ISS Lahti pilot case study

New ways of working

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Renate Fruchter, Leonard Medlock, Kincho H. Law, Pekka Mattila, Adriana Ståhlberg, Hannamaija Määttä & Esa Nykänen. Espoo 2014. VTT Technology 176. 81 p.

Abstract

This report presents the results from the ISS Lahti pilot case of RYM SHOK New-Wow project which was conducted in collaboration between Stanford PBL lab, ISS and VTT during 2011–2012. The purpose of the Lahti pilot case was to study factors of physical, virtual and social environment that enhance or disrupt knowledge work on individual and team level at a new ISS regional office in Lahti remodelled according to new ways of working principles. More specifically, the objective was to examine how to increase engagement in the work of service secretaries, superiors and managers working in the business area of security, technical and cleaning services. The employees had moved from an old office space not supporting the needs for transparency, interaction, collaboration, and engagement promoted by new ways of working practices. The remodeled ISS Lahti regional office was designed following a new space concept developed at ISS called *the office of* choice*. The new space concept was designed to support diverse work tasks allowing the employees to choose a space most suitable to their activities.

The research team conducted an ethnographic study during three working days at the new Lahti office site, where the researchers observed how the employees experienced the new space in their daily work. Three methods were utilized; observation, interviews and questionnaires. Additional workshops were held at the ISS Lahti office to engage the employees in the study as well as provide them feedback

The results of the Lahti pilot case contribute to the development of methods that support a continuous and dynamic transformation of the work environment, explicit choices employees make with regards to place, technology, and work processes. This encourages an integrated approach that brings space management, ICT management, and business processes together taking into account the end user perspective and evolving needs.

Contents

List of symbols

New WoW   New Ways of Working

BBI   Bricks-Bits-Interaction

eMoC   engagement Matrix of Choice

F2F   Face-to-Face interaction

ICT   Information and Communication Technology

KW   Knowledge Worker

KWP   Knowledge Work Productivity

1.   Introduction

This report presents the findings of the ISS Lahti pilot case, which was one of the case studies of RYM SHOK NewWow "New Ways of Working" project during 2011–2012. The NewWow project aims to provide an understanding of the changing nature and demands of knowledge work and their impacts on facility management and productivity of organisations. ISS is one of the company partners in the project, representing the real estate and business facility domain. The company provides personnel support services for private and public organisations. The ISS Lahti pilot was seen as an interesting case study for the NewWow project, as it went through a major relocation and remodeling effort to foster a more open and collaborative work environment. This provided an excellent opportunity to study the success of the remodeling effort and functionality of the new work environment from the knowledge worker perspective. The pilot case was chosen as a research case study by the PBL Lab research team at Stanford University, who participated in the RYM SHOK project launched in Finland. The case study was a part of PBL Lab's uEngage research project focusing on the levels of engagement. uEngage studies technical, spatial, and behavioral aspects related to engagement, agility, co-creation, and dynamic choices fostered by New WoW contexts. The research work was conducted by PBL Lab in collaboration with VTT and ISS.

2. Objectives

2.1 Case description

The management of the facility planning department of ISS had realised that there is a need to renew the local working conditions in their regional Lahti office. The old office was found impractical as it did not support the work processes of ISS employees in an efficient way. There were also challenges concerning internal air quality in the facility. The renewal of this regional office was expected to be a reference example within the organisation. The purpose was to gain the interest and support from ISS top management to enable the scaling up of the developed solutions for other ISS regional offices around Finland.

At the beginning of 2011, the Lahti regional office employees were given the possibility to select a new building site for the new regional office and remodel it to better address the tasks and activities of the employees. The purpose of the ISS Lahti regional office remodeled space was to create an office concept that better supports open and collaborative new ways of working, as well as establish a signature flexible and mobile workspace concept be used in the remodeling of other ISS regional offices in Finland. The goal of the space design was to create *an office of choice*; a functional and engaging work environment, where employees may choose the space according to the task at hand and the desired individual or team process.

The employees chose an old office building previously used by a Finnish furniture company. The remodeling of the new office began in spring 2011 and was finished during the summer of 2011. The furniture from the old office was utilized more efficiently in order to reduce the size of the workstations. The employees of the Lahti office mainly consist of service secretaries, superiors and managers working in the business area of security, technical and cleaning services. As ISS has various work profiles, the work methods of the Lahti employees were studied in terms of what kind of workstations they occupied in the old office, how much space is needed and used, and how many tables and storage units they have.

The new ISS Lahti office was ready for the twenty-one employees to move-in from the old regional office to the modern remodeled office space after they came back from their vacation in the summer of 2011. The new office includes *open mobile* and *team stations* meant for mobile individual or team work and for having

small meetings and project reviews; *a phone and laptop-lounge*, where employees may talk on the phone and have discussions without disturbing others; *a quick meeting point* for breaks and casual meetings, as well as for mobile co-workers who may drop in to work for a short periods of time; *a quiet cube* for meetings for up to three people or for private phone calls; two personal offices for employees requiring privacy due to the confidential nature of work. The space also includes three larger meetings rooms; a client meeting room, an internal meeting room and a project meeting room, as well as a kitchen for coffee and lunch breaks. Each employee has 2–3 shelves or storage units, i.e. less storage space than in the old work environment. This led everyone to make explicit decisions what content was critical for their job to be stored and what could be discarded or stream lined in a shared storage space.

The previous office was described as old fashioned consisting of a lot of underutilized space where employees had various desks, cupboards, individual storage spaces and archives. The new Lahti regional office has the same amount of square meters as the previous office had. However, the space was designed and utilized in a more effective way offering diverse types of work settings. The remodeling vision aimed to encourage employees to choose the space most suitable for each task and activity conducted during the day instead of having assigned desks or rooms (see Figure 1).
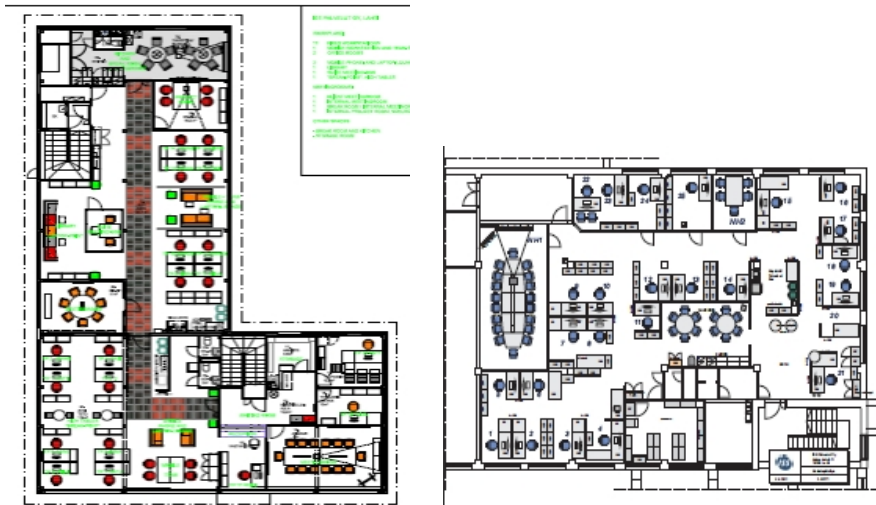
Figure 1. ISS Lahti office: (a) The old floor plan and (b) the new floor plan.

2.2   Research objectives

"We shape our buildings; thereafter they shape us." (Winston Churchill)

The PBL's **uEngage** project aimed to go beyond this static outcome to allow teams to continuously make explicit choices and assess their work spaces, collaboration technologies, and work practices to address the needs of specific tasks and activities they engage in. What is hard about knowledge work? The worker or knowledge worker typically needs to collaborate on multiple, distributed teams in decentralized organizations. Today's knowledge worker looks for purpose and engagement. However, the typical work space is standardized, gray, and often dull, and the work environment is slow, legacy bound, risk averse, crowded with information so the big picture is hard to see. In addition, guidance and performance feedback is provided once a year on an individual basis.

The key research objectives of the ISS Lahti case study were to observe how effective the new work environment is and to demonstrate the eMoC (engagement Matrix of Choices) tool developed by PBL in observing the employees' work environment choices and how these choices support their activity and business goals. The approach was to engage the participants from the ISS Lahti regional office in participatory activities during the study. In order to achieve this we explicitly communicated to the participants that *"everyone has a voice and will be heard"* and the PBL research team will listen to *"what participants want to tell us"* vs. *evaluating how they do their job or how they work*.

The Lahti pilot case study served as a testbed to address one of the overall research question of the RYM SHOK NewWow project, focused on identifying social environment key factors that enhance or disrupt knowledge work at individual and team level. The results of the Lahti pilot case support the overall RYM SHOK project goals and contribute to the development of methods to manage the change processes from the viewpoint of space management, taking into account the end user perspective. In fact, **uEngage** offered an approach that fosters managing choice which is a continuous process of knowledge work productivity improvement rather than managing change that is a addressing a onetime switch from an old work space to a new one, as well as from an old work practice to a new one

The research questions for the pilot case are:

- How can we increase engagement at work?

- What are key engagement indicators?

- What enable or hinder knowledge workers to be highly engaged in their individual and team work in the context of current and future ways of working and work environments?

- What are key characteristics of current and future ways of working and work environments?

2.3 Theoretical points of departure

The theoretical points of departure of this study build on design theory and methodology, distributed work, workplace design, knowledge creation and management, agile processes, learning theory, learning organizations, and human computer interaction as we characterize the knowledge workplace and engaging future interaction experiences.

We leveraged and extend the *bricks-bits-interaction* (BBI) framework developed by Dr. Fruchter and the PBL Lab research team in the late 1990s (Fruchter, 2001). The BBI framework (Figure 2a) is at the intersection of:

- *Bricks*, i.e. the design of *physical spaces*;

- *Bits,* i.e. the design of *virtual spaces* that focus on ICT including digital, mobile, and virtual worlds, and

- *Interaction,* i.e. the design of *social spaces* that focus on emergent work practices, process, and new ways people behave during communicative events using the affordances of their physical, digital, virtual, mobile, and robotic ICT and workspace.

We believe that a better understanding of the relationship between bricks or physical space, bits or virtual space, and interaction or social space, leads to:

- design workspaces, that better address and adapt to the communicative events and activities performed by knowledge workers,

- develop ICT that support natural communication idioms among knowledge workers as they perform their tasks, and

- engaged knowledge workers in richer interaction experiences.

Any change in one of the three elements of the BBI framework impacts the other two. Consequently, it is critical to take a bricks-bits-interaction integrated approach in the analysis of the current state of practice and the creation of future work environments. Changing only one of the three elements of BBI without considering the implications in the other two can lead to significant unforeseen hindrances and impact knowledge work productivity. One of the central objectives is for the three communities or business units representing the three elements of BBI – facility management or workplace business unit, IT business unit, and HR and business process development units – in any institution, be it industry or academia, to work together and take an integrated BBI approach in order to better support the knowledge workers' activities and increase their productivity.

In addition, knowledge work increasingly takes place through collaboration from different and changing workplaces due to mobility, multi-location, and geographical distribution of participants. Due to the changing contexts knowledge workers, teams, and organizations need to constantly adapt, readjust, and re-align according to five factors: *task, team structure, work process, workplace, ICT, and organization policy* (Bosch-Sijtsema et al., 2011) (Figure 2b).

(a)

(b)
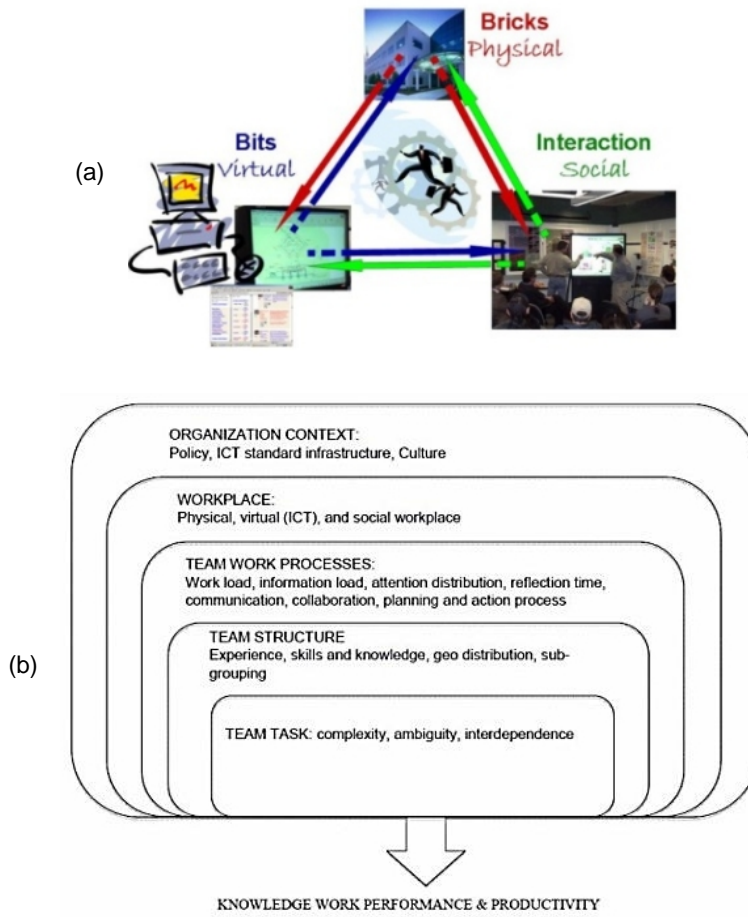
Figure 2. Frameworks of analysis.

3. Data collection and analysis

The remodeling of the ISS Lahti office was chosen as a pilot case by PBL at a kick-off workshop with RYM SHOK partners in summer 2011. The research activities were set to be conducted in collaboration with VTT and ISS during fall 2011 and spring 2012. The research begun in August 2011 with preliminary interviews with the facility manager and a designer responsible for the remodeling of the new work space in order to gain insight into ISS's business goals and current objectives to introduce new ways of working and work environments.

The following interview protocol was used:

- What is your role and experience at ISS?

- What is ISS's business – internal and external services and customers, specific activities that the Lahti office focuses on National or International business – geo location of offices and customers?

  - Are international business units exchanging their experience and knowledge related to space design?

- What is the business relation between RAPAL and ISS?

- Why did ISS start this remodeling effort – reasons, cost?

- Does ISS want to improve the work environment for their employees or only focus on cost savings by reducing space and operation expenses?

- How did ISS proceed in profiling the different work types and environments? Did they use a standard procedure? Was it a typical process or was it new?

- What activities were envisioned for these spaces?

- How are the spaces and desks assigned in the new work environment?

- What are the new workplace policies and norms?

- What challenges were encountered before and after the move into the remodeled space?

- How was the new ICT infrastructure provided and arranged in the new work space?

To support the preparation for the study, we received the floor plans showing the old and new work environments of the Lahti regional office (presented in Figure 1), which provided an initial understanding of the key transformation of the work environment from dedicated office and desk spaces, to an open work environment with a mix of diverse spaces from clusters of dedicated desks to clusters of free address desks, informal spaces, quiet room, break areas, group/team workspaces, meeting rooms, phone booth and library space. It was clear that the move-in to the remodeled work environment required a new way of thinking from the employees to use the transformative space, as they were used to a lot of personal office and storage space and reduced open and collaboration spaces.

For this study, a participatory case-based multi-method approach was chosen utilizing a participatory LIKE-CONFUSED-NEED-WISH feedback exercise, ethnographic field study, interviews and surveys.

