



Space for the Digital Age

A Usability Study

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SPACE FOR THE DIGITAL AGE – A USABILITY STUDY

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Abstract:

Purpose: The paper presents an evaluation of a new broadcasting facility with focus on the usability of the new workplaces and working environments and the satisfaction both with the user involvement and the finished buildings.

Methodology/approach: The evaluation is mostly based on post occupancy evaluation including an interview survey among managers and staff in DR. The results of the survey are analyzed in relation to the intentions for the new facility and the concept of usability.

Findings: The research indicates that the involvement of the users in briefing and design has a clear positive effect on the finished buildings and the user satisfaction. Besides measuring satisfaction, the study also indicates a number of ways that the facility supports and improves the efficiency and effectiveness of the working environment and the organisation.

Research limitations: The survey covers 18 respondents at an early stage after occupation and the results are qualitative. The intention is to follow up with further evaluations of both quantitative and qualitative nature.

Practical implications: The study can help the user organisation to improve the facility and other organisations to learn from this case.

Originality/value of paper: The paper provides a case study with presentation and evaluation of a new architecturally and technologically advanced media centre and contributes to the understanding and methodology to investigate the usability of workplaces

Keywords:

Usability, workplaces, user involvement, post occupancy evaluation.

INTRODUCTION

This paper presents an evaluation of the usability of a new media centre (DR Byen) for Danish Broadcasting Corporation (DR) in Copenhagen, Denmark. The paper is based on the author's experience as deputy project manager in the client organisation for the building project during briefing and design as well as research as a university researcher, which includes a post occupancy evaluation based on an interview survey among DR's staff after their move to the finished building complex.

The evaluation concerns the buildings as work environment, the involvement of users in the planning process as well as the fulfilment of the vision for the new media centre. The investigation aims at gathering the experiences from the building project, and the research has

been carried out in collaboration between Danish Technical University (DTU) and DR's client organization. The evaluation is also part of the international research project "Usability of Workplaces" carried out in collaboration between CIB W111 and EuroFM's Research Network Group. As part of this project a workshop took place at DR Byen in April 2007 to present and discuss preliminary results from the evaluation with representatives from the client organisation, the Danish research team and the international research group.

DR and DR Byen

DR is a national public service broadcaster of television and radio financed by license fees. Until the relocation DR had 12 different addresses and two main centres in Copenhagen – Radio House from around World War II and placed close to the city centre of Copenhagen and the Television Centre from the 1960's and 1970's placed 10 km north of Copenhagen. With the new development DR has relocated all functions in the Copenhagen area to the new media centre called DR Byen (DR Town) and placed in a new part of Copenhagen on former military land close to the city centre and serviced by a new Metro line.

During the planning process DR formulated a vision for DR Byen shown in Figure 1.

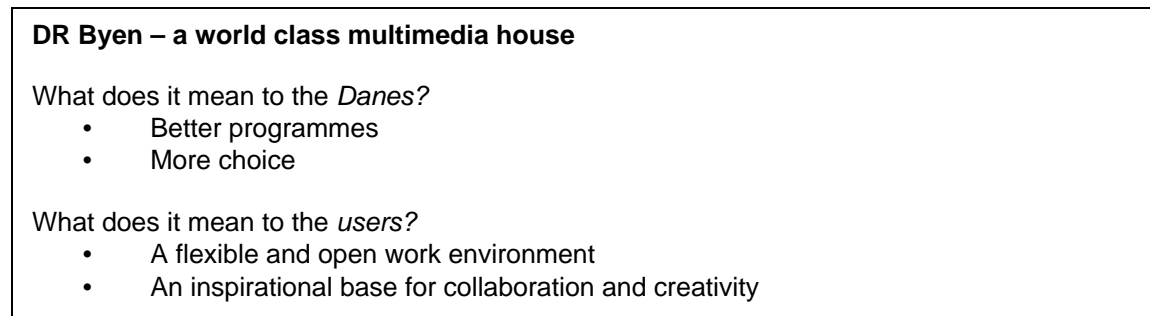


Figure 1. DR's vision for DR Byen (DR, 2003)

The main reason for the relocation was the revolutionary changes in the electronic media from analogue to digital technology. This change involves a convergence of information and communication technologies and has been the basis for the introduction of new ways of producing radio and television. Today editing of video and sound is done on computer based technology like text editing and the possibility of content sharing has increased tremendously. This means that journalists and other program staff can do many tasks in the production of electronic media, which earlier were specialist tasks carried out by technical staff – very similar to the changes in the division of labour between journalists and typists in the printed media during the 1970's. In DR, these changes were followed up by the formation of a new multimedia organisation, where the earlier strong division between departments producing radio in Radio House and departments producing television in the Television Centre has been replaced by departments, which both produce radio and television as well as diverse on-line products. Besides these technological based reasons, an overall purpose with the relocation was to change

DR's image and corporate culture from the monopoly era to become a modern, open and dynamic organisation.

