



After the fire. New ways of working in an academic setting.

Journal:	<i>Facilities</i>
Manuscript ID:	draft
Manuscript Type:	Original Article
Keywords:	New ways of working, University, Post-Occupancy Evaluation, Employee satisfaction

 scholarONE™
Manuscript Central

Review

After the fire

New ways of working in an academic setting

Authors

Marjan J. Gorgievski, Department of Industrial and Organizational Psychology, Erasmus University Rotterdam
E: gorgievski@fsw.eur.nl.

Theo J.M. van der Voordt, Department of Real Estate & Housing, Faculty of Architecture, Delft University of Technology & Center for People and Buildings, Delft. E: D.J.M.vanderVoordt@tudelft.nl

Sanne G.A. van Herpen, RISBO Research-Training-Consultancy, Erasmus University Rotterdam
E: VanHerpen@risbo.eur.nl

Sophie van Akkeren, MSc student Faculty of Architecture, Delft University of Technology
E: sophievanakkeren@gmail.com

Corresponding author

Theo J.M. van der Voordt can be contacted at D.J.M.vanderVoordt@tudelft.nl

Additional information about the authors

Theo J.M. van der Voordt is associate professor in real estate at the department of Real Estate & Housing of the Faculty of Architecture, Delft University of Technology, and a senior researcher at the Delft knowledge centre Center for People and Building. He has a special interest in briefing and evaluation, workplace strategies, successful health care real estate strategies, and conversion of empty office buildings into housing. Dpt. of Real Estate & Housing, Faculty of Architecture, Delft University of Technology. P.O. Box 5043, 2600 GA Delft, the Netherlands. T: +31 6 3925 1096. E: D.J.M.vanderVoordt@tudelft.nl. W: www.re-h.nl and www.bk.tudelft.nl/users/voort/internet.

Center for People and Buildings, Kluyverweg 6, 2629 HT Delft, the Netherlands. T: +31 15 278 1271. E: info@cfpb.nl. W: www.cfpb.nl.

Marjan J. Gorgievski received her Ph.D. in Occupational Health Psychology at Utrecht University in 2002. Since then she has been working as an assistant professor at the department of Industrial and Organizational Psychology at the Erasmus University Rotterdam. She teaches job analyses and job design, health and safety at work, and psychology of entrepreneurship. Her current research focuses on the relationship between job and task characteristics, work performance and health from a multilevel perspective (intra- and inter-individual processes, and person-environment fit). She published several book chapters and scientific articles in *Human Ecology*, the *Journal of Occupational Health Psychology*, *Journal of Occupational and Organizational Psychology* and the *International Journal of Business and Globalization*.

Dpt. Of Industrial and Organisational Psychology, Erasmus University Rotterdam. Room T13-03, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands. Tel. +31 10 40888799. Fax. +31 10 4089009.

Email: Gorgievski@fsw.eur.nl.

Sanne van Herpen graduated in 2007 in Educational Sciences at the Radboud University Nijmegen. Topic of her thesis was professional development of university teachers at the Erasmus University Rotterdam (EUR). She evaluated the training and development needs of employees, and their professional identity. Since September 2007 she has been working as an education consultant / researcher at Risbo. Focus of her job is on quality management in higher education, amongst others research on the quality of training in Medicine at the EUR, and professional development of teachers.

RISBO, Erasmus University Rotterdam. Room T11-08, P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands. Tel. +31 10 4082116.

Email: vanherpen@risbo.eur.nl

Sophie van Akkeren has just finished her MSc thesis on 'flexible working in an academic environment' at the department of Real Estate & Housing of the Faculty of Architecture, Delft University of Technology.

Jacob van der Doesstraat 101, 2518XM Den Haag, the Netherlands T: +31 6 41018310

E: sophievanakkeren@gmail.com

1
2
3 **After the fire**
4 **New ways of working in an academic setting**
5
6
7
8
9

10
11
12 **Abstract**
13
14

15 **Purpose** – This paper presents the research findings of a Post-Occupancy Evaluation of new ways of working
16 at the Faculty of Architecture of the Delft University of Technology and the lessons learned.

17 **Design/Methodology/Approach** – The article is based on an internet survey among daily users, additional
18 interviews with decision makers and other participants involved in the implementation process, analysis of
19 documents and personal observations.
20

21 **Findings** – The new office plan scores high on possibilities to meet other people. Work spaces are considered
22 to be functional. On the other hand, employees reported a lack of spaces suited for confidential (telephone)
23 conversations and insufficient visual and auditory privacy. Employees can insufficiently control the climate of
24 their direct work environment and the way the environment looks like. Safety of the workplaces is rated
25 below average. People want more rooms equipped with doors, and doors that can be locked. Finally, an
26 important complaint was lack of personal and collective filing and storage possibilities.
27

28 **Research limitations** – There was no opportunity to conduct a zero measurement ex ante; long term
29 effects on use and experience are not known yet, nor the effects of improvements that are being
30 implemented this year.
31

32 **Practical implications** – The results can be used to support decision makers in implementing new office
33 concepts, in general and in particular in an academic setting, ex post or ex ante.
34

35 **Originality/value** – Much has been written about new ways of working, but research on this topic in
36 academic settings is scarce.
37

38 **Key words** New ways of working; University; Post-Occupancy Evaluation; Employee satisfaction.
39

40 **Paper type** Research paper
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

After the fire

New ways of working in an academic setting

New ways of working at the Faculty of Architecture in Delft

In 2006 the Faculty of Architecture of the Delft University of Technology got a new dean. One of the first ideas of this former architect and governmental architectural supervisor was to upgrade the old faculty building (taken into use in 1970) in order to stimulate communication and social interaction within and between different departments. The old concept of cellular office spaces for administration, research and coordinating or preparing teaching activities was perceived as not very functional and inefficient. Data from the late nineties showed average occupancy rates of 31% for staff rooms and 65% for administrations (van der Voordt, 2001). Apart from informal meetings in the faculty restaurant and at social events, cross departmental contacts were limited to formal meetings. Students primarily came to the faculty for lectures and design studios and worked at home on conducting their design exercises. For this reason the dean started a "bubbling building" project. The "faculty street" – the ground floors' central corridor with common facilities such as the library, restaurant and helpdesk – got a facelift and a number of new student workplaces had been realised. When a new architectural design professor came in, all walls between the one and two person rooms had been broken down in order to create an open office space that supports social interaction. In 2007 a group of 10 people started a pilot to share a group office with 8 workplaces, partly personal desks and partly non assigned desk. And then the fire came, May 13, 2008. The faculty building burnt down completely (Figure 1).

