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CCall—Healthy and Successful Work in Call Centres

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Call centre workplaces are in many ways a challenge to occupational health and safety. The occupation itself can be described as an information technology-supported, communication-intensive form of work with often unusual working hours and a high rate of part-time employment. Data on the employee turnover as well as absenteeism related to occupational disability is quite contradictory. Occupational safety and its proponents still have to find new ways into the corporate structures and cultures of this relatively new and rapidly growing branch of industry. In a 2-year research and development project, using a holistic approach and under consideration of all the relevant disciplines, call centre workplaces were studied, and organisational measures were developed and field tested by putting them into practice. Practical help was developed for a sustainable strategy for successful and healthy work in call centres.

call centre design of work indoor environment ergonomics stress work organisation guidelines of good practice workers with disabilities

1. INTRODUCTION

A new form of service company has been evolving rapidly since the second half of the 1980s. Call centres began to appear in conjunction with reorganisation efforts in companies and in public administration; their arrival altered internal and external communication processes. The basis for this change lay in the evolution of communication and information technology (IT) over this period. The organisation of labour in companies changed substantially, and call centre firms were established as independent enterprises. It is estimated that more than 100,000 call centres now exist worldwide. By some estimates, around 1% of everyone employed now works in a call centre in Europe, with the greatest call centre employment rates found in the United Kingdom and Ireland. The proportion in the USA is assumed to be around 3%. Obtaining reliable figures is problematic, because standard statistics have not as yet listed call centres separately.

Even if this growth trend has been slowed by the lagging economic growth rates at the beginning of the 21st century and by the technical development of electronic speech systems, call centres have become a significant factor in the economy and on the labour market.

The typical focus areas for call centres have been in the fields of serving, caring for, and acquiring customers. Call centre agents connect callers, record complaints, take orders for goods and services, conduct market research, and handle customer service. Service hotlines, insurance and banking services, as well as direct telephone sales are also among the duties of call centre agents [1].

The working conditions and the stress and strain experienced by the workforce in call centres differ largely from those among workers in traditional occupations in production and administration. Important characteristics include [2, 3]:

- Night work, shift work, flexible schedule planning, and a high rate of part-time work;
- Work in open-plan offices with a high level of background noise, a high rate of work in front of computer screens, often with a limited amount of space, too;
- High demand for mental concentration due to the simultaneous requirements to speak, listen, and look as well as to use fine motor skills;
- High levels of work concentration and performance monitoring;
- In part, high psychological and emotional loads from restricted telephone contact with often difficult customers;
- Vocal cords are under particular long-term strain ("speaking with a smile").

A series of studies have indicated the health effects of this strain on call centre workers. Yet effective strategies for producing sustainable improvements in call centre working conditions have so far been lacking. Realising these improvements was the aim of the project "CCall—successful and healthy work in call centres" conducted by the Berufsgenossenschaft (BG) for administrative occupations. Achieving this aim required the development of interdisciplinary design approaches for tackling pressing problems in call centres—and among their workers—and for solving those problems in practice.

The authors wish to thank everyone who contributed to the CCall Project for making the project into such a success through their efforts. Only a small number of these could be mentioned in the article and in its brief bibliography. We are particularly grateful to the initiator and sponsor of the project, the former German Ministry for Labour and Social Affairs (BMA). BMA passed the project's leadership role to the Verwaltungs-Berufsgenossenschaft (VBG), the institution for statutory accident insurance and prevention of the administration sector, responsible for most of the call centres, which was to ensure the close relationship to the project's practical nature, the implementation of the results, and the sustainability all within the framework of its legal obligations to promote prevention.

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2. CONCEPT, METHODOLOGY

An interdisciplinary approach including the disciplines of work environment and ergonomics, psychology, labour studies, economics, and occupational medicine was chosen to achieve the scientific and practical aims of the study. The specialist concept (Figure 1) assumed that the holistic approach—considering workplace tools and materials, the working environment, job organisation, and, above all, workers—would analyse the problems appropriately and create conditions for "good practices" via optimisation.

