COMBINED USE OF DIFFERENT MEDIA TO SUPPORT THE DEVELOPMENT OF SMALL- AND MEDIUM-SIZED ENTERPRISES: A THREE-YEAR FOLLOW-UP STUDY

Manninen O, Peippo K and Peippo P

Labour Protection Department, PO Box 272, FIN-33101 Tampere, Finland
Keski-Suomen Tiedonvälitys oy Ltd, PO Box 555, FIN-40101 Jyväskylä, Finland

Abstract

Between the years 1995 and 1998 a large-scale training and development project (The Milliards Game) for small- and medium-sized enterprises (SMEs) was carried out in Central Finland. The project made extensive use of the media to find a solution to a major problem in present institutionally structured training: how to contact the trainees. This problem is not only typical of Finland but exists world-wide and calls for an urgent solution. The results of the project show that the issues and themes concerning the development of working communities and environments brought up in the project were reflected in the operation and attitudes of the enterprises and people involved in the project. In particular, a comparison of the data collected by postal inquiries at the beginning (in 1995) and at the end (in 1998) of the project show that favourable development has taken place in several areas. For example, attitudes towards the development of enterprises have turned more favourable. Managers’ awareness of the health and security hazards of the workplace has increased, and they are now more confident about their own possibilities to acquire information of labour protection and occupational health. Their ability to use external expertise has also increased. Moreover, managers and entrepreneurs are no longer confused by regulations and laws concerning working environments and occupational health. The managers’ satisfaction with the ergonomics and safety at workplace has also increased year by year. Training and development activities in enterprises are much more frequent than three years ago. Even the profitability of enterprises has improved from 1995. The enterprises included in the intensive monitoring alone hired 185 new employees during the project, so the net result of the project can be assessed to be about FIM 60 millions (about ECU 10 millions). While the managers’ needs of EU information and labour recruiting information have been satisfied, the role of the enterprises’ own product development and the need of information related to it have increased radically. During the three years leisure activities, outdoor activities in nature, and concern of their own health and fitness have increased among managers. By contrast, their marital status and appreciation of home and family have remained unchanged: almost all are married or cohabiting and think that their home and family are of great importance to their work. Both managers and employees have significantly increased their radio listening during working hours at the workplace. Radio is appreciated and it can be influential when listened to frequently. Usually radio is assessed to be a very suitable medium together with newspapers and company visits. Especially with a view to the development of the enterprise and the dissemination of ideas and information radio is considered the most significant individual medium. More often than big enterprises, small- and medium-sized enterprises use radio and newspapers for finding the information on occupational health and labour protection that the enterprises fail to receive from the occupational health personnel and labour protection authorities due to their lack of official contacts and service agreements. In fact, a small enterprise with a good and effective communication atmosphere is eager to find information and new ideas. Among small enterprises the need to maximise the benefits of using the media is particularly dependent on the manager's/entrepreneur's favourable attitude towards the issue. On the other hand, the managers of big enterprises can be contacted best by personal company visits and face-to-face meetings. When thinking about the development of their enterprises the managers have a more discerning and critical approach to media in 1998 than in 1995. Especially...
information networks are seen as inadequate in providing assistance for the development of the enterprise even where computers and e-mail are generally used. The Milliards Game has shown that the development of the working organisation of small- and medium-sized enterprises require regular, coordinated and continuous multipurpose training in communications. Enhancing the operation and developing the communications further serves to eliminate delays in the interpretation, transfer and application of information and achieve planned communication between a great number of people and various sources of information. Alone in the enterprises representing the three branches of industry included in the intensive monitoring more than one thousand managers and employees were interested in learning about working communities and environments during working hours either using all communications offered by the project together or in various versatile combinations. The radio broadcasts of The Milliards Game on Thursday mornings attracted as many listeners in the Jyväskylä region as the other channels together. The interest that has been aroused in the general public not only in the radio broadcasts but also in the development of working communities and environments in general is also evidenced by the fact that most managers in the region want to get the final report of The Milliards Game. More than one half of the managers have also announced that their enterprises would be interested in similar development projects if they will be launched in Central Finland in the near future.