Take in Plate 1a and 1b:

The Faculty of Architecture building being on fire and after the fire

Already at the day of the fire a steering group including the dean, the CEO of the University and the DTU Real Estate and Facility Management Department started to look for other accommodation. Teaching restarted after five days in big tents. Staff members were accommodated temporarily in other faculty buildings. At the end of May the decision had been made to move the faculty community to the former head building of the Delft University of Technology (at that time vacant and being converted into residential apartments), until a new faculty building would be available. The present accommodation should be "a platform for intellectual debate" and "a community building with well defined identities and improved interaction between staff and students". Because the available space was 30% less than in the old situation, two additional glasshouses have been built. Still the available space is insufficient to accommodate personal desks for all staff members and sufficient work places for students. This situation offered the dean the opportunity to introduce new ways of working for the whole faculty. A so-called flex-team started to elaborate a new office concept "From your own office to an office of your known", together with Fokkema architects who were also involved in upgrading the former faculty building. Apart from personal desks for supporting staff, desk sharing for everyone and clean desk policy had been introduced, in different settings with a variety in scale (2, 4, 6 or over 6 desks in one space) and openness. Personal storage space is limited to 1.2 m per person. In addition, extra storage is available for direct support (secretariats) and by shared bookshelves in the living rooms.

Box 1: Impression of the "new" Faculty of Architecture Building in Delft ('BK City')

Take in Plate 2: Open office with non assigned desks

Take in Plate 3: Workspace for students

Take in Figure 1: All possible working activities are being supported, including 486 desks + 349 extra work space and 44 meeting rooms for 806 employees (444 f.t.e.); 688 BSc studio desks for 1420 BSc students; 832 MSc student desks for 1675 MSc students; 5 lecture halls

End of box 1

Need for evaluation research

The main objectives of the new office concept are increased flexibility, space reduction and stimulation of social interaction across staff and students of different departments. Possible disadvantages have not been considered very carefully. When 30 staff members send a joint letter to the dean to express their worries about having to give up their personal desks and rooms with positive conditions for privacy and concentration and plenty of space to store books and other documents, he characterized this response as "cold feet" and asked them to wait until the building was taken into use. Although from literature and Post-Occupancy Evaluations of office environments it may be concluded that most people can cope quite well with new ways of working, complaints appear as well (Van Wagenberg, 1996; Becker and Sims, 2002; Vos and Van der Voordt, 2002; van der Voordt, 2003; Mallory Hill et al, 2005; Maarleveld and Van der Voordt, 2006; Maarleveld et al, 2009). Usually 10-20% of employees working in non-territorial offices don't like non-assigned desks at all. They miss their personal territory and the opportunity to personalize the work environment. More people complain about a lack of privacy and poor facilitating of concentration work, or report insufficient storage space.

Research in open plan offices shows a conflict between the standardized workspaces for communal use wanted by management, and universal human needs such as the need for a place of one's own, privacy, identity, status and the ability to arrange one's own work environment to suit one's own personal needs (Sundstrøm et al, 1982; Oldham and Fried, 1987; Allen and Gerstberger, 1994; Brennan et al, 2002).

Whereas a lot of research has been conducted in the office sector, much less is known about flexible working concepts in educational settings, with a few exceptions. Van der Voordt and Van der Klooster (2008) investigated new ways of working in an Institute for Higher Education. The extent to which the work environment supported productivity got a mean of 5.1 i.e. 'unsatisfactory'. The accommodation concept scored about 5.5, while the organization and facilities scored about 6 (recognized as a 'pass'). Only work process had a mean score corresponding to a good pass (6.6), though all aspects received also scores of 7 or 8 from individual respondents. The survey found 46% and 54% respectively of the respondents to be satisfied or highly satisfied about the spatial configuration of the work spaces and the openness and transparency of the work environment, but an appreciable minority (25% and 30% respectively) were dissatisfied or highly dissatisfied with these aspects. A lot of people complained about lack of storage space and lack of confidentiality because of the ambivalent public/private character of the staff zone, where students came to talk individually with their teachers. No fewer than 37% of the respondents were dissatisfied about lack of privacy, and 23% were even highly dissatisfied. Similar levels of criticism were found concerning the extent to which the work environment allowed people to concentrate on a particular task.

1
2
3 Most employees were quite satisfied about the attractive architecture of the building, the modern IT facilities
4 and supportive conditions to enable communication.
5

6 Parkin et al (2006) reported similar ambivalent results in research environments for higher education.
7 Provisions for relaxation and informal socialisation were highly appreciated. Researchers felt the absence of
8 partitions in open plan group offices to increase the opportunity for interaction that stimulates intellectual
9 debate and group cohesion. On the other hand, people complained about poor conditions for concentration,
10 lack of privacy and loss of storage space. Some researchers came into work early, or stayed late in order to
11 work when there are fewer distractions; others choose to work from home if they need to concentrate.
12 'Cubes' i.e. small study booths were not used very often, because people find them too small and find it
13 impractical to move work from one's desk to another location. Some people are less likely to engage their
14 peers in conversations than when they worked in closed offices, because they don't want to disrupt the
15 concentration of those working nearby. Hotdesking was not always effective, in particular when researchers
16 use their desk most of the time, or when the available number of desks does not necessitate desk-sharing
17 and desk-rotating. In spite of the complaints, most researchers of a Club pilot did not want to revert to more
18 traditional, cubicled research rooms; for those who did, dislike of hotdesking policy was the main reason.
19
20
21
22
23