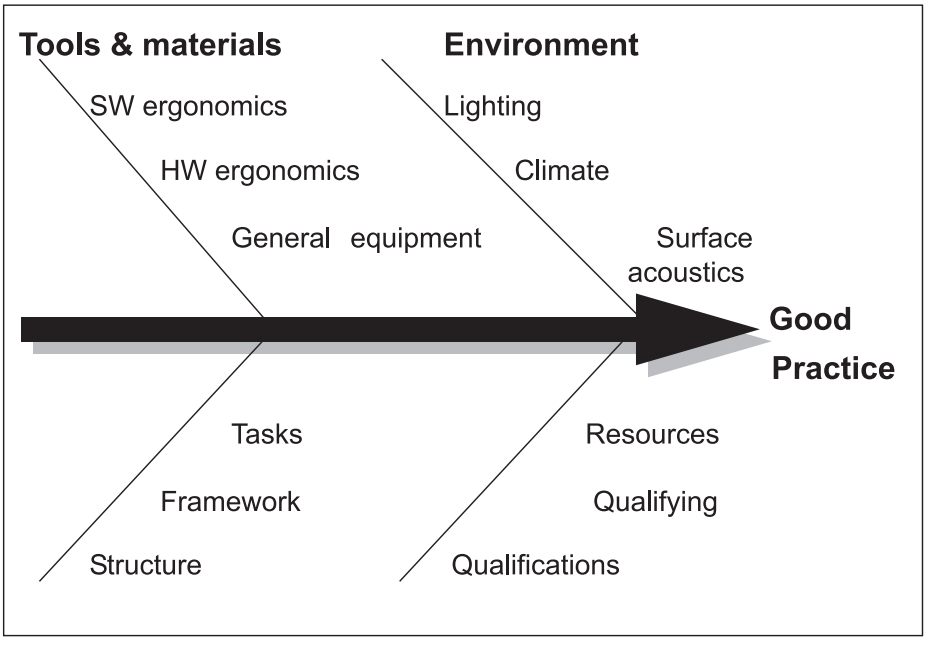

Figure 1. The concept behind the CCall Project. *Notes*. SW—software, HW—hardware.

The project was conceived as a learning project from the outset, and was implemented as such in practice, which meant that the results were constantly applied in practice, tested, and then optimised. These activities, although not entirely scientific in nature, were necessary for clearing the way for true improvement of working conditions in call centres using the fruits of the project.

3. RESULTS

3.1. Analysis of the Branch of Industry

An analysis of the call centre branch [1] gathered basic data on call centres in Germany: the number of firms, number of workers, size and regional distribution, range of tasks and duties, forms of organisation, age and gender structure of the staff, requirements for employee qualification, and an overview of the working conditions and occupational health risks. Because the call centre branch is not defined in official statistics, relevant data had to be collected from a number of publications and from surveys of the call centres themselves. The analysis was necessary so as to develop a representative strategy for the study and to provide design suggestions that would be applicable in the future for this fast-moving branch. The most important results applied to the employee structure, divided into two groups of in-house and service provider call centres. Considerable differences were found here reflecting the part-time working agreements, temporary employment arrangements, and the proportion of women employees. Figure 2 shows typical job requirements for call centre agents,