**Key words:** Small- and medium-sized enterprises (SMEs) — Combined use of media — Multipurpose training — Continuous development — Occupational health - Working environment — Working communities — Metalworking enterprises — Building construction enterprises — Service station enterprises

---

**Introduction**

Data collected from different countries of the European Community show that the number of enterprises in Europe grows by 1.5 % annually, i.e., about a million new enterprises start their operation. According to statistical data (Eurostat) 99 % of all enterprises in the European Community are small- and medium-sized enterprises, and out of them 84 % are micro- or small enterprises. In 1997 this meant about 5.7 million enterprises (and about 30 % of the total labour). From 1992 the number of small enterprises (i.e. those employing 1-9 persons) has increased particularly fast. New enterprises are especially effective in creating new jobs [COM (1996)329final, Manninen 1996, European Observatory for SME's 1997].

Quantitatively the situation is similar in Finland, both in the country as a whole and in different areas. In May 1998 there were a total of 218 180 workplaces in Finland under the surveillance of labour protection authorities, and 86.8 % of them employed 1-9 persons. Likewise, the share of enterprises of this size in Central Finland was 86.6 % and in the Häme region 88.6 % (Manninen et al 1998).

At present the fifteen member countries of the European Community have a total of 147 million people in working age, and out of them 83 % are employees and 17 % self-employed entrepreneurs. Entrepreneur/ owner/manager included, an average European enterprise employs six persons. An European small- and medium-sized enterprise employs an average of four persons and a big enterprise 1035 persons. The average size in the Community varies between countries (European Observatory for SME's 1997). Just for comparison it is worth noting that approximately 54 % of the 75 million workers in the United States work in settings where fewer than 100 persons are employed. The Small Business Administration itself estimates that about 97.7 % of all businesses employed fewer than

The bigger the enterprise, the better it finds its possibilities to succeed in the European domestic market. Small enterprises tend to report various fears and threats related to operating in the European domestic market more often than bigger enterprises. The programs aimed at the development of the European domestic market seem to appeal primarily to and influence on big and medium-sized enterprises. However, it is worth noting that the economic measures taken have had a very modest impact on big enterprises. The number of international contacts also tends to grow with increasing company size. Statistical data show that in this respect the gap between big and small enterprises has increased in the past five years. Compared to small enterprises, big enterprises know how to make use of the internationalisation trend in their own operation. Small- and medium-sized enterprises together cover 10% of their turnover by exports while the figure for big enterprises is 20% (European Observatory for SME's 1997). The profitability of work increases with increasing company size. The profitability of work per one employee is about 80% higher in a big enterprise than in a small one. Likewise, the profitability of business operation is highest in big enterprises and lowest in small enterprises. Labour costs also decrease with increasing company size. The relative share of labour costs in small enterprises is on average 63%, in medium-sized enterprises 60% and in big enterprises 53% (see also a in Endnotes).

Training needs of small- and medium-sized enterprises

One of the biggest challenges in Europe and worldwide is how to support the development of SMEs. Recently the word training has increasingly been replaced by the term development. This suggests that training is only one means to support the development of the individual, the group and the organisation. Thus the term also comprises the development of the enterprise, the development of the entrepreneur and the development of the management. Profitability and well-being can develop simultaneously when the working conditions, the contents of work assignments, skills and management are developed.

The qualitative development of SMEs also involves work and production environments. Development needs arise from the experiences and observations made in several hundreds of SMEs around the European Community. Although the laws on health and security and their enforcement in the Community are among the strictest in the whole world, small- and medium-sized enterprises have very little knowledge of issues related to health and security (Bibbings 1995). Only one in five enterprises knows the labour protection regulations. Several enterprises have failed to arrange an occupational health service [COM (1995) 357final]. Likewise, the basic ideology of the European domestic market and European directives and standards are generally known and understood poorly. Because of the special jargon of standards and quality systems enterprises have difficulties to understand and apply quality systems and in particular to formulate the quality system procedures (Manninen et al 1993, Manninen 1994, Manninen 1996, European Observatory for SME's 1997, see also b, c in Endnotes).

