EVALUATION OF WORK CONDITIONS IN A PUBLIC UNIVERSITY AND ITS RELATIONSHIP WITH THE ONSET OF OCCUPATIONAL DISEASES

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ABSTRACT

The present study had as the main objective to verify the work conditions in a public university of the State of São Paulo in respect to the materials and equipments, set of work and interpersonal relationships. The sample were 64 subjects distributed among 48 students, 8 teachers and 8 workers of the administrative section, shared equally with relationship to the sex. The researched university has been suffering reduction in number of workers, work overload, depreciation of the work conditions and consequently exhibition to risk situations for the academic community's health. The collected information indicated some obsolete furniture, discomfort in several body areas, standard inadequate postural favoring the appearance of occupational diseases. This way, there is need of attention and improvement of the work, re-engineering of work, planning organization positions and the creation of mechanisms of the workers' participation in the decisions about the real activity of work.

KEY WORDS: occupational diseases, work conditions, prevention.

INTRODUCTION

This study aims to investigate the working conditions in a public university of the State of São Paulo, which is facing a reduction

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of personnel both in the faculty as well as in the operational personnel. This fact has contributed to an increased load of work what implies in depreciation of the working condition, exposing workers to health risk situation.

According to Verdussem (1978) the adequate working environment will furnish to the worker satisfactory conditions regarding primary factors: temperature, light, noise, vibration, odors and colors, as well as secondary factors such as architecture, human relations, salary, stability and social support. However, relations among men and work, and its various modalities, are not harmonious all the time and can turn into a worsening factor or limiting and disabling condition. One example is mentioned by Oddone et al. (1986) according to whom that a significant number of workers, along the history of humankind, were victims of diseases, disabilities and death due to working conditions.

With industrialization and the resulting introduction of the Taylor/Ford models it has been seen the depreciation of the working and health condition of workers (IIDA, 1995; CARNEIRO, 1998; OLIVEIRA, 1998; ODDONE et al, 1986).

Such situation requires, from researchers and professionals of many areas, an effort to establish possible associations of pathologies and the working conditions aiming the prevention and promotion of workers' health (MENDES, 1995; CIDO, 1995)

Studies focused on the ergonomic issues have a close relation to biological and health sciences. The interface between these areas seems to indicate a path towards the joint solutions to the promotion of a working environment that favors the development of activities in a way that preserve health and productivity.

To Iida (1992), the idea of seeking an adaptation of artificial objects to the natural environment has been always present from the times of non-mechanic production since man has been transfoming tools and techniques for production. To him, some of the practical objectives of ergonomics are: safety, satisfaction and well being of workers in their relation with the productive system, being efficiency the result of this process.

The area of interest of ergonomics has been intensified in the last decades (MACIEL, 1995; IIDA, 1992) covering many aspects of work and its adequacy to the characteristics of the worker resulting in more comfort and reduction of health risks.

In what regards occupational disease, due to its complexity and multicausality, Maciel (1995) stresses the need for a participative ergonomy in which the analysis of work and the solutions take into consideration the participation of all involved in the process.

The author stresses also that, among the advantages of this approach, it is the involvement of workers in the identification and construction of alternatives, a factor that acts as an attenuator in the resistance against changes and favors its awareness.

Aiming to obtain further information on the relation between the working conditions and health the present study tried to identify, from the perception of a group of workers (staff and faculty members) and students, the presence of risk factors related materials, equipments, working environment and interpersonal relation.

METHOD

The samples included 3 groups, (a) 48 under graduate students; (b) 8 faculty members; and (c) 8 staff members of the university, totaling 64 individuals reflecting different areas of knowledge (such as exact sciences, biologic sciences and human sciences), which were equally distributed by sex.

Data collection was done through a questionnaire (ANNEX 1) containing 14 questions, being 14 open and 4 closed. Questions were related to a variety of subjects: (a) working conditions; (b) health conditions; (c) interpersonal relationship; (d) suggestions to improve working and relationship conditions. Before data collection it was done a pilot study with 6 individuals to test the questionnaire as well as to proceed with necessary adjustments.

Data collection was done as follows: (a) randomized selection of individuals to participate in the study; (b) the analyzed individuals were invited by personal contact in the university campus and the objective of the study was explained, as well as the request to participate; (c) the data collection was done just after the invitation and agreement or was scheduled for a later date at the convenience of the participant.