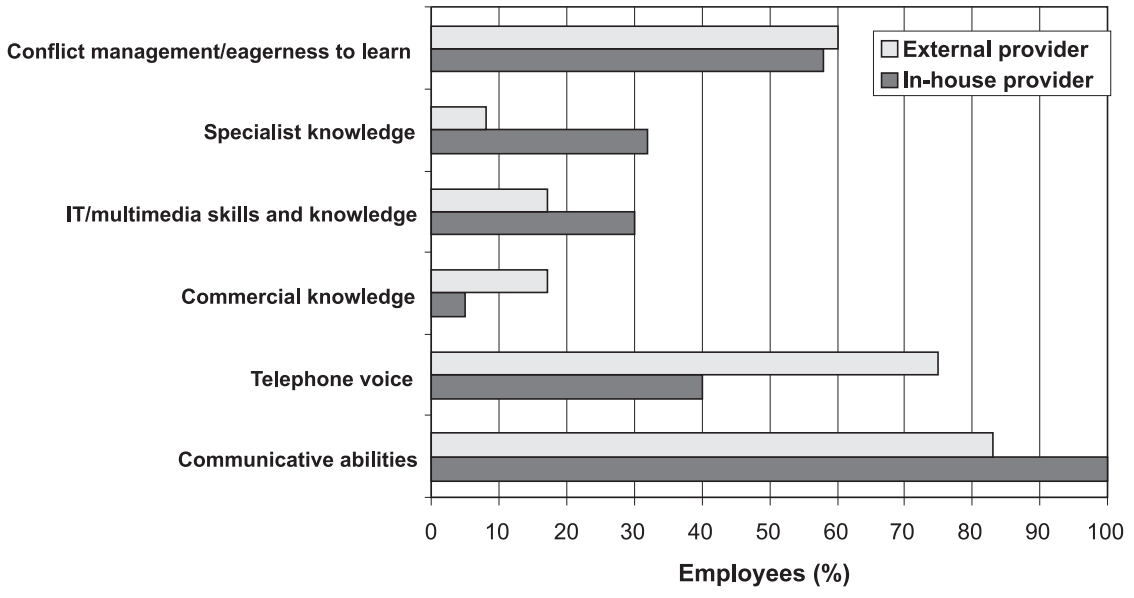

Figure 2. Employee qualifications for call centre agents (a survey of call centre managers, according to Dieckhoff et al. [1], p. 29). *Notes.* IT—information technology.

also categorised as either in-house call centres or external service providers (a survey of 12 call centres in Bremen, Germany). The overall profile is similar: a good telephone manner seems to play a special role among external service providers, whereas specialist knowledge is more in demand among in-house call centres.

3.2. Work Organisation

The project focused on the analyses of occupational psychology [4, 5]. The aim of the studies was to provide concrete suggestions for optimising the stress levels among the workers. The concept of optimising stress is based on the assumption that eliminating stress should not be the aim of prevention at work, because stress has both positive and negative effects on workers' health [6]. Interrelationships among people, organisation, and technology had to be considered. The employees' health and performance can only be maintained and supported significantly if a balance can be achieved between the requirements of the working environment and the competence of individual staff members. Table 1 shows the complex relationships between the problem hot spots in call centres—from the point of view of the staff members on the one hand, and the management on the other; in terms of the potential effects as well as the places where changes are possible. The principle points of departure are in the work organisation, the design of job responsibilities, and the design of the daily work schedule.

The following factors have been found to be relevant factors that result in the perception of inordinate strain and stress, and these go alongside the classic occupation science factors, such as room for manoeuvre within job tasks:

- Emotional strain on workers from direct customer communication,
- Social factors resulting from co-operation with others,
- Lack of supportive behaviour on the part of the supervisor,
- Perceived recognition for work performance.

It is not new that these factors influence the perception of strain and stress at work. What is new is the increase in the importance of these factors in service occupations. It appears that, aside from several fundamental factors, there are branch-specific influences (such as the proportion of telephony during the shift) whose importance is on the rise.

Six rules of thumb for effective work design in call centres were identified. They are focused on

TABLE 1. Problem Areas in Call Centres

Main Problem Areas in Call Centres

Discontented Customers	**Discontented Employees**	
Causes from the point of view of the management	Causes from the point of view of employees	
Problems Resulting From Orders	**Problems Resulting From Orders**	**Problems Resulting From the Work Environment**
• Non-achievement of the desired service level • Irregular work loads • Variable order situation • Qualification deficit due to rapid change of orders	• Performance and time pressure • Rapid information flow • Tiring tasks due to uniform job and task requirements • Limited scope for independent action and decisions • Limited financial and/or social recognition	• Poor working conditions (e.g., drafts, noise), poor work materials and tools • Lack of support among colleagues • Weak employee-oriented leadership behaviour
Possible Effects	**Possible Effects**	
• High absenteeism • High employee turnover • High overtime hours • Low employee commitment	• Perception of inordinate strain and stress • Reduced sense of health and well-being • Increased complaints of bodily aches and pains • Aversion and stressful response to customers • Burnout	
Scope for Change		
Work organisation	Design of job responsibilities	Work schedule design

Notes. Table taken from Baumgart et al. [5], p. 60.

the typical positive and negative factors of stress in call centres as mentioned earlier: emotional strain, social factors, lack of supportive behaviour, perceived recognition.

