DECOMPOSING PROGRAMMES. Re-coding hospital work with spatially syntactic information

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Abstract

This paper argues that one of the main problems of finding consistent and valuable relations between workflow, organization, and spatial configurations lies not in the lack of relations or dominancy of programme, but in underdeveloped descriptions of activity and programme in a specific sense: the programmes and activities studied have been described from an organizational point of view rather than a spatial. This paper investigates how to rewrite the work programmes of a Hospital into something that carries syntactical information in its own description, thereby making a discussion of spatial configuration and workplace environments more feasible. The paper is based on a research project on Karolinska Universitetssjukhuset in Huddinge, south of Stockholm, where several hospital units have been studied to allow a continuously refined understanding of the workflow and its spatial conditions in consecutive iterations. The proposed model for re-description of work highlights certain parts of spatial configuration connected to the different situations in which the work takes place, and goes on to discuss the implications of this re-description for architectural programming as well as workplace analysis. This empirical support includes individual interviews, group seminars, and presentations in small workshops, and material from this study will be included to support and develop the argument. The main argument revolves around breaking up the connection roles-functions-spaces into a descriptions of tasks-situations-configurations, which can then be brought back into the different roles and stages of the organizations workflow and better accommodate for flexible spaces where the differentiating needs within as well as between different roles can be taken into account.

INTRODUCTION

Workplace environments have been thoroughly studied within space syntax research, providing a series of results but also consistently challenged the field in that few clear and consistent correlations have been found, that some results appear to be contradictory, and that to certain extents spatial configuration have appeared to be of little importance for the performance of organizations (Sailer & Penn, 2009; Sailer, 2007; Steen, 2009). Specifically regarding movement flows and interaction patterns, which have been the main topics of many studies, results vary, and the interconnection between the two has been found to be weak even in situations where correlations between movement and configurations have been high (Blombergson & Wiklander, 2006). Other found correlations, such as between positional exposure and degrees of face-to-face interaction by the desk (Markhede, 2010), tend to show little correspondence to movement flow patterns. While results thus *have* been found, there have been problems to establish them consistently and thoroughly in the way as has been done in urban environments (e.g. Hillier, 1996; Hillier & Iida, 2005), and to some extent public buildings (Rohloff, Psarra & Wineman, 2009; Tzortzi, 2007; Choi, 1999; Peponis, Conroy Dalton, Wineman & Dalton, 2004; Koch 2005, 2009). Reasons are many, ranging from the influence of organizational boundaries, to impact of programme and relevance of the spatial system versus experience and expertise of co-workers. Three interesting steps have been taken lately to move knowledge forward, e.g. the role-activity-space investigations of Heo, Choudhary, Bafna, Hendrich, and Chow (2009) and Lu, Peponis, and Zimring (2009), shifting focus from generic flows and behaviour to effects of configuration on role-specific tasks involving movement, a shift towards actor-network analysis suggesting relations to rather be on the levels of social networks than directly observable (generic) behaviours (Sailer & Penn, 2010; Sailer & McCulloh, 2011), and analysis of position and configurations of organizations as they are spatialized (Markhede, 2010; Steen & Markhede, 2010). Common between these later papers, is that they reformulate the question of what relations between configuration and performance are to be found, and how these are to be analysed. They also appear to provide solid results regarding the influence of configuration although work remains to secure their general validity.

In this paper, we will focus our attention to a central question for these works that has in part already been made in them but can be done more thoroughly, which is to argue for a refined description of the *work* similar to the refined descriptions of space developed within the field. The outset of this is to try and find descriptions of work that have spatial content (instead of e.g. organizational), similar to how the origins of space syntax comes from finding spatial descriptions that contains social content. I.e. if it is that case that if space is to influence social relations, these relations have to be built into these forms (Hillier & Hanson 1984), we attempt to reverse the formulation and say that "if social activity is to be affected by spatial relations, spatial relations have to be embedded into these activities". This, it must be noted, is a discussion also in the Social Logic of Space, but one that has had less effect on the way analyses are commonly performed today. If we look at many of the studies made, and furthermore the wide range of organization management literature or office studies (compare: Amin & Cohendet, 2004; Price, 2007; Peponis, Bafna, Bajaj, Bromberg, Congdon, Rashid, Warmels, Yan & Zimring, 2007; Sailer & Penn, 2009), this is not the case; similarly to how functionalism can be criticized for making spatial units of activities in a way that they are not necessarily spatially rooted (e.g. Hillier, 1996; Forty, 2000), workplace research tend to treat organization and work going through *organizational roles* and *positions* rather than through spatially relevant activities as they take place. Reversing this requires a fair deal of ground-up discussion, and the purpose of this paper is to begin such an analysis. It is not thought that work can be described directly in spatial terms in a one-to-one direct fit (compare: Alexander, 1971), but rather, it is the basis of this discussion that different tasks within a workflow hold conditions that have spatial implications both locally and syntactically. By this we mean that spatially relevant description of workflow or roles contain socially

configurative characters which can be realized spatially. In order for this to be plausible, the activities also have to be described not only through their functional intent, but in their contextual demands through the course of their performance.

In this way, this argument builds both on the description of office work as conceptually differentiated into long questions (e.g. concentrated work that is hindered by interruption) and short questions (e.g. a series of shorter readings in-between which interruption is welcome, or where catching up once interrupted goes quickly) (see Steen, 2009, 2010), on the findings by Heo et al (2009) demonstrating how building analysis on the basis of roles (in Heo et al's case nurses) and their different workspaces (e.g. individual patient rooms) provides correlations between, for instance, the average number of visits to patients and the syntactical depth between them and the nurses' station; and on the arguments presented by Koch (2010) regarding configurational 'staging' of architectural-social situations.

CONTEXT AND BACKGROUND

In practice, the material herein has been developed through a research project regarding the role of visibility in co-operation and communication in hospital environments, specifically between medical staff (doctors, nurses, auxiliary nurses[1]). It has been found that this role distinction is not descriptive of more than general tendencies in their respective spatial needs or wishes, why a refined understanding of the roles as decomposed into a number of activities became a central part of the study, as well as providing ways of describing work that allowed the staff themselves to better contextualize and describe the various needs they had. The study was made at the Karolinska University Hospital in Huddinge, south of Stockholm, which provides a number of beneficial conditions for such a study, and majorly through interviews and follow-up seminars. Before continuing, it is in place to introduce this hospital as well as the research method.

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[1] In some cases, the position of auxiliary nurse had been abolished, and the medical teams consisted of doctors and nurses only. In these cases, however, it was common to rotate the traditional tasks of nurses and auxiliary nurses among the nurses over the days. Note further that the translation is indirect, as the 'auxiliary nurse' here is his or her own professional category more focused on care, whereas the nurses are more focused on medicine.

