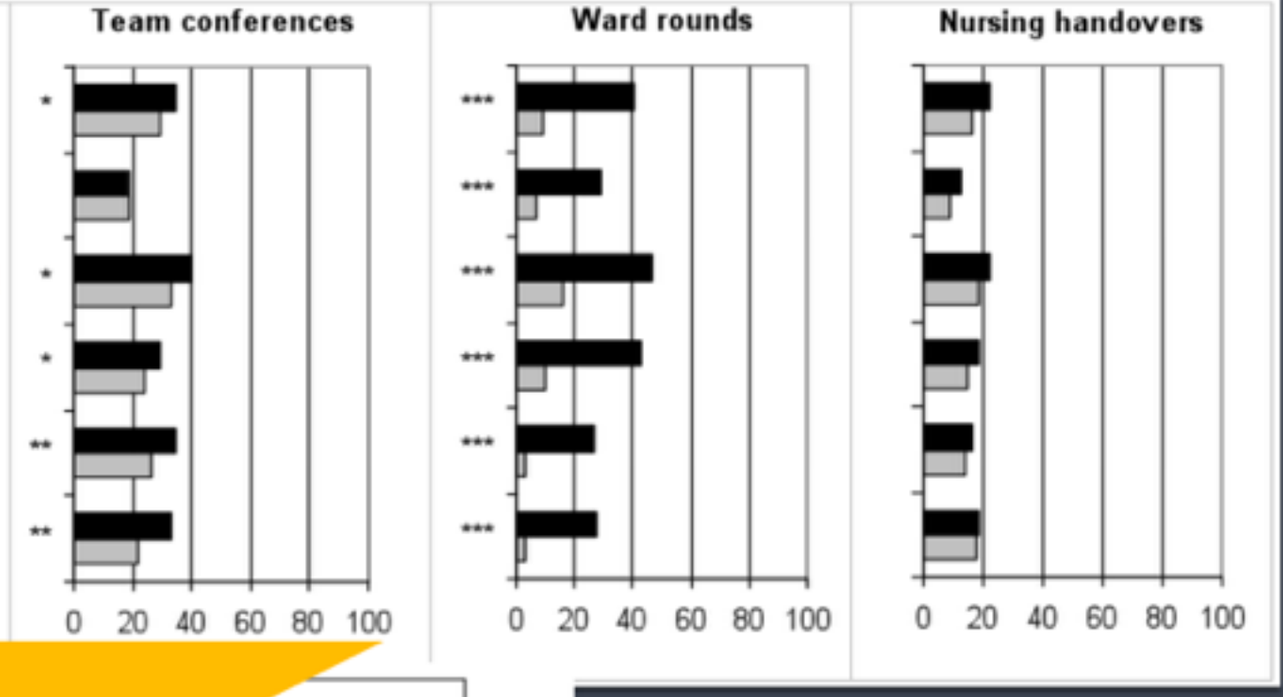
Published in [5, 8, 12, 13, 14]
Documentary movie:
- In Danish
- In English

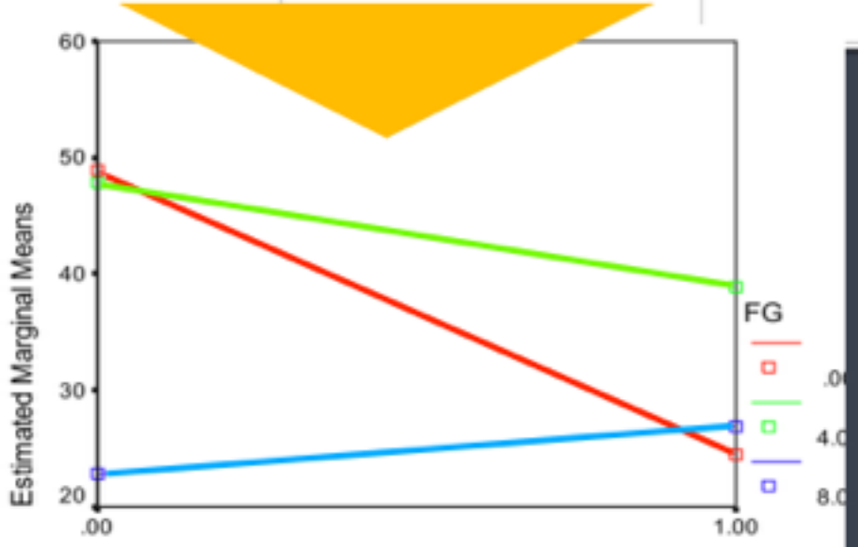
- ‘Back-office’ using Wizard-of-Oz techniques
- 38% (183 out of 482) design ideas from users during 5 days of real use

