



Delft University of Technology

## Post-occupancy evaluation of a new office concept in an educational setting

van der Voordt, DJM; van der Klooster, W

**Publication date**

2008

**Document Version**

Accepted author manuscript

**Published in**

Healthy and Creative Facilities

**Citation (APA)**

van der Voordt, DJM., & van der Klooster, W. (2008). Post-occupancy evaluation of a new office concept in an educational setting. In *Healthy and Creative Facilities* (pp. 579-587). CIB General Secretariat.

**Important note**

To cite this publication, please use the final published version (if applicable).  
Please check the document version above.

**Copyright**

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

**Takedown policy**

Please contact us and provide details if you believe this document breaches copyrights.  
We will remove access to the work immediately and investigate your claim.

## **POST-OCCUPANCY EVALUATION OF A NEW OFFICE CONCEPT IN AN EDUCATIONAL SETTING**

Dr. Theo JM van der Voordt

Associate Professor, Department of Real Estate & Housing, Faculty of Architecture, Delft University of Technology; Senior researcher, Center for People and Buildings, Delft, the Netherlands. [D.J.M.vanderVoordt@tudelft.nl](mailto:D.J.M.vanderVoordt@tudelft.nl). W: [www.re-h.tudelft.nl](http://www.re-h.tudelft.nl) or [www.cfpb.nl](http://www.cfpb.nl).

Wendy van der Klooster

Junior researcher, Center for People and Buildings, Delft, the Netherlands.

[W.vanderKlooster@tudelft.nl](mailto:W.vanderKlooster@tudelft.nl); W: [www.cfpb.nl](http://www.cfpb.nl)

### **ABSTRACT**

At the end of 2006, Avans Hogeschool (a Dutch Institute of Higher Education) moved a number of previously dispersed departments to a new building. This move was taken as an opportunity to introduce new workplace strategies with desk-sharing and desk-rotating in a transparent setting. This paper presents the results of a post-occupancy evaluation of the new development. Staff was found to be satisfied with the modern architecture, the advanced IT facilities and the openness of the building that supports communication and social interaction. However, many complained of a lack of privacy, conditions that hampered concentration on one's work and insufficient facilitation of the interaction between teachers and students. Seven years ago, Delft University of Technology introduced an innovative office concept in one of its faculty buildings. Evaluation of user satisfaction showed that desk sharing was generally regarded as one step too far at that time. But the improved openness, the extra space for display of research work and increased opportunities for students to work in the research area were highly appreciated. In this paper the Avans results are discussed and compared with the findings of the case study at Delft University of Technology.

KEYWORDS: new workplace strategy; post-occupancy evaluation; educational setting

### **NEW OFFICES FOR AVANS HOGESCHOOL**

Worldwide, both public and private organizations are applying new office concepts such as desk sharing and desk rotation in a variety of activity-related workspaces, with the general aims of facilitating communication and concentration, increasing employee satisfaction, improving productivity and reducing facility costs (Duffy, 1996; Balkin et al, 2001; Becker, 2004). 'Non-territorial' offices can be found in particular in banks, accountants' offices, insurance companies and the like, and are beginning to be implemented in educational settings (Watson, 2007). An interesting question is, whether such new workplace strategies are suitable for use in an educational setting. The move of a number of previously dispersed departments of Avans Hogeschool in Breda (in English: Avans University of Applied Sciences) to a new building with a new office concept offered an opportunity to investigate how teachers and administrative staff experience new ways of working. The management of the Hogeschool took the move as an opportunity to rethink its educational and accommodation policies. After due deliberation, they opted for the concept of activity-related workspaces: ARW. No one has a fixed personal desk – with the exception of members of staff who are dependent on special facilities and receptionists and helpdesk staff. Each member of staff chooses a type of workplace that suits his or her current activities: open worksites to support communication, cockpits for tasks requiring a high level of concentration, conference rooms and spaces for less formal get-togethers, classrooms etc.

Office facilities such as printers and copiers, fax machines and stores of office supplies are provided at central locations. Certain rules apply to the use of these worksites, such as a 'clean desk' policy.

Before implementation of the ARW concept, Avans management formulated the following core objectives: 1) The new working methods should support communication and promote cooperation; 2) They should contribute to staff welfare and work quality; 3) Floor area usage should be reduced, thus boosting efficiency; 4) The new working methods should support cultural change by making staff more result- and customer-oriented. Apart from these qualitative objectives, it was stipulated that 80% of all staff involved should have a positive or neutral attitude to ARW at the moment of delivery, and that 80% of all employees should be satisfied with the work environment six months after occupancy.