To reduce direct customer communication to an acceptable level, the following are necessary:

1. A telephoning rate of less than 60% of working time,
2. A regular system of short breaks of 5 min per hour of labour on average.

To enrich the job tasks for more satisfaction of the agents, e.g., by co-operative work with colleagues:

3. Well-designed conditions for completing the tasks (job requirements, room for manoeuvre in job tasks, optimised performance and time targets),
4. A switch between telephoning and clerical duties.

To support perceived recognition for work performance:

5. Inclusion of the agents in the definition of job tasks and processes, performance measurement and evaluation, and in devising the work schedule.

To strengthen the support by the supervisor:

6. Qualification and training for agents in specialist knowledge and in socio-communicative areas.

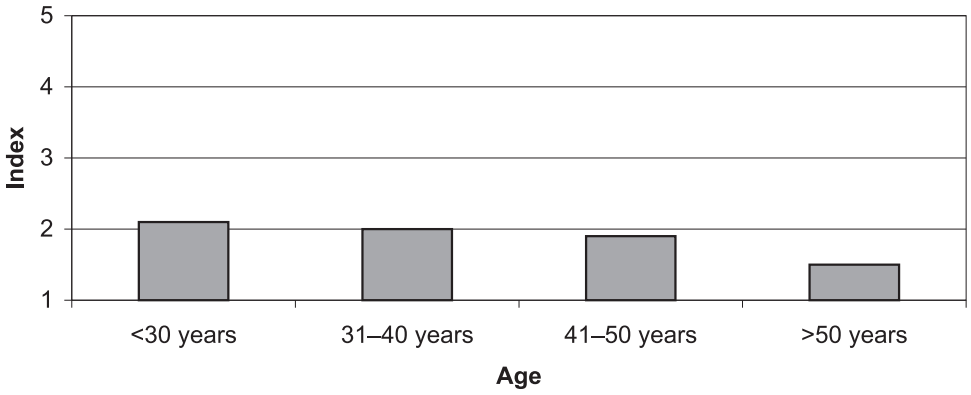

Figure 3. Age and psychosomatic stress (gastrointestinal complaints) at call centres. *Notes*. 1—*hardly ever*, 2—*about twice a year*, 3—*about twice a month*, 4—*three times a week*, 5—*almost daily*, (from Baumgart et al. [5], p. 73).

The method of prospective occupational design, which is applied during the planning phase for a new call centre, has proven to be particularly effective in the prevention of stress. This method was successfully applied for the first time at the call centre in the Stadtsparkasse bank in Hannover, Germany. The project was awarded a first prize by the European Agency for Safety and Health at Work during the European Stress Prevention Week in 2002.

Call centres are often considered to be typical workplaces for young people. Yet it was found that the, increasingly common, group of employees over 50 had the lowest values for stress. A series of similar findings here only shows the frequency of psychosomatic complaints as related to the employee's age (Figure 3). This provides important evidence for re-evaluating the suitability and the ability of older workers to cope with stress, particularly at IT-supported workplaces in the service sector.

3.3. Work Environment and Ergonomics

Key factors influencing the health of the work environment in call centres include [7] room acoustics, headset acoustics; indoor climate, especially humidity; air quality; lighting; ergonomics; and workplace geometry. Studies on these were conducted both in call centres and in the laboratory. The aim was to identify the most pressing problems and to develop practical solutions.