The closed questions were categorized and quantitatively analyzed and the information from open questions was qualitatively analyzed out of the categorization of the contents of their discourse. Later on, data was organized in tables and figures.

RESULTS AND DISCUSSION

Description of results is grouped in categories and subcategories according to the instrument of data collection. Information

is presented in comparati ve terms among the studied g roups as follows:

a) Activities developed by each category;
b) activities causing greater physical fatigue;
c) activities causing greater mental fatigue;
d) main areas for body discomfort;
e) characteristics of materials and equipments;
f) working environment and
g) interpersonal relations.

ACTIVITIES DEVELOPED BY EACH CATEGORY

Main activities carried out by students are:

a) academic life (attending lectures, reading, typing on the computer) 70%;
b) physical conditioning activities (walking, soccer, gym activities, swimming, tennis, etc) 20%;
c) moneyed activities (scholarships for scientif ic initiation, scholarships for acti vities or class assistants) 7%. It w as expected a majority of academic acti vities (70%) since most of the courses in the Univ ersity are full time and, thus, students allot many hours every week for this purpose.

Main activities carried out by w orkers are:

a) using computer (typing texts, letters, proceedings, etc) 33%;
b) counter activities (attending professors, students, other staff members, phone calls) 24%;
c) mail delivery 14%;
d) physical conditioning activities (sports practices) 5%; and
e) household activities 5%. Re garding staff member, activities involving computer are predominant although counter activities are also signif icant and in volves alteration of posture.

Main activities by faculty member s are:

a) academic life (preparing and gi ving classes, conferences) 50%;
b) research 15%;
c) bureaucratic activities 11%;

d) physical conditioning activities (jogging, running, etc) 5% and

e) household activities 5%. Activities for faculty members are quite diversified, that is, include seating, standing and walking postures. Academic activities are predominant (50%) with some similarity to the g roup students. Research and bureaucratic activities are less relevant. If research is included as academic activities, results become closer to that for students, respectively 70% and 65%.

Most activities carried out by the studied categories are in the seating position, which has some advantage regarding the other activities since there is some possibility of rest included in it. Ho wever, it is impor tant to note that such posture has some adv antage only if fur niture and equipments are adequate and does not of fer health risks to users (GIL COURY, 1995).

B
ACTIVITIES ENHANCING PHYSICAL FATIGUE

Activities causing higher physical fatigue were also investigated in the three categories. Academic activities were found to be the cause that induces higher fatigue among students and faculty members. For staff, computer activities arise as the main cause of fatigue. This sort of activity seem to be the liaison betw een staff members and faculty members and students since such activity is implicit in the preparation classes, conferences and research activities, although this activity is not objectively mentioned by faculty members.

C
ACTIVITIES PRODUCING HIGHEST LEVEL MENTAL FATIGUE

Similarly to the above, results indicate that academic activities are the main cause for physical stress in students and faculty members. As for staff, the main causes are computer works and public attendance. Once more, computer works are common to both categories. Thus, it can be said that there is similarity in causes that lead to great mental and physical stress among the studied categories.

D
Main areas for body discomfort

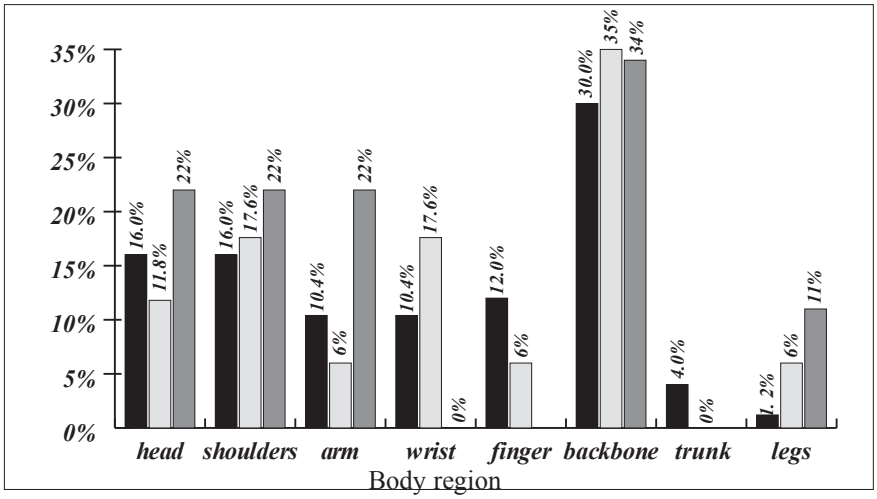

FIGURA 1 - Body regions presenting disconfort.

