Offices – the need to design both the spatial and social configuration in new ways

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Abstract

Over the last decades there have been significant changes in general in offices. One change has been a move towards flatter organisations with more comprehensive tasks for office workers; another has come in the form of technological developments which increase independence in terms of time and space. Changes of this kind have rendered the issues of knowledge development and creativity more strategically relevant for office design. The overall aim of our research is to understand the interplay between social and spatial systems in offices. Our method involves comparing cases that have similar spatial concepts but different types of activities, and vice versa. We use observation techniques supplemented by questionnaires and interviews. Over a ten year period, we have studied several office organisations comprising more than 2,000 individuals. We have found that, on average, the amount of interaction is similar in spite of differences in work tasks, work organisation and spatial configuration. We have further found that it is important to take different types of accessibility, into account. Passing other people’s workstations when moving to common areas obviously increases the chances of interaction. Individuals who are more visible than others tend to interact more with co-workers. We also interpret our findings in the area of visual exposure: the individuals you see most often will be the ones you trust and will therefore also be the people you consult for judgement-related questions. We argue that this kind of interaction is the very reason for working in an office. The second kind of interaction deals with fact-related issues, which are easier to handle at a distance and are not so easily disturbed by office noise. Another important finding is that organisational borders act strongly as walls. This indicates that so-called spontaneous interaction is of a more programmed nature than is usually conceived to be the case. This is probably very efficient. If, however, we look for interaction across borders to be the trigger for new questions and creativity, this disciplined behaviour may be problematic in the long run. In conclusion, it is necessary to combine design efforts for spatial configuration with new design solutions for social configuration. It is imperative to maintain established relationships and roles, while supplementing them with new arenas for interaction across the borders of an organisation. The FM sector faces the challenge of supporting experiments in this direction and developing sustainable knowledge.

Keywords: work space design, office work, interaction, spatial configuration, social configuration
1. Introduction

Our research has long focused on interaction between office workers in the same lines of business, the kind of interaction that motivates a co-ordinated workplace. As researchers within the field of architecture, it is natural that our interest lies in the influence of an office’s spatial configuration on its interactions, and especially the kind of interaction defined as spontaneous, as opposed to planned interactions in meeting rooms and break areas. However, there is always interplay between the physical and social side of life, and in this paper we highlight the importance of social configuration in enhancing the kind of interaction that benefits the overall development of a business.

2. Research strategies

Our investigative strategy has been prefaced on a twofold approach: studying similar office activities in different office concepts; and studying different activities in similar office concepts. In the first case, we studied a technical consultancy firm located in five different buildings (Steen 2001). Next we examined the headquarters of an insurance company that had individual rooms and landscapes, as well as three tax offices with cellular offices, combi-offices and cubicles (Steen et al 2005, Blombergsson and Wiklander 2006). We then studied a newspaper office with open plans: one for the editorial section and another for administration (Markhede and Steen 2006). Finally, we looked at the head office of the Swedish mail company where we studied three similar floor plans with some differences in work activities (Markhede and Koch 2007, Markhede and Miranda 2007, Steen and Markhede 2008). The idea has been to study what might be considered normal office work: the relatively independent management of a certain amount of tasks/commissions. The newspaper case was selected on the basis of being somewhat different.

Social data was collected through observations, logbooks, questionnaires and interviews. In the final case, data was also gathered by asking office workers to map out their own face-to-face interactions. Spatial data was gathered using Space syntax methods (Grajewski 1993, Hillier 1996, Penn et al 1999). Initially, we used Axman-analysis, followed by Depthmap in the later cases, supplemented by other spatial values.

3. Results from earlier studies

3.1 The interaction pattern

In our observations of spontaneous interaction we found that, on average, nine out of ten interactions occur at workstations, with one out of ten interactions occurring in common areas.
such as corridors or in the proximity of printers. We found the highest value of interaction, 17%, in the common areas of cellular offices, compared to an upper value of 14% for open plan solutions.

In our analysis using space syntax methods we did not find any correlation between integration values and movements. Consequently, there was no correlation with the outcome of interaction. On the global level there is more correlation with movement, but not with interaction. This is most likely an effect of the necessity for a building as a whole to form a tree-like structure, and act accordingly.