Activity	CSC	Region Zealand	Stroke unit	Researchers
Preparations	1996	527.4	237.5	240
Training and paper-record measurements	64	0	65	71
Trial period	534	141.6	70	58
Other	197	0	0	48
Total	2791	669	372.5	417

	Effect	Evaluation method
Planned-realized	Better overview of patients	Mental workload/TLX
Planned/curtailed		
Emergent		
Opportunity-based		

See [8]





Physicians
Nurses
Therapists

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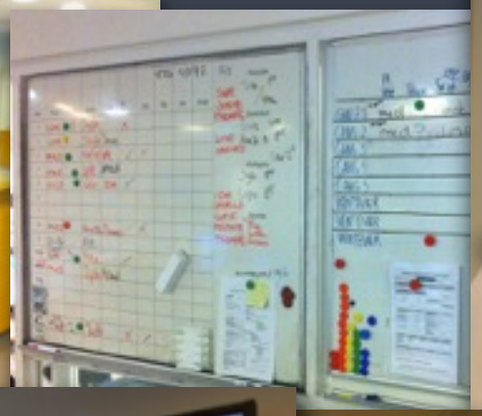
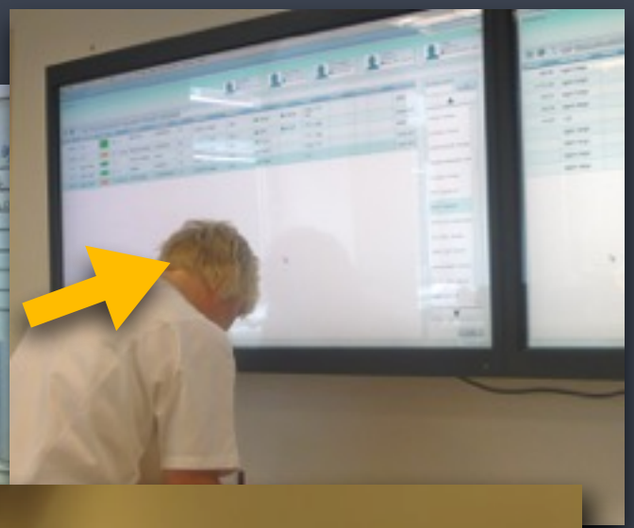
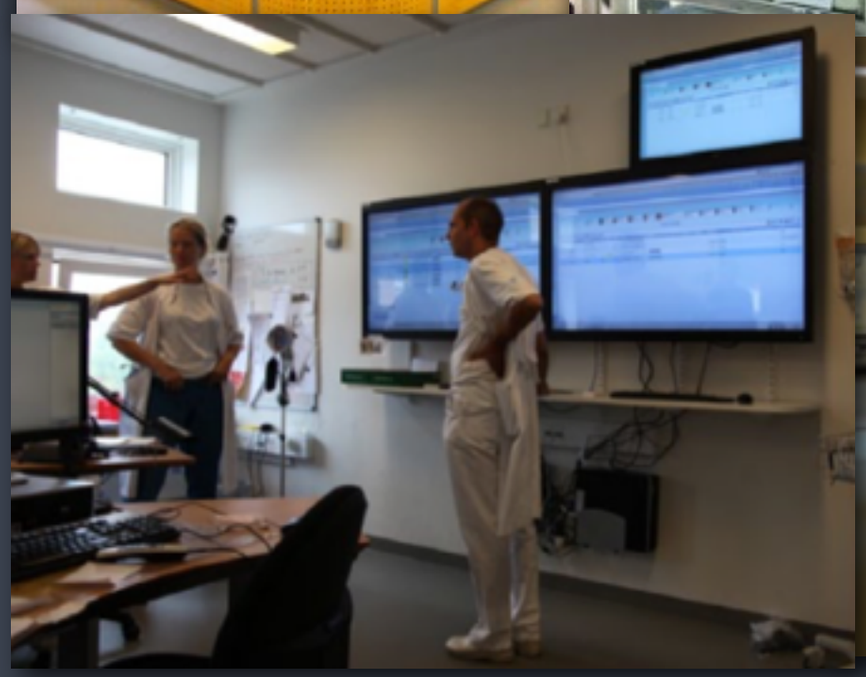
Case: ED - ongoing (re-)configuration