Keeping in mind the proportion of number of participants in each category it is possible to stress that backbone discomfort is predominant (30% of students, 35% of staff members and 34% of faculty members). Another predominant region for discomfort is the head (16% of students; circa 12% of staff members and 11% of faculty members) although shoulders and wrist show significant numbers in the three studied categories (FIGURE 1). In general, it is possible to associate the discomfort expressed by individuals to the type of activity, characteristic of materials, equipments and furniture (chair, table, computer, etc.), as reported in item E below in which these items were evaluated in terms of suitability and comfort.

E
Characteristics of materials and equipments (desks, chairs and computers)

The quality and suitability of equipments and furniture used by participants in this study were investigated. Main results are as follows:

Desk/position of monitor

Data indicate that desks were adequate for most students (72%) that reported a high level of acceptance for the position of

monitors (83.3%). Among staff member desks are adequate for (72%) as well as in what concerns the position of computer monitor (72%). Among faculty members desk were considered adequate by 75% and the position of the monitor by 62.5%. One should remember that disajustment among the position of the monitor; the height of the desk and anthropometrics measures may induce harmful and uncomfortable postures.

A low desk, the height of the monitor and reading angle while typing are conditions that lead to incorrect position of the neck. Although most of participants consider the desk and the position of the monitor as adequate it should be stressed that symptoms in the head and backbone (cervical region) are among the regions mostly reported as uncomfortable by all studied categories, which may be due to an inadequate relation of desk/monitor height. However, adjustable chairs can compensate for minor differences in height.

Chair

Among students chairs were considered as adequated by 50%. Among staff members chairs were approved by as many as 71.4%. Conversely, among faculty member chairs were considered adequate by only 25%.

In what concerns comfort, 65% of students and 62.5% of faculty members said chairs were uncomfortable. However, for most staff members chairs were considered as comfortable (83.3%).

Some characteristics associated to comfort, such the possibility of adjustment, which allows better postural comfort and favors fitness to anthropometrics patterns of the user seldom appear. In this regard, adjustment is only present in 12.55 of chairs used by students, 14.3% of chairs used by staff members and 62.5% of chairs used by faculty members.

Usually, the greater the possibility to adjust equipment, the greater the chance to obtain a posture complying with the anthropometrics pattern of the user (GRANDJEAN, 1997).

Arm support, which decrease shoulder girdle overload during activities, is rare. Students detect such characteristic in only 20%, staff members in 14% and faculty members in 37.5%. Complains of shoulder (16% among students, 17% among staff members and 22% among faculty members) and arm discomfort (10% among students, 6% among staff members and 22% among faculty members) may be associated to the lack of arm support due to the massive use of computers by the studied categories. Keeping shoulders

for a long time in the same position result in pain due to the contraction of muscles, and may lead to inflammatory processes (tendonitis, bursitis) and ultimately leading to compromise of the joint and ligaments (ASSUNÇÃO, ROCHA, 1993; PUTZ-ANDERSON, 1992; GIL COURY, 1995).

Another factor to be stressed is the low number of revolving chairs. This sort of chair may prevent sudden rotational movements of the trunk, which can cause repercussion in the backbone. Only 16.7% of students, 89% of staff members and 50% of faculty members use such chairs and this has a direct connection with the high index of backbone discomfort reported by participants of this study.

In the same way the lack of wrist support may cause inadequate positioning leading to deviations (upper/down or lateral) and friction among tendons, ligaments and bone structures. Such positioning, if associated to repetitive movement, may cause tenosinovities (GIL COURY, 1995; ARMASTRONG et al., 1987; HOPPENFELD, 1999). The wrist support, which allows its stabilization and prevents occupational disease, is a simple appliance that could be easily adopted. Among participants 15% of students, 16.7% of staff workers and 12,5% of faculty members used the support. Out of the participants, 10% of students and 17.6% of workers reported wrist discomfort. Monitor protection screen, which aims to protect vision against light reflexes and helps in alleviate visual effort, was not used by any of the individuals in the three categories.