It was shown that good acoustic conditions, optimal humidity (>45% relative humidity) as well as regular ventilation (CO_2 content < 1000 ppm) make a decisive contribution to helping staff maintain their ability to concentrate. The arrangement of the workplaces plays an important role in the acoustics of the rooms. Star-pattern arrangements, for instance, can cause acoustic conflicts among the agents.

Ergonomic posture and joint movement recordings were carried out at 11 call centre workplaces and at five conventional office workplaces using the CUELA measuring

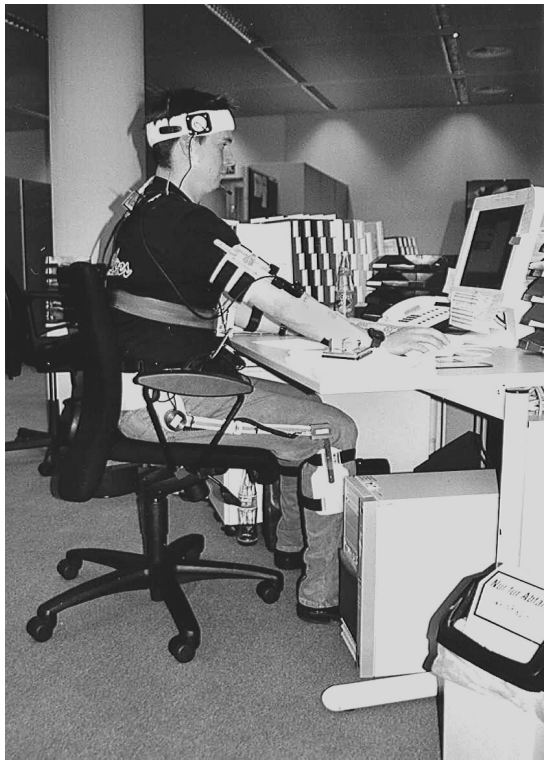

Figure 4. Application of the CUELA system at a call centre workplace.

TABLE 2. Measured Body Angles and Sensor Types Using the CUELA System

Joint/Body Region	Dimension	Sensor Type(s)
Head	Flexion/extension	Inclinometer
Elbow	Flexion/extension	Potentiometer
Cervical spine	Flexion/extension	Inclinometer, gyroscope
Trunk	Flexion/extension in lumbar spine and upper thoracic spine area; torsion, lateral flexion	Inclinometer, gyroscope
Pelvis	Inclination	Inclinometer
Hip joint	Flexion/extension	Potentiometer
Knee joint	Flexion/extension	Potentiometer

TABLE 3. Averaged Working Time Spent in Selected Postures/Body Angles Classified in Three Different Motion Ranges in Dependence of Working Time Spent on Telephony (%)

		Averaged Working Time Spent on Telephony		
Body Angle Classification	**Motion Range**	**0–40%**	**40–80%**	**>80%**
Trunk curvature (difference of cervical and lumbar spine flexion angle)	neutral, <20°	59	38	40
	medium, 20°–60°	41	62	59
	extreme, >60°	0	0	1
Cervical spine flexion angle	neutral, <20°	70	67	57
	medium, 20°–40°	25	26	34
	extreme, >40°	5	7	9
Pelvic inclination angle	neutral, >–15°	52	15	11
	medium, <–15° to >–30°	42	76	61
	extreme, <–30°	6	9	28

system, which is designed for long-term field measurements with a resolution of 50 Hz [8]. The CUELA system consists of inertial movement sensors, goniometers, and a miniature data logger that can be attached to the clothes (see Figure 4). In this study, a special version of the system adapted for sitting workplaces was used. Table 2 illustrates the measured body angles.

After measurements, the collected data can be displayed and analysed with custom-developed CUELA software. For body angle evaluation a classification with respect to the range of motion for each body region/joint angle was made in green (neutral), yellow (medium), and red (extreme). In Table 3 the mean results of three selected body angles are shown in dependence of the percentage of working time spent on telephony. It was found that with an increasing proportion of telephony on the job, the amount of extreme spine postures increased (see Table 3 and [7]).