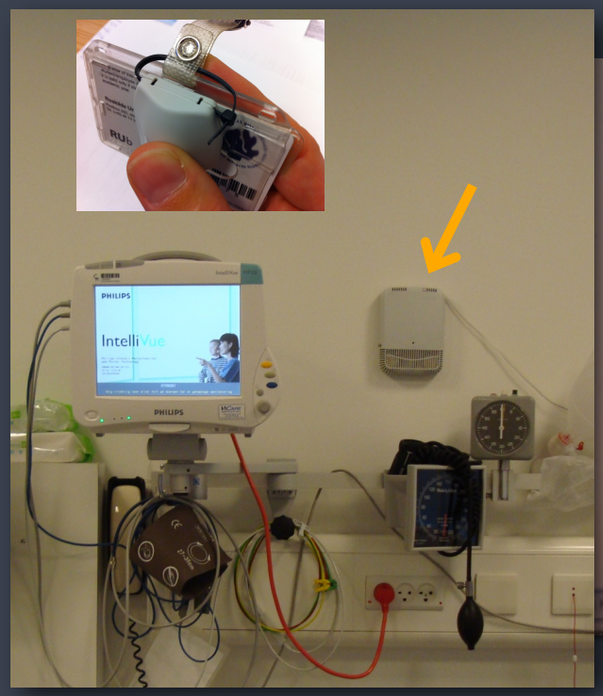


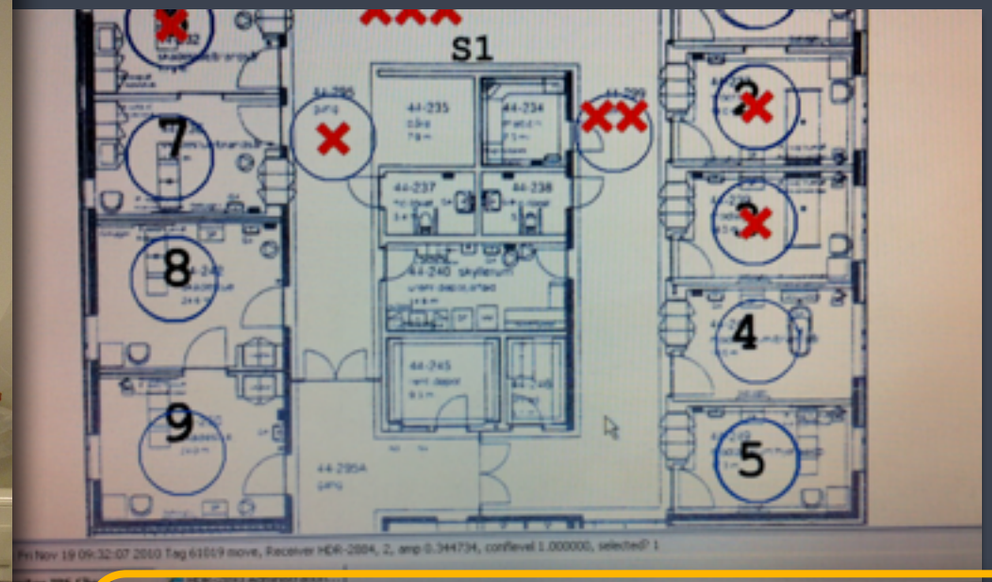


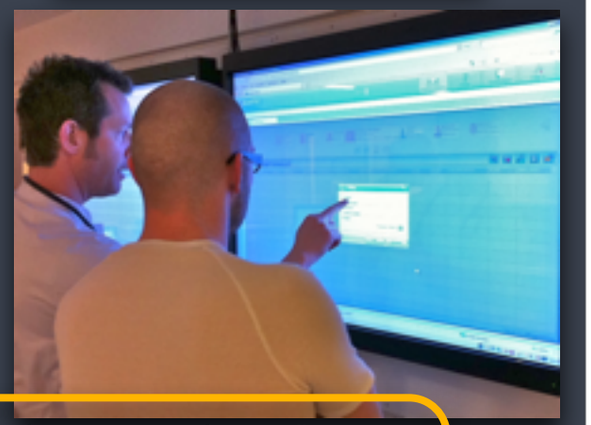


Emergency Department
Centralized healthcare with higher specialization. More ‘warm hands’
Optimized patient flow and logistics in and between wards
Improved resource coordination and prioritizing related to patient flow
Improved overview of incoming and current patients
List of all incoming and current patients, resource allocation, plan, status, etc.

