

## **Stress proofing in a media convergent work environment Interim project report**

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*This paper is structured around an ongoing organisational development project within the BBC, involving the technological change process with the convergence of media and the effect on the work organisation, job and task design and employees health and well-being. The focus of the project is particularly on mental and physical stresses with the aim of ensuring continuous development of a happy, healthy, comfortable and inspiring work environment in line with the overall business requirements. A participative, practitioner based approach will be used, where focus is on identifying current relevant knowledge for the successful application into the work organisational design with pre and post implementation measurements to evaluate effectiveness. The project inter-links with a previous MSc research project by the author, supervised by Dr C Haslegrave at Nottingham University (Haegeland, 1999)*

### **1. Introduction.**

As a National Public and World Wide Commercial Broadcaster and News Organisation, the BBC is in the middle of convergent of the communication media.

This project is designed to address relevant issues of physical and mental stresses related to the introduction of new technologies and the consequent new ways of working. The intention is to actively identify and potentially apply current relevant knowledge and research findings, initially into the set-up of a new BBC Regional Centre as well as developing recommendations for a broader application within the corporation.

The physical stresses related to the risk of Work Related Upper Limb Disorders were assessed and analysed in a previous project (Haegeland, 1999). The current project will therefore in particular focus on occupational stress and well-being.

For the assessment of the effect of the implemented recommendations, critical success factors are being specified and a programme of monitoring and review will be used for evaluation.

### **2. Media convergence and technological change**

The concept of "media convergence" is described by the development of digital, binary coding of data and improvements in data compression techniques, allowing an amalgamation of telecommunication, audio and visual broadcasting and computer

technology. Subsequently production, manipulation and transmission can be done within the same format. (Chignell et.al., 1997:1810).

#### **2.1 Current changes in the broadcasting industry**

From the introduction of teletext in the 70's to now digital, interactive, on-line broadcasting of not only text but also audio and visual images, new media products have been developed and an explosion in broadcasting companies and channels can be seen (Evans, 1995:78; Jones et.al., 1999:1). This increased competition has fuelled intense developments of new media formats such as internet services and interactive, digital television with programmes on demand. Increased competition has boosted the requirement for increased programme content and innovative re-use of existing content.

## 2.2 Effect on the work organisation

With the use of multimedia and desktop computer systems bringing all available information onto the operators desktop, an increasing part of pre-programme research and planning, audio and video editing and publishing or transmitting can be done from the same workstation and by the same operator.

Job and task content, as well as the operational structure and methods used to achieve job and task goals is changing. Changes in efficiency and productivity requirements have led to wide scale multiskilling, job enlargement and enrichment, partly enabled by new technology.

To ensure cost-benefit of the opportunities new technology brings, there is a strong pressure on implementing new ways of working as well as finding new contextual arrangements for the work processes. These are covered under concepts such as learning organisation, hot-desking, home-working and teleworking, video conferencing and cyberspace meetings, browser bars and touch-down work stations and continuous availability through mobile and portable electronic communication and flexible, innovative job arrangements. (HSE 259/2000).

## 2.3 Human Factors imperative for financial success

The main motivator for new technology often originates within a economic, marketing or technical framework related to projected benefits such as productivity increases, cost reductions, space savings, marketing and competition improvements. However, for the UK it is stated that 80-90 % of investments in new technology fails to meet all of their objectives mainly due to lack of recognition of the human factors involved. (Waterson, 1999; McLoughlin et.al.; Clark, 1994; Baker et.al., 1998). The technology itself can never be better than its human inventor and manufacturer and the success of its utilisation depends on the users' understanding of the system and the level of usability (ISO 9241-11) represented in the user interface.

## 2.4 New Ways of Working - Challenges

How do we ensure the health and safety of employees in a maelstrom of change? This has become of increasing importance in our high technology organisation, where you never reach the end of one implementation cycle before you are well into the next.