Figure 1: Avans Hogeschool

Left: workplaces in open settings and cockpits.



Right: students at work in the new learning centre

At the request of Avans, the Center for People and Buildings carried out a study of the use and user perception of the new office concept in the summer of 2007. At that moment, the first group of employees had been in the building for 3-4 months. The management hoped that the results of this study would provide valuable insights that could be used in the next phases of the move. The focus was on the perception of the concept by employees, i.e. the teaching staff and the staff providing administrative and management-support services. The way students used and perceived the new concept fell outside the scope of the present study.

## RESEARCH QUESTIONS

The research questions were formulated in consultation with the ARW project-leader:

1. How does the first group of users experience the ARW concept? How does the concept work? Are the users satisfied with it?
2. Does the ARW environment meet the objectives and expectations formulated in advance?
3. What lessons can be learnt from the experience gained so far?
4. How can the results of this study be incorporated in the preparations for the subsequent phases of the move?

## RESEARCH PROCEDURES AND METHODS

The study comprised the following components:

1. An introductory talk, during which the members of the research team were informed of the objectives of the move of Avans Hogeschool.
2. Collection and study of documents and other information on the previous accommodation and the new accommodation (location, floor plans, m<sup>2</sup> gross and net floor space, use), mode of communication concerning the study etc.
3. Sending of a digital questionnaire to all users via Avans-Intranet. The questionnaire measures user satisfaction or dissatisfaction with 19 aspects of the work environment (Volker & Maarleveld, 2007). These issues were found in previous studies to be of more than average relevance for employee satisfaction and perceived productivity (Barber, 2001; Brill and Weidemann, 2001; Pinder et al, 2003). Apart from scoring all aspects on a 5-point scale, six aspects were given an overall rating on a 10-point scale familiar to people from its use in marking work at schools (where 5 is a ‘fail’, 6 is a ‘pass’, 8 is ‘very good’ and 10 is ‘exceptional’). A few additional questions were included concerning the gender, age, education and training and job description of the respondent, the amount of time spent on various office activities and the way the worksite was used.
4. Analysis of the study data with the SPSS statistical and data management package.
5. Feedback in two group discussions with users of the findings and interim conclusions.
6. Preparation of the final report and making of agreements about communication of the results of the research and the conclusions and recommendations.

## RESEARCH FINDINGS

A total of 114 questionnaires were filled in and returned. This represents a response rate of about 40%. The users estimated that on average they spent roughly half (52%) of their time on “desk work”, 7% of the time on phoning and another 7% on reading for more than half an hour at a time. An average of 21% of the time was spent on planned and unplanned consultation, and 7% on filing and document processing. The spread of these values is high. When asked where they usually worked, respondents estimated that they spent 61% of their working time at a desk in an open worksite and 19% at a workplace arranged for concentrated work. These figures add up to 80% of their time spent behind a desk. This is appreciably higher than the above-mentioned 52%. However, phoning, filing and part of informal communication also occurs at ones desk, so if one adds up the above-mentioned 52% + 3 x 7% + 10% (nearly half of 21%) for consultation, one arrives at a total of 83%. This is very close to the 61 + 19 = 80% referred to above.

### Overall appraisal

Respondents were asked to rate six aspects of the social and physical work environment on the 10-point scale (Table 1). The extent to which the work environment supported productivity got the lowest score: a mean of 5.1, corresponding to the qualitative appraisal ‘unsatisfactory’. Both the extent to which the work environment was perceived as agreeable and the accommodation concept scored about 5.5, while the organization and facilities scored about 6 (recognized as a ‘pass’). Work/work-process was the only aspect with a mean score corresponding to a good pass (6.6), though all other aspects received also scores of 7 or 8 from individual respondents.