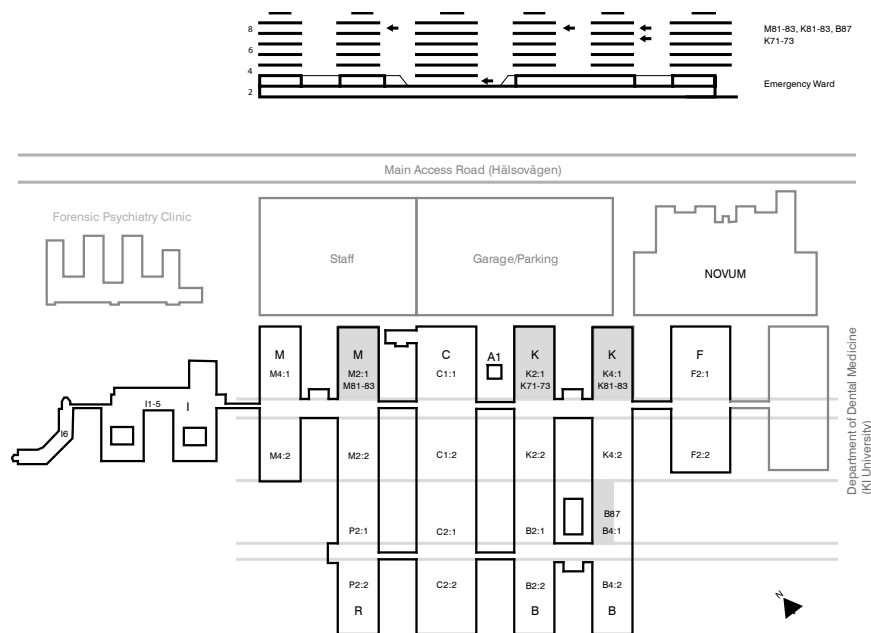### Karolinska Universitetssjukhuset in Huddinge

Figure 1. Overview over the Karolinska University Hospital and the module Grid (indicated in grey lines), as well as units of study (marked with gray in plan and arrows in section). Figure based on drawings from LOCUM.

Huddinge Sjukhus, part of the Karolinska University Hospital, is located some 20 minutes south-southwest of Stockholm in Flemmingsberg, in the municipality of Huddinge. It came to be as a result of an excessive need of health care buildings in the Stockholm Region in the late 1960s and construction began in the early 1970s, with a plan largely supported by a range of investigations into proper measures and systems for modular construction of healthcare environments in the 1960s and 1970s (see e.g. Persson & Sjöqvist, 2010). Originally designed by Sven Lindholm and Karl-Åke Hellman at HLLS Arkitekter, it is constituted by an alteration between two-atrium and three-atrium modules, interconnected by corridors and staircases [Figure 1 & 2]. On the entrance floor, the connections are even provided with 'street names' to facilitate wayfinding for visitors, although the main method of orientation is the modular system of grids (M, C, K, R, B) and floors (1-8). Cross-modular movement (i.e. between building volumes) is possible on all floors, whereas moving through modules is not always possible depending on what unit is housed in the module in question. The standard solution is that each unit has one module, but some units have half (one side of the row of atriums). The hospital is continuously being rebuilt, unit per unit, with at least two modules free for or under reconstruction so as to not interrupt operations, why the interior configuration is continuously developed and refined, and changing after concurrent healthcare ideals.
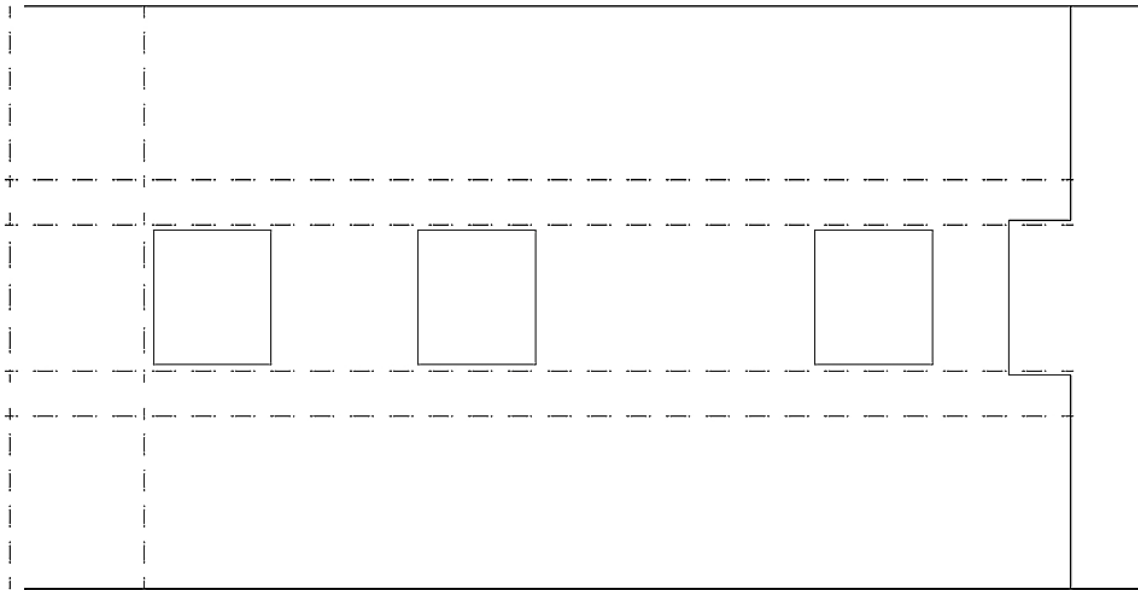
Figure 2. The module unit of Karolinska University Hospital, with indications of common partition principles (dash-dot) and atrium gardens. Worth noting is that modules in the center have two atriums whereas the ones in the ends have three per module.

Methods

The research project has taken place over one and a half years, part-time, gathering empirical material and developing method in parallel, as the study has moved from hospital unit to hospital unit. The limited time and the type of research question has made it apparent that the method best suited to gather data was interviews, which have been conducted with representatives of each of the three medical staff roles (doctor, nurse, auxiliary nurses) in each unit studied, with a minimum of two representatives each, in certain cases up to four. The results of these interviews have then been analysed before follow-up seminars with the interviewees have been held in which a re-description of their work has been presented in order to test whether made descriptions are accurate and generalizations relevant. New ways of discussing workflow and work activities have also been presented, to better be able to discuss hospital architecture. Finally, experiments were made with the building plan based on syntactic analysis to test different ways of accommodating reported problems or wishes regarding the work environment. These seminars have further unearthed particularities of the workflow that does not come up during regular interviews as they are so embedded in routine. Interviews asking the interviewees to make generalizations (i.e. patterns of workflow) have been altered with interviews asking interviewees to describe specific workdays (e.g. 'yesterday'). Discrepancies in pattern results from these interviews have shown to be small, even if there appears to be a larger loss of side-activities in the former and more sensitivity for exceptions in the latter. Overall the follow-up seminars have worked well as quality assurance of the data. The units were selected in co-operation with the hospital to ensure reasonable similarity as well as difference in both working practice and spatial configuration, with the main focus on differences in configuration. While observation studies were made of

the emergency ward after these interview studies, this paper is focused on the analysis and results of the interviews and seminars.