24 Because of the ambivalent research findings, the Faculty of Architecture case is a very interesting one
25 to learn more about the advantages and disadvantages of new ways of working in an academic setting. For
26 this reason and also to meet the demands of the representative advisory board the steering group and the
27 flex-team jointly commissioned an external research group to conduct a sound evaluation of the new working
28 environment (Gorgievski et al, 2009), with five leading research questions: 1) How do the faculty's employees
29 experience and assess the new situation with desk sharing of a variety of activity-based workspaces? 2) Do
30 different staff groups (with regard to job function, age, sex, department, fulltime or part-time) assess the
31 concept in a different way? 3) What is the impact on employees' perception of social aspects of the working
32 environment, wellbeing and motivation, and work performance? 4) What is the occupancy level of different
33 types of hot desks? 5) Which improvements could be implemented within the concept of hot desking? This
34 paper focuses on the answers on questions one and five. Students were not involved in this research.
35
36
37
38

39 **Research method**

40
41
42 266 employees participated in an internet survey (response rate = 26.4%). Overall participants are a
43 representative sample of the University's population, but student-assistants and visiting professors were
44 underrepresented in the sample. Because of this reason, the sample differed significantly from the population
45 concerning gender (54% male as compared to 60% in the population, $X^2_{(1 \text{ df})} = 7,00, p < .01$), mean age of
46 the sample = 42.23 years (sd = 12.09) as compared to 39.89 years (sd = 12.58; $T_{(988 \text{ df})} = -2.61, p < .01$),
47 tenure (on average 17.44 years (sd = 15.18) compared to 7.21 years (sd = 13.06; $T_{(403.40 \text{ df})} = -9.70, p$
48 $< .001$); and number of hours worked per week(on average 30.80 hours (sd = 11.56) as compared to 15.92
49 hours (sd = 14.72; $T_{(589 \text{ df})} = -16.49, p < .001$).
50
51

52 Employees were told about the goals and method of research in an email signed by the management,
53 and personally invited by email to participate in a survey on a secure website of an independent research
54 bureau. The data were automatically written to an external file. Employees were first invited to fill out a
55 general questionnaire once, and subsequently to fill out a quantitative diary for three different days asking
56 them about specific experiences of the day. Reminders were sent regularly during a two week period of data
57 collection, until the diary had been filled out three times. Questionnaires could be filled out in Dutch or
58 English. In total, 83 employees (response rate = 8.2%) filled in the diary at least once (175 diary entries).
59
60

1
2
3
4 The questionnaire asked respondents about their satisfaction with the housing situation of their faculty;
5 their department; their personal work space and the concept of flexible work spaces. Answers ranged from 1
6 "not at all satisfied" to 7 "very satisfied". In addition, questions were asked about the extent employees felt
7 their housing situation and personal work spaces fulfilled physical, task related and psychological
8 requirements, such as privacy, safety, and direct and indirect control over the environment. Answers ranged
9 from 1 "totally disagree" to 5 "totally agree". Finally, the data file contains information on demographic
10 variables, such as age, gender, tenure, number of working hours per week and number of hours worked at
11 home. The quantitative diary asked respondents to list the tasks they had been performing during the day
12 and at what time; in what type of workstation the tasks had been performed; and how functional they
13 considered this working environment to be for the task at hand (1 "not at all functional" to 5 "very
14 functional"). Data were analyzed with SPSS version 16. Analyses include univariate and multivariate
15 descriptive analyses (Chi Square and paired and independent sample T-test).
16
17
18
19

20 Results

21 Analyses show that employees are overall satisfied with the new accommodations for the Faculty, their
22 own department and their own office situation (Figure 2). They are somewhat less satisfied, however, with
23 the concept of a flexible office plan.
24
25

26
27 Take in Figure 2 and Figure 3 about here
28

29 When comparing their current work situation with the old situation in which they worked in traditional
30 cellular offices, employees are less satisfied with their own work situation (Paired $T_{(241 \text{ df})} = 5.560, p < .001$)
31 as well as the accommodations for their department (Paired $T_{(241 \text{ df})} = 2.991, p < .005$), but they are as
32 satisfied with the accommodations for their Faculty as they were before.
33

34 The new office plan has several advantages (Figure 3). It scores high on possibilities to meet other
35 people and have informal face-to-face conversations. The environment is not very crowded, the preferred
36 workplace is generally available, and work spaces are considered to be functional. Employees also reported
37 weaknesses and disadvantages, in particular as a lack of spaces suited for confidential (telephone)
38 conversations and insufficient visual and auditory privacy. Employees can insufficiently control the climate of
39 their direct work environment and the way the environment looks like. They did not have sufficient say in the
40 way the offices are furnished. Safety of the workplaces is rated below average; people can often not leave
41 their belongings behind at their work station for a minute and want more rooms equipped with doors that can
42 be locked. Finally, an important complaint was lack of personal and collective filing and storage possibilities.
43
44
45
46

47 Take in Figure 4 and 5 about here
48

49 The diary data show that especially large flexible offices of more than 6 persons are experienced as
50 less functional (Figure 4). Also silence rooms, which are usually somewhat larger in size, and meeting rooms
51 scored below the scale's average of three (not agree/ not disagree).
52

53 The functionality of different work environments is perceived to be similar across tasks for supportive
54 and administrative personnel, namely on a scale from 1 to 5 the accommodations scored on average 3.06 (sd
55 = 1.26) for supportive and 2.59 ($sd = 1.41$) for administrative personnel. However, employees in an academic
56 position experienced that functionality of the office situation differs across tasks. The accommodations are
57 perceived to be least functional for coordinating tasks, making phone calls, filing material and information and
58 teamwork (Figure 5).
59
60