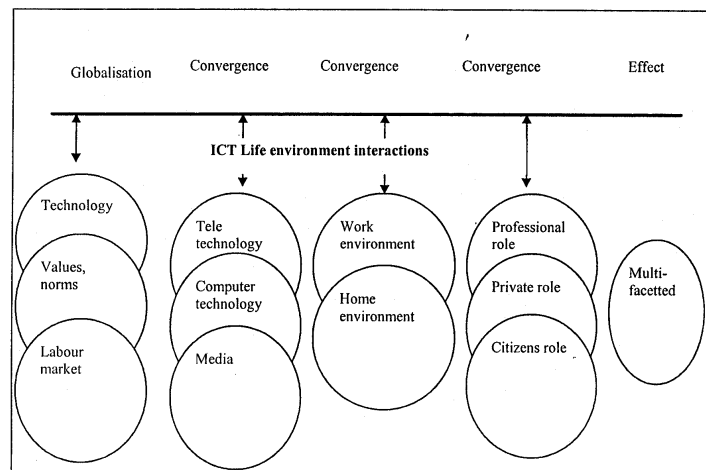
As suggested by Bradley, it is not only at work we can see a convergence between environments and roles(as illustrated in figure 1). Bradley suggests globalisation initiated through communication and information technologies affecting labour markets and the boundaries around associated values and norms. The ability to work, play and live independently of location and time seems to change the perception of time and space (Bradley, 2000). We can now work at any location in the world, as long as we have a computer. With the computer we can shop, listen to radio, see tv, have contact with friends and make new contacts, have sex, arrange travel; i.e. most of our needs can to some extent be stimulated and satisfied through a computer interface, but at the cost of real-life people-people interaction. From a work organisational point of view there is a strong need to address these issues, with the aim of identifying cost effective and healthy strategies based on human requirements and limitations.

An interesting proposal by Bradley, and with high relevance for our organisation, relates to technology enabled home-working and its effect on norms, values and culture: Are we moving from home-working to "homing at work"(Bradley 2000), where the boundaries between work and private life are disintegrating? This can already be observed in terms of space (work and private life in the same environment, can be anywhere), time (work not time limited) and media (both activities uses the computer to achieve goals). There may be strong cost-saving drivers encouraging such a development. Is it beneficial from a human factor perspective?

From a macroeconomic view, with society consisting of several sub-systems, the current primary driver appear to be the technology system with the rest trying to adapt and fit in. Should we ever say "slow down"?

### 3 Occupational stress and technological change

The "stress-proofing" project is based on a transactional model of stress as proposed by Cox (1978, 1993). This concept of stress takes into account the "person-environment-fit" model by French, Caplan and van Harrison and the Job Decision/Job Demand Latitude model by Karasek as described by Cox (Cox, 1993). The Transactional model proposes a definition of occupational stress by an imbalance between subjective and objective individual resources and controls on the one hand, and the subjective and objective environmental demands and



**Figure 1: Theoretical model of information and communication technology and psychosocial life environment (Bradley, 2000, in Ergonomics 43/7)**

support on the other, through cognitive appraisal. Cox also proposes a consensus summary of "stressful characteristics of work. These are grouped under the following headings: organisational function and culture, role in organisation, career development, decision latitude and control, interpersonal relationships at work, home/work interface, task design, workload and pace and work schedule. This understanding of occupational stress creates the platform for the design and development of the "stress proofed" intervention.

#### 3.1 Link between technological change and stress

A sequential process for change - related to the implementation of new technology and its link to occupational stress - is proposed as a framework in the design of the intervention. The process is included in figure 2. It advocates the need for strong user involvement in the management process and the need to acknowledge human requirements and limitations when evolving new ways of working.

The hypothesised stressors are related to:

- Lack of control; the change process being technology driven and not initiated by primary human needs, it is there because it is possible (even if we don't want it!).
- Insecurity; job insecurity linked to multiskilling, job enlargement and automation, which may mean a reduced need for human resources
- Mental over-load, linked to mental work load and usability, increased complexity of interfaces, continuous change and adaptation to new systems
- Speed; no planning or preparation time, less time to think, planning and execution go hand-in-hand
- Changed expectations related to pace; others expect immediate action, pressured if not happened or have to wait

### 3.2 Design of intervention

UK health and safety legislation is based on a concept of risk management and risk assessment, which can be defined by the following steps (suggested link to stress management in brackets):

- Identification of hazards (stressors)
- Assessment of associated risk (severity and likelihood of health problems from existence of stressors)
- Implementation of appropriate control strategies (Measures to eliminate ill-health influences from stressors or reduce health effect to acceptable level)
- Monitoring of effectiveness of controls (Baseline measures and ongoing monitoring of stress, coping strategies, satisfaction and general health, benchmarking)
- Re-assessment of residual risk (is it acceptable or need for modifications to approach)
- Review of information and need for education of managers and workers to ensure effectiveness of controls (partly based on HSE 1999, Cox, 1993)

This informs the control cycle used throughout the "stress proofed" project.