**Table 1: Overall appraisal of six aspects of Breda work environment on a 10-point scale**

	<b>≤ 5</b>	<b>6</b>	<b>≥ 7</b>	<b>Mean</b>
Organization	28%	32%	40%	5.9
Work and work process	17%	19%	64%	6.6
Facilities	30%	19%	52%	6.1
Extent to which work environment is perceived as agreeable	37%	25%	38%	5.7
Extent to which work environment supports productivity	48%	27%	26%	5.1
Accommodation concept	45%	19%	35%	5.5

### **Appraisal of the building as a whole**

The appraisals of the distinctive aspects are summarized in Table 2. The architectural appearance of the building gets the highest score, with 58% satisfied and 25% highly satisfied. Opinions were divided on the location of the work sites: 27% of respondents were neutral, 43% satisfied and 22% dissatisfied. Only 5% and 3% ticked the “highly satisfied” and “highly dissatisfied” boxes respectively. Opinions were also strongly divided on the number, diversity and functionality of the workspaces in the immediate vicinity of the worksite. Views on the spatial configuration of the work spaces and the openness and transparency of the work environment were fairly positive. The survey found 46% and 54% respectively of the respondents to be satisfied or highly satisfied on these aspects. At the same time, an appreciable minority (25% and 30% respectively) were dissatisfied or highly dissatisfied with these aspects. All other respondents scored “neutral”. The internal climate including lighting and acoustics got the highest level of criticism. No fewer than 36% were dissatisfied with this, while another 33% were highly dissatisfied. Only 16% were satisfied, and 1% highly satisfied. Respondents complained that they were not allowed to open a window, because this would interfere with the operation of the climate control system.

### **Appraisal of the new office concept**

There was a lot of criticism about the privacy of the work environment. No fewer than 37% of the respondents were dissatisfied with this aspect, and 23% were highly dissatisfied. Only 1% was highly satisfied, 18% were satisfied and 21% were neutral. One of the problems mentioned was the lack of privacy for a confidential talk between a lecturer or a tutor and a student, who may be quite upset about a particular issue and who may moreover have to walk through an office landscape where people are working to get to the interview room. Similar levels of criticism were found concerning the extent to which the work environment allowed people to concentrate on a particular task: 56% were dissatisfied or highly dissatisfied with this, as compared with only 26% who were satisfied or highly satisfied. There were also reports of a high level of ambient noise, and complaints about the difficulty of making an undisturbed phone call. Respondents were on the other hand quite pleased with the scope offered for communication and social interaction: 55% were satisfied and 11% were highly satisfied, as compared with only 10% dissatisfied and 11% highly dissatisfied.