One explanation for the lack of correlation at the local level is the existence of common functions, which either act as attractors or assume the position of counteracting or supporting spatial properties. Obviously this is not limited to the position of hard artefacts: managerial staff and experts are also attractors in the spatial system.

Shallow systems at the local level may provide a second explanation for the spatial values in our analysis of the major differences encountered at each office included in the study. As almost every workstation is positioned one or two steps from the main passages, the spatial configuration will not create the major differences in terms of use and usability that had been anticipated.

In order to understand more about the mechanism behind so-called spontaneous interaction and the associated role of spatial properties, we used a new method for our final case, the head office of the Swedish mail company Posten. Our problem had been a lack of knowledge of who was interacting with whom. Now we asked every office worker on the three floor plans (250 people) to map all their interactions over a two-day period. Each person’s data is represented on a single layer in the computer and is tagged with the information of the applicable organisation (for departments consisting of 30 to 50 people).

This new method made it possible for us to see that 95% or more of all reported interaction occurs within the same department. And this is the case even in situations where two departments are closely integrated spatially. This means that spontaneous interaction is very much programmed: people talk to others who are appointed as their fellow-workers – people with whom they are supposed to cooperate and produce joint results. Perhaps we can say that people are not social in the sense of talking to just anybody: they economize their sociality. However, not every interaction must be of immediate importance and use. Some interactions seem to have as their primary role the maintenance of the social system at the individual level. Organisational belonging is the cause of interaction, while also lending it legitimacy. With this in mind, we should perhaps avoid using the concept of spontaneous interaction. But if the interaction is programmed in the sense that it is related to work tasks and roles, we do not consider every interaction to be a necessity. As such, there will be a scale ranging from interactions that are probably useful to those that are necessary. Almost all forms of interaction do seem however to be related to the formal organisation in ways that can seem surprising.
In order to evaluate the interaction pattern, we conducted a social network analysis. In the questionnaire sent out to all office workers at the three floor plans at Posten, we asked for the names of five people within the whole organisation with whom the person in question most frequently interacted in the following ways: a) face to face, b) by mail, c) by phone. As we knew the names and positions both of the respondents and the people they named, it was possible for us to study the influence of physical distance as well as the configurational relations in space.

We divided the floor plan into squares of four or, in some cases, two workstations. If the respondent named a person sitting in the same square, the distance was 0. If the person was sitting in an adjacent square, either at a right angle or a diagonal, the distance was 1, and so on. Had space not played a part, face-to-face interaction would have resulted in a value of 5.9. Our questionnaire provided a result of 1.2. By this we can conclude that 41% of interactions of this kind occur within the same unit of workstations. 76% of the respective respondents’ five most regular face-to-face contacts sit within a distance of 1, and 88% within a distance of 2.

We also found the distance effect to be strong in our early study of the technical consultancy firm, where almost everybody works in cellular offices. There we asked for the distance to the five most useful people. On average, we received responses to the effect that three of the five most useful people had workstations in the immediate proximity (Steen 2001).

3.2 Proximity and knowledge sharing

The impact of distance on interaction frequency is significant. This should not come as a surprise when one considers that it is normal management strategy to position people close to each other on the basis of their likelihood to cooperate. Members of a team obviously understand that their task is to cooperate for the common good. There are however reasons for questioning the way in which this positioning tallies with the organisation of work tasks into different roles, i.e. social configuration. In interviews aimed at understanding existing work processes in terms of similarities and differences, we found that the level of cooperation between office workers in the same group/team is not at all as homogeneous as the results shown by the questionnaires. To some extent, these differences are hidden behind the “five people most contacted”. They are relational values and reveal nothing about the number of contacts per day.

One reasonable initial explanation for the importance of proximity relates to the level of confidence built up as a result of seeing a person regularly. It should perhaps also be noted that much weight seems to be given to relationships occurring at an equal level, i.e. a mutual relationship of giving and taking. The effect of proximity – talking more to people in one’s immediate vicinity – is reinforced by the tendency to regard people encountered regularly as more useful.
It is my contention, however, that the phenomenon can be further explained by the content of the interaction. We know that it is extremely difficult to acquire information on an interacting pair’s verbal exchange without disturbing the situation. If however we could obtain concrete information about the interaction content, we would be forced to develop new theories to categorize the data in relevant ways.