3.1 LIKE-CONFUSED-NEED-WISH feedback exercise

3.1.1 Protocol

Six weeks after the move-in we visited the Lahti regional office and organized a workshop to launch our case study. One of the goals of the workshop was to introduce all the employees to the pilot study's purpose, activities, and benefits in order to motivate them to participate. 18 employees participated in the workshop. They gave feedback during PBL's participatory LIKE-CONFUSED-NEED-WISH feedback exercise, where the purpose was to find out what the employees think of the new office arrangement. At the end of the field studies at Lahti, the personnel were invited to a second workshop where the results of the feedback session were presented.

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Figure 3. The LIKE-CONFUSED-NEED-WISH exercise.

It is important to note that this workshop was timely for data collection of subjective perceptions and feedback since the ISS Lahti employees moved-in only six weeks before and were adjusting to the new work environment and could vividly recall the old work space and compare it to the new space.

3.1.2 Key findings

The Lahti Workshop and ethnographic field study in September 2011 were very productive. After meeting with the group and sharing the objectives of the pilot study a participatory feedback exercise was organized focusing on a crowdsourcing brainstorming method LIKE-CONFUSED-NEED-WISH that allowed all Lahti participants to express their perspective regarding the remodeled work environment. All ISS participants received four colors PostIt notes – green for LIKE, red for CONFUSED, yellow for NEED, and blue for WISH – and asked them to write down one message per PostIt note for each of the four questions:

- What do you like in the remodeled work environment?
- What is confusing in the remodeled work environment?
- What do you still need in the remodeled work environment?
- What do you wish would be provided in the remodeled work environment?

We collected their PostIt notes, clustered them by topic and prioritized them according to the amount of similar comments. Next we present some of the views regarding the above mentioned questions about the work environment.

Regarding the LIKE aspect, the employees gave feedback on work environment quality, types and organization of spaces and furniture. In the work environment, the employees especially liked air conditioning, the carpet, daylight, openness of space and the coloring of the space. Regarding the types and space organization the employees liked multiple diverse good meeting rooms, the breakroom/kitchen area as well as the organization of people in the space. The employees especially liked the nice workstations and chairs, as well as the couches. Many of the employees provided positive comments about the new work environment, such as *"… new office space has addressed some special needs e.g. more variety on meeting rooms such as phone booth/quiet booth though it is difficult to drag your laptop with you all the time, when you contact a customer…"*

Like

Topic / Nr. of votes	1	2	3	4	5	6	7	8

Work environment quality

Topic	Votes
Air Conditioning	8
Carpet	6
Day light	5
Openess of space	4
Color	3
Interior	3
Cleanliness	3
Green plants	2
Acoustic due to carpets	2
Fresh look	1

Types and organization of spaces

Topic	Votes
Multiple diverse good meeting rooms	5
Break room/kitchen	4
Organization of space / people	3
Silent cube space for concentration	2
Having own office for high security data work	1

Furniture

Topic	Votes
Nice workstations	4
Couch	1
Nice work chairs	1

The employees reported that they were confused about the relation between physical spaces, ITC and work practices, which is a key requirement of the BBI integrated approach. Regarding the physical space, the employees felt confused for example about the noise in the open space, significantly reduced storage space, too low or missing partitions between desks. All complained about the unreliable internet connection and WiFi infrastructure, and IT security which is business mission critical. Some employees reported being confusion of new work practices as well, for example, the confusion related to desk assignments in the open work area not having assigned work desks.

Confused

Topic / Nr. of votes	1	2	3	4	5	6	7	8
Bricks – physical space								
Noise in open space/phone conversations	█	█	█	█	█			
Too little storage space	█	█	█	█	█			
Too small desks	█	█	█					
Missing partitions between desks	█	█	█					
Partitions between desks too low/ lack of privacy	█	█	█					
No elevator	█	█	█					
Location too isolated from public transp./food	█	█	█					
Not enough parking space	█	█						
Coffee room too far	█							
Have to sit with your back to people	█							
Not clear how to adjust chairs	█							
Functionality of the lighting in the project space	█							
Big Meeting room is too small	█							
Color of wall	█							
Empty walls	█							
Storage room too small	█							
Missing recycling area	█							
Mail delivery location missing	█							
No coffee machine in lobby	█							
Not clear what the phone chairs are for	█							
Location of trash cans	█							
Bad public transportation	█							
Bathrooms are not nice	█							
Bits – virtual space (ICT)								
No reliable Internet connection	█	█	█	█	█	█	█	
No push button at door	█	█						
Connection with printer and fax not working	█	█						
IT security	█	█						
WIFI connection for mobility	█							
Not enough printers	█							
Location of printer	█							
Computer screen at the lobby	█							
Interaction (work practice, process)								
Confusing work area – free address workstation	█							
Cross-office communication and transportation delays	█							
Functionality does not support my work	█							
Move-in process was not smooth	█							
Not clear what the phone chairs are for	█							
Door bell is disruptive	█							

Need

Topic / Nr. of votes	1	2	3	4	5	6	7	8
Bricks – physical space								
More storage space	■	■	■	■	■			
More desk space	■	■	■	■				
More quiet spaces to concentrate	■	■	■	■				
Coat hangers	■	■	■					
Storage room for supplies	■	■	■					
Office supplies	■	■						
Place for having phone calls	■							
Place where I can put my bag	■							
Walls – color, look	■							
Place for documents that go to the shreader	■							
Trashcan in the room	■							
Coffee machine in the lobby	■							
Guest parking	■							
Own workstation	■							
More pinboard space	■							
Bits – virtual space (ICT)								
Docking station and monitors for visitors	■							
Headphone (to enable concentrated work/no distration/ no noise)	■							
Printer	■							
Button to open the door	■							
IT security	■							
Internet connection	■							
Rights for using all the software programs I need to do my work	■							
Own workstation	■							
Paper shreader	■							
Interaction (work practice, process)								
Headphone (to enable concentrated work/no distration/ no noise)	■							

What the employees felt they needed in the new work environment following the BBI frame included: more storage and desk space, more quiet spaces for concentrated work, storage room for supplies, docking stations and monitors for visitors, rights to use all software programs needed to do the work, headphones to enable concentrated work.

Wish

Topic / Nr. of votes	1	2	3	4	5	6	7	8

Bricks – physical space

Topic	Votes
More Parking spaces / assigned parking spaces for ISS	5
Own work room	3
Soda machine / snack machine	2
More workstation space and storage	1
Bigger coffee machine	1
Bigger fridge	1
Bigger hall	1
More green plants	1
Winter car heaters in parking	1
Bigger coffee machine	1
Bigger hall	1
Winter car heaters in parking	1

Bits – virtual space (ICT)

Topic	Votes
Remote work connection	2
Soda machine / snack machine	2
More training for the ICT programs	1
Big monitor	1
Time spent on ICT issues problem solving	1
Decent phone	1
More functioning Internet connection	1
Winter car heaters in parking	1
Big monitor	1
Decent phone	1

Interaction (work practice, process)

Topic	Votes
Remote work connection	2
More group activities / social activities	2
Soda machine / snack machine	2
Service secretary	2
More training for the ICT programs	1
Time spent on ICT issues problem solving	1
More meetings with my own team	1
More money	1
More parties	1
Decent replacement when people are on vacation	1
Flexible hours	1
Lunch break without interruptions	1
Clear organizational policies/work practices	1
More quiet at work	1

The employees expressed a need for more parking spaces for the personnel, own work rooms and a soda/snack machine due to the fact that the new location is far from any food shops. Employees required remote work connection and more training to be able to use the available ICT programs and newer technologies like videoconferencing.

The preliminary feedback results were shared and discussed with the Lahti team. This led to an action plan to address the top priorities identified in the LIKE-CONFUSED-NEED-WISH participatory feedback exercise to further improve the work environment at ISS Lahti office.

3.2 Ethnographic field study

3.2.1 Protocol

The participatory workshop session was followed by an ethnographic study with field observations at the Lahti office that lasted two and a half days (approx. 20 hours) where the research group shadowed different employees as they used the new work environment for different activities and tasks.

3.2.2 Key findings

Organization augmented by New WoW environment

As we study how organizations can be augmented and people empowered by new ways of working we believe that:

- You **cannot "fix"** a troubled organization or project team only through acquisition of IT and new spaces.

- You **can** take a good organization or project team **from good to great** through New Ways of Working (New WoW) integrated BBI choices.

The Lahti regional office culture has created a very supportive community of knowledge workers who are ready to assist, coach, and help each other. As one employee indicated: *"… just voice your problem and someone will come and help."* This office culture is now supported by the new open work space environment that fosters visibility of people and transparency of activities at all organizational levels. Employees can easily drop by the desk of their superior and discuss problems and get immediate input. Consequently, it fosters access to people and their knowledge as well as makes people accessible from an organization culture point of view. The field observations indicated that the remodeled work environment continues to build and sustain the community spirit in the Lahti regional office. Important positive consequences of the transparency, visibility, accessibility of people at all organizational levels are:

- strengthened work relations, and
- trust that is built and maintained.

Figure 4 illustrates snapshots of the new inviting and engaging new spaces in which knowledge workers (KW) marked with white shirts have easy access to interact with their supervisors and managers (marked with black shirts).

Figure 4. Lahti open work space environment that fosters visibility of people and transparency of activities at all organizational levels.

Connector spaces and people

It is critical to create connector spaces and people to link KW, spaces, and activities. In the Lahti work environment we found the reception area and the receptionist to represent one of the connectors between

- KW,
- spaces, and
- activities in the remodeled work environment.

Flow and interaction

The open work environment supports dynamic interactions and provides a natural flow of movement from open space to informal interaction space to group space to quiet space. For instance Figure 5 illustrates two interaction spaces separated by a gray curtain – on the left cleaning service employee discusses with her superior

a problem and on the right two knowledge workers sit in the informal alcove on the sofas and work.

Figure 5. Lahti open work environment supports dynamic interactions.

Free address desk cluster fosters collaboration and knowledge transfer

The mobile workstations organized as free address desk clusters foster collaboration, allowing the knowledge workers to help each other, work together on problems, exchange information, have a dialog, informally mentor each other, and bond. This was visible in the work areas where the tech and cleaning service employees were sitting in these open area desk clusters – talking a lot with each other about their work and issues, sharing information, discussing and getting feedback and suggestions from co-workers. They used the open space effectively as they smoothly navigated between their private work area in front of their laptop to assist other co-workers as well as sharing their knowledge and work practices. It proved as an effective space for knowledge transfer and collaboration. These free address workstations were used by Lahti employees who are mobile, multi-location, and "on-the-go" a lot during the day. The free address desk cluster creates an open space that is effectively used by the knowledge workers to (Figure 6):

- smoothly navigate between private work area in front of their laptop,
- interact and assist other co-workers,
- share knowledge and work practices.

Figure 6. Interaction in free address desk cluster.

Interaction, buzz, and noise

Private work spaces in an open work environment can quickly transform into small group interaction spaces (Figure 7) as each KW sits in front of their workstation and talks with the other co-workers in the open space. This may be an enabler or a hindrance.

Figure 7. Interaction in dedicated workstation open space.

Enabler (Figure 8): A by stander who is not engaged in the small group dialog can help in problem solving or provide valuable information and feedback on the fly.
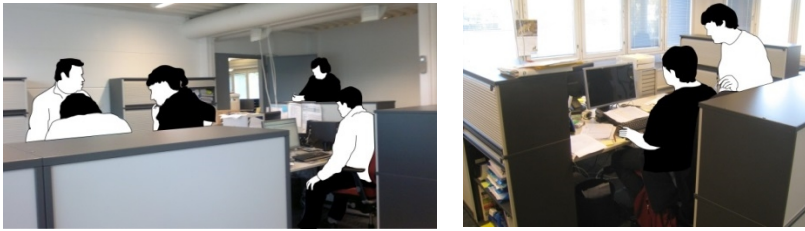
Figure 8. Engaging by-standers in dialog and problem solving.

Hindrance (Figure 9): all the conversations are audible people have to be used to work in noisy environments, otherwise it is disruptive when work requires deep thinking and concentration.

Bar table area used by mobile and multi-location workers that come rarely to the Lahti ISS office only to use the office equipment e.g. printers.

➡ Opportunity to interact with superiors and colleagues.

Facility manager is on the cell phone talking with people in the field and solving a specific problem.
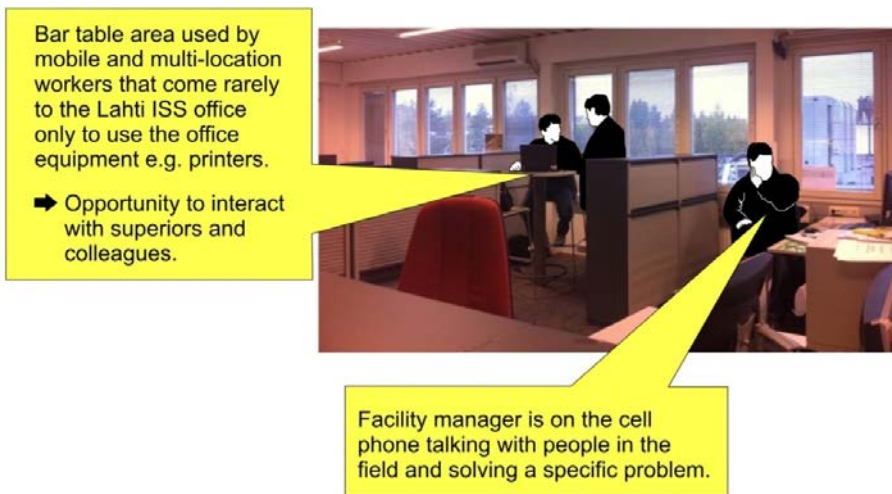
Figure 9. Opportunities for interaction as well as disturbing noise in the open workspace at Lahti.

The area with high round tables was used by mobile and multi-location workers that come to the Lahti ISS office rarely – only to use the office equipment such as printers. This area also provides an opportunity to interact with their superiors as shown in Figure 9. As can be seen in this picture the place is buzzing and can be noisy – as the mobile worker interacts with his superior, another facility manager is on the cell phone talking with people in the field and solving a specific problem.

Meaning and purpose of work spaces

It is important to provide meaning and purpose for every work space both during the design phase when spaces are conceptualized as well as immediately before

and during move-in. To illustrate this need we describe two instances of space interpretation and use by the ISS Lahti employees.

The spaces for informal interaction were initially not well understood as their purpose was not explained either during the design phase nor at the time of the move-in. Consequently, these informal interaction spaces were ignored by most of the employees. During our field observations we decided at the end of the second day to make some interventions and reconfigure some elements in these informal spaces to provide hints of their purpose and tacitly invite Lahti employees to use them. The following day we were very pleased to see that these informal spaces started to be used. The following instances illustrate:

- the need to provide clear explanations of space purpose and use scenarios, and

- the interventions and transformation of space and interaction practice.