PROGRAMME DE-COMPOSITION

The argument of this paper will go through three steps revolving around 'program de-composition': an introduction to the concept of de-composing and spatializing activity; a model of principally different working situations and their adaption or integration into hospital work *through the filter of communication and visibility;* and a methodological and theoretical discussion, developed for and refined in the interviews and feedback seminars, on mapping work in a series of fields (following Bourdieu (1984) they would be called 'work spaces') highlighting tensions between internal and external conditions of different activities.

Introductory Example: Reading as Function and as Situated Activity

In "Guessing the Future of the Library", Bart Verschaffel (2010), with remarkable clarity and simplicity, discusses the activity of *reading*; so central to much work, as well as libraries, but often simplistically treated as *one* activity with *one* aim – and perhaps even more remarkably, as if the activity of reading was limited to the functional performance of continuously and uninterruptedly reading words and sentences. This, he means, is a central problem in the discourse on library design, namely in that

> "[…] it is crucial that reading as an activity remains intensely related to its environment. Reading is absorption and concentration with the eyes on the page, but also seeing and feeling and hearing the paper of the page and the book, and letting the eyes wander and rest on the table, on the walls, and, through the windows, stare at the landscape and the sky – all while staying 'in' the reading. Because reading is a situation that 'takes place', it is important to investigate in detail how the experience of space becomes part of the activity of reading." (Verschaffel, 2010, p. 89)

Reading, he concludes followingly, "[…] is situated on a threshold: it is focused on an 'elsewhere' but is at the same time aware of its 'here'." (p. 93) He then goes on to develop this describing how different forms of reading interact differently with the environment, and through this shows how dependent on context reading is – also visual context. Furthermore, we can from this decompose reading into separate activities – as it is not the central point currently exactly *what* activities, we can begin by making use of Verschaffel's description differentiating reading into *reading at home, reading in nature, reading among the crowd, reading in the study room,* and *reading in the library.* While these are illustrative and telling in many ways, this is where we also need to deviate from Verschaffel's argument as these definitions are only vaguely spatially defined (defined by experiential quality or functional program of space) and insist on keeping divisions of activities only loosely tied to *specific spaces* and *thoroughly tied to socio-spatial situations*, as the latter, arguably, is what space syntax work with. To do this we can turn to the findings of library studies showing that most reading in public libraries take place in rather disturbed environments, namely close to the main flows of people (Koch, 2004). With Verschaffel's division as point of origin, we can then perhaps explain the found preference of seats near crowding over seats with a good view – 'reading in the library' would here be separated between a *social* activity (reading amongst the crowd), a private, secluded activity ('reading in nature') and a concentrated activity combined with writing ('reading in the study room') with

following effects on patterns of reading activity occupation in libraries. It is following not far-fetched to claim that reading *in a library* is a predominantly social activity (preferably shared with others doing the same, one might note), as reading 'in private' can be as easily done elsewhere, e.g. at home. This can then be further refined by introducing definitions that provide spatial conditions not only during the activity but also as contextualized activity of before-after conditions (see e.g. Mattsson, 2006), as well as internal refining conditions such as the character of long questions and short questions (Steen, 2009).

Situating Space: A Conceptual Model for Principles of Working Situations

With this background, as a first step in developing these arguments within the topical project we worked on a simplified model of spatial situations and communication properties of visibility, that was then generalized further. The point was a clear description of plausible working situations within the hospital that made a more nuanced description of visibility and communication, as in the interviews and seminars it was predominantly discussed following rather simple models, as a completely reciprocal need, and through reciprocal solutions, leading to unnecessary and irresolvable conflicts between overview, access, privacy, and disturbance. The model took its basis in the differentiation between access and visibility of such situations as presented by Koch (2010) and in the directionality of vision explored in practical cases by Lu et al (2009; see also Penn, 2005; Koch 2007), and was then tested for validity in subsequent seminars with good response (i.e. the description of working situations and patient situations serving as the basis were validated as relevant and functional, as well as enriching their way of thinking about work and its spatial conditions). The model [Figure 3], though having several iterations, thus consists of three principally different relations of visibility: directed *from* the subject *towards* someone/something; directed *both ways between* subjects/places; and directed *from* someone/somewhere *towards* the subject. These situations were then given typical working situations derived from the interviews and the logic of Steen (2009).

Figure 3. The principles of different visibility, staging relations between employees (E) and patients (P) working with different tasks and in different conditions. All the principal work tasks as well as patient conditions have been validated by hospital staff as relevant.

As the project focus was communication between staff primarily, we then continued to develop the model to see whether it was plausible to set up a similar description using only personnel and working situations, with the result seen in [Figure 4], which again was validated through the seminars. It should be noted that

this model does not intend to set up a solution but to test if it was plausible to fill all 'slots' with work activities that were possible to relate through these means.
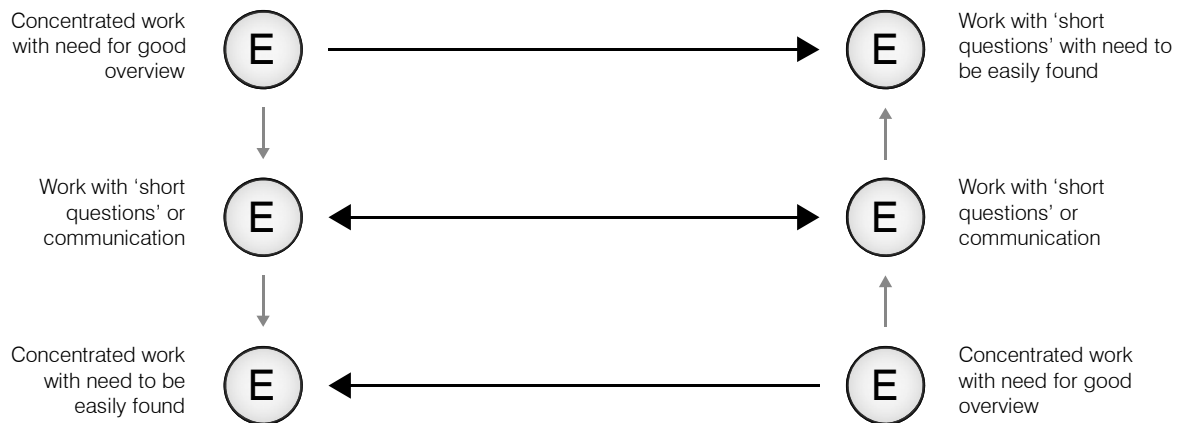

Figure 4. The relations of Figure 3 described as relations between situated work tasks.