Rather than drowning in a surplus of knowledge categories, we have identified a main level where differentiation occurs only between two categories of knowledge, or knowledge-related interaction types: fact-related knowledge and judgement-related knowledge (Steen 2009).

For fact-related questions, people will carefully consider who to ask on the basis of their expertise. If that person cannot provide an answer he/she will say so, enabling the asker to either put the question to another expert or attempt to find the answer in written material.

When it comes to judgement-related questions, anybody can ask a question and expect to to receive an answer. As it is not a matter of right or wrong, everyone can understand the question to some extent and have an opinion. But as these kinds of questions depend so much on an understanding of the context, one must have confidence in the other’s experiences and value systems. When it comes to matters of judgement, it is my view that people rely on those in their proximity, the people one sees often and knows as individuals to some extent. Furthermore, this interaction process will strengthen the ties to people in the immediate vicinity. In addition, face-to-face contact is often crucial in areas of judgement, as often a counterpart’s facial expression offers sufficient evidence of their opinion. Fact-related questions are easier to define and transmit via email or telephone.

### 3.3 The downside of interaction

So far we have looked at interaction as a positive force in office lives. But even if interaction is necessary for businesses there is also a negative side, which must be understood if we are to draw any conclusions about the design of office concepts.

In most office work you are forced to work individually to achieve results, and there are limitations on the amount of time you can interact with others. Since we know that a normal work pattern for office workers involves interaction integrated into work tasks on an hourly basis – which is one of the reasons teleworking is not more widespread – handling the surplus of interaction is essential to minimise disturbances to work concentration.

Exposure to movement is not a cause of disturbance; instead, problems arise through exposure to eyes and ears. In this regard, open plan offices pose problems of a degree not found within the cellular concept. The negative aspects of visibility, however, are easier to handle as there are ways of not having to visually notice people passing by. But every action undertaken to make a visual situation calmer – such as erecting screens or turning one's back on thoroughfares – will restrict the positive side: the ability to look others in the eye and engage in interaction.
It is however aural exposure in office landscapes that is the primary cause of real problems, judging from the answers to our questionnaire in the Posten case. First we divided disturbances into two categories: a) Are you disturbed by others interrupting you? b) Are you disturbed by other people chatting nearby? We also asked about having the opportunity to talk undisturbed to other people at one's own workstation and the related feeling of disturbing others and perhaps restricting conversations.

Looking at our depthmap analysis of the three floor plans at Posten, we do not find any correlation between spatial values and answers concerning disturbance through interruptions, by other people talking, or the possibility of talking at one’s own workstation.

In order to further test the impact of spatial properties we divided all workstations into two groups: workstations adjacent to main thoroughfares and those not adjacent. Of respondents with workstations adjacent to main thoroughfares, 27% replied that they were disturbed several times per day. Fewer respondents in the second group, 23%, reported several daily disturbances. When asked whether they were disturbed by other people talking, the distribution among respondents was similar: 38% in the adjacent group were disturbed several times per day, as opposed to 31% for the non-adjacent group.

Regarding the possibility of being able to talk undisturbed at one’s own workstation, the distribution of responses was somewhat surprising: 82% of people sitting adjacent to thoroughfares said “no” compared to 86% of people in deeper office positions.

In conclusion, the division into two simple spatial dimensions did not produce the anticipated differences in an obvious way.

However, when we cross check different data from the questionnaires about disturbances and work content, we find that disturbances are experienced most acutely by respondents indicating a need to work undisturbed. The answers suggest that respondents experience disturbances to a greater extent when their work requires a high degree of concentration.

### 3.4 The interpretation of our results

It is often said that the problems (some) people express regarding noise disturbance are an effect of individual characteristics. To some extent this is of course true. I will, however, argue that work content is the key factor behind the experience of disturbance. To this end, I will return to the discussion of the two categories of knowledge.