Some characteristics of the furniture are different in the three categories involved in the study, although data suggest a better quality of materials and equipments for staff workers than those made available to students and faculty members. The position in the University seems to influence the quality of furniture. In fact, employees have furniture with some items of comfort such as lumbar support, spinning and adjustable chairs. Indeed, the classification of chairs as "comfortable" and "adequate" were higher (62.5%) among them. In the case of students, which have a transitory relation to the University, they face some less comfortable conditions to their activities. In fact, the comfort characteristics are not present in the chairs and tables they use. Main complaints are: uncomfortable chairs, insufficient number of chairs in the computer laboratory, student's desks being used as chairs in the laboratory, chair disproportional to the height of user, damaged chairs, too much low or high chairs, tables being used as computer desks, limited working space on the tables, etc. Most of these characteristics are referred as interfering in the class performance and knowledge gain. Faculty members complain of archaic furniture with low index of comfort and

inadequate use. One of the members has stated that: " *They haven't changed my chair since I started working here*". The amazing thing is that this teacher has been working in the University for 20 years.

The adequate characteristics of furniture and equipment play an important role in the prevention of occupational disease, mainly posture problem, tendonitis and tendosinovitis, backbone problems, among others, which are corroborated by the regions of discomfort referred in FIGURE 1.

F
Working environment (temprerature, ventilation, lighting and space)

The data obtained suggest that the majority of participants considered the working environment as adequate (students - 60%, faculty members - 62% and staff members - 43%). As can be seen, only among staff members there was a high rating for non-adequate environment (57%). However, the classification of the working environment as adequate does not exclude some problems such as: need for better lighting according to the type of activity, maintenance of luminary and replacement of burned bulbs, AC, ventilators, improved roofing, arborization, greater number of windows to improve ventilation, etc. In what concerns the space it is, many times, considered as limited, with bad planned departments and with an excess of division walls, which leads to a warm, stuffy, poorly ventilated and noisy ambient. Some of the suggestions refer to construction of brick walls in lieu of wood-division walls and allocation of individual rooms.

G
Interpersonal relationship

The quality of the interpersonal relationship was also addressed in this study in what regards the relations among working colleagues and relations with chiefs. Data reveal that relationship among coworkers is adequate (good – 67% among students, 29% among staff members and 74% among faculty members; excellent – 27%, 57% and 13% respectively). Although data are quite positive there is a strong incidence of psychosocial symptoms, which, most of the time, are connected to the interpersonal relationship

TABLE 1 - Psychosocial symptom, referred by participants

Symptoms	Student	Staff members	Faculty members
Enragement	66%	37%	25%
Difficulty/lack of concentration	48%	---	25%
Memory (forgetfulness)	43%	12.5%	25%
Dispay	58%	---	---
Excess appetite	27%	12.5%	---
Fear/apprehension	23%	---	---
Increase in the desire to smoke	18%	---	12.5%
Sadness without a clear reason	37%	---	---
Lack of social contact	17%	12.5%	12.5%
Insonnia	23%	25%	25%

Some of the referred symptoms suggest the university environment favors or determines stress level among students, staff or faculty. In this connection, it is important to understand the meaning of stress and the stressing factors. Among the factors it can be cited: personal characteristics, excess of work, nature of function, difficulty to say no or to establish limits, sense of excessive obligation, huge ambition, unbalanced nutrition, sedentary life, lack of or little leisure (FRANÇA, RODRIGUES, 1996).

Among symptoms referred by individuals affected by stress it can be cited: irritability (reported by 66.7% of students, 43% of staff members and 25% of faculty members), low self-esteem, anxiety, depression, lack of concentration (48% of students, 25% of faculty members), memory problems (43% of students, 12.5% of staff members and 25% of faculty members), increase in cardiac frequency, paleness, muscular tension, sleeping alterations (sleeplessness: 23% of students, 25% of staff members and 25% of faculty members), sexual dysfunctions, nutritional dysfunctions (excess or lack of appetite: 27% of students and 12.5% of staff members), etc.