1
2
3
4 In the flexible office concept employees have the opportunity to change work places for different tasks.
5 The question is whether people actually use this opportunity. The diary data (85 people, 175 days) shows
6 that at least within one workday the number of times people change work places is very modest. The modus
7 lies at working only at one workstation (45% = 79 days). The maximum number of changes is fourteen times.
8 Most changes of work place are related to going into meetings, teaching responsibilities, taking a break at the
9 cantina and working at home. Only 19 days could be qualified as "real flex working" days, characterized by
10 changing from one office environment (e.g. a small flexible office) to another (e.g. a large flexible office or
11 silence room).
12

13
14 Finally, in the new situation employees work a larger percentage of their time at home than they did in
15 the old situation. The 232 people who answered this question worked on average 26.60 % of their time at
16 home, as compared to 15.55% in the old situation (Paired $T_{(231 \text{ df})} = 8.374$, $p < .001$).
17

18
19 Respondents did not often make use of the opportunity to add additional remarks in the box "space for
20 additional comments" and if they did, primarily to explain negative responses. Employees miss the
21 opportunity to make phone calls and use their computer at the same time, small work places for confidential
22 conversations, and instant workplaces to check their email. Complaints are made on the absence of doors:
23 "doors are no obstacles to prevent openness but means to lock a room in case you need it" and "I have too
24 many belongings in order to be able to store them temporarily when I leave the room". Hotdesking is not
25 appreciated, for example, because "I am too old to carry around heavy books and a laptop". A negative affect
26 of clean desk is that "it leads to clean rooms, sterile, impersonal" and "waste of time because of the need to
27 log in several times per day". In spite of problems with concentration, people hesitate to address colleagues
28 who cause disruptions by speaking too loud or making phone calls. Positive remarks have been made about
29 the increase of social interaction ("more contact with other chairs") and the nice architecture of the building,
30 though also remarks have been made such as "The main objective is beauty, how staff wants to work plays a
31 minor part". One of the respondents is extremely negative: "The one who invented this concept does not
32 have the slightest idea how education, research and different work styles should be facilitated. It is clear he
33 does not need to work here himself. One size does not fit all" and "I don't need many workspaces, I need one
34 good one".
35
36
37
38
39

40 41 **Recommendations**

42 First, in flexible office plans, safety of work spaces needs special attention. Common lockers showed to
43 be insufficient. People should have the possibility to leave personal belongings behind in the office without
44 running the risk of theft. Offices that cannot be locked or closed by a door, and large, impersonal open offices
45 where many people have easy access, may be particularly prone to thefts (quite a number of laptops have
46 been stolen yet!). People also need to feel safe subjectively. Subjective feelings of safety also relate to the
47 extent people can give their environment its own identity. This does not need to be on individual level, but
48 may also be accomplished at the level of the group.
49

50
51 Second, the work environment needs to provide sufficient visual and auditory privacy. This includes
52 spaces for formal and informal telephone calls and face-to-face meetings, but also adequate space to process,
53 print and store personal information about students and employees. Spaces allocated for personal face-to-
54 face conversations and telephone calls need to be multifunctional, and for example provide easy access to
55 (electronic) personal documents.
56

57 Third, large office spaces in particular (in our study more than 6 workstations) may be accompanied by
58 physical discomfort (e.g., noise, temperature). This can be improved by dividing larger spaces into smaller
59 units using plants or filing facilities.
60

1
2
3 Fourth, personal and collective filing and storage capacity need to be well organized. Employees should
4 be able to store their personal belongings and work material close to their preferred work space.

5
6 Fifth, the functionality of work spaces depends on the tasks employees need to perform there. In this
7 study, scholars indicated that their flexible office environment did not sufficiently support all of their tasks.
8 Hence, work spaces need to be sufficiently differentiated, and the types of work spaces provided need to be
9 based on careful job analyses.

10
11 Finally, the best way to ensure fit between work environment and employees' needs is to give
12 employees sufficient direct influence in the way the office is designed and furnished. It might be considered
13 to allow departments and sections to adapt "their" working environment more made-to-measure, including
14 few personal desks for people that are in the office quite often and/or who are not able to cope with non
15 assigned desks ("I work forty years in the same way and can't change that anymore").
16
17

18 19 **Discussion and concluding remarks**

20 Overall the new accommodation of the Faculty of Architecture seems to be a success. Many employees
21 are positive about the appearance of the old building with its characteristic expression, spacious rooms and
22 high windows, and the overall building lay-out, colors, materials, and furniture. Social interaction and
23 communication is well supported and stimulated. The occupancy level is still low (average 27%, with a few
24 exceptions - service desk 82%, secretariats 52% - and temporary peaks of 60-70%), so employees can often
25 choose a preferred work place. But it is striking that percentages satisfied employees decrease according to
26 the scales of the building as a whole, the department domains, and the individual working environment.
27 Complaints that have been reported in the literature about lack of privacy and concentration, loss of storage
28 space, and not being able to express ones identity by personalization of the workspace appeared in the
29 Faculty of Architecture case as well. One of the employee responded that "everything has been organized
30 according to the design view of the architect, everything is open, without any subtle distinctions ". Another
31 one remarked that "the building has been designed like an architectural office, but we are not all architects".
32 As a consequence, more people work more often from home than in the old situation (27% of the work time
33 versus 16%). Because of hotdesking, staff members lack a place of their own ("we are always on the way")
34 and people have to drag laptops and documents from one place to another. Staff is more difficult to find than
35 in the old situation with personal desks and assigned rooms and often have to be phoned or mailed to know
36 where they are. In group spaces phone calls cause disruptions, whereas going outside to a "phone spot" is
37 difficult because one does not have digital information by hand. Lack of safety showed to be another
38 important issue, probably due to the semi-public character of an educational building. This had already been
39 predicted by employees during the introductory presentations. Many of these problems are being solved now,
40 without giving up the flexible concept.
41
42