Finally, the model was expanded from visual relations to communication in general by introducing different forms of relations to clarify in what way visual, face-to-face, and other forms of communication such as technical solutions (i.e. transpatial communication, see Sailer & Penn, 2009) could be considered [Figure 5]. In this way, the model provides a clearer understanding of the properties and potentials of visibility, or 'visibility only', as a communicative device, and what it may or may not replace or be replaced by. Furthermore, it suggests a certain degree of interchangeability between visibility and technical equipment. It does, however, show how *architectural solutions* staging visibility clearly, to some extent can *reduce the need of technical equipment*, or at least reduce the degree of dependency on them. Deliberate staging of visibility can then also resolve a number of conflicts reported in the interviews between need of overview or need of easily locating someone vis-à-vis need of seclusion in order to perform concentrated work. To a certain extent, it also explains why de-centralised solutions with more exposure of the stations reportedly work better from this perspective than those with less, *providing that means of limiting access* (i.e. limiting amount and risk of disturbance) *were included.*
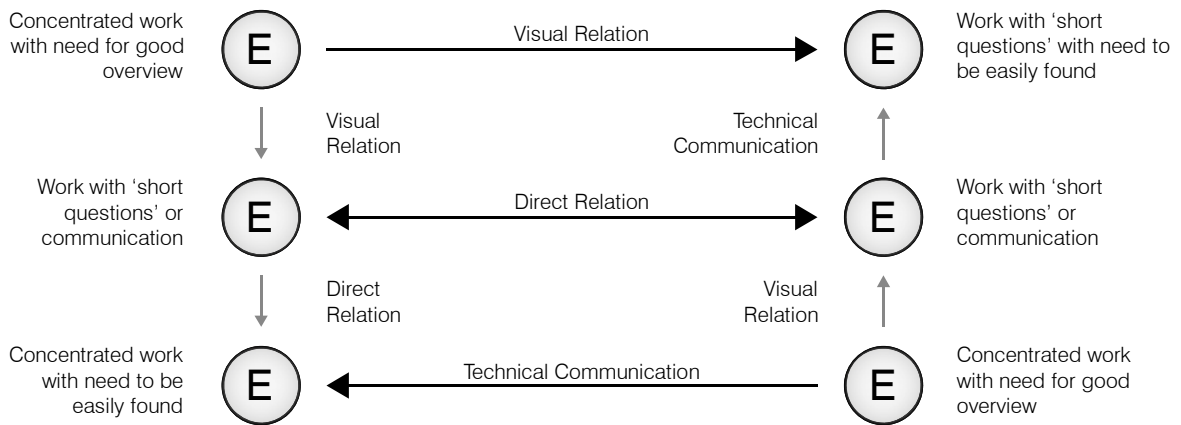
Figure 5. The relations of Figure 3 described as relations between situated work tasks, expanded by different forms of communication.

Continuing from this stage, however, it can be seen how visibility and permeability can be so arranged in inter-personnel situations that different working conditions can be met, *if the working conditions are first defined as spatial situations clarifying their spatial needs*, so as to – for instance – offer a place with good overview but otherwise neither exposed nor central in the permeability patterns, a place that is well exposed but not disturbed by having too much visual input, places that are visually and permeability wise central. What the model does not include are the visually disconnected workplaces, as it focuses on potentials of visibility. However, we can see how a model deduced from consumption research (Koch, 2007) can be translated to workplace situations, and with added directionality of a workplace, translated to valid working situations [Figure 6].
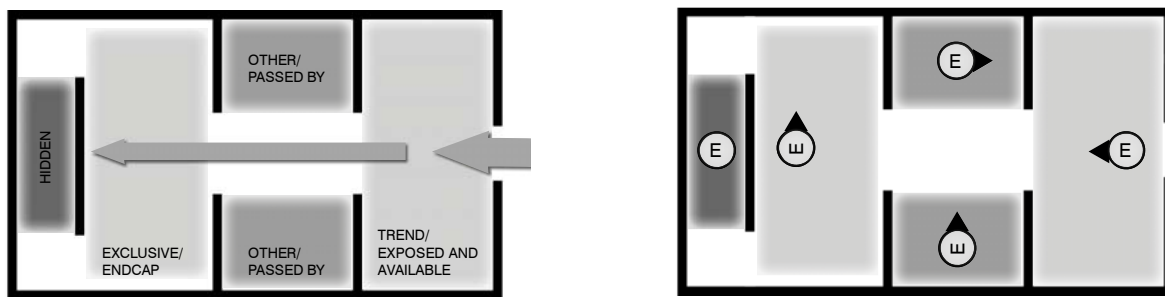

Figure 6. Just as the situations can be staged to describe consumer goods (from Koch, 2007), they can form working situations. Through directionality of workplaces the situations in either end of the corridor is changed, as well as in the side-rooms.

Contextually, workplaces could now be inserted in the diagrams presented by Koch (2010) and thereby tied back to findings within space syntax research correlating movement and occupational patterns to configurative properties. If we retrieve that understanding back into the model as worked with here, and set it in relation to targeted visibility (Lu et al, 2009), positioning analysis (Markhede & Koch, 2007) and face-to-face interaction through the filter of movement (e.g. Heo et al 2009; further Sten & Markhede, 2010), we can see how they tend to approach these questions from different views of visibility as in [Figure 7].
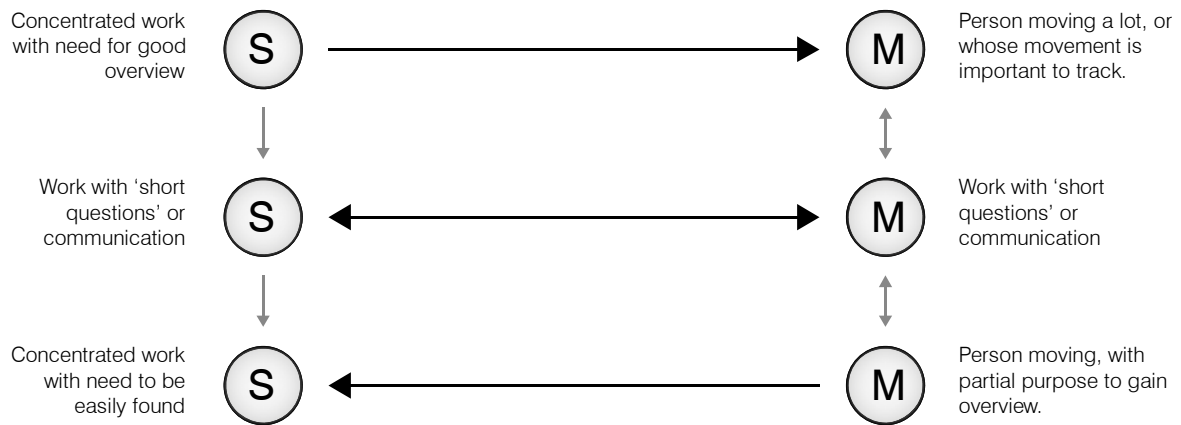
Figure 7. When shifting the right column to be about movement (M) and considering the left to be 'static' (S), we can see how the questions of Lu et al (2009) regarding targeted visibility for moving nurses and questions by Markhede & Koch (2007) regarding positioned visibility from workplaces complement one another, and common interpretation of interaction/meetings (middle).