Effects assessment







More “Warm Hands”: 44 min/nurse/shift

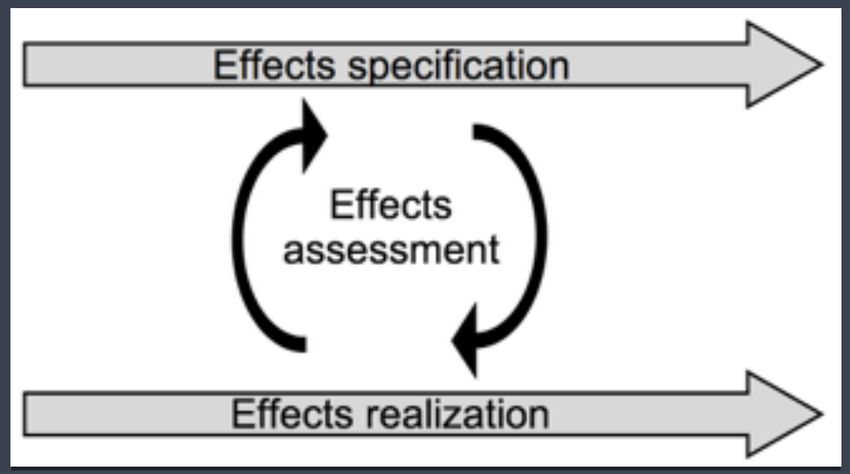
$N = 663$ shifts See [7, 15]		Physicians			Nurses	
		Before	After		Before	After
Patient room		19	20	***	17	28
Coord. Center	**	52	59	**	55	44
Other	***	29	20		27	28

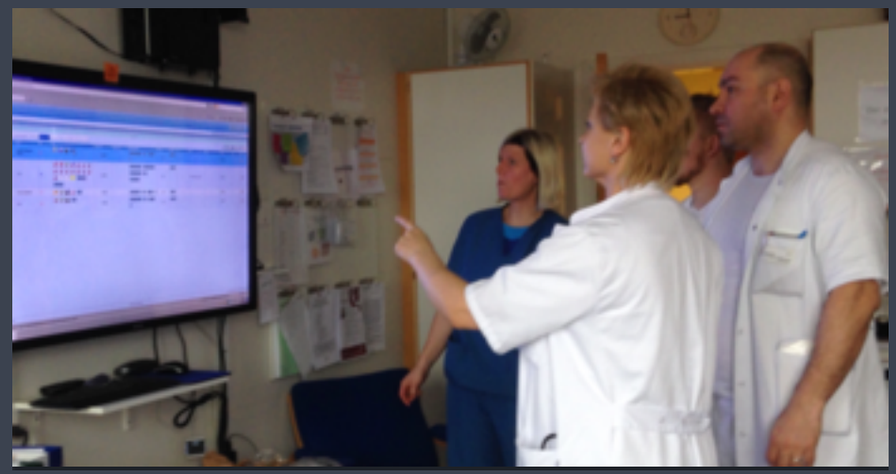
Case: Fasting time & Interruptions

- local competencies in ‘infrastructuring’

Publised in [6, 10]
Forthcoming in [9, 11]

- Effects are specified, fasting times & interruptions are prioritized
- Recording fasting time with eWB - interruptions on smartphones-app
- Data is reported and analyzed
- Assessment of results, suggestions for interventions
- Implementation of interventions





Kirurgiske operationer (OP A)