Some knowledge workers in the Lahti office did not understand at first the purpose of the informal work space and ignored it. It is interesting to observe that most of them are more senior people (baby boomers) in the organization. Their view is that work takes place at a desk in an office (closed or open) not on a couch. They needed further hints, explanations. We created a space reconfiguration intervention – changing the location and re-purposing the two armrests by stacking them on the floor between the two couches to play the role of a "coffee table." This provided a known purpose for the workers. Consequently, the next morning they started to use it for informal activities that they typically perform in such spaces, e.g., to read the newspaper or talk on the cell phone (Figure 10a). Gen-Y knowledge worker preferred and understood immediately the purpose and use of this space. They used this space for individual work (see Figure 10b), social interaction and multitasking – one is using the laptop and the second is texting on the smart phone (Figure 10c). For them, this is a typical work space for any type of task or activity.
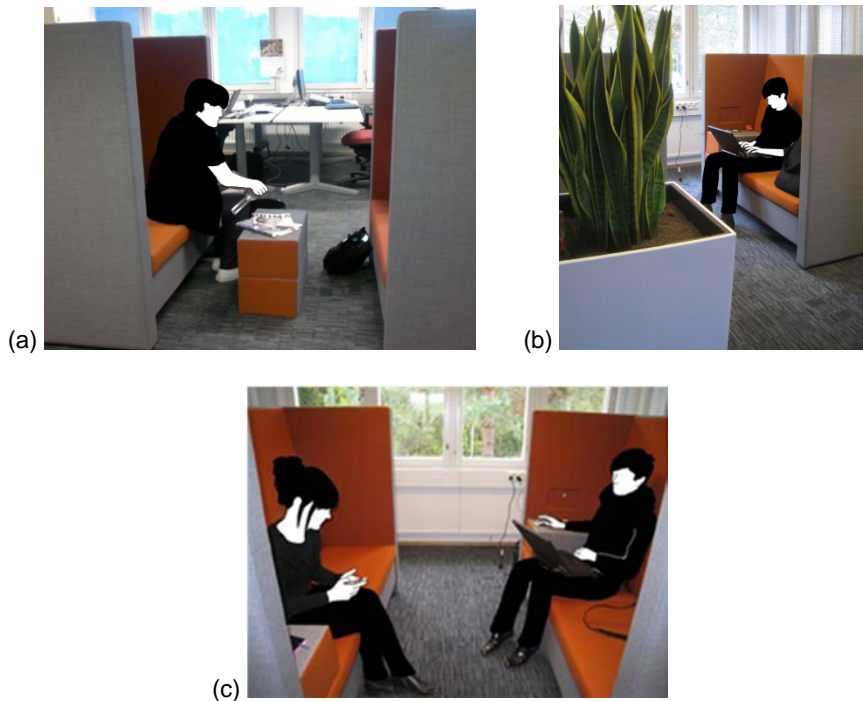
Figure 10. Different generational interpretation of informal semi-private work space: (a) Baby Boomer knowledge worker reading newspaper; (b) Gen Y mobile knowledge worker using her laptop; (c) Gen Y knowledge workers interacting and multitasking.

Another case was observed in the library area designed for informal interaction where there was a couch. The couch consisted of modules that were originally neatly lined up by the wall. None of the employees understood that they can re-configure the arrangement of these couch modules to support informal group interaction. This required an intervention. The ISS interior design architect, re-organized the arrangement of the couch modules (Figure 11). As a consequence, the re-arranged space became an inviting and productive place for informal group interaction.
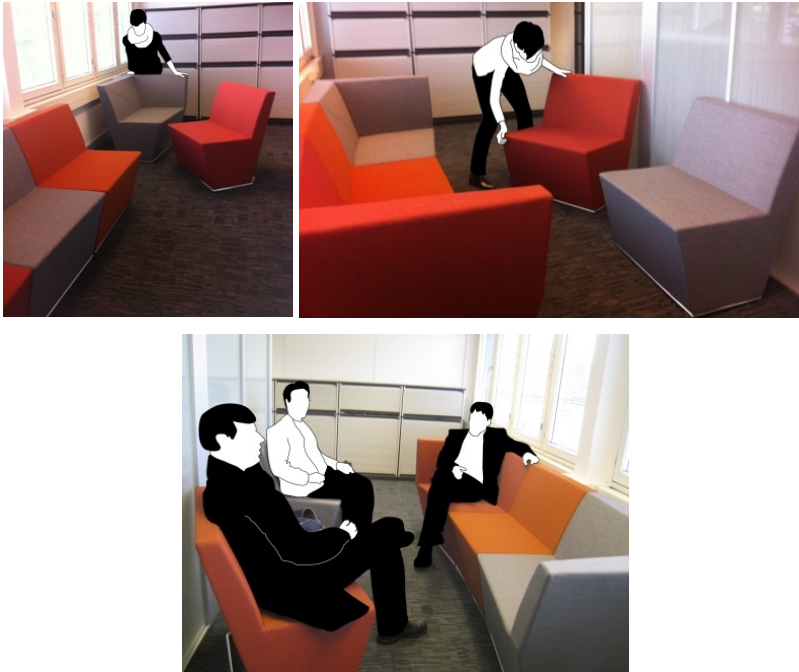
Figure 11. Transforming spatial configuration of furniture to hint the purpose of this space for informal interaction.

These scenarios highlight two key aspects:

1. Different generations expect, interpret, and use space differently.

2. Work place policy and practice, and mental attitude transformations are required towards "*Giving*" and "*Taking*" *Permission* to modify the work space in order to support the tasks and activities at hand. "*Giving permission*" needs to come from the organizational level in the form of policies, rules, or norms, and "*taking permission*" needs to be a practice at the individual and group level. These are transformations that need to take place together.

Meeting rooms and collaboration technologies

Meeting rooms are used effectively for both collocated and distributed video conference sessions (Figure 12) as long as one of the managers was present and knew how to operate the videoconference device.

Collocated meeting with client

Distributed videoconference session between Lahti and Oulu offices
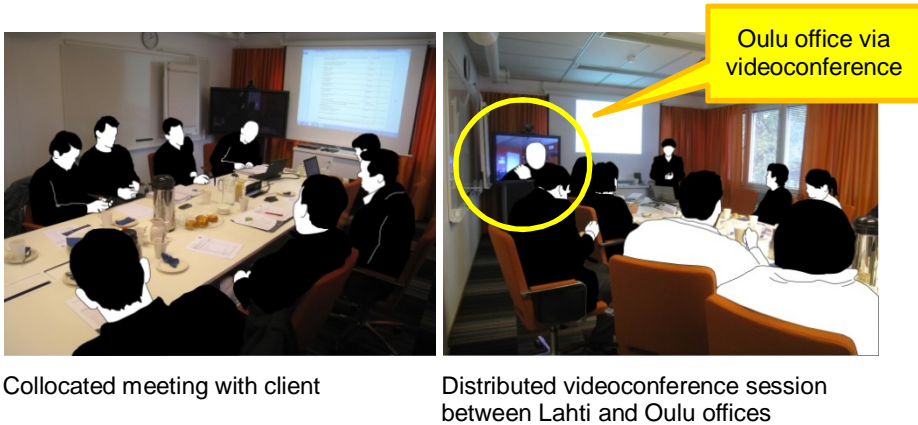
Figure 12. Meeting rooms and collaboration technology in action.

A key work practice that needs to be disseminated corporate wide is to ensure that all employees know how and when to use the collaboration technologies with confidence.

The small meeting room was typically used for either individual quiet concentrated work or for small group meetings or coaching sessions during which the large display was used as a shared digital surface to project content from the employee's laptop (Figure 13).

Figure 13. Collaborative session in small meeting room.

The quiet cube was used for either individual work or cell phone conversation to avoid the noisy open work space, or small group meetings as shown in Figure 14.

Basic office supplies for quick note taking and brainstorming is still required in the quiet rooms.

Individual cell phone session   Small group meeting with field worker

Figure 14. Quiet cube use case scenarios.

Social space

The kitchen area was very well used by the employees in the Lahti office for socializing and informal interactions. For instance cleaning, tech, admin employees would take a break in small groups and have their social coffee get-together in the kitchen. This is another aspect of the new work environment that supports community building within the company (Figure 15).
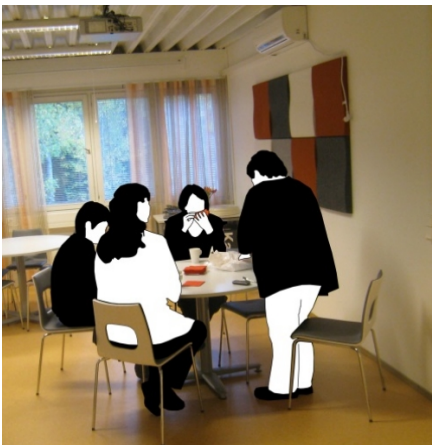
Figure 15. Socializing during coffee break in the kitchen.

In general the atmosphere in the Lahti office is very welcoming and engaging (Figure 16).

Figure 16. Sense of community and engagement at Lahti office.

This has been also articulated by employees who indicated during the interviews:

"… in Lahti it has been easier to familiarize yourself with the group, in Vantaa HQ I always felt like an outsider…"

"… the community spirit is better in Lahti…"

"… in Lahti it's fun! …"

3.3 Interviews

3.3.1 Protocol

The field observations were supported by data collection from eight interviews with the Lahti regional managers and service managers. We used the following protocol for these interviews:

- What is your role at ISS?
- What tasks do you perform?
- What locations do you work from?
- What spaces do you typically use and need?
- Do people need to come to your desk/office? For what purpose?
- Do other people work with you?
  - What tasks do you perform jointly?
  - Where are they located?
  - How do you interact with them?
  - How often do you interact with them?
- Does the new space support or hinder your tasks?

3.3.2 Key findings

We interviewed eight Lahti employees who are regional managers and service managers. A key finding from the Lahti pilot reconfirmed the difference between working in headquarter (HQ) and regional offices, or what we defined in a previous study as the difference between working in the *beehive* vs. the *satellite office* (Bosch-Sijtsema et al., 2010). Such was the case of the payroll team that has the geographic distribution shown in Figure 18. The interview data emphasized that

- Vantaa (HQ) is:
  - Very noisy
  - Disruptive
  - Group of 26 knowledge workers get together in Vantaa three or four times a year during "*XXX* days" used for internal meetings and social events.
- Lahti Regional office (satellite office) is:
  - Quiet
  - Allows knowledge worker to focus on his/her work
  - Knowledge worker (KW) knows the 150 people for whom she processes their salary and can immediately see any problems and solve them.

Figure 17 illustrates three worker-location types: beehive large collocated group, satellite subgroup or dyad, and satellite individual KW.
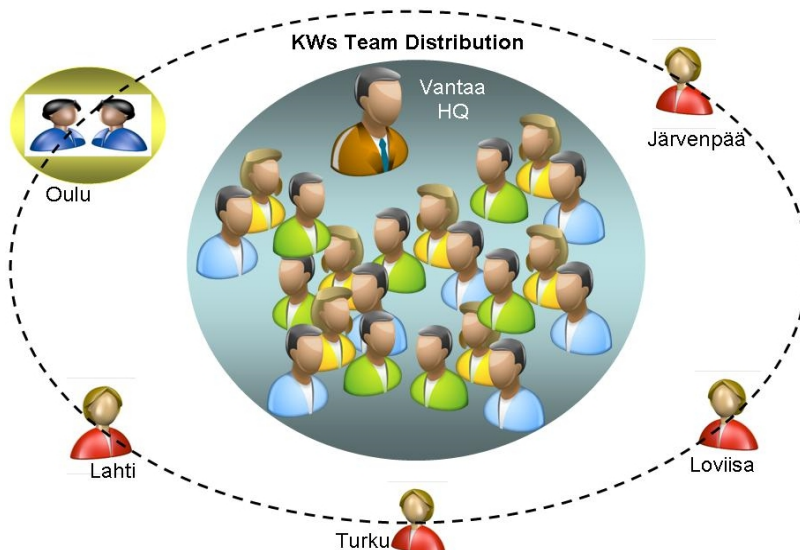
Figure 17. Payroll team member geographic distribution vs. collocation

As one of the payroll team members located in Lahti indicated: "…Payroll processing is a function of many variables. It is critical to discuss problems with the six regional team members and people in the Vantaa HQ office."

As we analyzed the differences between working in the *beehive* vs. the *satellite office* we identified a number of specific BBI enablers and hindrances that such geographically distributed knowledge workers face:

Bricks enablers

- Working at the Lahti regional office that is in the town where knowledge workers live allows them to maintain their work-life balance, with minimal or no commute which reduces the CO_2 emission and transportation cost.

- The new work place significantly improved work conditions providing the Lahti payroll knowledge worker to have her own office. This was necessary to ensure privacy and security of the payroll data handled.

Bits hindrances

- No use of application sharing ICT when distributed KWs collaborate. They do not use any application sharing tools to view data. They only send memos and documents over email and each participant in the conference call opens the same documents on their own computer.

- No training how to use videoconferencing

- No shared digital user group or bulletin board to share problems and solutions

- No fast printer to reduce processing time

- Communication channels used are: email for typical communication, and phone for fast-paced problem solving sessions

Interaction hindrances

Team member geographic distribution vs. collocation influences their productivity:
- Beehive – 20 collocated knowledge workers in HQ
- Satellite Subgroup Dyad – two collocated knowledge workers that help each other locally
- Satellite Individual knowledge workers:
    - Feel isolated, in need of a community of practice
    - Feel more like a group member with the remote knowledge workers than with the Vantaa group due to their similar work conditions.

In summary, the first three data sources: LIKE-CONFUSED-NEED-WISH exercise that provided initial employee feedback, interviews, and field observation indicate

that the new remodeled Lahti office creates a vibrant and productive work environment. As is the case with every move-in to a new place *"… It takes time to get to know the space…"* as one of the employees emphasized.

Nevertheless there are key hindrances that need to be addressed in order to improve the work environment, some of which deserve immediate attention to improve KWP.

Bricks

- Not enough room for a big conference. Currently, there is only one larger conference room in the Lahti office.

- Need larger desks for specific tasks, i.e. differentiate desk sizes as a function of diverse tasks and their correlation with content or artifacts that need to be placed on desks.

- Missing bin for confidential material that needs to go to the shredder

- Air conditioning

- More attention to ergonomics in the work place.

Bits

- **Unreliable Internet connection**

- **Lack of corporate wide training of every employee to learn how to use videoconference with confidence and establish interaction work practices and protocols**

- Usage of e-mail has increased a lot and requires new interaction protocols

- Using email or phone only creates problems due to the fact that facial expressions are not visible and please miss the social interaction context

- Tech support of specific roles/jobs require fast printers. Currently the stream lined solution of having one large noisy printer in the center of the office that everyone uses leads to productivity delays and long wait periods for specific jobs.

Interaction

- Noise/distraction due to open work space

- Undesirable noise in the case when all employees are present in the open work space and talk at the same time

- Need noise policy/rules/norms – sometimes co-workers "shout (debate)"

Interaction improvement opportunities

From a BBI perspective the data indicates that even though the Lahti employees moved into a new physical work space, the other two elements (1) the virtual ICT and (2) the social interaction and work practices have not been addressed individually as well as in an integrated BBI strategic fashion. Following are some recommendations and opportunities to address these needs:

- Deploy shared digital bulletin boards, Facebook groups, user group or discussion forum: to share, issues, problems and solutions with all team members in a timely fashion

- Visibility of people: create an environment where remote team members and their boss who sits in Vantaa are visible and their activities transparent to each other.

- Videoconference use for the weekly meetings in Vantaa instead of using only teleconferencing system that allows participants to only hear each other

  ➔ Train ALL employees how to use videoconference collaboration technology

  ➔ Develop, deploy, and standardize work practice to use videoconference, i.e. norms and interaction protocols

- Application sharing to allow distributed knowledge workers to "be on the same page" share and co-create/edit documents

  ➔ Train knowledge workers to know and use simple application sharing tools, e.g., web conferencing

  ➔ Develop, deploy, and standardize work practice, norms and interaction protocols to use application sharing.

3.4 BBI surveys

3.4.1 Protocol

After the onsite data collection and research activities, the PBL research team expanded the study with three surveys that were sent to the entire personnel of ISS Lahti office during spring 2012. The surveys were based on previous studies by the PBL Lab that focused on background information, work environment and ICT, and knowledge work and productivity. The surveys were translated into Finnish and customized to the Lahti business and work context. Surveymonkey.com was used to design, test, and deploy the online surveys.

NewWow contexts can be studied on different levels: micro/individual, meso/team, macro/organization, and mega/B2B or network of organizations. The analysis of PBL Lab Stanford focused on the micro/individual and meso/team

level. The data was analyzed during summer 2012. The following sections present the results of the case study.