43
44 It should be taken into account that the negative response may be colored by the moment of
45 evaluation. Some of the applied functional and technical improvements (e.g. acoustics) were still under
46 construction at that time. Another factor with a negative impact on employee satisfaction is the lack of user
47 participation during the conceptualization and implementation of the new office concept. For this reason the
48 decision making process has been characterized by some employees as authoritarian (Kooijman and Sierksma,
49 2009). One might question if this lack of user involvement is a consequence of the dean's management style
50 or an inevitable consequence of tough time pressure. Most employees labeled the information about the
51 process "quite well".
52
53

54
55 The research findings are not only applicable to improve the present building. The Faculty of
56 Architecture still intends to build a new building. Many ideas have been collected by an open international
57 ideas competition (Faculty of Architecture, 2009). Hopefully the lessons learned from the Post-Occupancy
58 Evaluation will be used to write a sound and "evidence based" brief for the following design competition.
59
60

Finally, cross case comparisons - nationally and internationally, between and across educational settings en other settings like banks, insurance companies and public organizations could help to improve our understanding of the impact of the organizational context, different working processes and different cultures.

References

- Allen, T.J. and , and Gerstberger, P.G. (1973), "A field experiment to improve communications in a product engineering department: The non-territorial office". *Human Factors* (15), pp. 488-498.
- Becker, F. and , W. Sims (2001), *Offices That Work*. International Workplace Studies Program, Cornell University.
- Brennan, A., Chugh, J.S. and Kline, T. (2002), "Traditional versus Open Office Design: A Longitudinal Fieldstudy". *Environment and Behavior* (34) 3, pp. 279-299.
- Balkin, D.B., Tremblay, M. and Westerman, J. (2001), "Workplace innovations in large, unionized Canadian organizations", *Journal of Business and Psychology*, Vol. 15 No. 3, pp. 439-448.
- Faculty of Architecture TU Delft (2009), *Building for Bouwkunde – Open to Ideas. Open International Ideas Competition and Think Tank*. Delft.
- Gorgievski, M., van Herpen, S.G.A. and Zijderwijk, L. with Hermus. P.W. (2009), *Ervaring met flexibele werkplekken op de Faculteit Bouwkunde, TU Delft*. Rotterdam: RISBO Research-Traning-Consultancy, Erasmus Universiteit Rotterdam. [Experiences with flexible work places at the Faculty of Architecture TU Delft]
- Kooijman, D. and Sierksma, R. (2009), "Flexible workspace and authoritarian surveillance", *BOSS Magazine* nr. 35, March, pp. 44-49.
- Mallory-Hill, S., Van der Voordt, T.J.M., and Van Dortmont, A. (2005), "Evaluation of innovative workplace design in the Netherlands", in: W.F.E. Preiser and J. C. Vischer (eds), *Assessing Building Performance*. Oxon, UK: Elsevier, pp. 160-169 and 227-228.
- Oldham, G.R. and Y. Fried (1987), "Employee reactions to workplace characteristics". *Journal of Applied Psychology*, 72, pp. 75-80.
- Parkin, J., Austin, S., and Landsdale, M. (2006), *Research Environments for Higher Education*, Loughsbrough University.
- Sundstrøm, E., Herbert, R.K. and Brown, D. (1982) "Privacy and Communication in an Open-Plan Office - A Case Study", *Environment and Behavior*, Vol. 14 No. 3, pp. 379-392.
- Van der Voordt, D.J.M. (2003), *Costs and benefits of innovative workplace design*, Center for People and Buildings, Delft.
- Van der Voordt, D.J.M. (2004), "Productivity and employee satisfaction in flexible offices", *Journal of Corporate Real Estate*, Vol. 6 No. 2., pp. 133-148.
- Van der Voordt, D.J.M. (2001), *Efficiënt ruimtegebruik*, Internal report, Delft: Faculty of Architecture, Delft University of Technology [Efficient use of space].
- Van der Voordt, D.J.M., and Maarleveld, M. (2006), "Performance of Office Buildings from a User's Perspective", *Ambiente Construído*, Porto Alegre, Vol. 6 No. 3, pp. 07-20.
- Van der Voordt, D.J.M., and van der Klooster, W. (2008), *Post-Occupancy Evaluation of a New Office in an Educational setting*, Proceedings of the CIB-W070 conference in Facilities Management, Heriot Watt University, Edinburgh, 16-18 June 2008, CIB report 315, 579-588.
- Vos, P.G.J.C. and van der Voordt, D.J.M. (2002), "Tomorrow's offices through today's eyes, effects of office innovation in the working environment", *Journal of Corporate Real Estate*, Vol. 4 No. 1, pp. 48-65.
- Van Wagenberg, A.F. (1996), "Redesign and evaluation of experimental Dutch office layouts", *Proceedings of World Workplace 1996*, Salt Lake City, pp. 715-725.