Substantial improvements are possible by improving the work organisation and by optimisation of the workplace design and the arrangement of work tools and materials.

3.4. Occupational Medicine

A focal point in the studies in the field of occupational medicine lay in the stress on the vocal apparatus among call centre agents [9]. The voice is the most important tool for a call centre agent. In telephone communication, the voice is of greater importance because of the exclusion of other communication means (gestures, facial expression). Relationships between the occurrence of voice-related complaints or disorders and occupational stress and strain have been repeatedly verified scientifically [10, 11, 12]. People who work in speaking occupations are overrepresented in speech therapy clinics and

in therapists' practices. Table 4 shows the results of a self-assessment survey, conducted in the framework of the CCall Project, of the stress and strain factors among call centre agents taken from the medical histories of speech therapy practices.

A questionnaire with 16 questions (2 open questions, 14 with multiple choice answers) was sent out to 52 speech therapy clinics, selected through a prior telephone contact (whether they had already treated call centre agents) from a random sample of 180 clinics (of a total of about 1,600 in Germany). Twenty-nine speech therapists answered.

These results were obviously not representative in a statistical sense, but they gave a realistic figure of the perception of workload factors by call centre agents suffering from speech problems. Furthermore they were in good accordance with the findings of Vilkman [12] and Rantala et al. [10].

TABLE 4. Stress Factors Among Call Centre Agents (Survey Results)

Workload Factor	Reported Relevance (%)
Ambient sounds	20
Speech frequency	19
Voice-specific factors, including	18
use of voice	8
improper breathing technique	5
lack of voice awareness	3
smoking	2
Work pressure	14
Open-plan office	7
Psychological pressure	5
Body posture	5
Room climate	3
Wrong seating	3
Lack of breaks between calls	3
Telephone earpiece/headset	3

Notes. Table taken from Sportelli et al. [9], p. 60.

Diseases of the voice can have many causes, both individual and occupational in nature. According to the findings of Rantala et al. [10], Sihvo et al. [11], Vilkman [12], and own observations the following work-related causes and corrective measures could be identified for call centre agents:

- Room acoustics and indoor climate are the principle factors behind strain on the voice (see section 3.3.):
  - The air in many call centres is too dry, especially in the winter. This causes the mucous membranes to dry out, and can lead to a higher susceptibility to colds and flu. Humidity levels between 45 and 65% (higher than typical for office rooms) should be maintained. Agents should also drink a lot of liquids.
  - Speaking over background noise puts additional strain on the voice. Noise reduction measures can help here, but also training in clear and resonant speech.
- Using voice for long periods of time calls for a very conscious, professional use of the voice. Call centre agents should thus be offered voice training. Excessive speaking should be reduced, for example, by mixing varied tasks.
- Uneconomical speech leads to quick exhaustion and can result in excessive strain on the speech apparatus. Speech training can also help here.
- Colds and hoarseness should be taken seriously. If the strain on the voice are not reduced, long-term voice problems can result.
- In order to compensate for the lack of supporting communicative tools such as body language and facial expression, many agents speak with a voice and intonation that is unnatural to them. Done over a long period of time, functional disorders of the voice may occur. Call centres should thus aim to have the agents speak in their authentic voice patterns.
- Poor seating ergonomics leads to muscular tension which reduces abdominal breathing and thus complicates speech. Emphasis here should be placed on work tools, materials, and furniture that are in good working condition, and then on using these properly.
- The psychological and emotional strain indirectly influence the voice because of the effects of muscle tension on breathing. Employees should be given the chance to take short breaks after stressful conversations in order to recover normal breathing and vocal function.

- Smoking should not, of course, be permitted in call centres.

A special training programme for voice prevention was developed for employees in call centres and successfully tested at a call centre in Berlin, Germany [13].