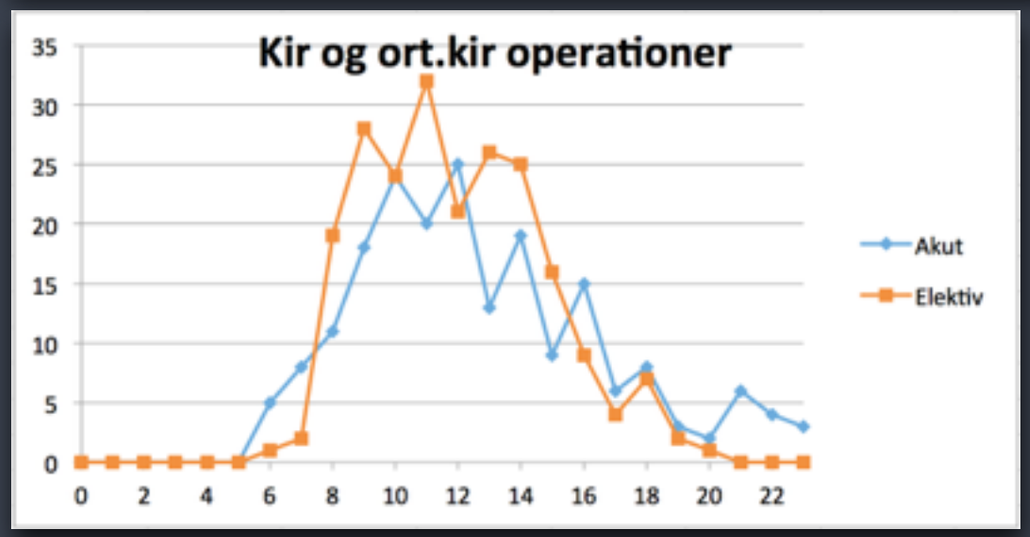
Periode: 11.05 - 14.08, 2015

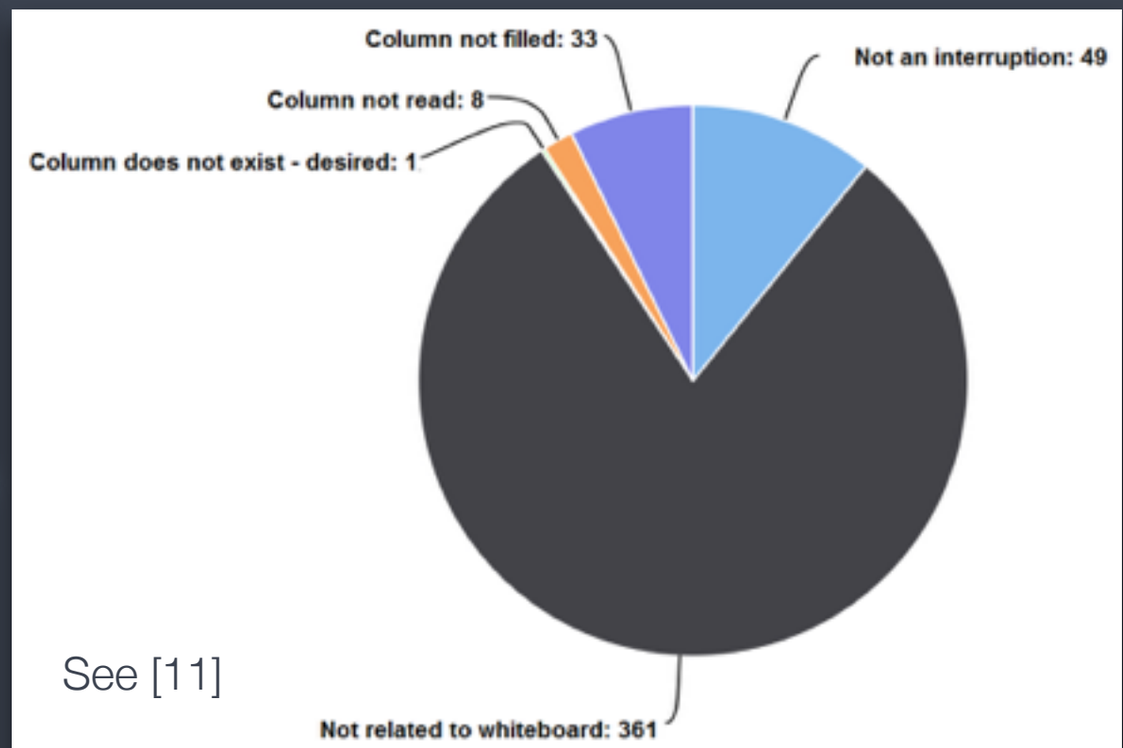
		Fastetid (timer)	Fastetid registreret		Antal operationer
Akut		**13,34**	**57**	**17%**	**345**
	Alder<70	13,49	35	15%	228
	Alder>=70	13,10	22	19%	117
Elektiv		**11,67**	**132**	**43%**	**305**
	Alder<70	11,77	103	44%	235
	Alder>=70	11,31	29	41%	70
Total		**12,17**	**189**	**29%**	**650**

Ortopædkirurgiske operationer (OP D)