The new media centre is a huge building complex with 130.000 m² including full basement. The decision to start the project was taken in 1999. Based on a master competition in 2000 the complex was divided in four rectangular buildings designed by different design teams. The four buildings are placed in one big rectangle which is separate by an artificial canal in north-south direction and joined together with a connecting "Internal street" in east-west direction, which cross the canal on the second floor as a four storey high glass covered bridge building, see Figure 2.

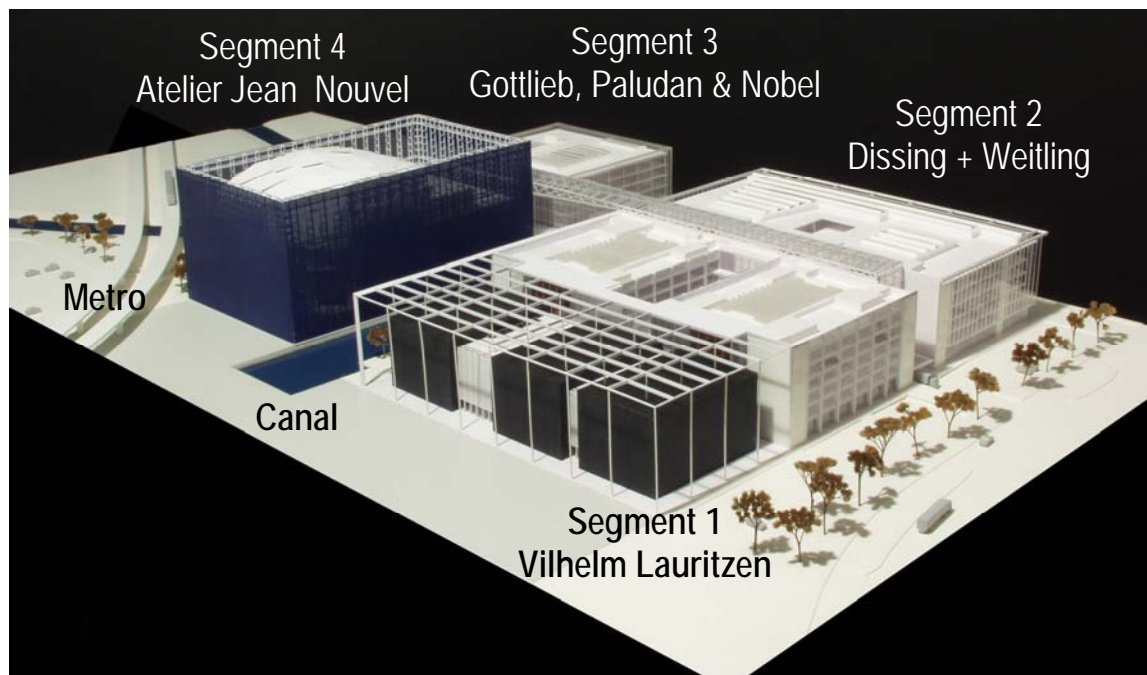


Figure 2. Model photo of the final design – seen from south-east

The complex is in general 6 storey's tall except for one part (segment 4) that includes the concert hall and has a total height of 45 m above ground. The building with the concert hall is designed by the French architects Atelier Jean Nouvel. The Danish architects Vilhelm Lauritzen AS won the master plan competition and has designed the largest building (segment 1) and the Internal Street. The other buildings are designed by Danish architects Dissing + Weitling AS (segment 2) and Gottlieb, Paludan & Nobel. (segment 3).

Segment 1, 2 and 3 were occupied gradually during 2006. Only these parts of the complex are covered by this evaluation. Segment 4 has been severely delayed and the office part was occupied in June 2007, while the concert hall will be open to the public early 2009.

THE EVALUATION

One of the objectives of the evaluation is to clarify to what extent the intentions, requirements and expectations to the use value of the buildings have been fulfilled. Another objective is to identify what could have been done to increase the use value, and what possible adjustments can be made to improve the buildings. In a wider sense the purpose is to contribute to the development of methods to evaluate the usability of buildings and workplaces and to utilize the experiences from DR Byen in improving future building projects.