3.5. Promoting Good Health

Friendliness, motivation, flexibility, and the ability to handle different customers and different customer inquiries are important requirements for the employees in call centres in particular. The maintenance and development of human resources is thus an important factor along with the use of suitable technology. Suitable preventive measures both related to the working conditions and to the behaviour of the call centre agents can help to avoid undesirable effects such as tension, feelings of sickness, fatigue, poor concentration, and reductions in performance. Measures related to the working conditions affect the design of workplaces and the work environment, work processes, information flow, the creation of a work-supporting office culture, and opportunities for employee involvement. Behaviour prevention should reduce behaviour that is a health hazard and should develop health-promoting abilities. Practical experience was gained by implementing health promotion in call centres [14]. Five steps can be recommended:

1. Identify problem areas, such as a high rate of absenteeism or social conflicts.
2. Create structures, such as a suitably composed project group for planning, accompanying, and coordinating necessary actions. Figure 5 shows a potential composition of such a group.
3. Analyse concrete problems.
4. Develop and implement the solutions.
5. Evaluate, improve, and regularise the measures.

3.6. A Practical Example

A drop in performance is registered at an in-house call centre; employees are increasingly dissatisfied with the work situation, and often feel tired and worn out.

- A project group, established by the management, consisting of representatives from the management, the agents, team leaders, and external and/or internal health and safety experts (see Figure 5), identifies—by reporting and discussion of experiences and

Figure 5. Possible composition of a project group.

observations—the potential causes for the described problems:

  - A lack of opportunities for employees to contribute to the design of their work,
  - Restrictive instructions,
  - A one-sided short-cycle task,
  - Excessive and confusing information,
  - Qualification deficits,
  - Poor lighting conditions,
  - Disruptive noise.

- The project group develops solutions to the problems with the aid of outside consultation:

  - A concept for a new workplace arrangement with partitions for reducing noise, along with windows for eye contact between employees;
  - The installation of additional lighting;
  - A concept for a new training workplace for training new staff members and for developing expertise;
  - Improvements in the exchange of information among specialised departments;
  - Enabling employees to change jobs across departments;
  - Creating a behaviour pattern for taking breaks (regularity, breaks for stretching and moving around);
  - Information for employees on healthy behaviour.

- The project group accompanies the implementation of its suggestions and monitors the changes, while ensuring the necessary optimisation and further regularisation.

3.7. Call Centre Agents With Disabilities

New forms of occupation in the fields of communication, IT, and services are often supported by a high degree of technology. This means that these occupations can offer quite suitable employment opportunities for people with disabilities under certain conditions. A representative survey for CCall in some 400 call centres with 60,000 workers in total found that fewer individuals with disabilities (at a rate of 2.1%) worked at call centres in Germany than is the overall employment average (at 3.9% in 2000). Yet 44% of the call centres interviewed employed people with disabilities. Of these, 48% had disabilities affecting the functions of their limbs, 2.4% had inner diseases, and 12% were visually impaired. Nearly 80% of the call centres reported *very good* and *good* experiences with employing the disabled (Table 5).

TABLE 5. Experience in Call Centres Employing the Disabled

Experiences With Disabled Persons in Call Centers	Reporting From Call Centres (%)
Very good	58
Good	20
Mixed	9
Poor	4
None	9

The project looked into the question of which disabled individuals would generally be suited to work at call centres, and which technical and organisational conditions needed to be created for such workplaces. A strategy was developed for convincing call centre managers to hire people with disabilities [15].

People with disabilities affecting locomotion are generally quite capable of working in call centres; the workplace, its direct surroundings, and the pathways to the workplace have to be made wheelchair accessible. Part-time employment can be sensible for people with chronic neurological diseases because of their ability to cope with psychological stress. People with disorders of the joints or chronic back disorders require workplaces designed in such a manner that bodily strain is kept at a minimum with the use of technical aids. These may include furnishings such as tables and chairs with adjustable height. Employing the visually impaired in call centres is also possible. Specially designed keyboards (with a so-called Braille row) and also enlarged computer monitors are available here [16].