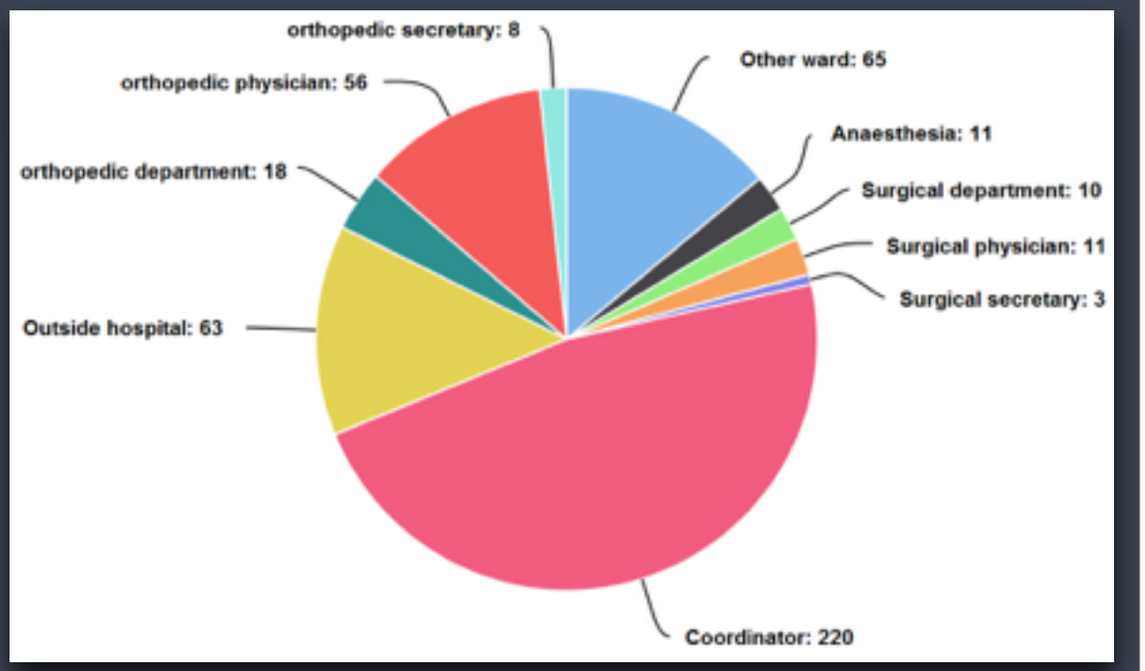
Periode: 11.05 - 14.08, 2015

		Fastetid (timer)	Fastetid registreret		Antal operationer
Akut		**13,13**	**143**	**33%**	**434**
	Alder<70	12,73	72	29%	245
	Alder>=70	13,54	71	38%	189
Elektiv		**13,68**	**84**	**56%**	**149**
	Alder<70	13,53	36	49%	74
	Alder>=70	13,79	48	64%	75
Total		**13,34**	**227**	**39%**	**583**

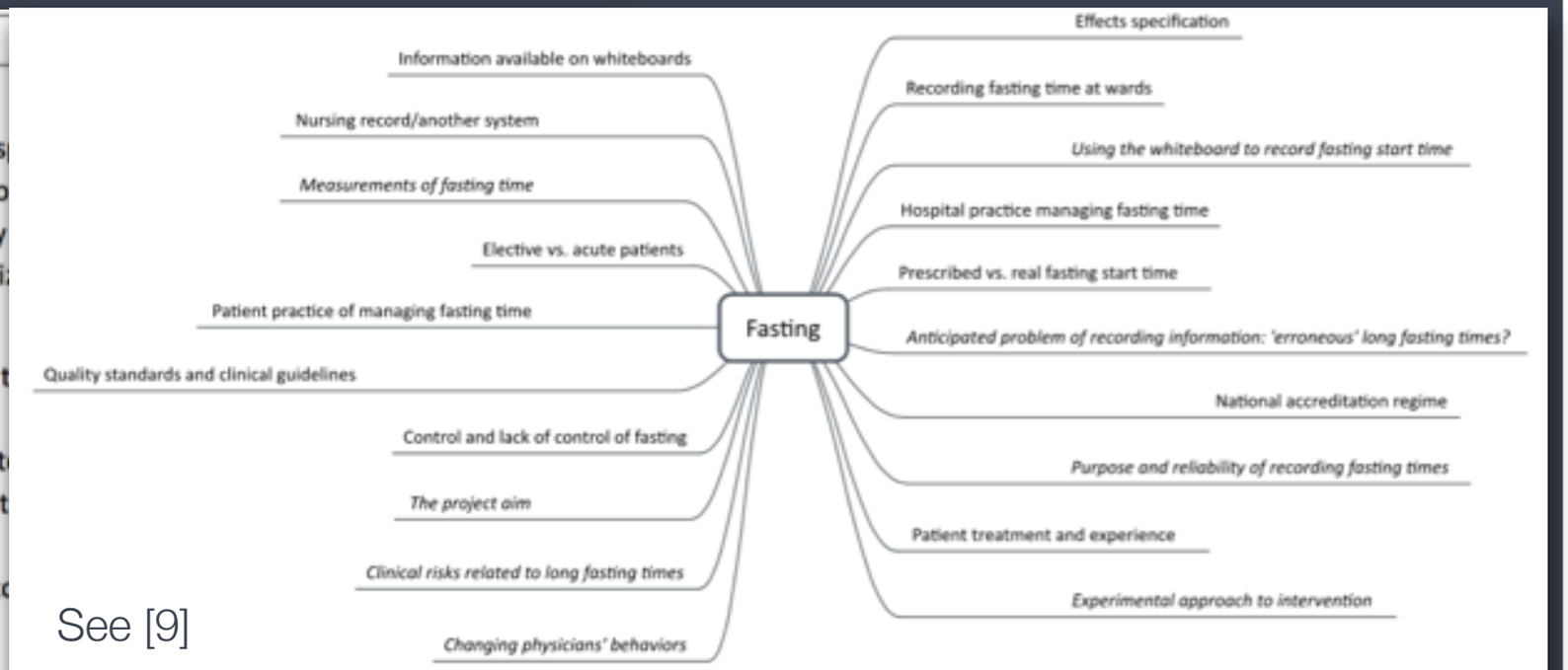




See [11]