Less than one third of all enterprises have carried out an assessment of work- and working environment induced risks. Risk assessment is three times more common in big enterprises than in small ones. More often than small enterprises, big enterprises also find information concerning risk assessment to be topical. However, enterprises that have not carried out a risk assessment do not blame the lack of information or costs for their failure to do it. Instead, the most common reason seems to be the erroneous idea that the frame directive from 1989 cannot be applied to the enterprise or that the directive does not require the enterprise to conduct a risk assessment. In general, awareness of environmental issues also depends on company size: the bigger the enterprise, the bigger investments in environmental protection and various environment management systems (systems for ecological management such as ISO 14001 or EMAS, European Observatory for SME's 1997).
Obstacles to participating in traditional training

Besides the community's own programs for small- and medium-sized enterprises and related training, support and encouragement measures, every country of the European Community has also developed national enterprise policies. They have been aimed at increasing the number of new enterprises, improving the quality of new enterprises starting their operation, promoting the possibilities of new and existing enterprises to cope in the increasingly international competition and to support the growth and development of the enterprises.

One problem with the various development measures is that small enterprises differ very much from each other in terms of branch, size, skills, business ideas or operational history. There are also a number of small enterprises that do not even want to grow or change. Thus there is no typical small enterprise nor a typical owner/manager of a small enterprise. For this reason the enterprises' information, training and support needs differ greatly. In recent times many countries have made attempts to remedy the disproportion between various needs of small enterprises and the traditional training and consultation services. Small enterprises are clearly more dissatisfied with the amount of available company cooperation training than big enterprises. They seem to experience more isolation and insecurity of working alone than big enterprises and would like to get support from each other (Hanhisalo et al 1994, Manninen 1996).

Most training events are arranged during daytime. However, the manager and employees of a small enterprise often cannot afford or do not have the possibility to interrupt their working day and leave for training. The smallest enterprises are also often unable to hire stand-ins to do the work during the training. If the training problem can somehow be solved, it may still not be possible to make use of the lessons: many managers say that they simply do not have time and resources for it. Many managers simply detest returning to the classroom. They may have bad memories of their school time and therefore do not think very highly of institutional training. The managers of small enterprises tend to find the trainers arrogant: they put themselves on a pedestal and distribute their knowledge from above within a schedule and at a pace they find suitable for themselves. Business managers generally hesitate to participate in group sessions in which their competitors or customers may participate. Besides being reluctant to publicise confidential business information, managers do not want to reveal their weaknesses and lack of managerial skills. Business managers tend to find the contents of training irrelevant to the specific needs of their enterprise. Every manager believes that their situation or their problems are unique and that training events are organised on a too general level. Managers find the training not only irrelevant but also too theoretical and have an excessive emphasis on paperwork. The training do not have enough in common with everyday reality and the development of the enterprise. Business managers prefer to learn by doing rather than by sitting in a classroom. Many small enterprises consider the available training too expensive and not sufficiently useful. They cannot pay a similar price for the training as big enterprises.

Many business managers have a modest educational background and very little in terms of reading habits. Reading and learning are skills that many managers do not even want. They remind them that they are forced to something that they do not understand or that they do not agree with (e.g. new regulations, laws and stipulations, filling in forms, etc.). Therefore, they also find it difficult to understand and internalise the contents of many training events based on traditional textbooks and training manuals (see Manninen 1996).

Isolation of small- and medium-sized enterprises

According to a study by the Amsterdam-Haarlem innovation centre it is difficult to approach small- and medium-sized enterprises as a group, because they differ from each other and tend to avoid cooperation. Competition between enterprises also prevents the exchange of information between them (Van Rosmalen 1993). SMEs are underrepresented in entrepreneur and employer associations. The results of the study further show that enterprises have difficulties in launching planned long-term training projects, they accept training and consultation only
when they need it urgently, and they are unable to assess their employment demands even two years ahead.

Differences between big and small enterprises in the use of external experts were very high, especially considering issues related to management, quality, health, safety, environment, internationalisation, marketing and communications. Both the use of external experts and the need of various information increase with growing enterprise size. On the other hand, enterprises that had just started their operation and those that had already operated for decades were most eager to turn to external experts for help. Likewise, highly educated, growth-oriented, opportunist entrepreneurs generally rely on external experts more than other entrepreneurs (European Observatory for SME's 1997).