3.4.2 Survey focus and key findings

The following describes the focus of the three surveys we administered.
Survey nr. 1 focuses on background information that includes:

- Geographic distribution and interaction

- Productivity as a function of skill, role, distance

- Distributiveness that provided quantitative data regarding number of teams each individual is involved in

- Business geographic distribution

- Skill, cultural awareness, and social network

- Workload

- Swift vs. long term teams

- Virtuality that provided quantitative information regarding number of geo-graphically distributed teams each individual is engaged in

- Physical and virtual space interaction and ICT

- Communication, collaboration, and coordination

- Communication channel preferences by role in team (i.e., manager, technician) and task

- Individual and collaborative work tasks

- What-Where-Who: Activity and location where the activity is performed by role in team

- An open question regarding challenges and needs allowing each member to identify specific hindrances that require attention.

Survey nr. 2 focuses on work environment and ICT:
- Motivation to go to work
- Role and task driven use of workplace
- Role/Task relation to workplace type
- Workplace performance link to roles
- Enablers and Hindrances and Opportunities
- Individual productivity-workplace
- Team productivity-workplace
- ICT availability and skills
- Access to space and ICT.

Survey nr. 3 focuses on knowledge work and productivity:

- Job characteristics and satisfaction based on task type, complexity of task, job satisfaction, control, workload, team interdependence

- Work distribution

- Frequency of changes in team composition frequency

- Communication with team members

- Individual performance in terms of work quality, satisfaction, and self representation

- Team performance

- Team satisfaction.

The following diagrams are a synthesis of the key findings from the survey data.

Number of customers per service manager
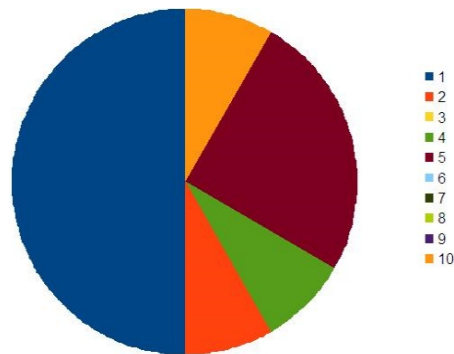
Workload
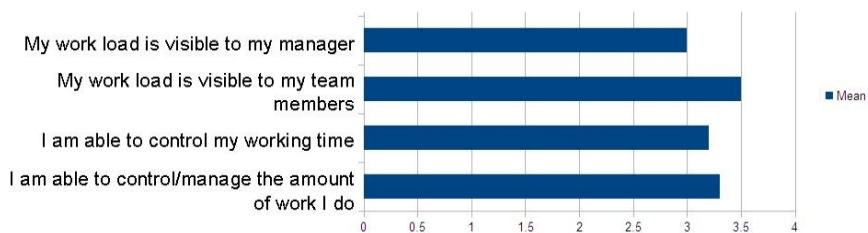
(10 service manager respondents, scale 1-5)

Task complexity
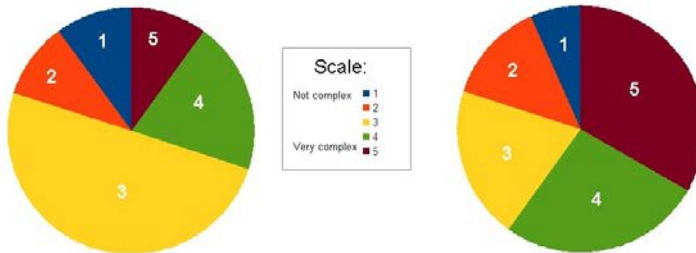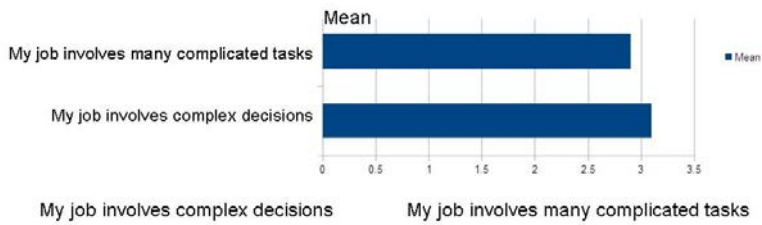
% of time for f2f vs. virtual work
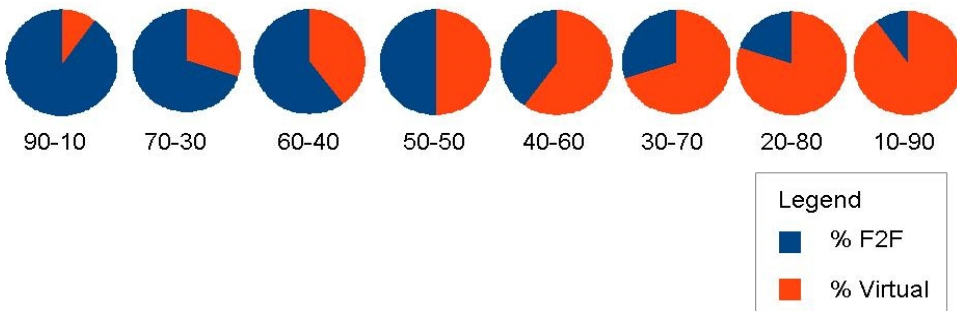
It is important to note that the data related to the amount of time (%) that employees spend in face-to-face (F2F) vs. virtual or mobile work settings indicates that the ISS Lahti regional office needs to support the complete spectrum of work patterns. This finding correlates with the response to the questions: "What is Your Primary Reason for Coming to the Workplace?" for which the typical reply during the interviews and informal discussions with the Lahti employees was: *"…One reason for being at the office is the other people, more easier to sit here and discuss about issues…"*

Reason to come to the office

1 **Cooperate with colleagues**

2 The nature of work demands equipment available in office to perform tasks

3 Administrative tasks / read email

4 Interact informally with colleagues (social aspects of work)

5 Use of the facilities offered (silent cube, meeting room, etc.)

6 Be visible to your colleagues and manager

7 Build a sense of organizational brand/identity

8 Workers' meeting

Note that for a number of questions and answers we explored different visual representations of the data in order to gain a deeper understanding of their feedback as well as to identify opportunities to improve the physical, virtual, and interaction/work practice at the Lahti regional office.

The next set of questions and feedback from the employees addressed the relation between workplace and performance, i.e.:

1. The workplace supports my way of working effectively.

2. The workplace supports the way I want to work and helps me to get my work done.

3. I can find appropriate places that meet the needs of my different work activities (individual work, meetings, informal talks etc.).

4. Noise and distractions in the workplace do NOT significantly impact my ability to get work done.

5. The workplace inspires me to be creative and innovative.

6. The workplace allows me to identify and feel connected with the company.

7. The workplace contributes to my job satisfaction.

The answers, on a scale from 1 = low to 5 = high, to the seven workplace and performance questions received from eight service managers from ISS Lahti are summarized in the following.

Means results for each of the seven questions
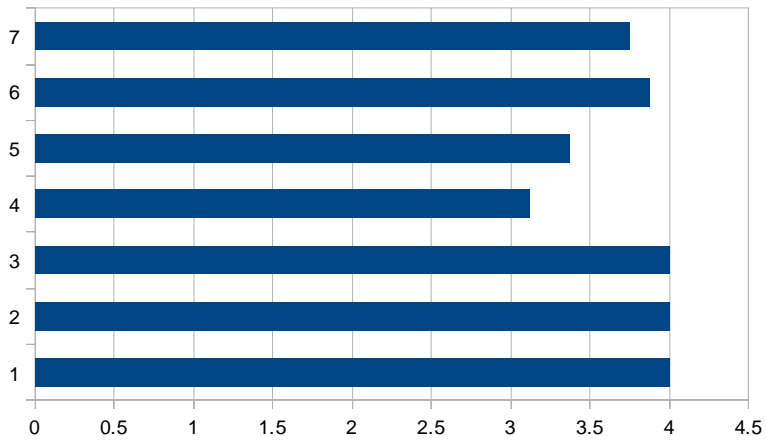
Distribution of responses to the seven workplace and performance questions by person, where P_i represents a different person.
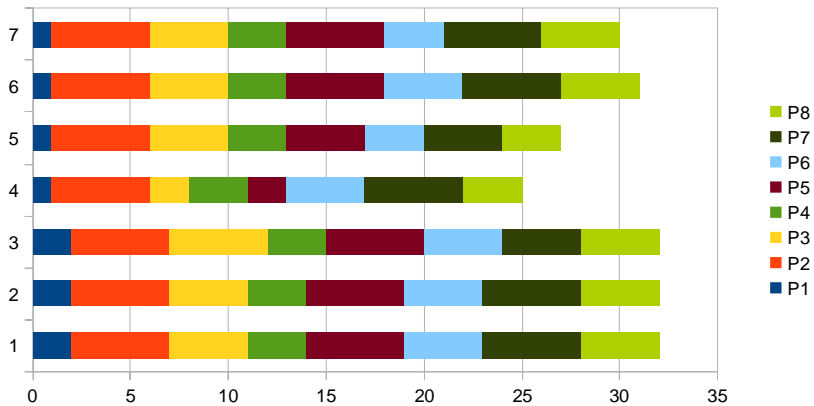
This data was further analyzed to identify the relation between extreme scenarios vs. the mean.

Workplace and performance extreme scenarios vs. mean

Mean Results for each Criteria
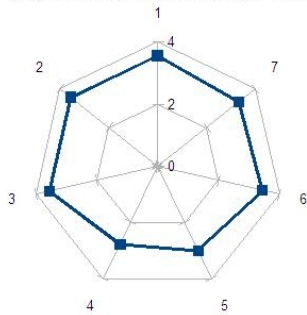
Diverse Individual Ratings
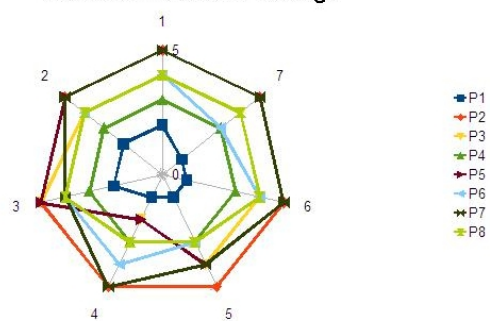
Extreme Low: Individual vs Mean
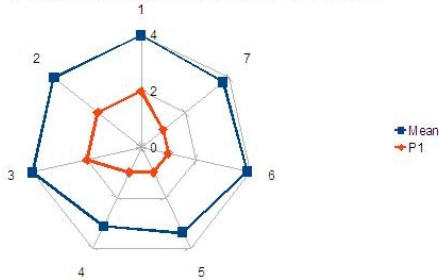
Extreme High: Individual vs Mean
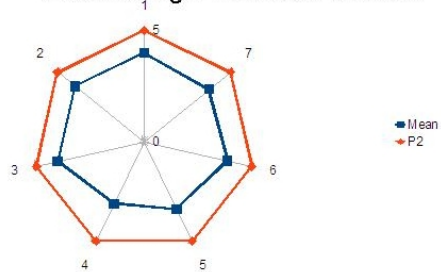
It is important to note that:

1. The extreme low shown by the difference between individual P1 and the mean is a key feedback indicating a silent low productivity situation. By making such feedback explicit and visual, it becomes a nudge for the organization to follow-up and find out what can and needs to be improved.

2. The extreme high shown by the difference between individual P2 and the mean is a silent indicator for high productivity, and a nudge to the organization to further define the excellent workplace situation in order to be able to standardize and replicate it.

Cooperation and interaction are key work practices that can lead to higher performance and quality of service. The following are six workplace criteria we asked the Lahti people to provide feedback on (scale from 1 = low to 5 = high):

3. The workplace contributes to interaction with the team members.

4. The workplace supports the way the team works.

5. I can find appropriate places to interact with others when I need to.

6. The workplace allows me to identify and feel connected with my team.

7. The places available for cooperation (e.g., meeting rooms, coffee, informal areas) are appropriate for my team to get the work done.

8. I can make my remote team members and managers aware of my local conditions (e.g. workload, project status, infrastructure and resources).

Cooperation and interaction

Mean Results for each Criteria

Diverse Individual Ratings

Extreme Low: Individual vs Mean

Feedback - a silent low productivity situation
Nudge to organization to ask and
find out what can be improved
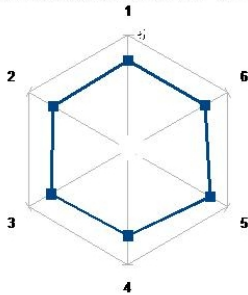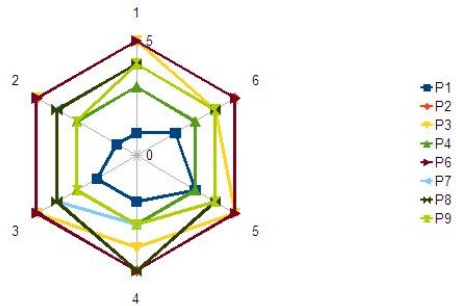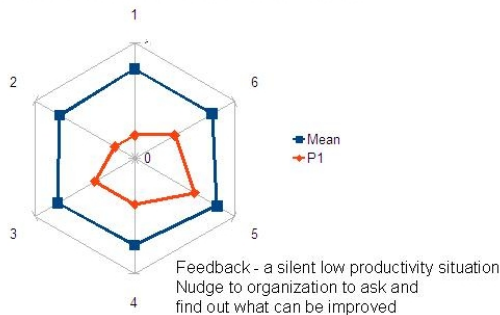
1.	The workplace contributes to interaction with the team members
2.	The workplace supports the way the team works
3.	I can find appropriate places to interact with others when I need to
4.	The workplace allows me to identify and feel connected with my team
5.	The places available for cooperation (e.g., meeting rooms, coffee, informal areas) are appropriate for my team to get the work done
6.	I can make my remote team members and managers aware of my local conditions (e.g. workload, project status, infrastructure and resources)

We further investigated in which workplace do employees feel they are most productive, and which workplaces support teamwork based on all the work places and locations they have available.

In which place are you most productive?
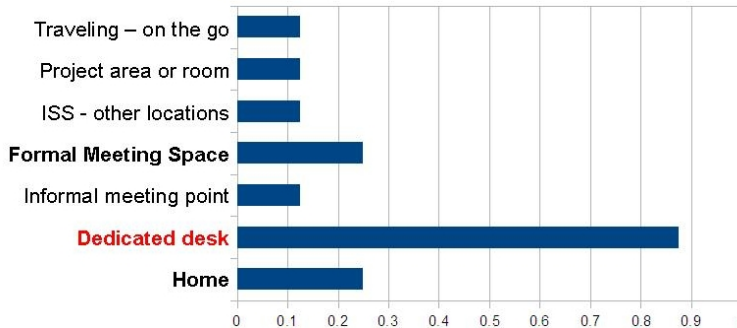
In which place do you work most productively as a team?
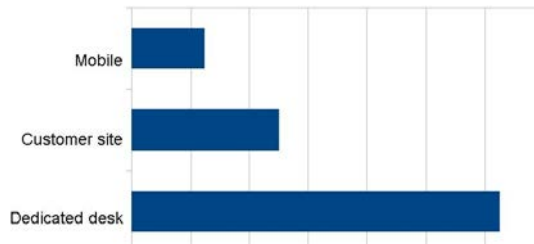
It is important to note that the dedicated desks by far best support their work, followed by formal meeting spaces and work at home for individual work, and customer site and mobile work for team work. These work locations need to be supported by all the BBI (physical, virtual, and interaction) organizational infra-structure standards, collaboration technologies, and corresponding work practices, norms and processes.

As we investigated the ICT the following survey feedback to key questions indi-cated

- what the ISS Lahti employees use to communicate with team members and customers,

- whether they have the appropriate ICT tools to support their tasks and ac-tivities, and

- whether they know how to use the available ICT for their tasks.