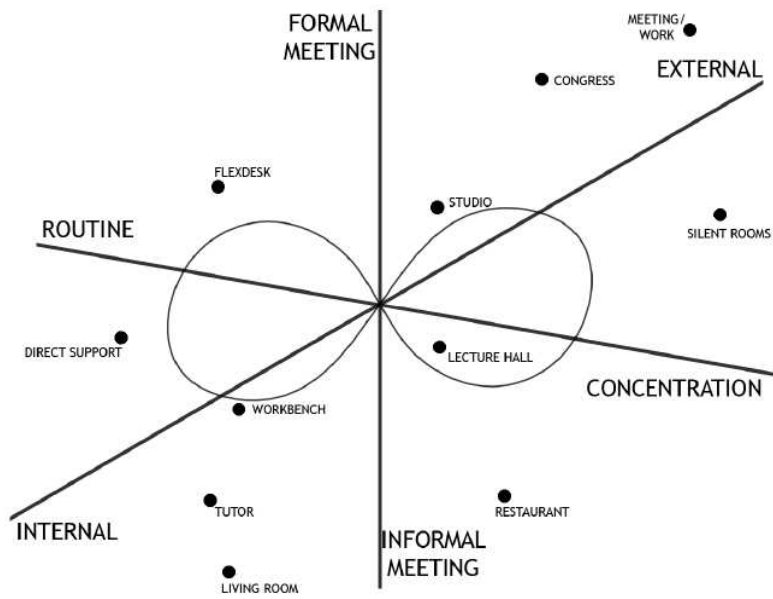
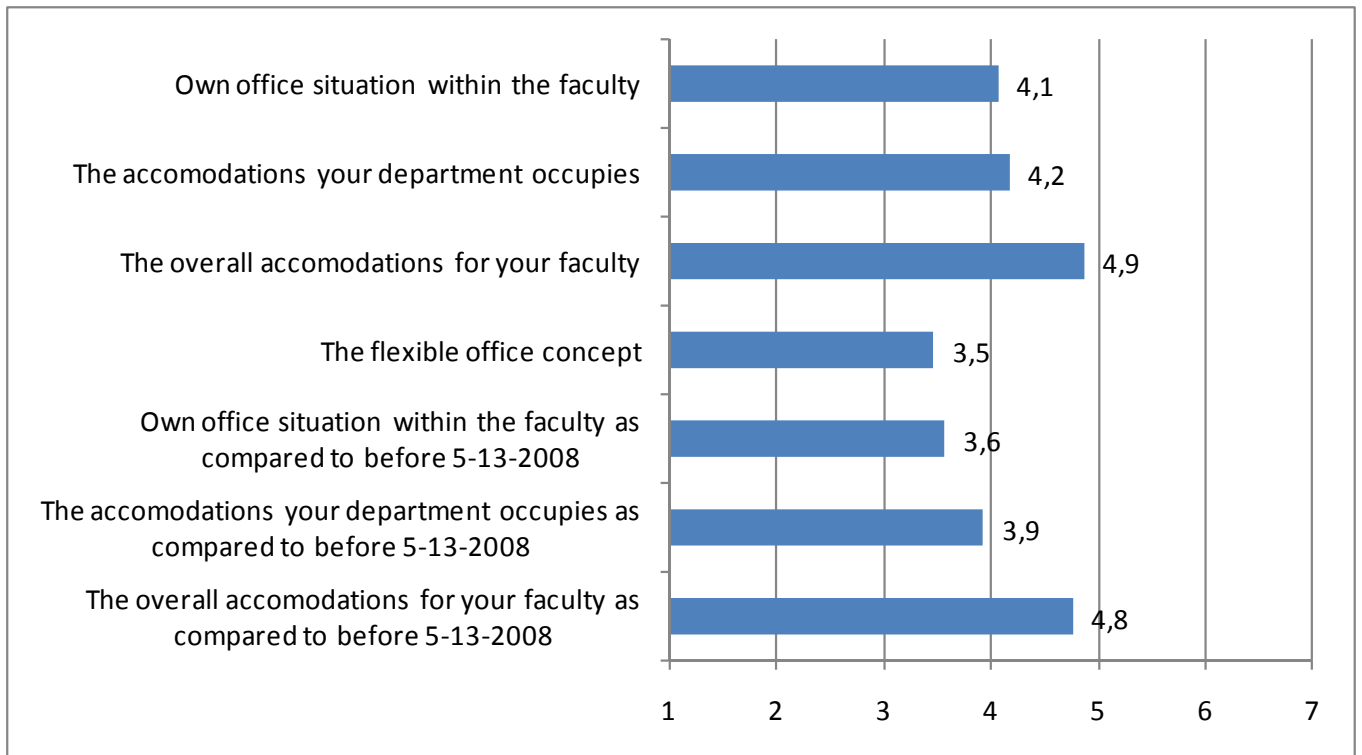


Figure 1: All possible working activities are being supported, including 486 desks + 349 extra work space and 44 meeting rooms for 806 employees (444 f.t.e.); 688 BSc studio desks for 1420 BSc students; 832 MSc student desks for 1675 MSc students; 5 lecture halls

Peer Review

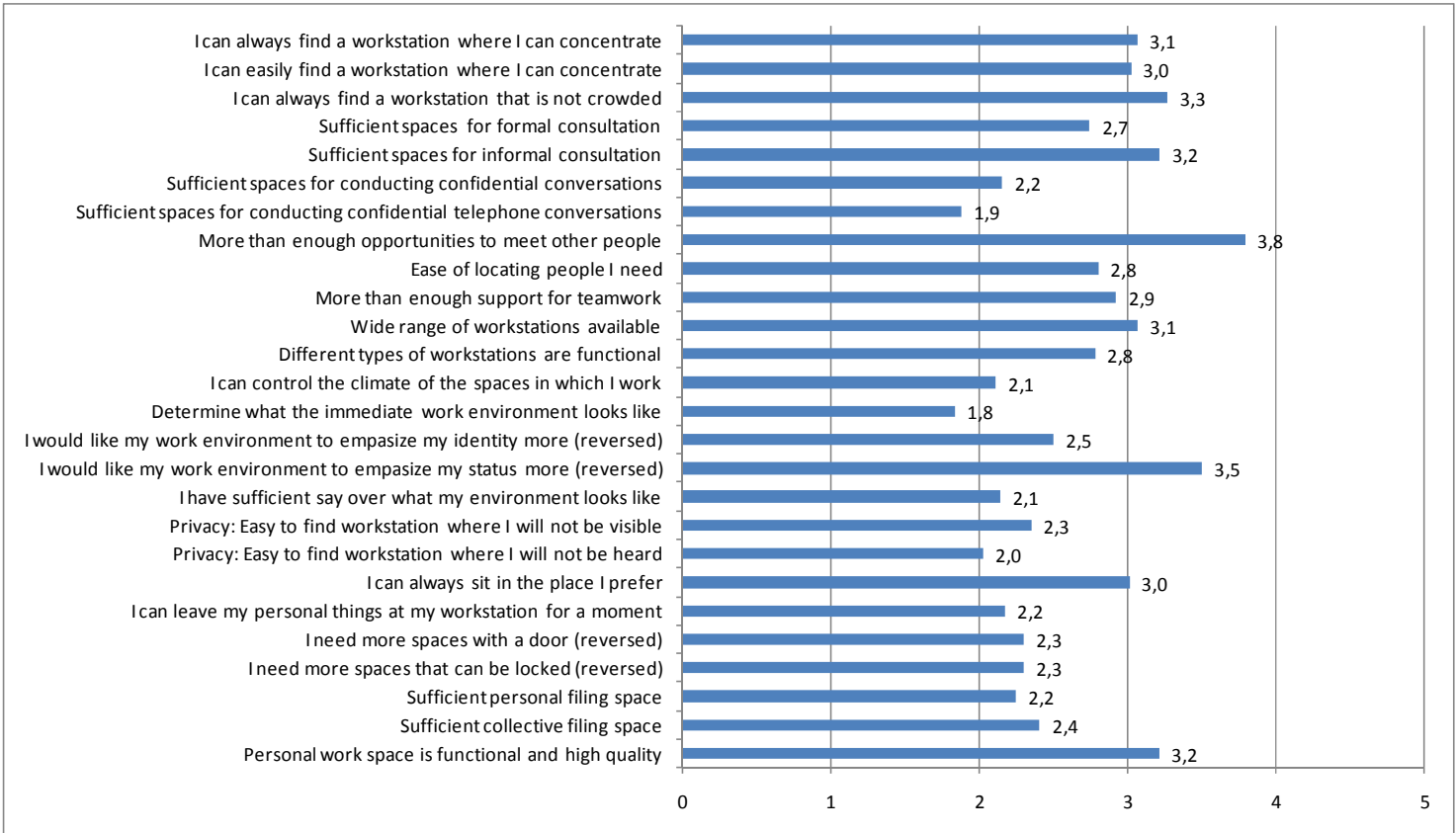
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Figure 2: Satisfaction with the working environment; N = 266 employees.