It is to be expected that any position, or formal organizational role, has tasks that fit to many if not all of these situations, but taking them into account it can be discussed first whether there is optimization to be done for one of the tasks (e.g. is one of these situations either most common or most important for the person/role in question?), or if it is better solved by providing several workplaces or altering conditions (e.g. alterable shades were often suggested for patient rooms). In both cases, this points towards first *accepting* that space will be differentiated (Hillier & Hanson, 1984; Hillier, 2003), and then *deliberately working* with using this difference to stage situations that are suitable for the work tasks and in line with intended outcome and identity of the organization.

Contextualized Workflow: Challenging Role Descriptions

While this model is ostensibly clear and simple, it still continuously kept discussions on specific situations or specific organizational roles, and it does not take other syntactic properties into consideration, such as sequencing (Hanson, 1998), integration (Hillier & Hanson, 1984), or targeted distance (Heo et al, 2009). For these reasons, another set of models were introduced working with specific pairings of perceived or real potentials or problems of socio-spatial character, also possible to realize spatially through manipulation of configuration and programme, but which were not translatable directly to organizational role (indeed, this was a conditional point of these models). The aim here was to primarily define social or organizational working conditions as the questions to produce responses that had spatial implications. These were tested in several iterations through the project to refine and develop their precision, starting with 'being available' and 'being undisturbed', nuanced and problemised through the control over when interaction takes place, as in [Figure 8].
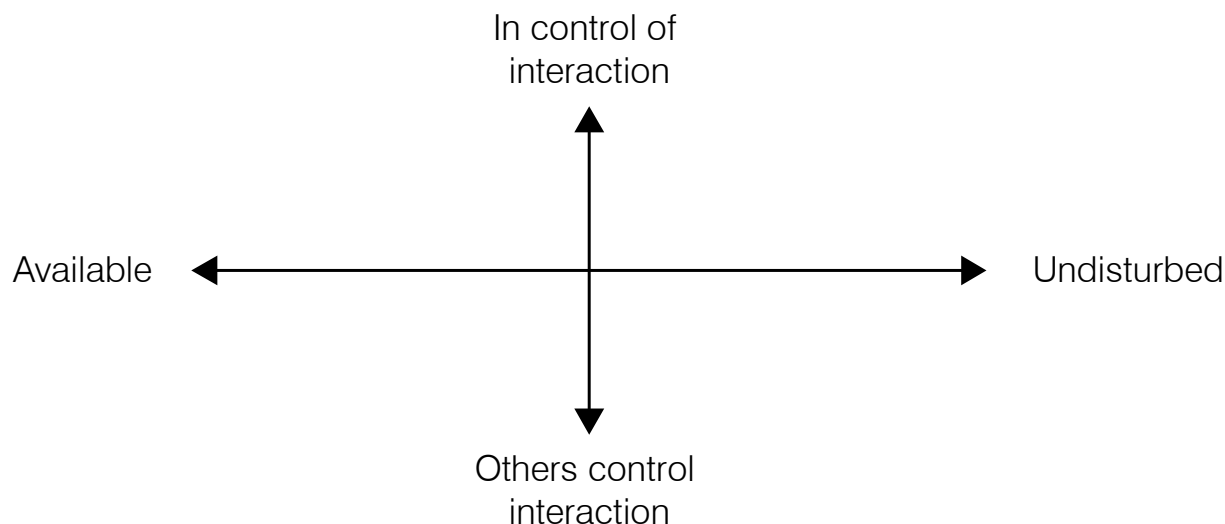
In control of
interaction

Available ←————————————→ Undisturbed

Others control
interaction

Figure 8. Principles of work conditions, describing the current situation and its relation to others, as well as who is in control of this relation.

This was well received and productive for the discussions, beginning to with more precision explain what was sought after within the different working roles and tasks, and also possible to relate to configurative properties either directly on existing plans or as discussions of principles. It also highlighted differences in the configuration of the organizational roles and the degree of tension between different demands inherent to them, such as that doctors had an internal functional demand to be undisturbed (in order to perform thorough analysis, catch up with latest research development or, as it is a university hospital, develop their own research) and a systemic functional demand to be available (nurses are not formally allowed to make decisions regarding e.g. changes of medication and thus need to be able to contact doctors at any time). This internal versus systemic functional demand, in conflict within the same role, potentially highlights where spatial solutions may be of aid, if it can be further defined what the different demands are. For instance, it can be discussed whether the nurses disturb a doctor more if she or he is unseen (e.g. 'elsewhere' so that contact must be made to find out if it is proper), or if a visibility solution may alleviate this through providing simple and direct information regarding whether the doctor is busy in deep concentration or look more open for disturbance (Steen, 2009). This can then be weighed against the risk of exposure implicating availability, but experiences from the units with glass rooms indicate that as long as there is an agreed upon symbolic means of communicating openness (in the case in particular quite direct: a door that can be open or closed). Such symbolic communication, it should be noted, is highly dependent on workplace practice and collective agreements on what they mean in order to function reasonably well.

The next step, rather complementing than replacing the figure above, was to elaborate on the 'external' or 'systemic' situation, i.e. the individual in his or her context. Here the interviews as well as research in general (compare: Amin & Cohendet, 2004) point to the organizational problem of not individual and collective, but the smaller social or professional unit (e.g. group or team) and larger unit (e.g. hospital unit or division), including but not limited to inter-group communication. It thus centred on the purpose and social context of *communication* as to exchange information, for instance, within the team or within the unit. As with the above diagram, it was also set into nuance by introducing another axis of the difference between 'social' and 'professional' communication, where the former is working to produce social relations and