Communication channels with team and customer
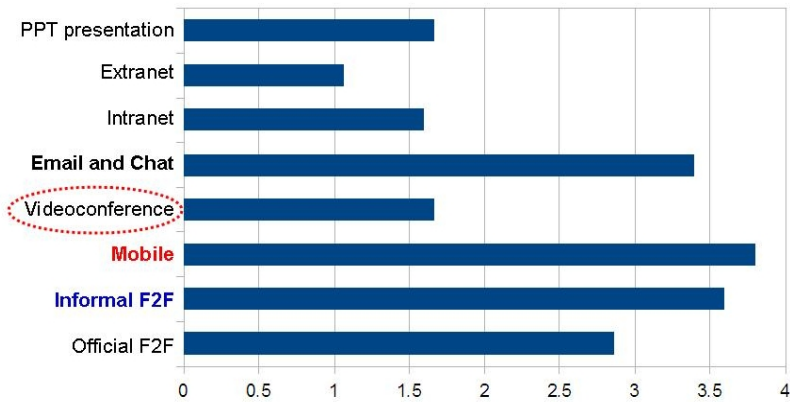
Note that mobile communication channels i.e., cell phone, informal and formal face-to-face (F2F) were rated the highest due to the available technologies, as well as knowledge how to use it. Most importantly, videoconference had a very low rate under two on a scale from 1 to 5. This corroborates with the findings and recommendations from the data collected during the interviews and field observations. This indicates for instance that even though they had access to videoconference equipment in the meeting room, it was underutilized due to the lack of corporate wide training how to use it and embed it into the daily work practices and activities.

I have the appropriate ICT

1. to do my task effectively (solo)
2. to get teamwork done in a meeting room with co-located members
3. to get teamwork done in a meeting room with remote members
4. to get teamwork done at my desk with co-located members
5. to get teamwork done at my desk with remote members
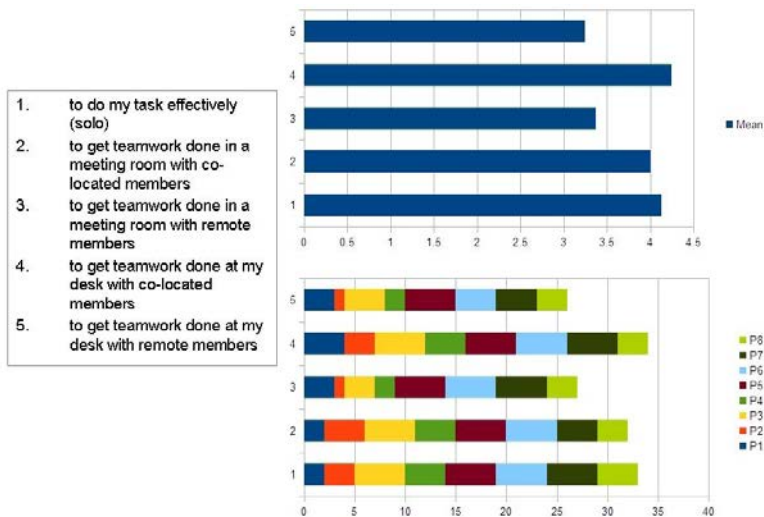
The mean of the response to the question whether employees have the appropriate ICT was high. Nevertheless, further analysis of the diverse work patterns and communication scenarios revealed again extreme highs and lows as silent high and low productivity scenarios. These are important indicators for the organization to identify the causes for the low response use case scenarios that need to be addressed, and the high response scenarios that can be standardized and replicated corporate wide.

I have the appropriate ICT

All respondents indicated that they know how to use the ICT they use to do their specific tasks and to collaborate with remote team members.

I know how to use the ICT

(mean value)

I have access to meeting rooms that have the appropriate technology for distributed collaboration to share data and information with my colleagues (scale 1-5)
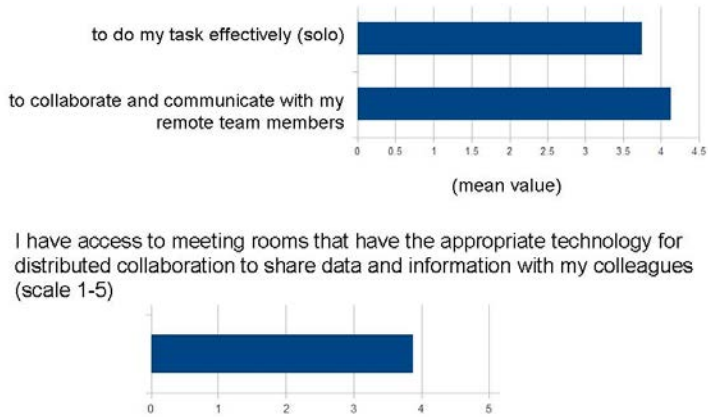
Nevertheless, by linking this response with the previous feedback as well as the interview and field observations, it is important to note that many new communication and collaboration technologies are not made available and employees are not trained to use them with confidence. This in turn limits their capacity to achieve higher performance levels.

The next set of criteria focused on job characteristics and satisfaction, sense of control and autonomy.

Job characteristics and satisfaction

1. My job contains problem solving tasks
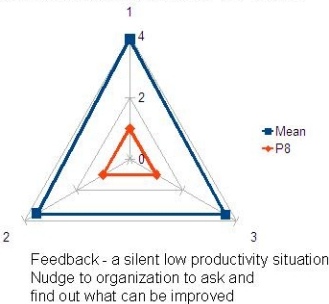2. My job contains coordination tasks
3. My job consists of creating new plans, protocols, and solutions
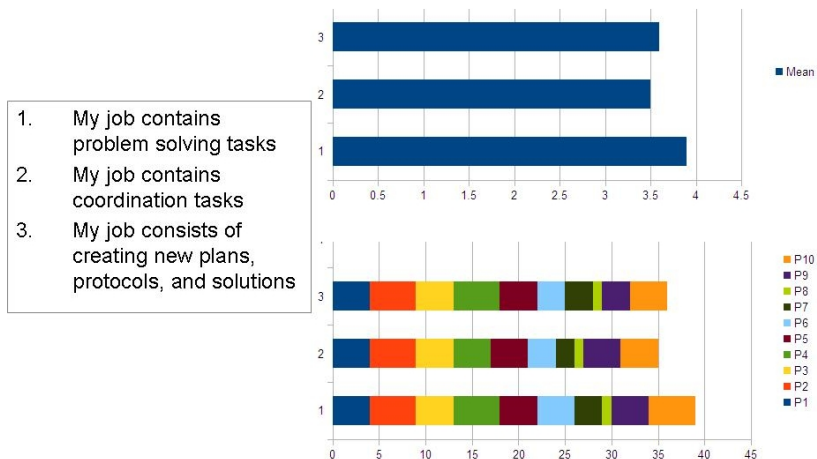
Job characteristics and satisfaction

Mean Results for each Criteria
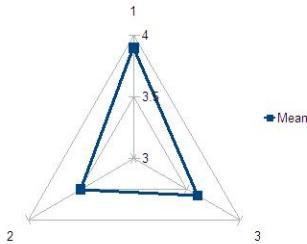
Diverse Individual Ratings
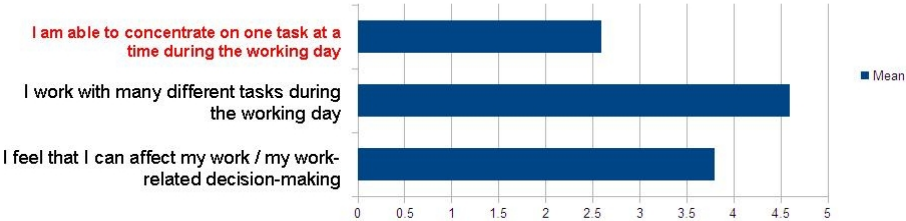

Extreme Low: Individual vs Mean

Feedback - a silent low productivity situation
Nudge to organization to ask and
find out what can be improved

Extreme High: Individual vs Mean

Feedback - a silent high productivity situation
Nudge to organization to ask and
find out what can be replicated
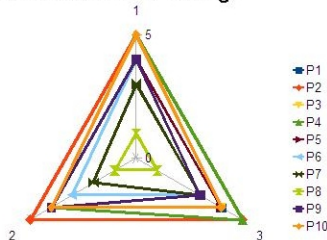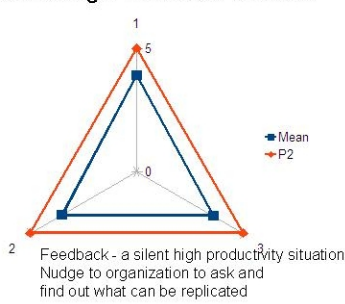
Job satisfaction

A sense of control and autonomy

(10 service manager respondents, scale 1-5)

45

It is important to note the response of the Lahti employees to the questions *"I am able to concentrate on one task at a time during the work day"* which is below average. This is an indicator that most of the knowledge workers have due to multitask during the day and few opportunities for deep, quiet concentrated work. This is correlated with the data that shows the work load and number of sites or customers. One of the impacts of such a workload is work-life balance and wellbeing.

The feedback regarding the lack of time to concentrate on one task at a time during the day is correlated with the results to one of the individual performance questions, which is "*time to reflect.*" This is a critical challenge we have found in many other similar studies related to knowledge work productivity we have performed in the past decade.

Individual performance

(10 service manager respondents, scale 1-5)

Knowledge creation and reuse through access to colleagues, expertise, and past corporate information resources can lead to high quality services and products. The following findings indicate that the Lahti employees have good access to people and experts within the company. This is supported by data collected through the interviews and field observations at the Lahti office. Nevertheless, access to past corporate project information is insufficient. This response corroborates with the findings from the interviews related to deployment, training, and use of the ICT solutions (see Bits recommendations). In addition, it highlights the fact that there is a need for a strategic and integrated BBI approach to create a New Wow work environment.

## Communication with team members

(10 service manager respondents, scale 1-5)
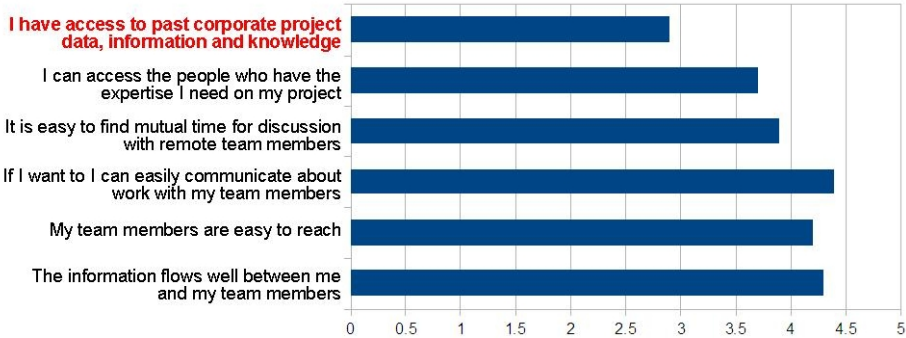
The next set of results illustrate the high level of team satisfaction and performance support the field observations at the Lahti office showing that the Lahti regional office has created a welcoming atmosphere, supportive and engaging culture.

Team performance

(10 service manager respondents, scale 1-5)

Team satisfaction

(10 service manager respondents, scale 1-5)
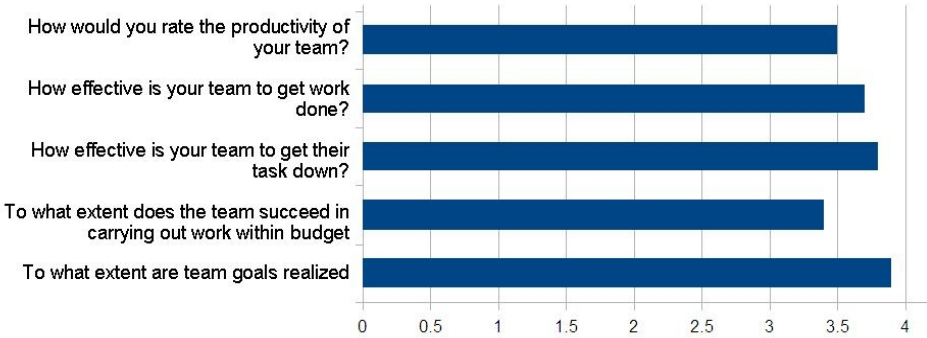
3.5 eMoc scenarios and observations

The PBL Lab uEngage project (that was part of the RYM SHOK project) envisioned team members and teams continuously assess and make explicit choices related to the BBI available options in their work environment, i.e., – physical, virtual, and interaction – based on an engagement matrix of choices (eMoC) (Fruchter and Medlock, 2013). Since the tasks, activities, and work environment conditions change team members define a journey of new ways of working towards a gold standard of engagement as they make better and more informed eMoC choices. The eMoC metrics and framework is based on the BBI dimensions, literature review, and PBL Lab team ethnographic studies of knowledge workers and global teamwork performed over the past two decades. To date organizations consider two work scenarios – collocated and distributed. Nevertheless it is critical to further distinguish different distributed work situations. Consequently, eMoC considers knowledge workers interacting in four types of locations/bricks: collocated, distributed, multi-locational, and mobile.

The ICT/bits focuses on networks, devices, and tools that employees use on a regular basis. To assess their impact on the degree of engagement at any point in time eMoC offers five metrics: reliable, available, accessible, affordable, and standard. The latter typically indicates that the specific networks, devices, and tools are part of the corporate standard infrastructure offered to all employees.

The eMoC framework defines four degrees of engagement/interactions:

1. **A**wareness – when participants can hear each other

2. **A**ttention – when participants can hear and see each other

3. **P**articipation – when participants can hear and see each other, and co-control shared content

4. **E**ngagement – when participants can hear and see each other, co-control and co-create content.

A gold standard is offered based on these four degrees of engagement where: (1) everyone can hear, see, and knows everyone else's conditions, and (2) everyone can share, edit, co-create content, and (3) everyone can hear, see, and control equipment. Knowing everyone's local BBI conditions is a key aspect towards the engagement gold standard. This becomes critical when knowledge workers are frequently changing their work environment due to new ways of working environments that offer diverse work settings as well as due to mobility and geo distribution of client locations. Consequently, knowledge workers need to assess and re-align their local work environment conditions and build awareness of each other's conditions. State-of-practice observations show that this is difficult to achieve due to the lack of eMoC principles, metrics and framework. Knowledge workers seldom are fully aware of other team members' local conditions. They typically try to find a work-around to existing work environment communication, collaboration, and coordination hindrances, which typically lead to frustration, re-work, response latency, coordination overhead.

At the time of the Lahti ISS case study eMoC was a Web-based tool kit that allowed knowledge workers to make choices based on BBI (Figure 18). The following provides a brief description of the eMoC Web-based eight tools illustrated with screen shot examples of Dr. Fruchter's and different team members' eMoC.

Bricks tools:

- **CoFlex** tool (Figure 19) allows teams to identify the work environment as a function of location distribution scenario their team members work in a specific situation and assess their level of **Co**ntrol-**Flex**ibility based on fifteen unique scenarios based on the four location distributions team members may work, i.e., collocated, distributed, multi-location, and mobile. The fifteen scenarios define a spectrum that spans from high control and minimum flexibility in the case all team members are collocated in a corporate office space, to minimum control and maximum flexibility in the case team members work in multiple locations and are mobile.

- **eLoc** (**e**ngagement **Loc**ation) tool (Figure 20) enables team members to indicate the type of place they work in, e.g., headquarter, corporate office, café, home, train, etc.

Bits tools are represented by **ccKit** (**c**ommunication and **c**ollaboration Kit). It provides three tools that allow team members to identify their communication and collaboration infrastructure as follows (Figure 21 – the larger the icon the more team members have that item available):

- **ccNetw** that indicates available networks.
- **ccDev** that indicates available devices.
- **ccTools** that indicates available tools.