The results of a contact study published in 1995 show that only 10 % of small- and medium-sized enterprises communicate with other enterprises concerning their research and development. Likewise, only one in ten small- and medium-sized enterprises has contacts to universities and research institutes. By contrast, about 40 % of big enterprises has contacts with other enterprises, and a majority also have daily contacts with research institutes as part of their everyday business operations. The study also shows that without contacts to research institutes and universities only one in five small enterprises (employing less than 20) was able to realise its innovations. On the other hand, one in two small enterprises could realise its innovations without contacts to external experts (Gemünden and Heydebeck 1995).

A comparison of the above results to a corresponding study of 1982 reveals that the isolation of small- and medium-sized enterprises, or their will and ability to make contacts to other parties has changed surprisingly little in the past few years. At that time 75 % of SMEs and 9 % of big enterprises had no contacts with research institutes and universities. The results further show that the higher the educational background of an employee in a small- or medium-sized enterprise, the more likely he was to have contacts with experts. Small- and medium-sized enterprises also tend to recruit fewer students or those working on their theses than bigger enterprises (Rothwell and Zegveld 1982).

**Working conditions**

Working conditions comprise a variety of things ranging from tools and forms of material and energy generated by the work to organisation of the workplace and planning of work. According to calculations made in several countries a maximum of nine (on average 2.7) simultaneously occurring work or work-environment related exposure factors can be identified in working situations. In metalworking enterprises noise as well as illumination, impurities in breathing air and unergonomic working postures are very common factors in certain exposure combinations. In building enterprises the most common individual work-environment related factors in various combinations include stone dust, cold, heat, weather conditions, noise, cooperation with others, cleanliness, order, unergonomic working postures and working in high places (Manninen 1994, 1997b).

It is currently known that exposure to various combinations of several factors has measurable effects on the functions and behaviour of the human body (e.g. Manninen 1988a). Negative effects can be manifested as accidents, malformations, high personnel turnover, reduced performance and working capacity, errors and reduced job satisfaction. For example, there are usually four factors that make the working posture of drivers stressful, and they are related to the cabin's environmental conditions, ergonomic properties of the seat and condition of streets and roads (Manninen 1987, 1988b). Furthermore, clinical findings show that the frequencies of the musculoskeletal diseases, diseases in the digestive system and the breathing system increase with the increasing number of work exposures (Ruppe et al 1986). Likewise sick leave increases if manual material handling, awkward working postures, vibration and noise are simultaneously during work (Vogel et al 1992).

Mobile work tasks in general and switching from one work task to another produce more varied exposure profiles: exposure to several simultaneous or consecutive factors. In the smallest, so-called micro-enterprises this applies both to employees and
to managers/entrepreneurs, who participate in every necessary work task without considering their roles as employees or employers. Likewise, in multi-purpose contracting and team work, one employee is required to exercise many different skills, which also involves exposure to various work and working environment induced factors at the workplace. Identifying their combinations and effects pose many challenges to public health work. Recent observations show that small productive enterprises have more work-related risk factors than medium-sized or big enterprises (Henry 1995). Similarly, young enterprises starting their operation involve more work-related risk factors and ergonomic defects than older and more established enterprises (Manninen et al 1993, Manninen 1994, Manninen 1996). Data from Occupational Safety and Health Administration (OSHA) inspections also show that small establishments are five times more likely to have upper-end exposures (upper quartile) than medium or large firms (Gomez 1997).

**Work-related diseases**

The European Foundation for the Improvement of Working and Living Conditions in Dublin, Ireland, has published an extensive study on working conditions in EU countries and their relation to the health of the working-age population in 1996 (European Foundation 1997). According to the results, the most common work-related illnesses are back pain (30 %), stress (28 %), and muscular pain in arms or feet (17 %).

Health problems are usually connected to poor working conditions. Annually work-related health problems cause absences to every fourth (23 %) employee, with an average duration of four days per person. Exposure to physical and chemical factors in the work environment (such as noise, vibration and hazardous products or agents) is common. For example, more than one fourth of employees suffer from noises and almost every second of painful or fatiguing working postures. Men are exposed to these factors more often than women. The pace of work is accelerating, and it is set most often by the customer, a work mate or a superior. 69 % of employees have direct contacts with the customers. Monotonous and repetitive work is also common: 37 % of the employees do short-spanned repetitive work and 45 % do monotonous work.