community whereas the latter is more about knowledge exchange. *It is crucial for the model that we consider both to be necessary in a workplace environment* (see e.g. Amin & Cohendet, 2004), and that they to some extent facilitate each other. However, it may be that certain groups are in greater need of one or the other, and they may be differently important in different scales (or between different vertical or horizontal layers of the workplace organization). Thus, the diagram is formulated as in [Figure 9].
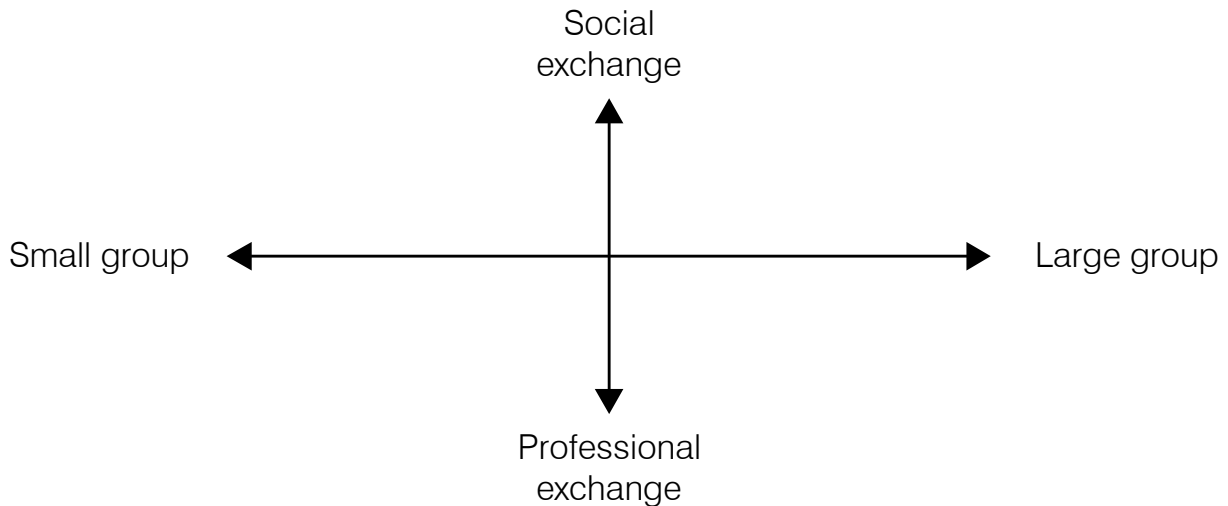

Figure 9. Principles of communication in the unit (or hospital), allowing a mapping of forms of interaction and the roles it has both socially and professionally.

Through this diagram, it is also possible to further understand the spatial conditions of different kinds of interaction that together make up the interaction of the hospital unit, and arguably any workplace. The length and spatial situation in which they can take place, as well as the degree of spontaneity with which they can happen, clearly has implications for what spatial configurations are needed to support them. I.e. it helps develop a refined understanding of 'meeting places' and the relation between encounter-based interaction (produced through space-time bundles; see Mattsson, 2006), planned meetings, and semi-spontaneous meetings which are not to be considered as 'planned' but not happening on-spot as a result of an encounter. It points towards the need to work much more deliberately with a range of meeting places responding to the contextual spatial conditions as well as the social preconditions of what meetings are aimed to be supported. One result is a simple need of differentiated meeting places (compare Bergström, Marcus & Koch, 2010), considered as a contextual activity in a similar way as 'reading' was above, but the nature of this differentiation is in need of development. It is thus not only levels of meetings but meetings as situated activity with the complexity that follows that provides a better potential to capture the kind of interaction which is aimed to be understood.

The final diagram that comes from this discussion to be presented here, is more centred on direct oppositions of spatial and functional properties, deliberately staged to challenge simplistic proposals of direct benefits of spatial solutions by introducing the question of what could be called 'indirect benefits', to a large extent possible to further understand through e.g. Lu et al (2009) and Heo et al (2009) with a certain expansion of the argument. It sets up the simple opposition of near and far which architecture always faces

due to its materiality and which is explored within space syntax research; that is, no matter how integrated or segregated a structure, it will have longer and shorter distances between things (see e.g. Hillier, 2003). On the other hand, the direct benefit of saving time can be posed against the indirect benefit of movement generating overview. Here, the indirect benefit could have been set to e.g. generation of potential for encounters, or exposure to co-workers or patients, but it was decided that the clearest opposition was the gathering of information for the one moving – which can to some extent be measured through adaption of targeted visibility analysis (Lu et al, 2009), producing the diagram in [Figure 10]
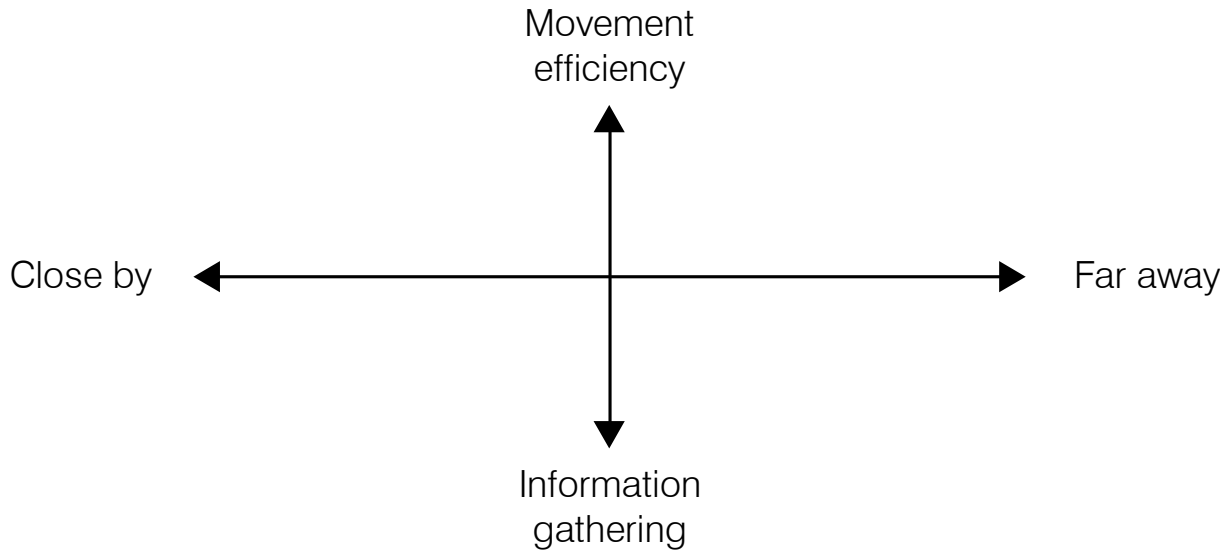

Figure 10. The relation between direct and indirect benefit of location strategies offering a refined discussion of the logistical choices to be made in relation to non-direct or non-function centered benefits offered by visibility.

What these figures allow, is highlighting tensions within roles and relation between roles of both functional and social character, which help us break them down into not only direct work tasks but into work tasks contextualized into their organizational, spatial, and social context. It further leads to a better understanding of why certain arrangements for a specific task is experienced as problematic by some and well-working by others, depending on the composition of functional, social, and organization-systemic demands and practices within their role. Adding the relation and tasks in regards to patients naturally complexes the picture further, but this is outside the scope of the current project.