Interaction tools:

- **vSpeed** (**v**irtuality **Speed**) tool (Figure 22) accounts for the impact of distributed or virtual projects on work load. The work load is determined as a function of number of projects in which team members are collocated or virtual. vSpeed makes the workload transparent to all team members. vSpeed shows reported vs. actual (adjusted) work load and consequently real work speed of the team members who are virtual vs. collocated. Activities that take place in virtual settings take longer and become more complex. vSpeed uses a heuristic factor of 1.5 for virtual project teams, i.e. the work load in a geographically distributed project team can increase by 50% due to communication and coordination overhead triggered by discontinuities such as time, space, and culture.

- **eSkill** tool that indicates the self-reported years of experience (or equivalent) each team member has. It is combined with a **360eSkill** tool that provides feedback from the other team members of the person's perceived skill. This tool was not used in the Lahti case study since the focus of the observations and eMoC model was on the performance of the work environment and new ways of working, rather than on knowledge workers' performance.

- **enGauge** tool (Figure 23) is intended to show the engagement level as a function of demand vs. supply, where the demand dimension indicates work load and availability (nr. of projects = 0–1/high availability, 1–2, 3, 4, 5, 6, >7/very low availability), and supply is represented by the skill level as a function of experience – one year equals novice, ten or more years indicates high expertise.
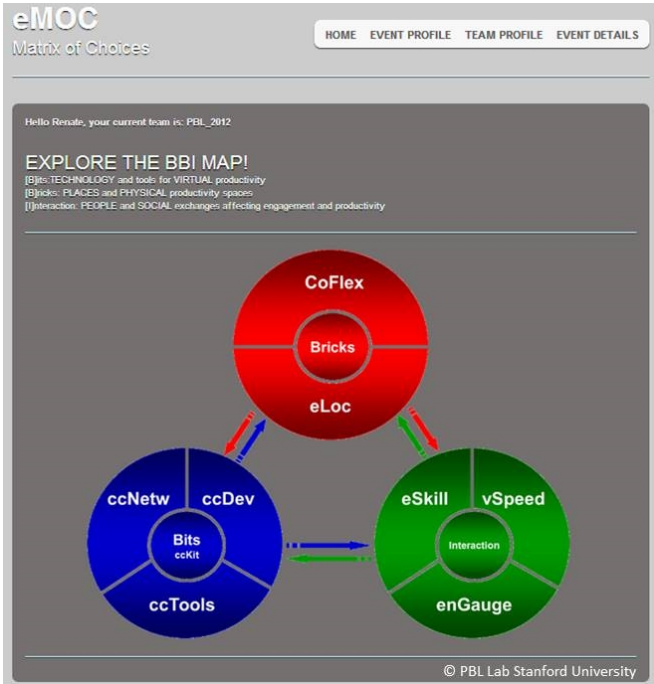
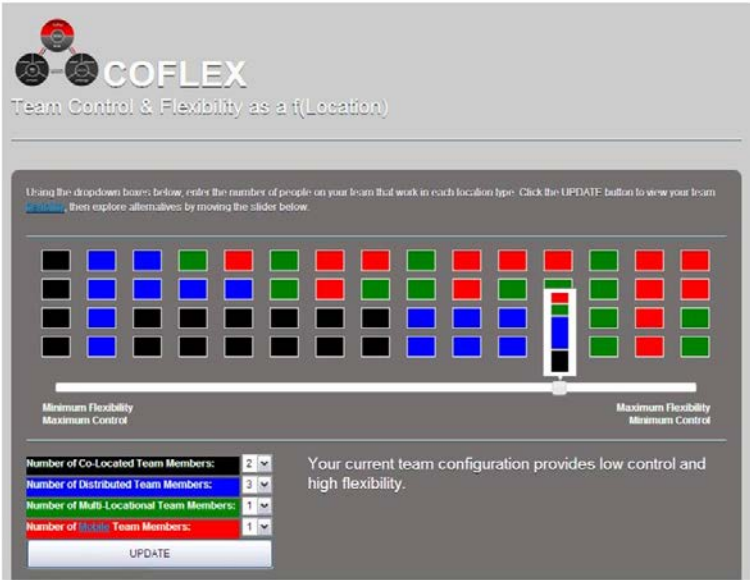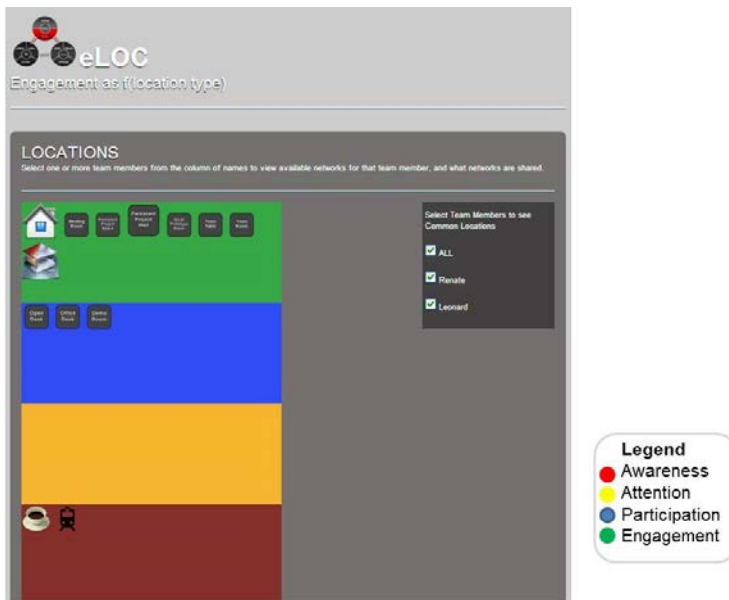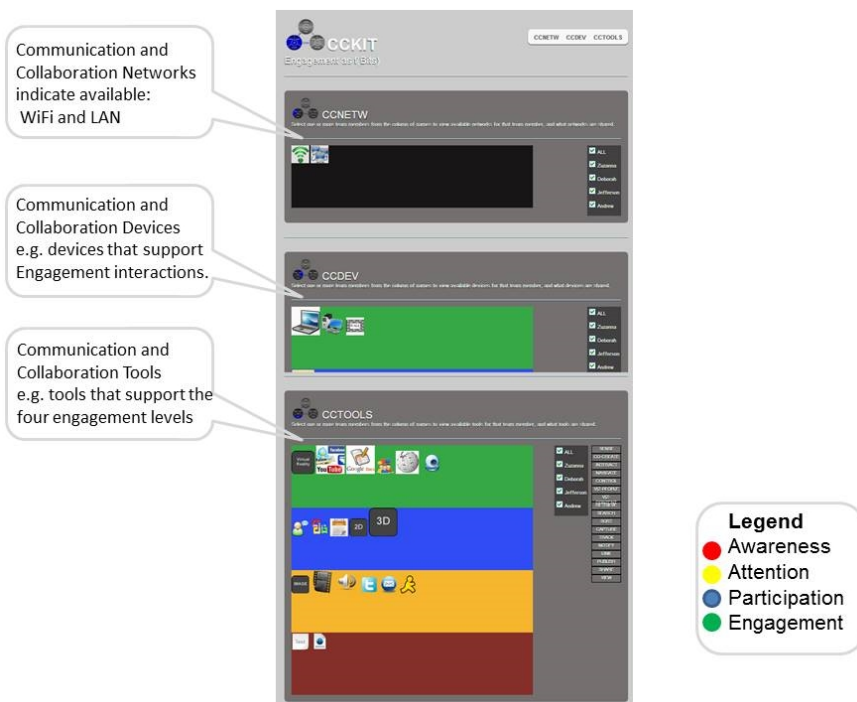**Figure 18.** eMoC web-based tool kit.

Figure 19. CoFlex – control and flexibility as a function of team members' location.
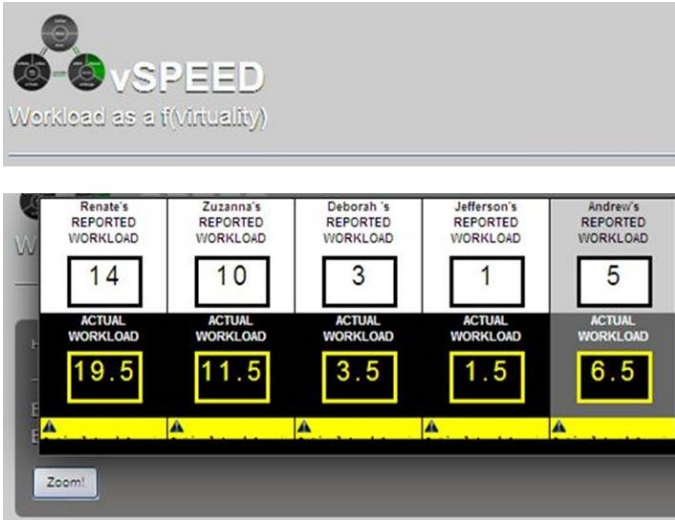
Figure 20. eLoc – available locations as a function of potential engagement degree.

Figure 21. ccKit – ccNetw, ccDevices, ccTools and their potential engagement degree.

Figure 22. vSpeed – workload as a function of virtuality e.g. Andrew's vSpeed shows 5 reported workload since he is working on five projects and 6.5 actual workload since 3 out of 5 projects are globally distributed.
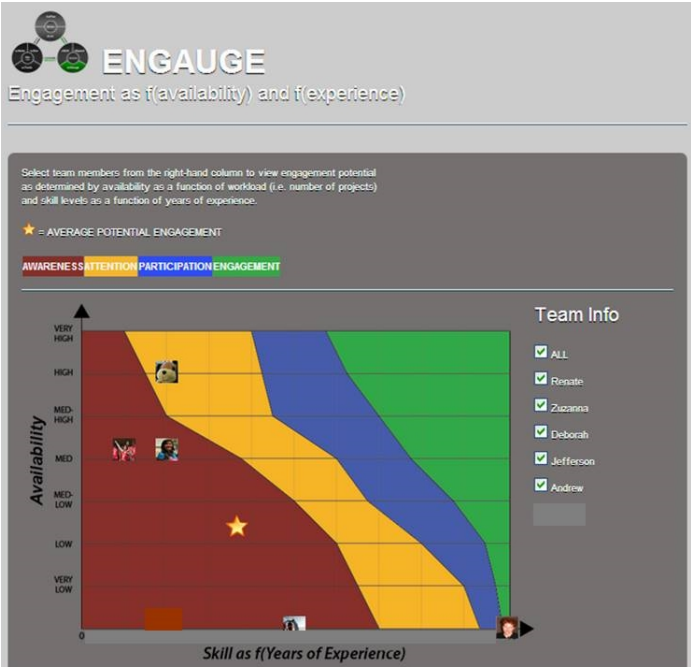

**Figure 23.** enGauge – potential engagement level as a function of availability and experience.

To better understanding the knowledge work scenarios and emergent needs in support new ways of working at the ISS Lahti regional office we engaged a number of ISS Lahti employees who provided us with their BBI work environment conditions. We used this data as input to create the following eMoC work environment scenarios. We created fifteen scenarios where knowledge workers were: collocated working from the ISS Lahti regional office, distributed working from home or café, multi-locational working at client's offices, and mobile working from their car. Typical scenarios are illustrated in annotated screen shots from the eMoC Web-based prototype. They highlight knowledge workers' available ccKit technology infrastructure correlated with their CoFlex work location distribution, their vSpeed workload, and their potential engagement level as a function of their availability due to workload and skill level.
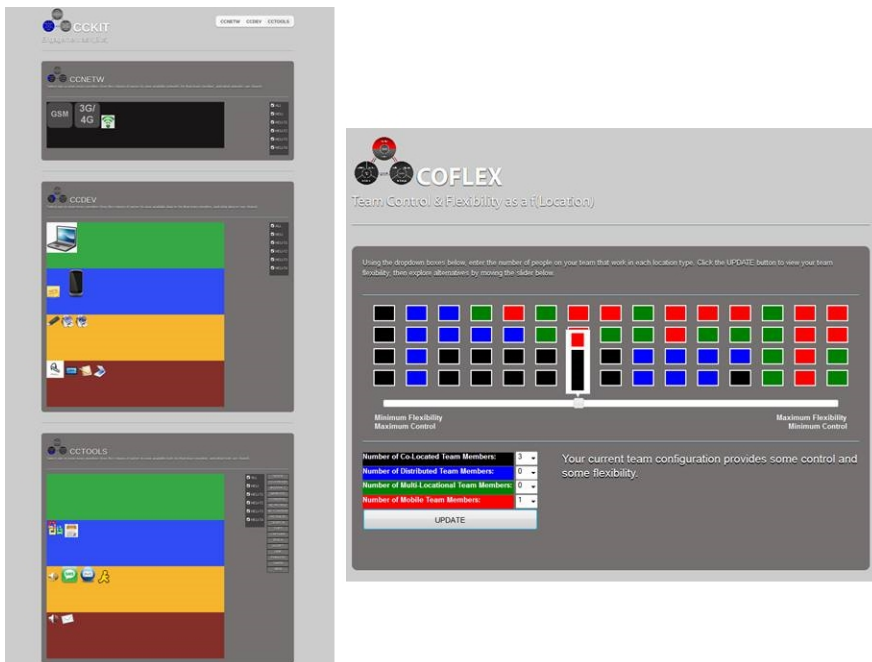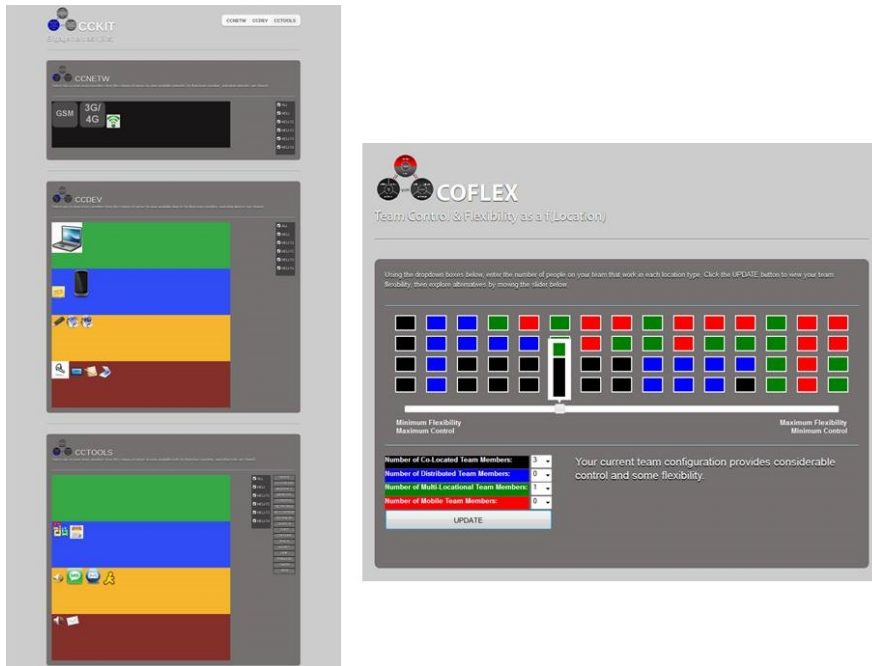

Collocated-mobile scenario. The mobile knowledge worker's conditions, i.e. only 3G/4G network connection, will limit the group to reach potential higher engagement levels, unless the three collocated team members meet in person choosing the best available devices and tools to reach a potential Participate engagement level and have the mobile member listen in with limited capabilities to contribute, acting as a satellite participant. They could also choose to use the common device and network, i.e. smart phone and 3G/4G to achieve a potential engagement level of Participate.
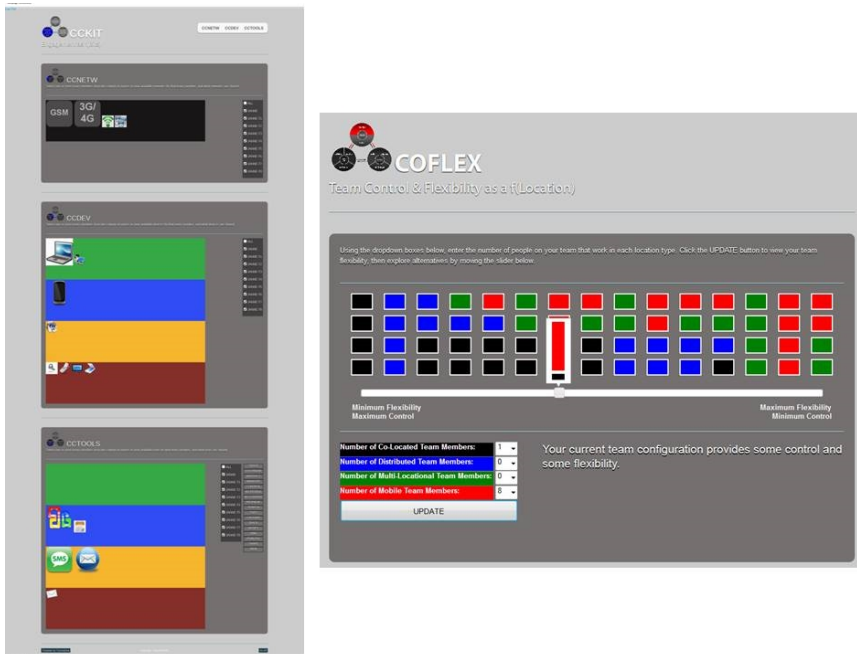
Collocated-mobile scenario. Even though the collocated team member is in the regional Lahti office and has WiFi, LAN and 3G/4G, the rest of the 8 team members are mobile and have only 3G4G. Consequently their common practical communication platform is the cell phone with no options to see each other, control or co-create content together.