The planning of the building project took place with a very extensive involvement of the users in the process. This included the briefing, the building design and the interior planning process. The user involvement and the briefing process are dealt with in more details in Jensen (2006). During briefing and building design about 20 user groups were actively involved and in the interior planning as many as 50 groups with approx. 300 users - 10% of all staff – were actively involved. One of the objectives of the investigation has been to evaluate, what the effect has been of the user involvement and the staff satisfaction with the involvement process and the finished buildings.

The evaluation concerns the generally usable spaces in DR Byen with main focus on the workplaces in open environments and the common areas like cafés, atria, the Internal Street, staff restaurant, meeting areas and service facilities. Special rooms like studios and editing suites are not evaluated as such, but the relationships between the open environments and the special rooms was also part of the evaluation.

The evaluation puts particular emphasis on the fulfilment of the requirements and intentions in relation to obtaining buildings with attractive and creative working environments, a pleasant indoor climate, the possibilities to easily adapt the layout to changing organizational needs and good opportunities for informal contacts across physical and organizational divides. Attempts were made to clarify what impact the new physical surroundings have on the way DR's organization functions and performs and its possibility to develop over time. The satisfaction among staff with the buildings was also investigated.

The results presented here are based on a first and early qualitative evaluation in spring. Further studies including a quantitative questionnaire survey and more in-depth qualitative methods like walk-throughs and workshops are planned. The evaluation is documented in full in a research report in Danish (Jensen, 2007a) and various aspects of the building project has been described and analyzed in a research report in English (Jensen, 2007b).

Method

The interview survey included a total of 18 interviews with people employed by DR. The interviewees were evenly distributed among managers, who all had been involved in the planning of DR Byen, and other members of staff – out of which 6 had been involved in user groups during the planning of DR Byen and 3 had not been involved.

The interviews were carried out as semi-structured qualitative interviews using an interview guideline with about 60 questions divided in four themes:

- Evaluation of the new surroundings
- User involvement
- The overall process
- The Vision for DR Byen

Questions were as far as possible formulated openly. As a main principle all interviewees were asked the same questions, but questions about the overall process were mostly asked to those who had been involved. In some cases additional questions were asked dependent on the interviewee. Each interview lasted about 1 hour. The interviews were recorded and written minutes were sent to the interviewees for comments and acceptance.

Before the survey, the managers among the interviewees were contacted by mail by DR's client organization with information about the investigation. Afterwards they were contacted by DTU, and arrangements for the interviews were made. The managers were asked to appoint the members of staff to be interviewed. None of the people contacted refused to participate in the survey.

The 18 interviews took place from 19. March to 16. May 2007, and at the time of the survey people had worked between 4 and 12 month in DR Byen. There was still a huge building site around the occupied buildings, and the Internal Street was not finished, but had just been opened between segment 1 and 2 without any service facilities in operation. In the occupied segments there was still trouble shooting going on both in relation to the building and the technology. Major changes in DR's organization also took place during the period.

However, most importantly, DR went through an economical crisis at the time with severe cuts being announced shortly before the survey, and as a consequence about 10% of the staff were going to be made redundant. The cuts were partly due to budget overruns on the building project – mostly related to the concert hall in segment 4. At some points during the period of the survey strikes occurred among DR's staff as protests against the redundancies.

This situation in the survey period could influence the results negatively. The economical situation has clearly had an impact on the replies to some of the questions, and particularly on those related to the vision for DR Byen concerning the possible effect on DR's broadcasting output. Besides these questions it is the impression that the interviewees mostly have been capable to separate DR's economical conditions from their evaluation of the physical environment in DR Byen and the previous planning process.

The report with the results of the evaluation was sent to DR's client organisation and to each of the respondents and only positive feed-back has been received.

RESULTS

The results of the interview survey are presented anonymously. The presentation follows the division in the four themes in the interview questions.

Evaluation of the new surroundings

The overall impression of DR Byen is generally positive. The diversity due to the involvement of four different architects and the transparency and the light in the buildings are emphasized as positive aspects. It is appreciated that everything is new and also that DR has become more united than before. The architecture is also mostly evaluated positive. The newsroom atrium with open and curved balconies is regarded as exceptional, but also other atria and high rooms are valued.