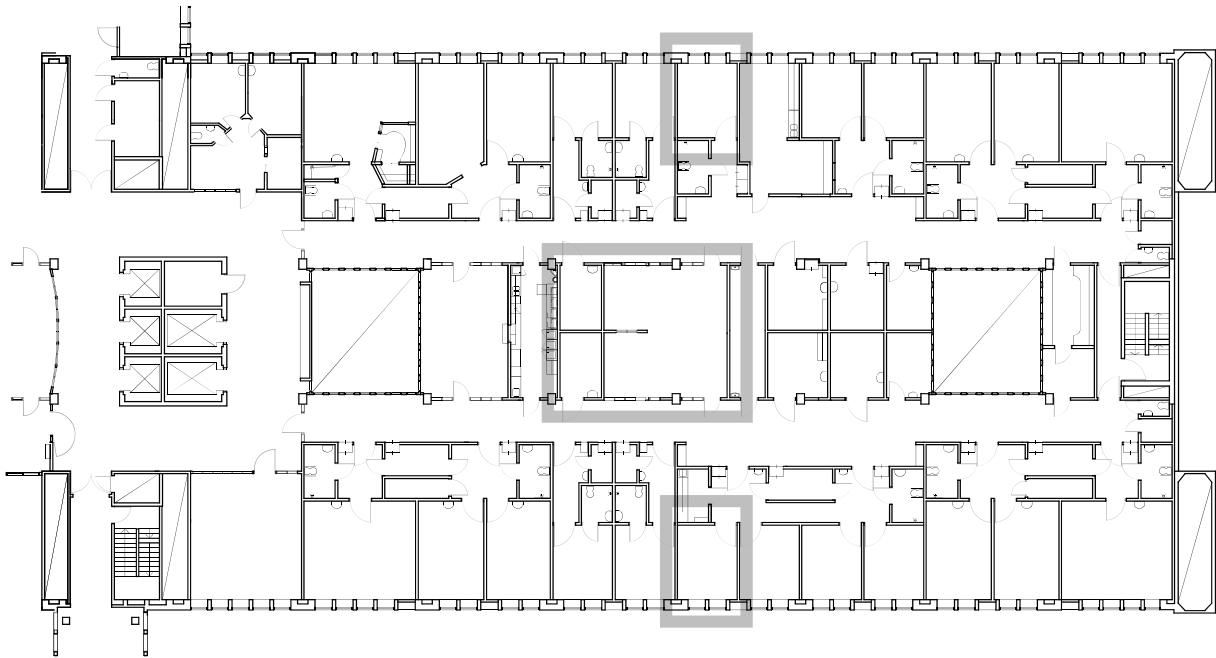**ROLE-TASK-SPACE-FUNCTION: A SIMPLE BUT ILLUSTRATIVE EXAMPLE**

Figure 11. The team rooms of M81-83. Two teams are located in the 'outside' compared to the corridor, and four teams are located centrally. The large room holds the general meetings, and there is a window between the smaller central team rooms and the large room.

Unfortunately, there is not room in this paper to fully go through a range of 'decomposed roles', as data is of a kind not easily abbreviated while still containing the distinct information needed. Therefore, we instead choose to present an example which, while humble, is illustrative in that they *are* part of everyday practice. The example we will make use of is the unit M81-83 (the Medical Emergency Care Unit), where work is arranged into rotating teams of doctor, nurse, and auxiliary nurse with responsibility for a set number of patients each day. The working day is governed by meetings and patient visits, so that there is a larger meeting in the beginning of the day, where *primarily* doctors and nurses participate but preferably all of the teams that are to take over, followed by team meetings to prioritize patient visits and brief discussion of cases, then followed by patient visits until the debriefing meeting, which in reality follows the overall briefing meeting of the next shift in the largest team room, why nurses and auxiliary nurses tend to gravitate to the coffee room for cross-team 'social debriefing'. Before the general meeting it is common for doctors and nurses to quickly read up on their patients, and for auxiliary nurses to both do this and to make sure materials and other necessities are in place for the coming patient visits. For this arrangement, there are six team rooms arranged into the structure [Figure 11]. As can be seen in [Figure 12], they have quite different configurative permeability and visibility properties as well as size. For both size and accessibility reasons, the two central 'rooms' (essentially one room) is used for the general meeting, and the team rooms (including the central one used for two teams) for the individual team meetings. So far, the function-space programme works out, and we see a correspondence between programmed use and actual use.

Instead of accepting this as the governing condition, we then continued to rather regard this as the basis, or normal condition, conceptually removing it from our studies to instead look at behaviour when function/programme did not prescribe this pattern. This happens in two cases primarily – one when working tasks and load are not requiring strict adherence to teams, and one where individual task is not dependent on systemic relations and can be performed at a place best suiting the task itself. It also includes cross-team communication not included in the formal arrangement of meetings. In these cases, a remarkably clear pattern began to emerge, facilitated by the configurational differences of the team rooms. They will be presented pragmatically case by case.
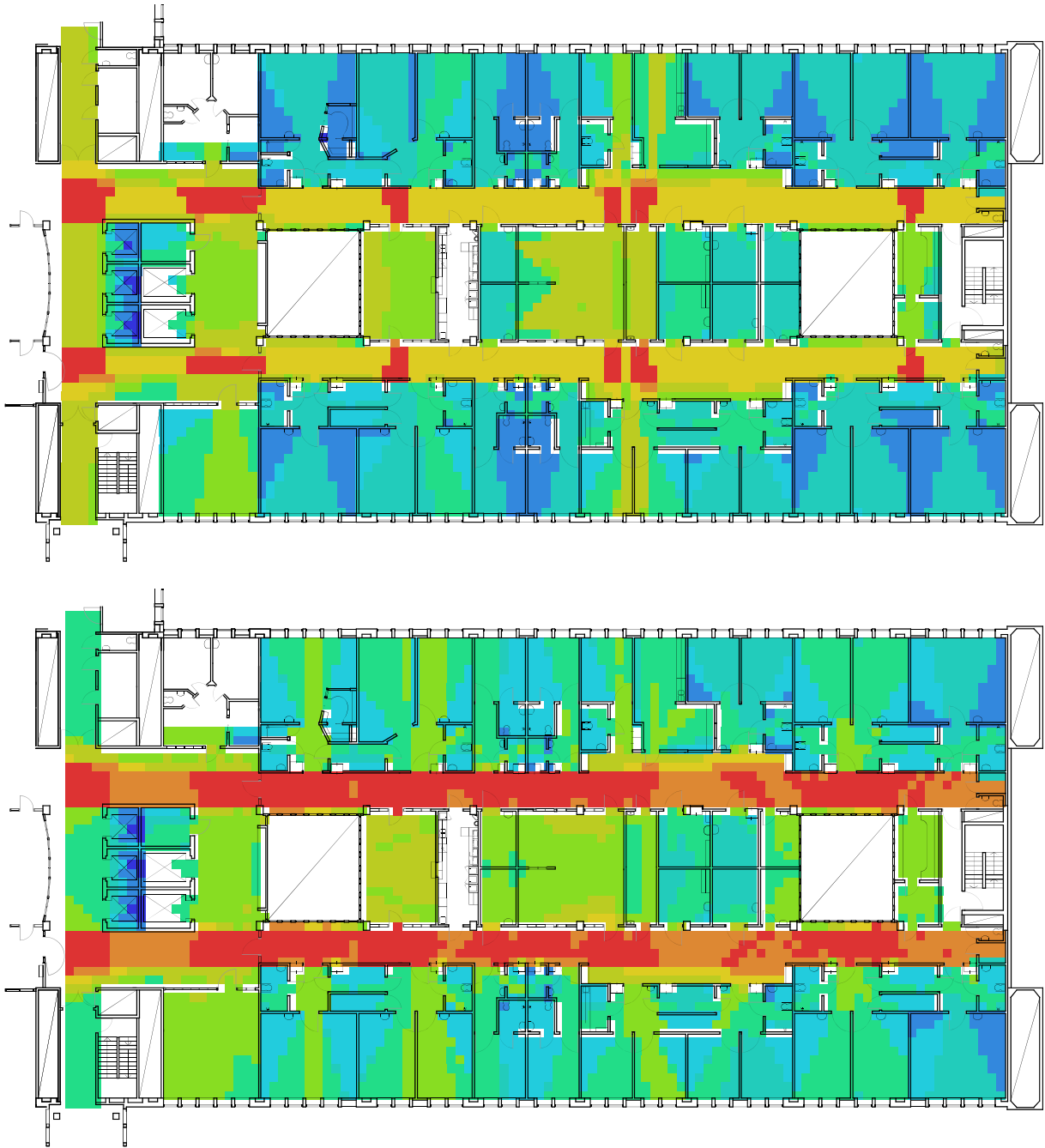