Collocated-multi-location scenario. The multi-location knowledge worker's conditions, i.e. only 3G/4G network connection, will limit the group to reach potential higher engagement levels, unless the three collocated team members meet in person choosing the best available devices and tools to reach a potential Participate engagement level and have the multi-location member listen in with limited capabilities to contribute, acting as a satellite participant. They could also choose to use the common device and network, i.e. smart phone and 3G/4G to achieve a potential engagement level of Participate.
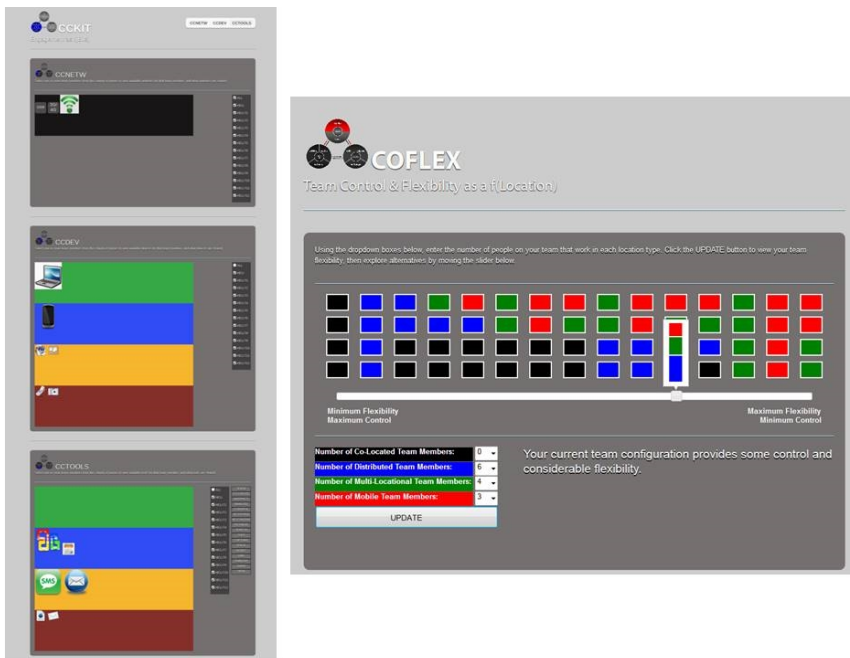
Distributed-multi-location-mobile scenario. More flexibility in terms of work-place location, all team members have WiFi devices that support higher potential engagement levels, i.e., Participate and Engage, however they are missing tools that support co-creation to achieve the highest potential engagement level.
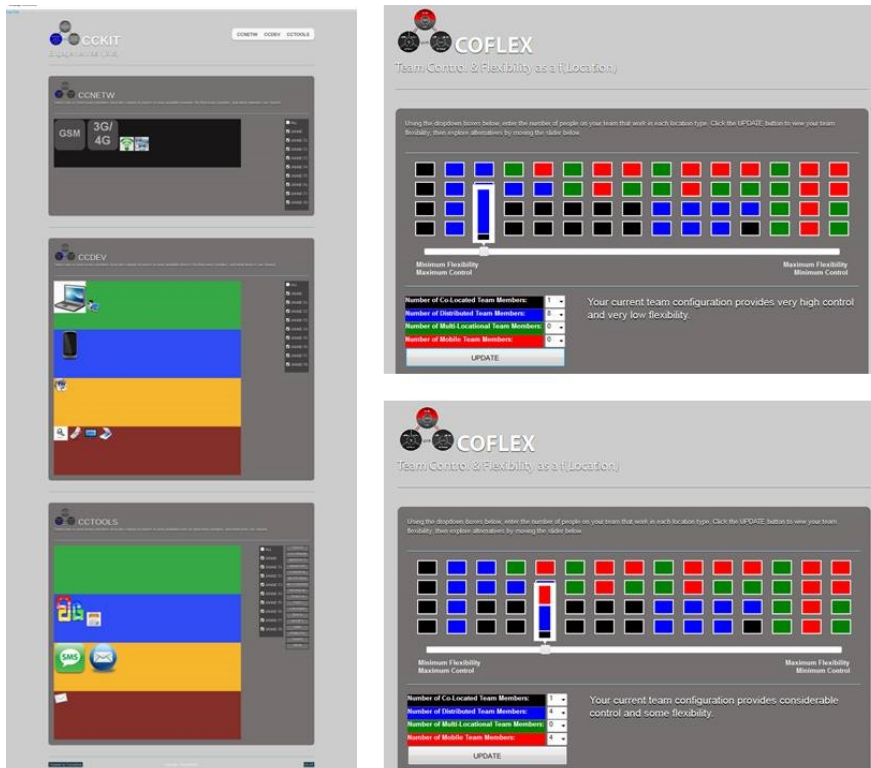
Collocated–distributed-mobile scenario. Knowledge workers at the office have LAN, some have WiFi, and all have 3G/4G. Smart phone is the common main channel of communication. Depending in what location configuration they will need to interact – Collocated-distributed shown in the CoFlex above, and Collocated-distributed-mobile below – the constraint for communication, collaboration will be placed by the limitations of the mobile team member who has only 3G/4G.
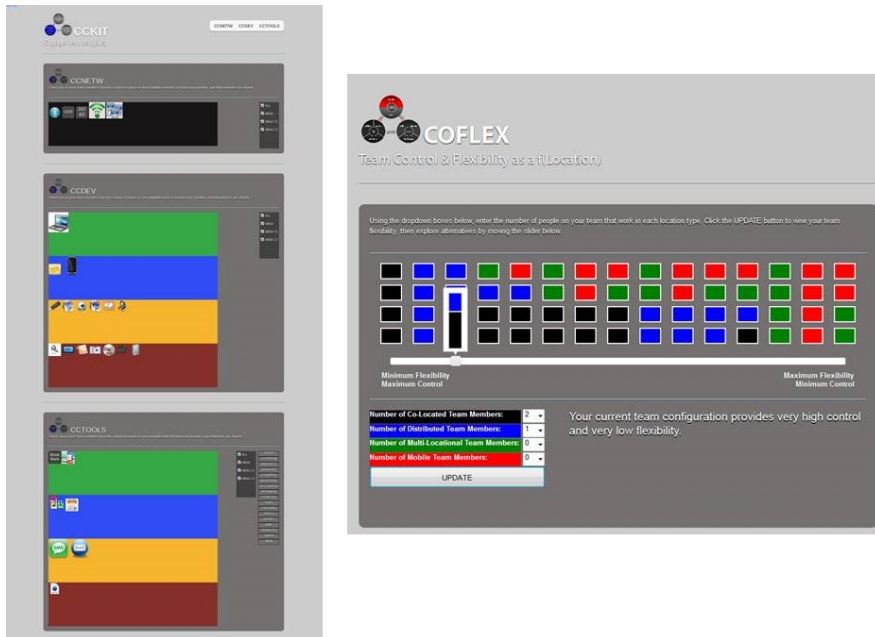
Collocated-distributed scenario. In this scenario two knowledge workers are collocated in the office and one is distributed. Since they have all the network options in the office, and have some tools that support potential Engagement level making the right choices could allow them to have the highest level of engagement.
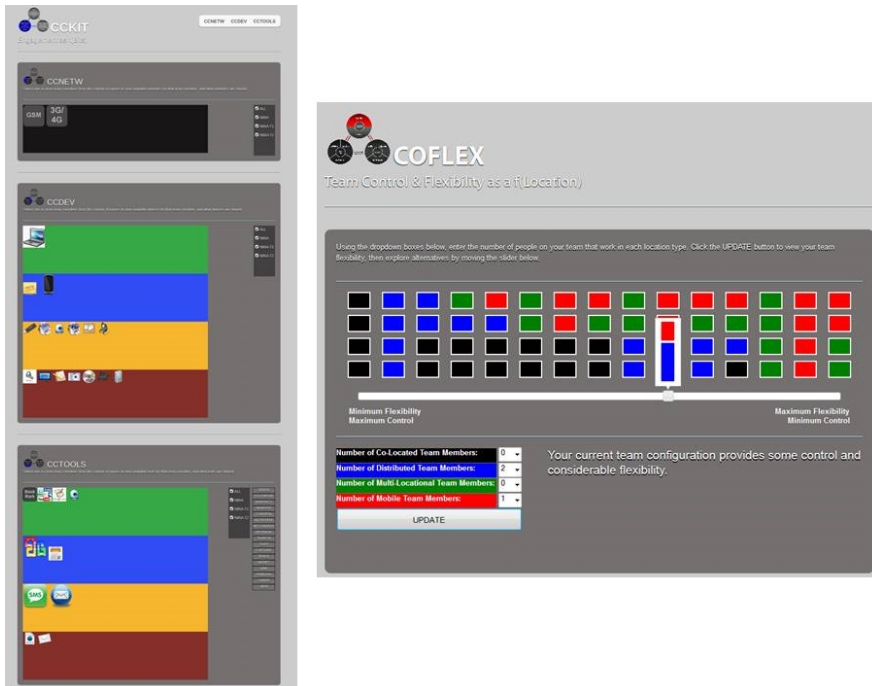
Distributed-mobile scenario. The employee working from his/her car has a few tools that could help to reach potential Engagement level. However the network infrastructure may be a hindrance since the other two team members are distributed and have also only cell network.
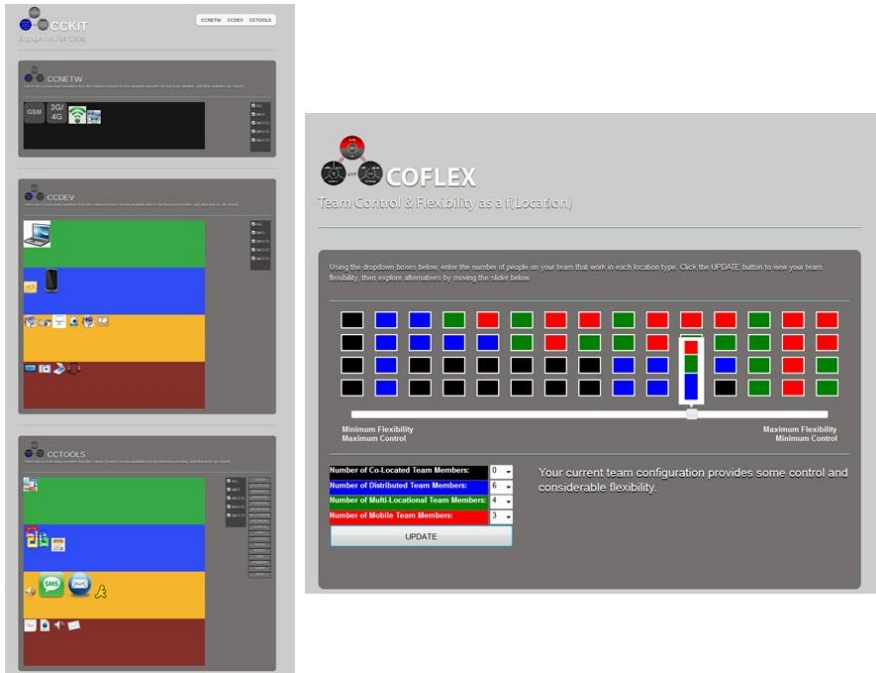
**Distributed-multi-location-mobile scenario**. The 6 distributed team members have access to WiFi and 3G/4G, the 6 multi-location have access to WiFi and one of them has access to LAN, and the three mobile team members have access to 3G/4G. Depending in what configuration they will need to work, i.e., one-on-one, subgroup, or team – they will be able to potentially achieve the highest level of engagement since they have one tool that supports co-creation, or have a low limited engagement level in the case the mobile team members are part of the interaction and have only 3G/4G and their smart phones available.
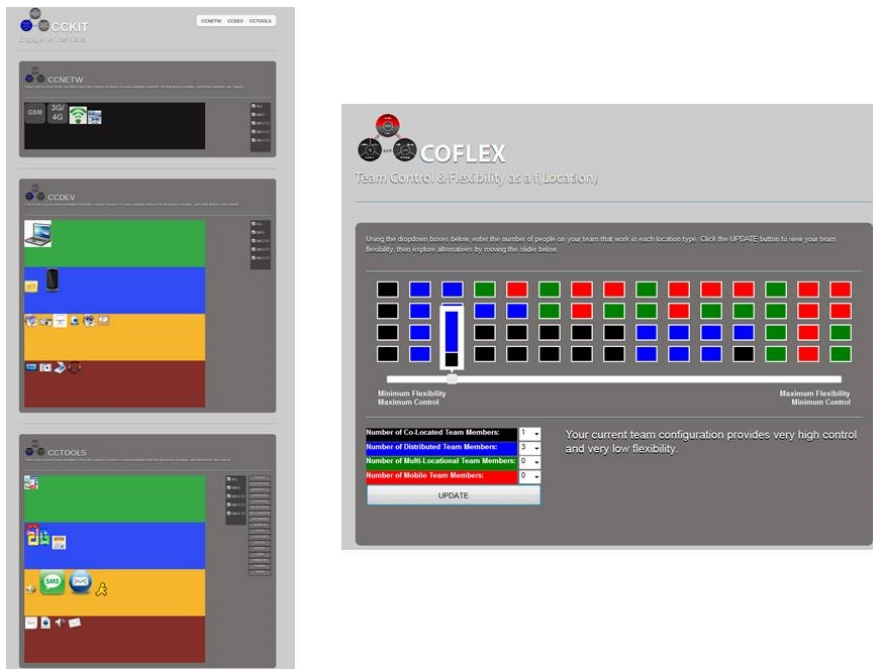
Distributed (Café) and collocated knowledge workers scenario can lead to potential Engagement level if the team chooses the right combination of network-device-tool in this case WiFi or LAN, laptop, and Web-based tool to co-edit and co-create content.