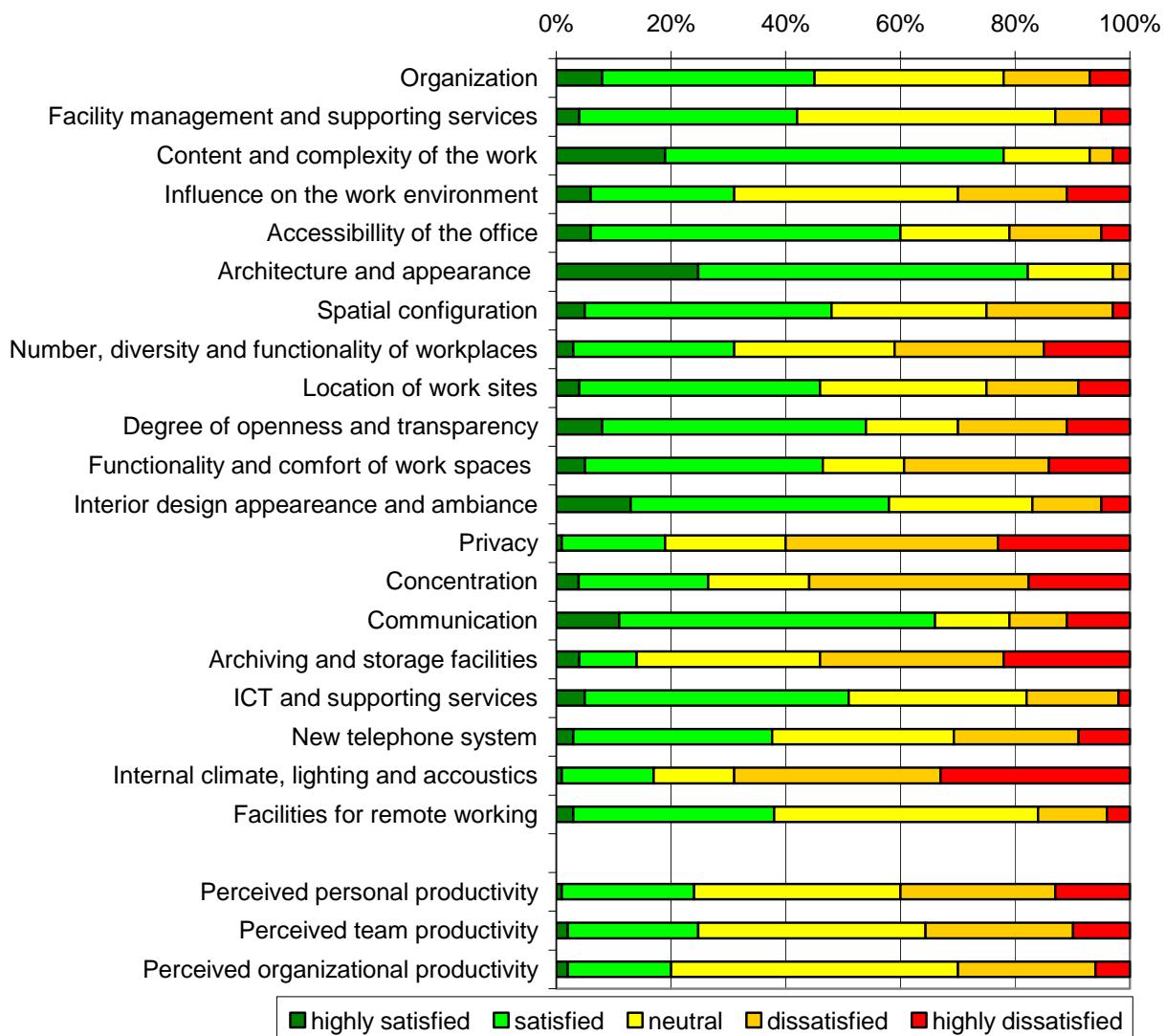


Table 2: Percentages of employees satisfied and dissatisfied with specific aspects (N = 114)

Respondents were not very happy with the filing and storage facilities. The project designers had tried to make the whole set-up much more professional in this respect, with a clear separation between central archives for documents that were not consulted very often and local filing facilities for documents that were needed frequently. The general opinion among respondents, however, was that 1 metre of shelf space for each employee's personal files was inadequate. Some set up extra bookcases at home to store their papers from work. The IT and ancillary services were much better received: 52% were satisfied or highly satisfied, as compared with 16% dissatisfied and only 2% highly dissatisfied; 31% had a neutral opinion.

There was little difference between respondents' assessment of the degree to which the work environment supported their own perceived productivity and that of the team in which they worked. In both cases, about 40% had a neutral opinion, a quarter were positive and 40% were negative, in particular due to problems with concentration and distraction.

## **Aspects of the work environment perceived as most important**

Respondents were also given a list of 17 aspects of the work environment, and asked to tick the three they considered most important. Functionality and comfort came top of the list (ticked by 57 respondents i.e. by 52% of the respondents). Internal climate, lighting and acoustics came second (41 x, 38%) and support for concentration on particular tasks third (35x, 32%). The number, diversity and functionality of the work spaces and the support offered for communication received 28 and 26 votes respectively. It is noteworthy that the architecture of the building (which was highly praised) received only 12 votes, and also privacy (strongly criticized by the respondents) got only 12 votes. These last-mentioned aspects are apparently considered to be relatively less important than functionality, an agreeable internal climate and conditions that lend themselves to concentration and to communication, depending on which is called for at a given moment.

## **Feedback from final group discussion**

The participants of the workshops mentioned that generally speaking the present building offers a much more pleasant work environment than the former one. The architecture of the present building was much appreciated, as was its openness which promoted social interaction and encounters – as opposed to the old building where everyone “was hidden away in his or her own little box”. The IT facilities (hardware, software, backup services) were also praised. The rule for use of the cockpits (closing the door of the cockpit means DO NOT ENTER) worked well. But the openness of the building also had drawbacks. The transparency and the access of all staff to all work spaces made it difficult to store confidential documents and hold confidential talks. Managers were particularly bothered by this aspect, though the respondents did not perceive separate rooms for managers an option as well. Since doors cannot be locked, users had to be extra careful not to leave valuables lying around. The provisions for concentrated work were seen as inadequate, despite the availability of the cockpits. According to one participant, the cockpits were too small, and were often all occupied. The same applied to other workplaces, so that employees sometimes had the feeling that “they had nowhere to go”. It may be remarked, however, that this feeling was not confirmed by the overall workplace occupancy rate throughout the building, which is low. People have to get used to the idea that the whole building is there to be worked in, not just the work sites in what one considers to be one’s own domain.