The workplaces and furniture in general function very well but the working environment is anonymous and impersonal, and some find that there is too little space. The views are very much divided in relation to the open environment. The managers are generally positive, even though they get more disturbed than before, but they are also more accessible for the staff. One of the staff representatives does not thrive at all in the open environment and prefers to work at home as much as possible. The views are also divided whether there has been an increase in knowledge sharing or not, but it is seen as an advantage that people sit closer to each other, and it is easier to see who are present. Another advantage is that more groups and departments have been placed more together than earlier. In spite of problems with trouble shooting for instance in relation to ventilation, light control and sun shades, the indoor climate is mostly evaluated positively. Some mention that the acoustics in the open environment work surprisingly well.

Most respondents find that there is more contact across the organization in DR Byen than before. Cafés and informal meeting places are used very differently. Some of the cafés are used as meeting places, while others are used only as kitchens. Those of the common areas that have been taken into use are generally evaluated positive. The atria are used in varying degrees. The staff restaurant is regarded as boring and has problems with logistics and capacity. The meeting centre functions well, but the architectural quality of a great meeting hall does not live up to some managers' expectations.

It is in general difficult to evaluate the impact of the new surroundings at the moment. It has become easier to change the layout of workplaces. There are some indications, that efficiency has increased, and there is a great potential for increase in productivity, but problems with technology has limited the benefits for those involved in production of radio and TV. The relocation has created a stronger coherence in the organization, and a more united culture has evolved.

The things that people miss in DR Byen are mostly of intangible character like ambience and atmosphere – particularly some of those who used to work in the old Radio House. The smoking policy with a total ban on smoking indoor is evaluated as positive and is accepted and followed, but the conditions in the outdoor smoking area are not satisfactory.

User involvement

The group based approach has worked well and was in accordance with the culture in DR. The sizes of the groups – maximum 10 during briefing and design and 8 during interior planning - were appropriate. Information exchange with the interior architects has been satisfactory and improved through the process, and the staff was well informed. The inputs from the users were implemented in various degrees. The process was mostly characterized by consensus with few conflicts, and differences in views have been handled well. The managers find that they had strong influence, but several members of staff find that the managers were equal partners in the involvement process.

The amount of staff resources used in the process has in general been on a reasonable level in relation to the outcome of the process. However, some managers feel that too many resources were used in the involvement process, while some members of staff find that the users' possibilities to influence the result were too limited.

The most important outcome is that the staff has been mentally prepared to move and feels ownership to the final result. Contrarily, a process without user involvement is regarded to have created dissatisfaction, more complaints and greater resistance to changes. Most find that the user involvement has led to buildings that suit the needs of the users better. The user involvement led to a higher degree of motivation among staff during the process, but after the relocation one does not notice any difference in motivation between those who were involved in the process and those not involved.

In general, there is satisfaction with DR Byen, even though there are differences in the level of satisfaction. Among the interviewees most managers find that there is great satisfaction while some of the members of staff are more uncertain.

The overall process

In general there has been a good coherence between the main processes in the planning of DR Byen, although there were some problems with the timing, particularly for the technology. The client organization has been sensitive to the needs of DR's organization, but there have in varying degree been problems in the communication between the different architects and the users. The management of the planning process should have been stricter.

The vision for DR Byen

The views are divided whether a world class multimedia house has been or will be created. Many believe and hope that DR Byen will become a world class multimedia house.

A flexible and open work environment has been created for the users, but the flexibility has not yet been utilized very much. Most of the interviewees also find, that DR Byen provides an inspirational base for collaboration and creativity, or that this will be achieved when the Internal Street is completely finished.

The views are very divided – both among managers and staff – about DR Byen’s impact in relation to DR’s broadcasting output to the Danish people, and the economical situation influences the evaluation considerably. Several expect that DR Byen over time will lead to better programmes, and some also think that DR Byen will provide more choice.

DISCUSSION

The concept of usability is defined in ISO 9241-11 as: “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO 1998). In relation to usability of workplaces a Norwegian project has developed a framework for usability criteria, where efficiency is sub-divided in efficiency related to organisation and efficiency related to building, effectiveness concerns added value understood as increased potential for cooperation, learning, innovation, adaptability etc., and satisfaction is sub-divided in satisfaction for employees and satisfaction for customers (Hansen & Knudsen, 2006).

This evaluation has not concerned efficiency related to building and satisfaction in relation to customers. The focus has mostly been on satisfaction for employees (including managers), but there have also been attempts to uncover the efficiency related to the organisation and the effectiveness in terms of added value. The following is an attempt to characterize the usability of DR Byen by summarizing the evaluation in relation to these 3 criteria and the effects of the user involvement.