Date	Activity
Phase 1: effects specification	
Sep 18	Workshop with 5 clinicians and a hos
Sep 26	Workshop with 10 clinicians and a ho
Nov 7	Workshop with 7 clinicians to specify
Dec 12	Workshop with 9 clinicians to prioriti
Phase 2: effects realization	
Feb 17	Meeting with super users to kick off t
Feb 20*	Meeting with super users
Feb 26	Observation at surgical department t
Feb 27	Observation at operating ward to get
Mar 6*	Meeting with super users
Mar 17*	Workshop with whiteboard vendor to
Mar 27*	Meeting with super users
Apr 10	Meeting with super users
Apr 24	Meeting with super users
May 8	Meeting with super users
May 22	Meeting with super users
Phase 3: effects assessment	
Jun 4	Meeting with super users
May 11 - Aug 14	Fasting times recorded and visualiz
May 18 - Jun 30	Observation at the surgical departr
Aug 21	Meeting with super users to discus
Sep 4*	Meeting with super users and depa
Phase 4: effects realization	
Sep 13 - Oct 4	Observation of whiteboard meetin
Sep 18	Meeting with super users
Oct 2	Meeting with super users
Oct 23	Meeting with super users
Nov 5	Meeting with super users
Nov 16 - Dec 15	Observation of whiteboard meetin
Dec 11	Meeting with super users



See [9]

Figure 4. Relations traced during the meetings held on February 20 and March 6, 2015.

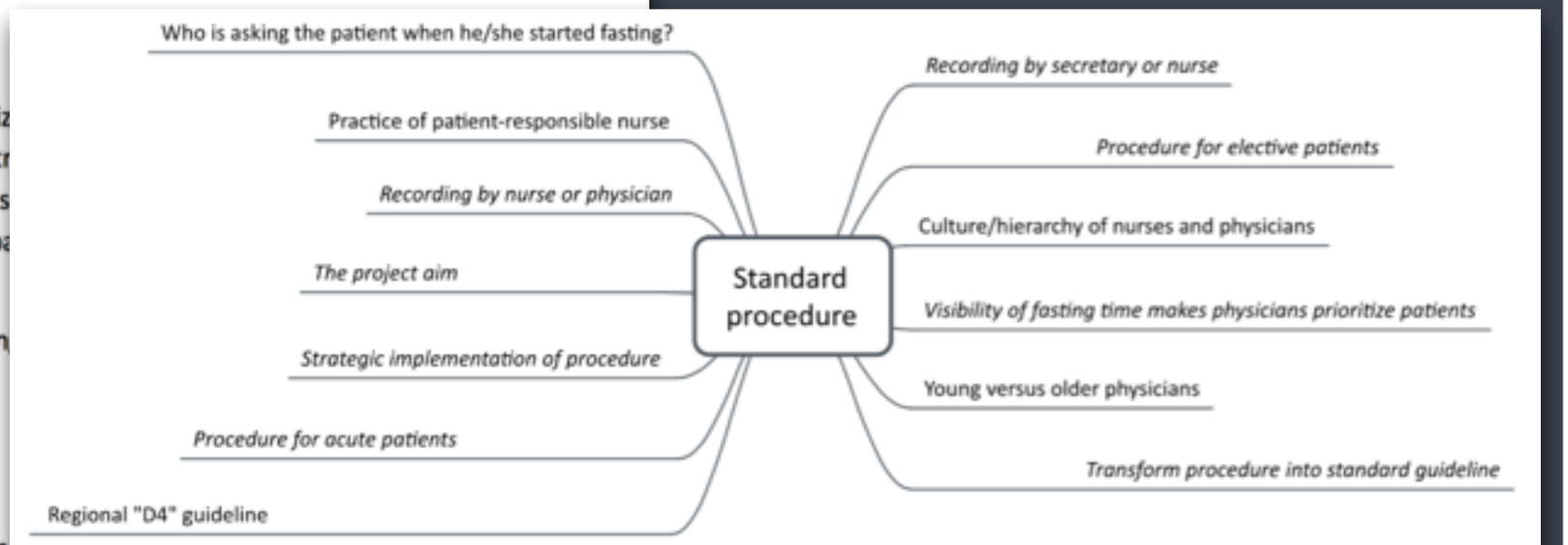


Figure 6. Relations traced during the meeting held on March 27, 2015.