## **Comparison with targets of Avans Hogeschool**

The survey shows that a few months after some of the staff had moved into the new building, many targets have not yet been reached. The building does indeed promote communication, and the architecture contributes to the well-being of the staff. There were few complaints about the flexi-work approach. The intended reduction in floor area had also been achieved. However, the building does not meet the wishes of the staff in a number of important respects, in particular the internal climate, the telephone system, the filing and storage facilities and the provisions for student-teacher contact. Users were not always able to find the conditions that allowed them to concentrate on a demanding task.

## A PILOT STUDY AT TU DELFT

In 1999, a pilot study was carried out in the Faculty of Civil Engineering and Geoscience (CiTG) of Delft University of Technology in order to gain experience in the use of a more transparent, dynamic study and work environment (Van der Voordt, 1999). The old situation was characterized by a double-corridor system with long, straight corridors, sanitary facilities and other services in the central core and mainly 1- and 2-person rooms round the outside. The massive walls gave the whole set-up a quiet but boring look. The lay-out was not conducive to creative work or contact between members of staff. In consultation with the Board of the Faculty, one of the wings of the main CiTG building was designated by the department of Real Estate Management of TU Delft as the site for a pilot study of the implementation of innovative concepts in the layout of an office/teaching/research environment. The pilot site had a gross floor area of 2050 m<sup>2</sup>. The original infill was completely demolished, and a new interior created that was characterized by more openness and smaller rooms, together with more shared space for meetings, spots for individual study, central filing systems and the display of the products of research projects. Since the sections housed on the pilot site were mainly concerned with research rather than teaching (any teaching activities being mainly restricted to one-to-one tutoring), the rooms in the new layout were still mainly 1- and 2-person offices. Glass walls gave the desired openness, while a strip of frosted glass at eye level ensured a degree of privacy. Since practically everyone concerned worked here on a full-time basis it was decided to continue the use of fixed personal desks, apart from the student research assistants. Some of the users were moved to another part of the building. The space released in this way was used to construct a new microlab for the study of concrete techniques. Integration of this laboratory in the office environment created an exciting, instructive blend of research and administration.

Evaluation of this pilot project showed, that the new look and feel of the department were highly appreciated (Van der Voordt and De Puy, 1999). A majority of respondents praised the work ambiance, the comfort offered by the furniture, the use of light colours and the transparency (lots of glass). Respondents found the work environment to meet the requirements of day-to-day work reasonably well, and to be equally suited to research and teaching activities. The new work environment seemed to appeal both to students and to new members of staff. The face-lift has improved the image of the department. The assessment of the functionality of the new set-up was ambivalent. The amount of space for formal and informal consultation and the provision of audiovisual aids in the conference room were appreciated. However, many users were dissatisfied with the internal climate, the limited scope for regulating the climate oneself and the lack of visual privacy. Despite the installation of overhead cooling and protection against incident solar radiation, it could get very hot and sticky in the building in the summer.

The mean overall satisfaction rating was 7.7 on a 10-point scale if two negative outliers were left out of consideration. The old situation got more or less the same satisfaction score, however, so in essence things had not really changed much. The unfavourable aspects of the new set-up would seem to have seriously tempered the enthusiastic response to the attractive new working ambiance, the transparency and the ample provision of aids to communication and cooperation. It may be noted in conclusion that a majority of staff found that the new work environment did lead to a slight improvement in their productivity.

## DISCUSSION

The 1999 pilot project at CiTG dated from the early days of innovative office concepts like combi-offices and hot-desking. Evaluation of the project indicated that hot-desking was a step too far for the academic users. While it is true that the preparations for the use of activity-related work sites at Avans Hogeschool did not start much later, there was still plenty of time during the preparatory phase to take on board the experience in the use of flexible office concepts gained elsewhere. This gave the Executive Board of Avans the confidence to proceed with this innovative project. The main difference between these two cases was the use to which the space in question was put. At CiTG, the space was primarily used for research, while at Avans it is chiefly for the administrative support of teaching activities and the individual supervision of students. This last-mentioned point has been found to give rise to some difficulties in the new set-up. The spatial provisions for the interaction between members of the teaching staff and students are not yet satisfactory. The mix of "private space ('staff only')", "public" spaces where students are allowed to come, and a joint "semi-private" staff zone is not facilitated on a satisfactory level. Supervisions often take place in the cockpits. Lecturers characterize the old situation, where each one had his/her own room, as much more acceptable. Students were able to find them more easily, and the door of the room could be closed to ensure sufficient privacy. The high level of transparency in the new situation is less suitable for a confidential or sometimes even quite emotional conversation. The new situation is also experienced as less convenient for the storage of personal documents, including the lecturer's own books and students' project papers. It would be advisable to take these findings into consideration during the preparations for the next phase of the Avans move and to think carefully - in consultation with the staff and certainly also the students! - about the best way to facilitate contacts between teaching staff and students.