In my opinion, it makes a lot of sense to describe work processes as consisting of tasks that deal with either long or short questions. Long questions pertain to tasks requiring consideration and are of the kind described above as judgement-related knowledge. Questions of this kind necessitate a juggling of ideas, either in one's own head or in league with others. This is
because long questions must be understood in their context – with implications changing as the context changes – which demands a chain of thought.

Short questions are simpler to process: they consist of shorter chains of thought and more fact-related knowledge. I think it’s reasonable to surmise that work processes of this kind are more predictable.

Of course you will find both kinds of questions in most roles in an office. The point is, however, that work dominated by long questions will have more negative interaction effects than work dominated by short questions, which can utilize the positive aspects of interaction to a greater degree. It is notable that half of Posten’s office workers stated that they often received useful information through listening to other people's conversation.

According to our findings, the negative aspects of interaction result mainly from exposure to sound and will above all affect people with long questions. In aurally open spaces there is a risk of lower efficiency, both due to interruptions and restrictions on more complex conversation that could lead to others being disturbed. These problems can be hidden behind the fact that there are obvious knowledge exchange processes at play in open plan offices – but perhaps this interaction over-stimulates the homogenizing of knowledge and the reproduction of social systems, rather than enhancing the kind of knowledge development that will lead to strategic development for the organisation as a whole (Becker and Steele 1995, Duffy 1997).

Visual exposure seems to play a more positive role, and perhaps a relatively active role, as mentioned above. Seeing other people, seeing that they are available for interaction, and being reminded of the value of talking to a particular person – all of these qualities are positive, we believe, in terms of the efficiency of work processes. Indeed, this forms the backdrop to our development of the Spatial Positioning Tool (SPOT), which is intended to be both an analytical and a design tool (Markhede and Koch 2007, Markhede and Miranda 2007).

4. New conclusions

In our earlier papers we have concluded that new spatial solutions are necessary in order to manage the balance between visual and aural openness. We have also said that creative and development processes within an organisation are hampered by the fact that so much of the interaction is performed within the organisational units. On the one hand, it is very efficient if people keep to the current paradigm, which represents order and ensures people know what tasks to perform. On the other hand, we do not want the group to be too isolated, and feel too safe, to the extent that they might not notice the changing context (Allen 1977). We have often seen that office managers have a well-established method for handling this dilemma: the organisation is changed regularly, forcing the development of new relationships between co-workers. The negative side of this strategy is the loss of knowledge and competence. No one really knows the value of what is thrown out with the bathwater.
Is it possible to find another strategy that does not have unnecessary negative consequences for production?

When it comes to the spatial aspect, we can design a system that makes people likely to be in the same space at the same time. But there is obviously no guarantee that interaction will occur across organisational boundaries. For various reasons, a spatial system cannot be tailor-made for just one organisational concept; it must be more generic and useful for different kinds of organisations. In the same way, it should be possible to build up a social artefact of a more general nature, which provides an organisation with situations in which different units interact in the resolution of issues which are both broad and deep in relation to the core of the business. Situations can of course vary, and might include hearings or workshops for instance, but the main idea should be the same: telling other people about the main issues you are tackling in your work and receiving questions geared towards challenging established ways of thinking and sharpening minds.

In my earlier thinking on this social artefact, I was convinced that each specific organisation should form an organisational design in the way it deemed most appropriate. Subsequent experience has taught me however that, for many reasons, this is not a workable strategy. First of all, the time spent seeking solutions must be balanced in terms of output, which requires managers taking a long-term perspective. Another obstacle is the detailed level of knowledge-exchange required, which can reinforce a situation in which people are mired in their own context, failing to see the main issues and overarching similarities.

My experience leads me to the conclusion that the facility management sector should play an important role in the construction of social artefacts for internal interaction across organisational units. In the same way that office organisations need help designing their configuration of space to ensure robustness over time, so too do they require assistance designing the social configuration, which will create a solid base for knowledge-sharing.

The FM sector does not currently have enough experience or knowledge to support the design process for the social artefact. But because facility management is a practical field in which knowledge is accumulated by comparing the situations of many parallel clients, and because there is a need for standardized behaviour, this represents a very interesting and challenging task for the sector.

References