Figure 12. The permeability integration (above) and visibility integration (below) of M81-83. Note the radically different situation for the team rooms (compare figure 10). Analysis performed in Depthmap in 2010 (see Turner & Penn, 1999; Turner 2001).

First, it can be noted that when given the choice, doctors had a preference to gravitate to the two least integrated and least exposed team rooms, as what little time they had that was not tied up by patient visits or team meetings, they were in need of reading up and being undisturbed. In many other units, this was solved by having a separate doctors' room, often outside of the unit, but here it was facilitated by two of the team rooms. Secondarily they chose the smaller of the central team rooms, which is not a thorough-fare and also not exposed to the corridor by windows. Occasionally they preferred this room in order to keep track of what happened in the larger team room (there is a window in-between).

Second, nurses and auxiliary nurses tended to gravitate towards the coffee room to exchange experiences and track workload, as well as catch up socially, when they are not part of the teams being in the general team meeting. Nurses and auxiliary nurses also tend to gravitate to the coffee room to eat lunch, whereas doctors went elsewhere to meet other doctors (unit-internal cross-team versus cross-unit interaction).

Third, when workload was smaller and/or there was less staff around, auxiliary nurses tended to gravitate towards the central team room for two explicit reasons: they gravitate to this space for social reasons, i.e. to have others to talk to, and they gravitate to this space for reasons of their working roles, i.e. part of their work at these times consists of being readily available and easy to find whenever something happens. At times when there is little staff around, this is also the team room closest to everything else, why at these times also nurses gravitate towards this room when possible.

Fourth, when movement took place between corridors, although distance and integration is similar through the central team room, the patients' lunch/day room, and the medicine room, the common choice was to go through the central team room, *in spite of* knowing this was cause for disturbance, but *adding the benefit* of keeping up to date both socially and professionally, and getting a better overview of the situation for the unit as a whole.

Thus we can see how the different working groups make use of spatial configuration to facilitate certain parts of their working roles that are not taken care of by the function-programme of the unit, but which are facilitated by the internal configurational differences between spaces formally assigned to the same function. This difference, in the case in question, is one that has appeared 'accidentally' – that is, it is not a deliberate design choice with this outcome intended, but serves to show how situations are sought out that respond to internal and systemic conditions of activities incorporated in the different working roles.

It can be argued, that the compactness within which these differences is offered in this case is specifically interesting in comparison to the large-scale separation that is often the case elsewhere (e.g. doctors having rooms outside the unit). This does not make the solution ideal – indeed some doctors did prefer to go elsewhere for certain kinds of work – but it means that the availability of a range of different working situations better provide for certain variations in working tasks than one providing the same conditions across the board, and that this balance is important to find. It is a balance, however, that must be based on first understanding the range, importance, and spatio-temporal distribution of work tasks and roles de-composed into activities and their internal and systemic contextual conditions and preferences, and it can not be claimed that this was 'optimal' in the case presented.

CONCLUSION: PROBLEMS AND POTENTIALS OF DE-COMPOSITION, OR, CAN IT BE RE-COMPOSED?

Based on the argument above, it may appear as the argument is for a break-down of every workplace or an organization into a myriad of activities with complex descriptions of them each. This is not the intention. The intention is rather to say that this is something that needs to be done in a number of iterations so as to better understand the nature of 'work' in different organizations, to then better be able to define what sort of analysis to be conducted (i.e. what are the spatially relevant roles and tasks). These will then have certain spatial properties in them which have both contextual dependencies (e.g. closeness or exposure), contextual impact (e.g. 'not close to', 'boisterous'), systemic dependencies (integrated, segregated) and symbolic or hierarchic positioning (such as representations of power in the various forms it takes).

That is to say, that while 'de-composition' is the topic of this paper, it must naturally be followed by a 're-composition', be it through nuancing organizational positions and roles, or by producing new roles based on emergent spatio-functional properties, or by de-subjectified configurative/systemic studies of tasks and spaces. This, it can be said, is not dissimilar to how other things have been treated, such as that we can decompose 'family' and 'villa' and find 'master bedroom' to have social and spatial implications (for more thorough analysis see Hanson, 1998), or in the way ranges of goods spatially define themselves not through functional use but identity (Koch, 2007). From this point of view, such de-composition is potentially viable also for urban analysis as categories lumped for functional reasons may have different spatial behaviour based on another set of criteria.

To a certain extent, the arguments around spatial positioning (Markhede & Koch, 2007) correspond to the findings herein, although the reasons and strategies within this process are better nuanced and developed through the discussion found here. It can also be principally defined why certain levels of management has certain kinds of spatial behaviour and others apparently opposite (see e.g. Penn, Desyllas & Vaughan, 1999; Markhede & Steen, 2006), as a result of the composition of work and the component parts internal and systemic conditions contextualized into the time-space flow of before and after.

The models presented here still suffer from one problem, which is how they are to be expanded into a larger systemic understanding. The benefits or problems of visibility in the first model presented here, for instance, is difficult to grow outside of individual situations or outside of principles. There are possibilities in the work of Dalton and Dalton (2010) to analyse some of the included properties, and to study situated work compared to Koch (2010), as well as there are also possibilities to develop questionnaires or 'gradings' based on the models of tensions and needs above to produce more systemized and measurable results, but this is only part of the way. With these problems acknowledged, it still seems to point to the validity and potential of the approach herein, just as it has proven valid and productive in the communication with the hospital employees during the course of the project. Constructing more systemic analysis would seem to be the most immediate problem, so as to make it better comparable to configurative analysis.

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