### **Considerations concerning the research methodology used**

Any measurement of user satisfaction is a snapshot taken during a continuous process. When considering the results of the Avans Hogeschool study, it should be borne in mind that the measurements were made shortly after the first group of users moved into the new building, when a number of important elements of the new work environment such as the planned Grand Café were not yet in place. The project bureau is still waiting for the permits for the seating to be installed in the (wide) corridors, which could help to provide more space for the supervision of students. It also took some time to get the internal climate control properly regulated. Unpleasant experiences on hot days stick in the memory for a long time, and clearly influenced user evaluation of the quality of the internal climate.

The use of a digital questionnaire for the survey had the advantage of ensuring that all users could be contacted quickly and efficiently, and that data could be rapidly made available in tabular and graphical form. A risk of this approach is the potentially low response rate. It also proved to be difficult to get enough users to participate in the group discussions. The disadvantage of small numbers is balanced by the two in-depth group discussions that made it possible to ask respondents about the reasons "behind their answers". A combination of questionnaire and group discussion would seem to be a highly effective means of gaining a sufficiently reliable and valid picture of user perception of the new work environment.

It might be possible, however, to use quite different investigative methods in future research. In particular with respect to cultural changes, anthropology is a discipline that might contribute to building up a body of knowledge about experience and use of work environments by participant observation and phenomenological approaches such as interviews-in-depth and asking users to keep a diary or to tell narratives about their working environment. Observations and stories to grasp their native point of view may help to improve our understanding of peoples' behaviour in such new settings. What kind of interventions occur as a consequence of people's resistance? *Why* do people behave as they do? What is the impact of type of business, organizational culture, social roles, group dynamics, attitudes and habits? What are short term and long term effects of a new work environment? Does the period of measurement – for instance in hectic periods with time pressure of teaching duties versus more quiet periods – make a difference? Unfortunately disciplines such as anthropology, environmental psychology, business administration and facility management seem to be hardly connected at all. We still have a long way to go.

## REFERENCES

- Balkin, D.B., Tremblay, M. and Westerman, J. (2001), "Workplace innovations in large, unionized Canadian organizations", *Journal of Business and Psychology* (15) no. 3.
- Barber, C. (2001), "The 21<sup>st</sup>-Century Workplace", In: Kaczmarczyk et al, *People and the Workplace*. GSA Office of Governmentwide Policy, Washington DC.
- Becker, F. (2004), *Offices at work*, Jossey-Bass, San Francisco, USA.
- Brill, M., and Weidemann, S. (2001), *Disproving widespread myths about workplace design*, Kimball International, Jasper, USA.
- Duffy, F., with Powell, K. (1996), *The New Office*, Conran Octopus, London.
- Volker, L. and Maarleveld, M. (2007), *Wodi-Light ontwikkeling en gebruikhandleiding*, Center for People and Buildings, Delft. [WODI-Light, development and user guide].
- Pinder, J., Price, I., Wilkinson, S.J. and Demack, S. (2003), "A method for evaluating workplace utility", *Property Management* Vol. 21 No. 4, 218-229.
- Voordt, D.J.M. van der (1999), *Universitair vastgoed: leer- en werkomgeving*. Delftse Universitaire Pers. [University Real Estate, an evaluation of two poilots].
- Voordt, D.J.M. van der (2007), *Activiteitgerelateerde Werkomgevingen bij Avans*, Center for People and Buildings, Delft. [Activity Related Workplaces at Avans].
- Voordt, D.J.M. van der, and de Puy, L. (2000), *Evaluatie pilot Civiele Techniek*, Faculteit Bouwkunde TU Delft, Delft. [Post-Occupancy Evaluation of the CiTG-pilot].
- Watson, L. (2007), "Building the Future of Learning", *European Journal of Education*, Vol. 42, no. 2, 255-263.