The previous investigation of this case was realized in 1991. A comparison of the results obtained now to those obtained five years ago shows that air impurities and pollution, noise, stress, ergonomic defects, and musculoskeletal diseases are the work-induced risks that have increased most in the EU. Therefore, to curb economic losses working environments and occupational health must be given top priority in the development of enterprises and organizations.

Despite the strict laws and supervision accidents and work-induced diseases increase continuously, incurring additional costs to enterprises, society and individuals. For example, in the countries of the European Community, more than 8000 people die every year in workplace accidents, 10 million employees are annually injured or catch a work-related disease. Moreover, we note that over 30 % of all employees, corresponding to 42 million people, believe that their health or safety is endangered in their daily work [COM(1995)282final].

Traditional occupational diseases are only one end in a continuous spectrum. Another end is the work-related diseases where work plays a minor role or where working conditions deteriorate an existing disease. World Health Organisation WHO (1985) includes the whole spectrum in the term "work-related diseases". WHO stresses that occupational diseases covered by indemnity are only part of work-related illnesses. As Hernberg (1998) states, a quantitative majority are illnesses whose emergence and worsening are only partly affected by work. In practice this means that the assessment of exposure should consider not only factors related to the individual and his health behaviour but also all physical, chemical and psycho-social factors that affect the individual during work and out of work. Therefore, scientific research aimed at maintaining health and understanding the development of diseases has recently focused on the combined effects of different and similar environmental factors. Depending on the target organ or the function of the body, the combined factors may amplify the single effects (Manninen 1983, 1990, 1993, 1995;
Musculoskeletal strain injuries

Regarding the factors affecting the safety, healthiness and productivity of workplaces, the significance of ergonomic factors (d) has been emphasised lately. Neglect of ergonomic principles brings inefficiency and pain to the workplace (Ayoub 1990). The compounding effect of job and/or workplace ergonomic deficiencies (e) will surpass the body's coping mechanisms, causing the inevitable: physical symptoms, emotional stress, low productivity and poor quality of work.

If the ergonomics of the workplace do not work and ergonomic factors are not under control, it means that gradually the symptoms, pains and injuries of the employees' back, neck and shoulder, upper and lower limbs and joints become more common, and the number of musculoskeletal disorders increase while the risk of accidents grows due to wrong working postures and erroneous observations. A standing working posture is particularly common in productive enterprises. Continuous standing may excessively load many joints and in particular the spine. Thus, for instance, pain and symptoms of back, hip and knee joints are rather common among employees doing standing work. Pain in joints during work, in turn, hamper efficient working (Manninen et al. 1993).

Most statistics show that, for example, the number of injuries in the United States of America grew almost fivefold between the years 1977 and 1989 (Amstrong 1996). Webster and Snook (1994b) calculated the average direct indemnity per one injury to be about FIM 43000 (US$ 8070) in 1989. According to Oxenburgh (1991, 1997), every back injury caused by moving, lifting or loading goods by hand costs on average FIM 25100 (AUD 7000) in Australia and on average FIM 28600 (US$ 5200) in the United States of America. It is interesting to note that the costs are almost the same in both countries. In Holland back pains are calculated to cost about 1.7 % of the annual GNP (Van Tulder et al 1995). If all kinds of injuries caused by defective ergonomics are taken into account, the costs will amount to astronomical sums alone in Finland.

Lowback disorders

Work-related lower back injuries alone cost about FIM 63 billion in the USA annually. Work-related lowback disorders (LBDs) continue represent a significant source of loss to industrialised societies. Losses resulting from LBD entail both pain and suffering experienced by workers, and economic losses (Dempsey et al 1997). In the United States, annual workers' compensation costs (medical and indemnity payments alone) have been estimated at US$ 11.4 billion. Indirect costs, such as lost production and training new workers, raise this figure significantly and are difficult to estimate accurately (Webster and Snook 1994a).