Aside from the technical and organisational measures, training individuals with disabilities for their new roles in call centres is a key to their success. This means not only that they learn their new jobs and skills, but also that the job and the working conditions are adapted to

suit each person's possibilities. The strategy for convincing call centre managers to employ people with disabilities is based on winning them over through the use of examples. In this, the BG for administrative occupations, as the statutory accident insurer also responsible for rehabilitation, systematically supported and accompanied the integration of accident victims into regular call centre workplaces.

3.7. Sustainability of Prevention Measures

Specialised detail studies fall short of their aims if their results cannot be applied in practice effectively and sustainably. A practice-oriented and modular manual was designed as one way of achieving this [17]. The greatest problem areas in call centres are discussed in this booklet. On the basis of the analyses conducted in call centres, the largest concrete problems are identified from the standpoint of the employees and of the proprietors, and practice-oriented and proven solutions are presented. Table 6 shows a representative excerpt from the manual's "Work Environment and Ergonomics" module.

Another pillar of sustainability is the inclusion of the findings from the research project in the advisory offerings of prevention service providers, such as those of the institutions for statutory accident insurance and prevention for their respective industries.

4. DISCUSSION

Research and development in the subject of occupational health and safety does not end with the results in the more narrow sense; the actual criteria for the success of the project lie in the manner in which the results are applied in practice, and how they are further optimised once in use. The CCall Project, where the results presented in this article were obtained, also served as a model for how these were implemented. The following criteria for success were identified.

The project adapted itself to the dynamics of change at call centre workplaces. The studies in call centres were closely connected to the trials of the design measures from the very beginning. The study, design, testing, and optimisation of the working conditions formed an integrated, and not merely sequential, process. The participating call centres immediately had a taste of process's utility.

TABLE 6. Excerpt From the Manual's "Work Environment and Ergonomics" Module [16]

Room acoustics	
Problem	**Solution**
Echoes of sounds and noises reflected from hard walls, ceilings, windows, and floors, or a largely unimpeded transmission of noise can lead to a higher, more irritating overall noise level.	Noise-absorbing structures should be installed and noise absorbing materials should be used for ceilings, walls, and flooring.
Disruptive noise	
Problem	**Solution**
Noise from neighbouring or opposite workplaces lead to communication problems and restrict the employees' abilities to concentrate. Noise from computer cooling fans can also be quite disruptive.	Fitted noise screens or room dividers should be placed between the workplaces. In addition, office furniture (such as cabinets) can be used as noise shields. Special headsets reduce disruptive background noise. This noise often causes premature fatigue.
Headsets	
Problem	**Solution**
Poor speech transmission, poor office chairs (such as for those who wear eyeglasses) complicate correct use.	Employees should be involved in the selection of headsets. (See the headset selection aids at www.ccall.de.) A good fit is important. Models for both ears improve comprehension in conversation with customers.

Communication pathways were established from the beginning, including a hotline with the project's own call centre, so as to reach out to the entire branch, as broad as it was, and provide it with needed advice. The attention to real call centre problems helped the project reach the branch, sometimes by suggesting effective solutions that could be implemented immediately. This method helped the project actively to include a large number of call centres.

Project participants faced the hard rules of their industry, in particular the economic and competitive market conditions. This meant that in call centres with basic telephone tasks, such as providing information or taking orders, which thus had a large number of temporary part-time workers, room for design manoeuvre was limited. Yet there were still effective measures that could be applied at little cost, such as the introduction of a system of short breaks.

A broad approach under consideration of all the partial disciplines and with the inclusion of specialists from various institutions led to the eventual success. Information and results on the central themes of climate, acoustics, ergonomics, occupational psychology, occupational medicine, work organisation, health promotion, software ergonomics, economics, and qualifications were applied in selective and integrated design suggestions while keeping prioritisation in mind.

The project's name, CCall, was positioned as a brand of competence through the use of professional publicity work in the standard communication platforms in the call centre industry (leading publications, trade fairs, etc.). Sustainability is assured by the interplay of these various measures. The VBG accident insurer continues to build on the reputation it gained in the project as a competent partner for call centres by integrating the results and methods in its consultative offerings. The CCall brand name is maintained, and the website www.ccall.de is still updated regularly with the latest information.

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