CONCLUDING REMARKS

This study aimed to seek indicatives on the working condition in a public university in the State of São Paulo by interviewing students, staff and faculty, totaling at least 1% of each category as participants. Therefore, the study does not intend to present its conclusion as undisputable truth. However, data obtained and its analysis can be taken as an important step to the understanding of the working condition in the university.

Data reveal that there is need for a g reater investment and attention to the issues related to the w orking conditions and, thus, in the quality of life in the academic community . Indeed, it was identified obsolete materials and equipments, signif icant presence of discomfort in many body regions, which may be related to the activities and to the fur niture that leads to inadequate postural patter ns and damaging to health. The way in which the work is organized is another factor to be addressed since the continuous reduction of staff members has resulted in an o verload of work in many sectors of the university, favoring the onset of health and inter personal relation problems.

It is recognized that occupational diseases have an accumulative effect. In this w ay it is necessar y to pay attention to signs and symptoms that ma y arise, in vestigate its causes, inter vene in the working place, reformulate the working organization, create mechanisms to guarantee the par ticipation of emplo yees in the decision process in what concerns the working place in order to prevent from becoming a starter for occupational diseases. To act preventively is a way to avoid a future unmanageable situation.

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BIBLIOGRAPHIC REFERENCES

1. ARMSTRONG et al. Ergonomics considerations in hand and wrist tendinits. *The Journal of Hand Suegery*, 12A (5), parte 2, p. 830-837, 1987.
2. ASSUNÇÃO, A.; ROCHA, L. E. Agora ... até namorar fica difícil: uma história de lesões por esforços repetiti vos. In: BUSCHINELLI, J. T.; ROCHA, L. E.; RIGO TTO, R. N. *Isto é tr abalho de g ente?* Rio de Janeiro: Vozes, 1993. p. 460-493.
3. CARNEIRO, C. R. Perfil Social da LER. In: OLIVEIRA, C. R. et al *Manual prático de LER – Lesões por esf orços repetitivos*. 2. ed. Belo Horizonte: Health, 1998. p. 65 - 95.
4. CODO, W. Providências na or ganização do trabalho para a pre venção da LER. In: CODO, W.; ALMEIDA, M. C. C. G. (Orgs.) *L.E.R. - Lesões por Esforços Repetitivos*. Petrópolis: Vozes, 1995.
5. FRANÇA, C. L.; RODRIGUES, A. L. *Stress e Trabalho – Guia básico com abordagem psicossomática.* São Paulo: Atlas, 1996.

6. GIL COURY, H. J. *Trabalhando sentado: manual para posturas confortáveis*. 2. ed. São Carlos: EDUFSCar, 1995.

7. GRANDJEAN, E. *Manual de Ergonomia: Adaptando o trabalho ao homem*. Porto Alegre: Bookman, 1997.

8. HOPPENFELD, S. *Propedêutica Ortopédica: coluna e extr emidades*. São Paulo: Atheneu, 1999.

9. IIDA, I. *Ergonomia - Projeto e Produção*. São Paulo: Edgard Blücher, 1992.

10. MACIEL, R. H. Er gonomia e lesões por esforços repetiti vos (LER). In: CODO, W.; ALMEIDA, M. C. C. G. (Orgs.) *L.E.R. - Lesões por Esforços Repetitivos*. Petrópolis: Vozes, 1995. p. 163 -201.

11. MENDES, R. Detecção dos Agravos à Saúde Relacionados com o Trabalho. In: MENDES, R. (Or g.) *Patologia do Trabalho*. Belo Horizonte: Atheneu, 1995. p. 49-58.

12. ODDONE et al. *Ambiente de trabalho - A luta dos trabalhadores pela saúde*. São Paulo: Hucitec, 1986.

13. OLIVEIRA, C. R. et al. *Manual prático de LER – Lesões por esforços repetitivos*. 2. ed. Belo Horizonte: Health, 1998.

14. PUTZ-ANDERSON, V. *Cumulative Trauma Disordes: a manual for musculoskeletal diseases of the upper limbs*. London: Taylor & Francis, 1992.

15. VERDUSSEM, R. *Ergonomia - A racionalização humanizada do tr abalho*. Rio de Janeiro: Livros Técnicos e Científicos S/A, 1978.