1 "very dissatisfied" to 7 "very satisfied"

Figure 3: Extent to which work places fulfill task and psychological requirements; N= 266 employees.

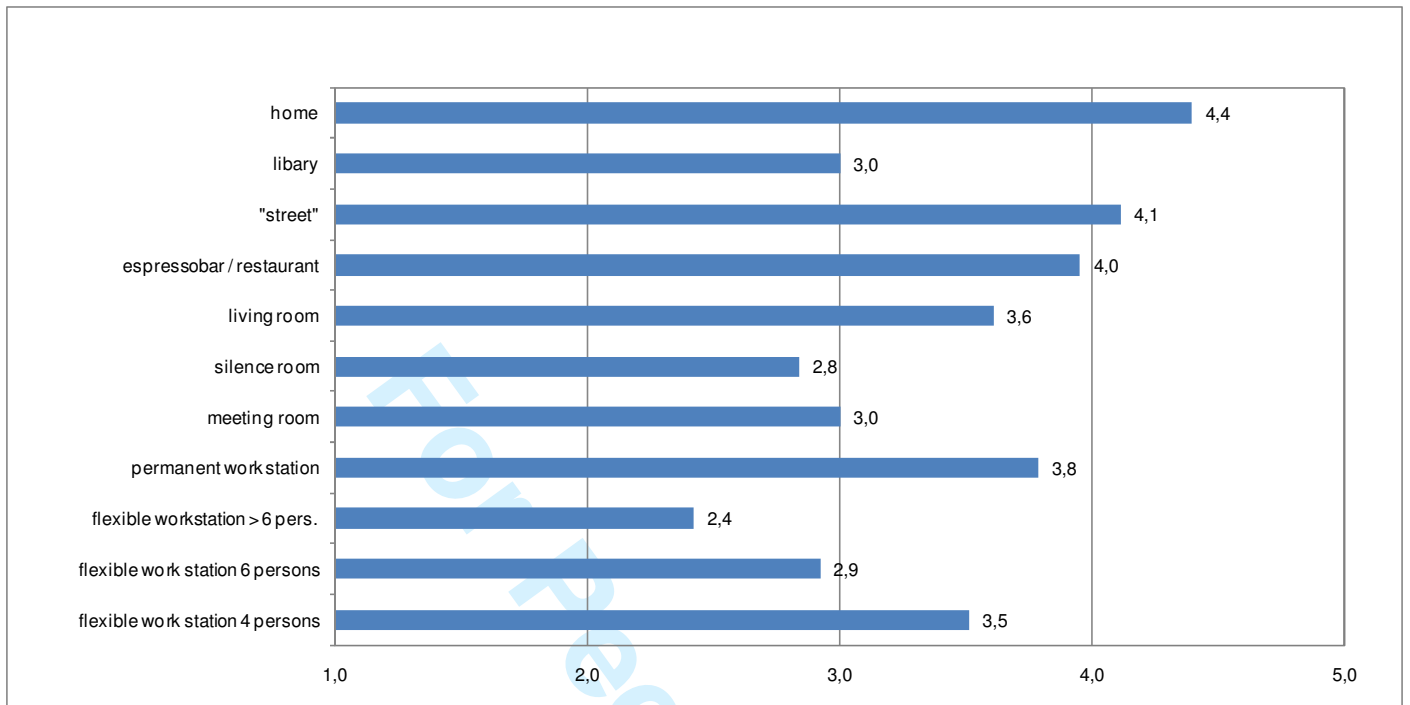


1 "totally disagree" to 5 "totally agree"