References (with links to download)

1. Hertzum, M., and J. Simonsen (2011): ”Effects-Driven IT Development: Specifying and Measuring Usage Effects”, *Scandinavian Journal of Information Systems*, Vol. 23 , No. 1, pp. 1-26.
2. Hertzum, M., and J. Simonsen (2011): “Effects-Driven IT Development: Status 2004-2011,” in M. Hertzum, and C. Jørgensen: *Balancing Sourcing and Innovation in Information Systems Development*, Tapir Academic Publishers, Trondheim, NO, pp. 165-192.Blog link
3. Simonsen, J., M. Hertzum, J. Scheuer, K. Østergaard, and M. Brandrup (2013-2017): Clinical Communication. Blog site for our current research project.
4. Simonsen, J., M. Hertzum, and A. Barlach (2011): “Experiences with effects specifications,” in M. Hertzum, and C. Jørgensen: *Balancing Sourcing and Innovation in Information Systems Development*, Tapir Academic Publishers, Trondheim, NO, pp. 145-164.
5. Simonsen, J. and M. Hertzum (2012): ”Sustained Participatory Design: Extending the Iterative Approach,” *Design Issues*, Vol. 28, No. 3, pp. 313-328.
6. Simonsen, J., M. Hertzum, H. Karasti (2015): “Supporting Clinicians in Infrastructuring,” in Enrico Maria Piras and Gunnar Ellingsen (Eds.): *Proceedings of the Fifth International Workshop on Infrastructures for Healthcare (IHC): Patient-centred Care and Patient generated Data*, 18-19 June, 2015, University of Trento, Trento, Italy.PDC’2012
7. Hertzum, M., and J. Simonsen (2016): ”Effects of electronic emergency-department whiteboards on clinicians' time distribution and mental workload,” *Health Informatics Journal*, Vol. 22, No. 1, pp. 3-20..
8. Hertzum, M. and J. Simonsen (2008): “Positive effects of electronic patient records on three clinical activities”, *International Journal of Medical Informatics*, Vol. 77, No. 12, pp. 809-817, doi:10.1016/j.ijmedinf.2008.03.006.
9. Simonsen, J., M. Hertzum and H. Karasti (forthcoming): “Infrastructural Inversion and Participatory Design: Insights from the Fasting-Time Project”, submittet to *CSCW SI: Infrastructuring and Collaborative Design*
10. Simonsen, J., and J.D. Scheuer (2016): *“Accreditation and Participatory Design: An Effects-Driven Road to Quality Development Projects”, in J. Pries Heje and P. Svejvig (Eds),: Project Management for Achieving Change, Roskilde University Press, pp. 11-31.*
11. Brandrup, M, K.L. Østergaard, M. Hertzum, H. Karasti and J. Simonsen (forthcoming): “Effects-Driven Participatory Design: Sampling Insights about Interruptions”, chapter to be submittet to (A.M. Kanstrup, A. Bygholm, P. Bertelsen and C Nøhr (Eds.): *Participatory Design & Health Information Technology*, OIS Press.
12. Simonsen, J and M. Hertzum (2008): "Participatory Design and the Challenges of Large-Scale Systems: Extending the Iterative PD Approach", in Simonsen, J., T. Robinson, and D. Hakken (Eds.): *Proceedings of the 10th anniversary conference on Participatory Design: Experiences and Challenges, September 30 – October 4, 2008, Bloomington, Indiana, USA*, ACM press, 2008, pp. 1-10.
13. Hertzum, M., and Simonsen, J. (2010): "Effects-Driven IT Development: An Instrument for Supporting Sustained Participatory Design", in K. Bødker, T. Bratteteig, D. Loi, and T. Robertson (Eds.): *Proceedings of the 11th biennial conference on Participatory Design: Participation – the challenge, November 29 – December 3, 2010, Sydney, Australia*, ACM press, 2010, pp. 61-70.
14. Simonsen, J. and M. Hertzum (2010): “Iterative Particpatory Design”, in Simonsen, J., J.O Bærenholdt, M. Büscher, and J.D. Scheuer (Eds.) Design Research: Synergies from Interdisciplinary Perspectives, Routledge, pp. 16-32.
15. Hertzum, M., and J. Simonsen (2013): ”Work-Practice Changes Associated with an Electronic Emergency-Department Whiteboard,” *Health Informatics Journal*, Vol. 19, No. 1, pp. 46-60.
16. Hertzum, M., J. Bansler, E. Havn, and J. Simonsen (2012): ”Pilot Implementation: Learning from Field Tests in IS Development,” *Communications of the Association for Information Systems*, Vol. 30, No. 1, Article 20, pp. 313-328