A considerable portion of work-related LBDs that are not attributable to traumatic events may be attributed to exposure to physical stressors in the workplace. The most widely studied class of physical stressors is manual materials handling, which includes lifting, lowering, pushing, pulling, holding, and carrying. Examples of other known or suspected risk factors include repetitive twisting, bending, exposure to vibration, and prolonged sitting. Although such occupational risk factors are thought to be significant contributors to work-related LBDs, there are also personal factors that are known or suspected to affect LBD outcomes (Dempsey et al 1997). In a recent study (Xu et al 1997) vibrations affecting the whole body, physically hard work, frequent twisting and bending, standing up, and concentration demands proved to be risk factors for the occurrence of low back pain, even after controlling for age, sex, educational level, and duration of employment in a specific occupation. A supported sitting posture and changing a person's work posture are important factors in reducing burdens on the spine and decreasing posture fatigue, as suggested in several other studies, too (Xu et al 1997).

Injuries of upper limbs

Strain injuries of upper limbs (i.e. mild and severe pains in fingers, wrists, arms, upper arms, neck and
shoulder region during stress) have become considerably more common during the past few years. In many occupations and branches of industry these injuries are among the main reasons for disability. These injuries also cause considerable loss of working hours and compensations paid to workers. Work-induced strain injury of upper limbs results in disability lasting on average 87 days (Hashemi et al 1998).

For instance, the construction and building trades pose many serious and costly health risks, including risks for musculoskeletal disorders. Results indicated that work-related symptomatic areas, and those accounting for the most reported lost work time and physician visits, were primarily back, neck, shoulder, and secondarily, elbow and wrist/hand (Cook et al 1996). A review of previous cross-sectional studies of construction workers, concluded that bricklayers suffer from diseases of a lumbar spine about 1.5 times more frequently than a random sample from the total construction industry (cited in Cook et al 1996).

An estimated 75 million US workers use video display terminals on a daily basis. Increased use of computers in the office environment has coincided with a rise in musculoskeletal and vision problems among employees who use them. The findings of an American study (cited in Springer 1997) revealed that 40% of participants reported symptoms consistent with upper extremity cumulative trauma disorders (CTDs). Hand/wrist symptoms were most common (23%) followed by neck symptoms (17%), elbow and forearm (13%) and shoulder (11%).

**Working capacity of aging population**

The increasingly modernised production has brought up new features of the relation between man and working environment. The focus of labour protection has also changed: physical overloading has decreased while rush and social conflicts, as well as the challenges posed by functional working communities, use, structure and mobility of labour have increased. Completely new types of tasks and problems have emerged in the sphere of work.

The working capacity of aging people at workplaces is a major problem. According to some estimates, the premature loss of health among working population alone costs society at least FIM 110 billion every year (e.g. Komiteannietintö 1996, Rissa 1996). The magnitude is illustrated by the following theoretical example: if the average price of one job as estimated by the Ministry of Labour in 1997, i.e. FIM 344000, is used as a basic for calculation, the billions lost in Finland annually could buy 319767 jobs (see fn in Endnotes).

In other words, investing in employees older than 45 years is profitable. If their sick leaves and work disability pensions could be reduced and their productivity increased to the level of younger employees, it would bring real savings equal to the above-mentioned sum. Moreover, if employees stayed fit and were more satisfied with their work, they would not need to retire early. If the average retirement age could be increased by three years, the savings in retirement pensions would equal the wages of 30000 new employees.

Although such calculations are theoretical, the results are impressive. And workplaces really can do something to make it happen.

**Total price of morbidity**

Economic research has revealed the urgency and economic significance of the issues discussed above. For example, 90 million Americans and 63 million working-age Americans have a chronic disease (Hoffman et al 1996). In fact, two out of three working-age Americans aged 45 to 64 has at least one chronic disease. Although a majority of the chronically ill are not actually disabled, their diseases cause extra health care expenditure, sick leaves and serious limitations to living. Absence from work caused by the chronic diseases alone cause losses equaling FIM 365 billion (US$ 37 billion) in America.