SILVA, Nilson Rogério da; TOYODA, Cristina Yoshie.

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QUESTIONNAIRE

PERSONAL DATA:

Name:_____ Age:_____

School: ( ) ninth grade complete ( ) ninth grade incomplete
( ) high school complete ( ) high school incomplete
( ) complete graduation ( ) incomplete graduation

Marital status : _____ Profession: _____

Time in the function : _____ Previous occupation: _____

1 - Have you or have you had any health problem? ( ) Yes ( ) No
If Yes, which?

_____

_____

2 - Which are the activities you commonly perform in your work?

Daily activities	Period in hours	Position			
		seated	standing	walking	crouched

3 - Among your activities, which one causes gives you more physical fatigue?

_____

_____

4 - Among your activities, which one let you upset and nervous?

_____

_____

_____

5 - Are you presenting any sort of discomfort or uneasiness?

Body region	weight	twinkling	Pricking	Burning sensation	Permanent pain	Pulsating pain	Pain comes and goes	During work time	After working time
Head									
Right shoulder									
Left shoulder									
Right arm.									
Left arm.									
Right wrist									
Left wrist									
Right thumb									
Left thumb									
Right index									
Left index									
Right middle									
Left middle									
Upper backbone									
Low backbone									
Trunk									

6 – Which activities were you undergoing when discomfort appeared?

_____

_____

7 - Have you experienced overall fatigue? ( ) Yes ( ) No
If yes, during which activities?

_____

_____

8 - Have you lack of body motor coordination (drop object, bump furniture, etc).
( ) Yes ( ) No
If Yes, in which situation?

_____

_____

9 - Does your working place have:

Physical aspects:

Lighting: it is, most of the time: ( ) Natural ( ) Artificial
Temperature: it is, most of the time: ( ) Natural ( ) Artificial
Ventilation: it is, most of the time: ( ) Natural ( ) Artificial
Physical space in square meters _____
How do you evaluate your working place:
( ) adequate ( ) inadequate? Why?_____

_____

_____

Materials and equipments:

Table:

Material	( ) wood	( ) Formica©	( ) steel	( ) veneer
Mobility	( ) Mobile	( ) Fixed		
height	( ) Adequate	( ) too high	( ) too low	
working space	( ) Adequate	( ) Limited		

Chairs:

Feet support	( ) yes	( ) No	
Arm support	( ) yes	( ) No	
Lumbar support	( ) yes	( ) No	
Comfortable	( ) yes	( ) No	
Spinning	( ) yes	( ) No	
Adjustable	( ) yes	( ) No	
Material	( ) wood	( ) regular foam	( ) PVC (plastic)
	( ) extruded foam (like in automobile seats)		

Computer:

Adequate desk	( ) yes	( ) No
Adequate chair	( ) yes	( ) No
Height of the monitor	( ) yes	( ) No
Sight protector or protective glasses	( ) yes	( ) No
Adequate height of mouse and keyboard	( ) yes	( ) No
Support to forearm, wrist and fingers	( ) yes	( ) No

How do you evaluate your equipments and materials ( ) adequate ( ) inadequate?
Why? _____

_____

10 – Have you resting period? ( ) Yes ( ) No
What is the duration (in minutes)_____
After how many time of work? _____

11 – Have you any of the below mentioned symptoms:

( ) irritation or impatient ness	( ) insomnia
( ) diminished sexual pleasure	( ) difficulty or lack of concentration
( ) memory (oblivion)	( ) sadness without apparent cause
( ) discouragement/lack of motivation	( ) lack of appetite
( ) excess of appetite	( ) lack of social contact
( ) fear/lack of assurance	( ) low self-esteem
( ) increase in the will to smok e	( ) increase in the desire to take alcoholic beverages

12 - How do you evaluate our relations with your working mattes? Why?

13 - How do you evaluate you relationship with your boos? Why?

14 - Which modification would you suggest in your work?

a) Regarding the working place: (lighthing, temperature, ventilation, etc). Why?

b) Regarding working organization: (pauses, working journey, physical space, layout, etc). Why?

c) Regarding materials and equipments: (desk, chair, etc.). Why?

d) Regarding interpersonal relations: (with working mattes, with your boss, communication in the work, liberty of expression, etc). Why?