Efficiency

Relocation of the organisation from 12 addresses into one facility have clear organisational benefits with directorates and departments being placed together without having to spend transport time to meet and with general easier internal communication. Besides that, the increase in efficiency is mostly related to the open workspaces, which means that it is easier to move around and adapt the configuration of the work environment to the changing needs of the organisation. The potential for increased productivity is high due to a more functional layout, for instance short distances between workstations and studios, but problems with technology were impediments at the time of the evaluation.

Effectiveness

It is difficult at this early stage to evaluate the buildings’ possible impact on the effectiveness in terms of added value for the organisation, but there are some indications of actual and potential impacts. It takes time to learn to know and fully use and utilize the new environment. However, it is an advantage for the internal collaboration that people are placed close together and can see who are present. There is also more contact across department and the common areas are used for informal information and inspiration, but still not to their full potential. Several respondents expect that DR Byen over time will lead to better programmes. There are signs of a change towards a stronger coherence in the organisation and a more united corporate culture.

Satisfaction

The satisfaction with the new working environment is generally high. Managers are mostly very satisfied while the degree of satisfaction is more varied among other members of staff. The disagreement mostly concerns the open workspaces, which some of the staff are opposed to. The furniture works well, but the working environment is impersonal. Several respondents find that it is a pleasure to move into a place with architectural diversity and where everything is new, but some find that the new buildings lack atmosphere and spirit. The transparency of the buildings dominated by glass walls is mostly regarded as positive, but it has created some problems with privacy.

User involvement

The satisfaction with the user involvement is also generally high – both among managers and staff – even though some managers feel that too much time was spent on the involvement and some members of staff would have liked more influence. The user involvement has resulted in buildings that better suit the needs of the user. The staff has been mentally prepared to move in and to the general change process that has been part of the relocation. The effect has also been an increased motivation for the work in DR for many of those who have been involved directly in the planning process, but this effect has only lasted for a limited period.

CONCLUSION AND RECOMMENDATIONS

In spite of the economical crisis in DR during the survey period with announcement of cuts and redundancies, and in spite of the trouble shooting going on in relation to both buildings and technology the interview survey shows an overall positive evaluation of DR Byen after occupation by the 9 managers and 9 staff representatives involved in the investigation. The managers are - not surprisingly – the most positive, while the views from staff are more mixed. However, most of the staff representatives are positive and only a few are very critical. The involvement of the users in the planning has been important for the usability of the buildings.

Recommendation for DR's organization

DR Byen was defined to be the physical environment for a new way to produce electronic media with focus on creativity and cross organizational collaboration, with possibilities to dynamically change the organization and creation of a new corporate culture as well as a new image based on openness to the surroundings and the public. Before the move great efforts were made to prepare DR's organization to the new conditions – for instance by user involvement – and it is important to continue this development of the organization to realize the potential, which DR Byen represents. The investigation indicates that the effect on staff motivation from the user involvement is no longer working.

It is recommended that DR consciously continues to disseminate the ideas behind DR Byen and create events, activities and learning processes in the organization to enable the staff to become informed about and experience the opportunities in the buildings, including possibilities to meet across the organization and use the common areas. The managers in DR have a crucial position

in this respect, and it is important that all managers have the necessary knowledge, commitment and ability to take the lead in the process.

Recommendation for further evaluations

This interview survey is a preliminary qualitative evaluation of DR Byen carried out at an early stage when the building project is not completely finished, and the staff has only worked fairly short time in the buildings. Therefore, it is recommended to follow-up with further evaluation of both quantitative and qualitative nature.

The crisis in DR during the survey period of this evaluation makes it even more interesting to see how the results are in a follow-up evaluation at a later stage, when DR's economy and organization is less turbulent, and the buildings are in a more finished condition. More specifically it is recommended, that DR carries out a questionnaire survey among all staff to provide a complete quantitative evaluation of the staff's experience and satisfaction with DR Byen. Such a survey could be part of a general survey on staff satisfaction in DR's organization, where the normal questions are supplemented by a number of questions related to DR Byen.

Furthermore, it is suggested to make a more in depth qualitative study implementing a method based on walk-throughs, which was introduced by Kernohan et al (1992) and has been developed in the international research project "Usability of workplaces" and tested in case studies of buildings, for instance in Norway (Hansen & Knudsen, 2006) and Finland (Rothe, Gersberg & Nenonen). When using this method, the researchers take a tour around the buildings together with a group of users, and based on the concrete physical aspects they meet on their way, comments and evaluations from the users are collected in relation to a number of focus points, which are discussed at a workshop after the tour. Based on this the researchers can make an overall evaluation of the buildings in relation to the selected focus points.

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