As part of the diagnostic measurement and evaluation strategy, triangulation of data is attempted to improve reliability.

Managers responsible for implementing change in the regions covered by the project have taken part in a focus group including short training sessions regarding occupational stress and controls. The group was set the task of developing practical recommendations for reducing organisational stressors and improving staff well being. 84 recommendations have been proposed. These are grouped under the following headings:

- Flexible working; Resources, working practices and staff benefits
- Environment; physical work environment, facilities
- Task/culture; Policy, management, culture.
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The recommendations will be reviewed for implementation into the project organisation. Any recommendations being made will be evaluated against the following criteria:

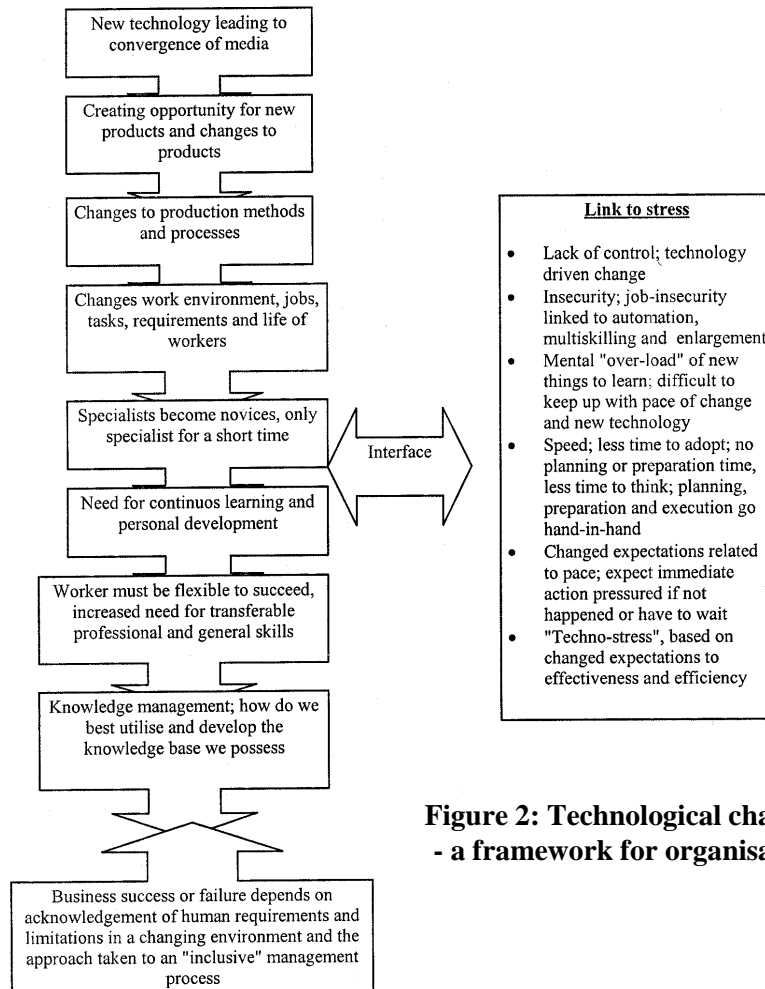
- Need to be SMART: (Specific, Measurable, Attainable, Realistic and Time-based)
- Cost efficient: best utilisation of resources and adding value to the business
- Effective: reduction in health risk due to occupational stress
- Global view: considered in view of political and cultural issues

## 4 Current challenges

By trying to design and develop a work organisation involving media convergent technology and work practices, several challenges has been identified. Some of these are summarised in the following list of questions, which also will be addressed in the workshop held at the Nordic Ergonomics Conference in Trondheim, October 2000.

- Is it possible to plan for a "stress proofed" work environment? What does it mean, does it exist?
- What are the costs and benefits related to new ways of working?
- How multiskilled can we be?
- How does continuous adaptation to new technology affect the individual?
- How do we design movement into stationary work tasks?
- What makes us happy and relaxed at home and can we utilise some of these factors at work?
- Does new technology represent new stressors? - if so, what are they and how do we measure and control them?

- Increased complexity in desk-top computer systems; are there a link to mental workload and stress?
- How can we benchmark and measure success in projects introducing new technology and new ways of working?
- Ownership and involvement is important. How do you do that in a global organisation with about 22000 employees?



**Figure 2: Technological change and work stress - a framework for organisational intervention.**

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