Review

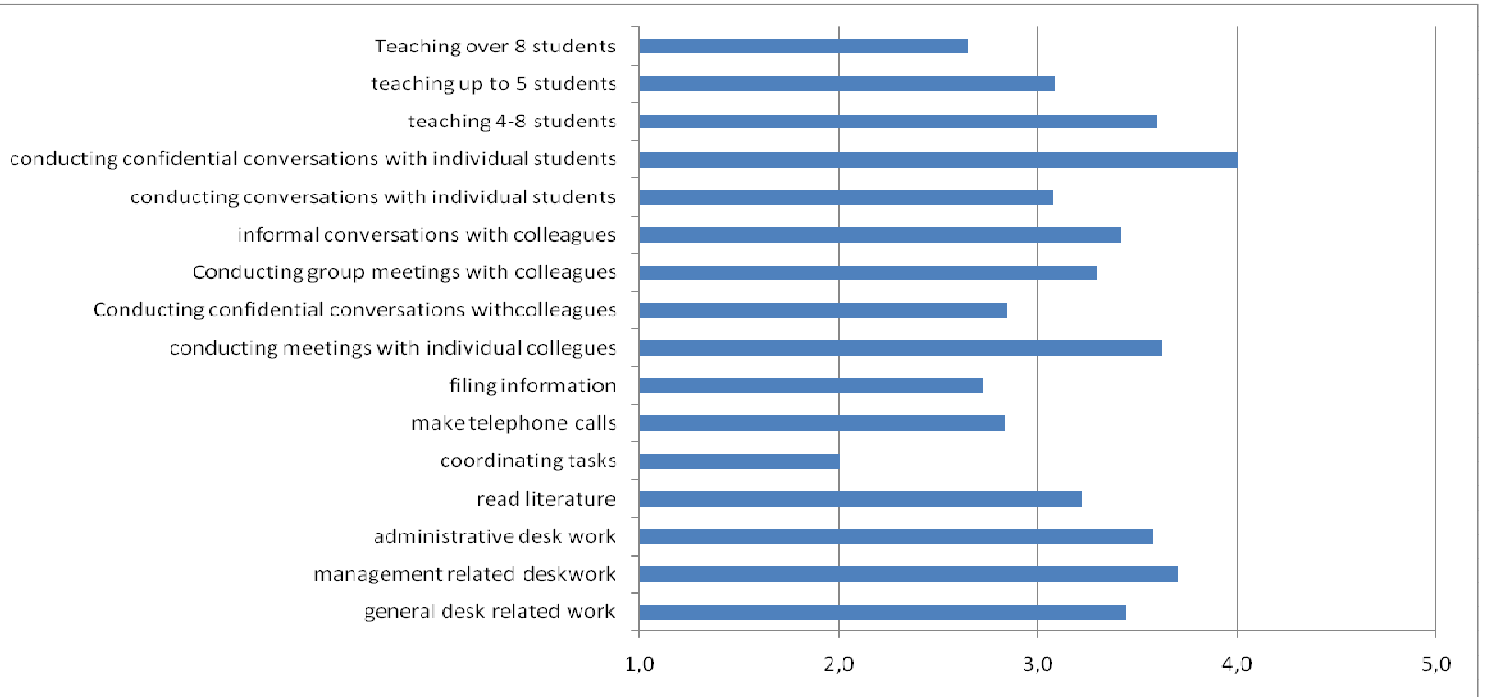
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Figure 4. Functionality of different types of workstations (83 employees, 175 diary entries)



1 "totally disagree" to 5 "totally agree"

Figure 5: Extent to which the work environment was experienced as functional per task.
Answers from 69 employees, on 554 tasks over 131 days.



1 "totally disagree" to 5 "totally agree"

Review

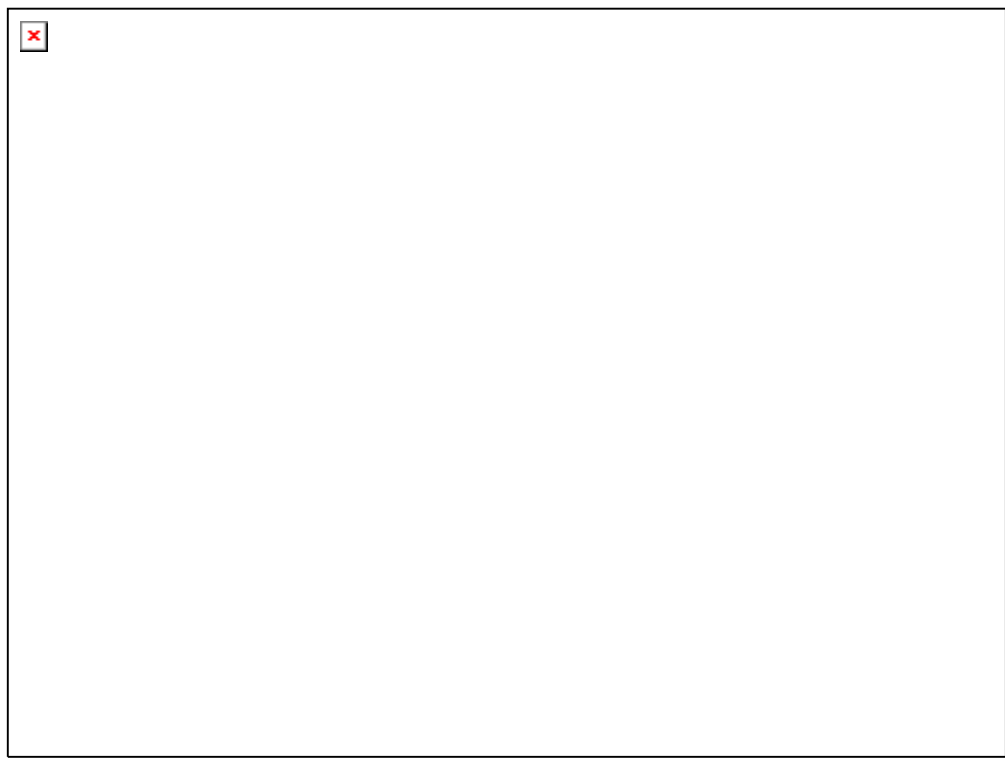
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



The Faculty of Architecture building being on fire
99x64mm (300 x 300 DPI)

Review

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



The Faculty of Architecture after the fire
99x75mm (300 x 300 DPI)

Review

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Open office with non assigned desks
99x75mm (360 x 360 DPI)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Workspace for students
99x75mm (300 x 300 DPI)

Review