Working from Café scenarios. Team member working at the café may reach different potential levels of engagement depending on the task at hand, the location, and common networks, devices, and tools that his/her team members have available. The larger the icons are the more team members have that item in common. The three screen shots show different ccKit scenarios of available networks, devices and tools – with increasing potential to reach a higher level of engagement from left to right. The first screen shot shows the team member at the café having WiFi, however the rest of the team is mobile and has only 3G/4G network available. In addition, none of the team members has any tool available to enable them to reach Engagement level. The second screen shows multiple team members being distributed and having access to WiFi. Nevertheless, their available choices of devices and tools will limit them to reach Participation at best. The third screen shot shows diverse available devices and tools at all four potential engagement levels. Consequently, the team can make choices to aim for the highest level of Engagement.

Working mobile (Car) scenarios. In the case where all team members are mobile their only available network is 3G/4G, which may also be unstable, i.e. not reliable. Consequently even in the case their devices and tools may support higher degrees of engagement, e.g. the ccKit scenario on the right, they will be limited to Awareness and Attention as potential engagement levels.

**Mobile (Car)-distributed scenario**. In the case in which some team members are mobile working from the car and others are distributed having access to WiFi the team may reach different potential levels of engagement depending on the task at hand, the location, group configuration they need to work, i.e. one-on-one, subgroup, or team, and what common networks, devices, and tools that the members have available.

Collocated-multi-location scenario. This case illustrates a scenario in which some team members are multi-locational working at the client's office where they have WiFi access and one team member is at the Lahti regional office where he/she has access to LAN network. Since none of them has any tools available to support co-creation, the highest potential engagement level they can reach is Participation.
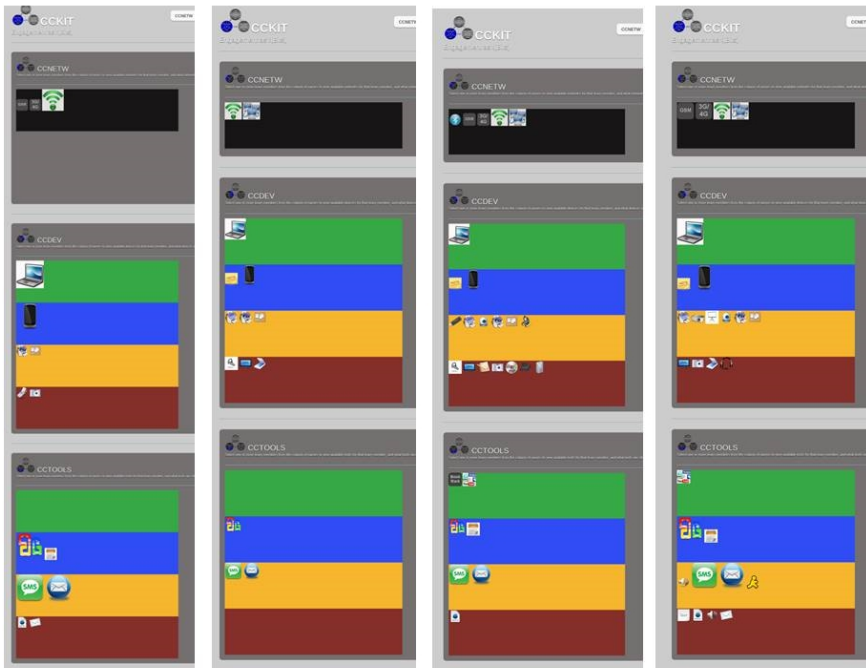
Collocated scenario. Here we show four collocated office scenarios. They indicate available networks, devices, and tools knowledge workers have and potentially choose to use as a function of their tasks. It is important to note that in the first two scenarios the knowledge workers do not have any tools available that may support Engagement level of interaction and collaboration. This hindrance was also found through data collected and analyzed from the surveys, interviews, and field observations.

Distributed (home) scenario. This case illustrates an instance of a ccKit with limited available devices and tools where the knowledge worker chooses to work from home. Most importantly to note is the lack of collaboration tools that would support the Engagement level.

The following six scenarios show:

- enGauge, i.e. the potential engagement level (marked with a start) of different team compositions. Red indicates Awareness potential, Yellow indicates Attention potential, Blue indicates Participate potential, and Green indicates Engagement potential.

- vSpeed, i.e. reported vs. actual workload as a function of number of collocated and distributes virtual team work.

enGauge together with vSpeed allows all knowledge workers to make their current workload transparent to their team members. This becomes critical in multi-teaming situations. It enables managers and team members to propose more realistic schedules and deliver on time, as well as manage expectations.
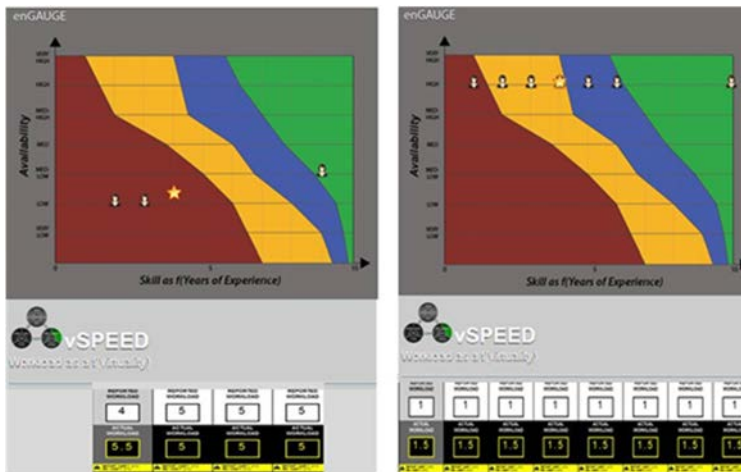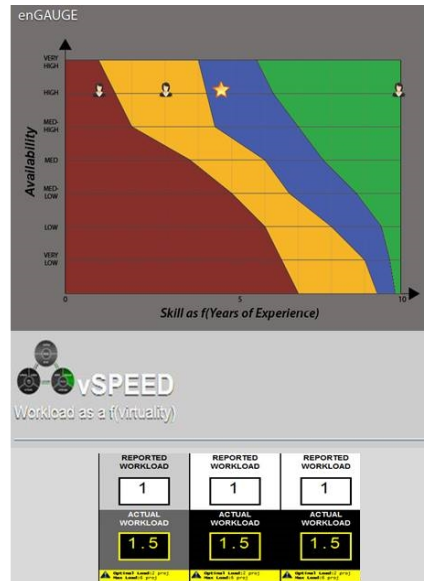

In this scenario manager has many years of experience is a mobile and multi-locational knowledge worker. It seems that the workload of all team members is almost the same as shown by the reported workload. Nevertheless, the demand of the manager's attention and guidance is high due to the fact that the team members are less experienced, and one of the teams is virtual, which makes all tasks more complex. This requires a ccKit infrastructure that supports both collocated and distributed collaborative work, visibility, and remote engagement for problem solving. Their potential engagement is in the range of Awareness.

In this scenario the manager who has many years of experience works with the team in distributed and multi-locational settings. The team is larger and team members come with diverse expertise and skill levels. Since the vSpeed indicates that all team members have the same low workload and typically interact constantly from distributed locations it allows them to be available at anytime from anywhere. Their potential engagement can reach Attention/Participation.
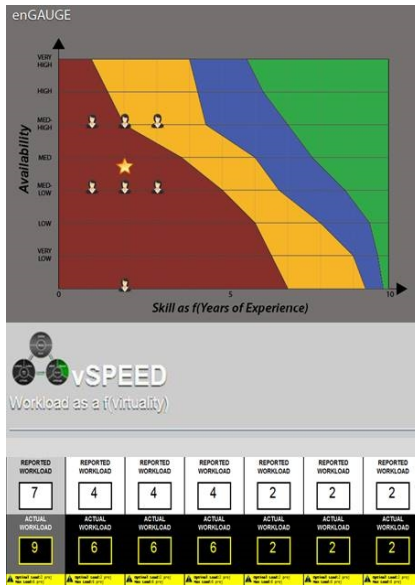
In this scenario team members have a mixed workload spanning from 2 projects to 9 projects as shown by the adjusted workload in vSpeed. Most importantly, the high workload of the young manager who is engaged in 4 geographically distributed teams, which are more demanding than the collocated projects, leads to low availability. Their potential engagement level is in the range of Awareness.

In this scenario the team members have a low workload, are available to collaborate. The skills and expertise is well distributed in this small team, from the manager who many years of experience to a young entry level employee. Their potential engagement level is in the range of Participate.
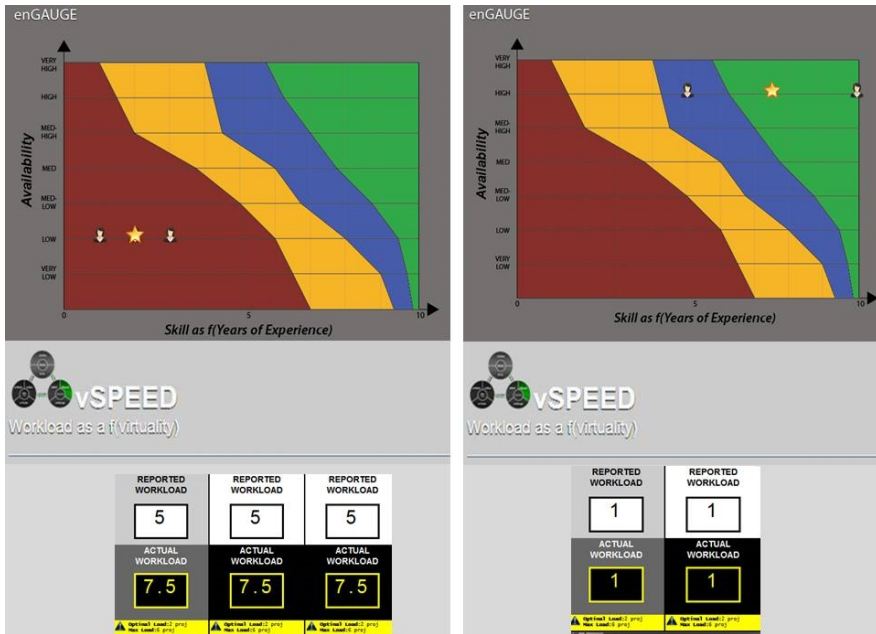
In this scenario the young team members have a medium to high workload with many geographically distributed teams. Since they are less experienced and are less available due to their workload their potential engagement level will be in the range of Awareness. ccKit devices and tools that will enable them to make their work and availability transparent to the team members will be desirable.

In this scenario of a team of two knowledge workers who are have advanced and expert skill levels, with a low workload, working collocated, their potential engagement level will be in the range of Engage.

4.   Discussion

4.1   ISS case study findings

The Lahti case study analysis and observations reinforce findings from similar previous studies related to the importance of:

- Participatory design and deployment of new work environments.

- Defining purpose and meaning of new work spaces that not only respond to the emerging needs and work practices, but are discussed with and explained to the employees during the design, remodelling, and move-in stages of the new work environment.

- Providing clear guidelines how to use the new spaces and creating excitement among the users of the new work environment

- Creating clear standards, work and interaction practices, norms and policies that maximize the use and functionalities of the new work environment.

- Providing new solutions and corresponding work practices that compensate for spaces that are no longer part of the new work environment, e.g. physical storage space that is reduced in the new work environment but the data content that was stored in such spaces in the previous work environment is still needed – could be stored electronically. Such an ICT solution needs to be linked with organizational infrastructure standards and work processes and employees need to transition to new work practices.

- Understanding the need to balance open work spaces that support fluid interaction and collaboration with spaces that support private discussions and quiet concentrated work. As in many other case studies we observed the high level of noise in open work environments – people talking with each other and more importantly talking on the cell phone. This required employees to move to the meeting room, quiet room, kitchen area, or informal work spaces such as the alcove seats, informal space couch, and often even walking outside the building to carry on a phone conversation.

- Ensuring reliable infrastructure, e.g., Internet, WiFi, printers.

- Training all employees how to use all the new ICT, e.g., video conference in meeting rooms.

- Creating a place for everything and everything in its place, e.g., office supplies available in a centralized space as well as in meeting rooms and quiet rooms.

- Fostering and supporting new social media and web conferencing ICT and work practices that link knowledge workers between other regional offices and ISS Vantaa headquarter to ensure knowledge transfer, reduce response latency, and accelerate problem solving, as well as strengthen a sense of identity and belonging

- Understanding the relation between BBI – bricks / physical, bits / ICT virtual, and interaction and work practices / social spaces and implementing it in an integrated fashion.

4.2 ISS corporate insights gained from the Lahti case study and next steps

The main insight of ISS from the Lahti pilot case was the importance of focusing on the development of the way of operating, not only on the facilities. The collaboration with HR and IT is essential. In the Lahti case there were some challenges due to the lack of HR policies and inefficient use of IT solutions. Many issues culminated in IT, as it is essential in the work of the Lahti employees. The technological readiness exists already at ISS, however, the implementation and active use of it is still challenging. There are various rules and protocols for IT communication within the organisation, which creates confusion among the employees. This is mainly because there is no one responsible for the IT communication practices. Mutual principles for different user groups should be agreed upon and supported. Training is also needed, as new technological tools are unfamiliar for some user groups, who are eager to implement new tools. In order to succeed, an active and a participatory discussion with the employees is essential during the design process. To make this possible, the support of management is a key factor.

At ISS, the Lahti case is seen as a successful and an important starting point for the renewal of regional offices. A team consisting of facility designers, HR and IT has been formed, and they have actively begun to collaborate in new office design projects, for example in the regional offices of Oulu, Tampere and Turku. The team collaborates closely with managers, superiors and the personnel at the offices in designing new solutions. Taking the specific regional requirements in to account is seen very important. The Lahti case provided new insights for supporting the design process, and the methods (workshops, interviews and observations) have been utilised in the recent design cases. The Lahti case has also contributed to the evolution of the organisational culture, which is seen important in implementing new ways of working at ISS. There has been progress in changing the mindset from traditional office setting towards flexible work practices, however, there is still much to do. The support of management is seen as a key enabler in

the transformation process, as their decisions have enabled many new projects in the area of new ways of working. Cases like the Lahti office provide internal visibility and enhance the understanding of the need for renewal of work places at ISS.

Acknowledgements

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Title	**ISS Lahti pilot case study**
	New ways of working

Author(s)	Renate Fruchter, Leonard Medlock, Kincho H. Law, Pekka Mattila, Adriana Ståhlberg, Hannamaija Määttä & Esa Nykänen

Abstract	This report presents the results from the ISS Lahti pilot case of RYM SHOK New-Wow project which was conducted in collaboration between Stanford PBL lab, ISS and VTT during 2011–2012. The purpose of the Lahti pilot case was to study factors of physical, virtual and social environment that enhance or disrupt knowledge work on individual and team level at a new ISS regional office in Lahti remodelled according to new ways of working principles. More specifically, the objective was to examine how to increase engagement in the work of service secretaries, superiors and managers working in the business area of security, technical and cleaning services. The employees had moved from an old office space not supporting the needs for transparency, interaction, collaboration, and engagement promoted by new ways of working practices. The remodeled ISS Lahti regional office was designed following a new space concept developed at ISS called *the office of* choice. The new space concept was designed to support diverse work tasks allowing the employees to choose a space most suitable to their activities.
	The research team conducted an ethnographic study during three working days at the new Lahti office site, where the researchers observed how the employees experienced the new space in their daily work. Three methods were utilized; observation, interviews and questionnaires. Additional workshops were held at the ISS Lahti office to engage the employees in the study as well as provide them feedback
	The results of the Lahti pilot case contribute to the development of methods that support a continuous and dynamic transformation of the work environment, explicit choices employees make with regards to place, technology, and work processes. This encourages an integrated approach that brings space management, ICT management, and business processes together taking into account the end user perspective and evolving needs.

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