In Sweden, morbidity costs society about SEK 60 billion or FIM 42 billion annually (Bylund 1996). To illustrate the magnitude of the costs, the total expenditure of sick nursing can be compared to the costs of social welfare, which in 1995 amounted to about SEK 11 billion or FIM 7.7 billion, or to the defence budget, which amount to SEK 40 billion or FIM 28 billion per year in Sweden.
Another recent projection of the economic burden of depressive disorders in the American workplace suggests a total cost of US$ 43 billion in 1990, with absenteeism alone contributing US$ 12 billion. Other factors in the total cost include losses arising from lowered productivity, safety risks, accidents, suicide and the cost of inadequate or inappropriate treatment for depression. Depressive disorders were also found to have the largest medical plan costs of all behavioural health diagnoses (Conti and Burton 1994).

Furthermore, headache is a very common symptom in the workplace. The indirect cost associated with disabling headache far exceed the direct medical costs associated with the diagnosis and treatment of headache and are the single largest component of the economic impact of the condition. In accounting for both actual lost workdays and reduced effectiveness at work, individuals lost the equivalent of 4.2 days per year because of headache (Schwartz et al 1996).

Accident insurance premiums

Statistical data on small- and medium-sized enterprise from 1990 show that accident insurance premiums have grown 0 to 15 percent in 24% of all small enterprises in the USA, in 38 % of the enterprises the premiums have grown from 16 % to 35 % and in 6 % the premiums have grown more than 60%. The average growth of accident insurance premiums per one employee during the past five years is 115 % (Briggs 1991).

Enterprises generally have accurate information of the costs incurred by accident insurance premiums. On the other hand, they have very little knowledge of indirect costs in the department or work cell where the accident or injury originated. Information collected from several countries and different branches of industry show that the indirect costs of work-induced injuries are 0.5 to 20 times the costs incurred by regular wages [British Standard BS 8800 (1996), Finnish Standards Association (1997)]. According to CEO Lee Iacocca the costs of accident insurance premiums in Chrysler Corporation exceed the cost of the steel required for making the cars (Briggs 1991). Accident insurance premiums per one manufactured car are on average FIM 3850 (US$ 700).

There are on average 5.9 consequences to injured person per accident (Aaltonen 1996). Besides personal suffering, accidents, illnesses and injuries cause huge costs to national economy. The total annual indemnities paid by insurance companies due to accidents and illnesses in the European Community as a whole are about FIM 110 billion.

According to British labour protection authorities, the overall costs to employers of accidents causing injuries, occupational diseases, loss of health caused by work, and avoidable accidents causing no personal injuries is estimated at 5-10 % of the total turnover of all enterprises in Great Britain. The significance of this circumstance is illustrated by the fact that economic losses from accidents not covered by insurance were 8-36 times higher than insurance premiums in the enterprises under study [British Standard BS 8800 (1996), Finnish Standards Association (1997)].

Work-related stress

Work-related stress is an increasing and costly problem. In the United States the representatives of the industries have been particularly concerned about the constantly growing expenditure incurred to enterprises by work-related stress experienced by the employees (cited in Lehmer and Bentley 1997). Adding productivity losses to monetary compensations claimed by employees for loss of health caused by work-related stress, the total annual costs amount to about US$ 150 billion or FIM 750 billion. Alone in California, the compensations claimed by employees for work-related stress increased by 700 % from 1979 to 1988. Legal proceedings related to work stress cost on average US$ 12 000 (FIM 60 000) (Lehmer and Bentley 1997).

Karoshi, sudden death caused by excessive work, has become a major concern in Japan (Hayashi et al 1996). A study on this phenomenon made among male Japanese workers of different ages was published recently. The researchers conclude that excessive work increases the loading of the cardiovascular system.

In 1992, a study focused on small productive
metalworking enterprises in Central Finland found out that maintaining and being in charge of one's own enterprise tends to stretch the working days of the entrepreneur or manager excessively (Manninen et al 1993). In particular new enterprises starting their operation involve a heavy workload that stresses both the entrepreneur/manager and the employees. But unlike the employees, entrepreneurs/managers cannot look forward to shortening working days and reduced stress and workload resulting from the establishment of the enterprise. Therefore, in particular entrepreneurs/managers need to develop their management skills and ability to delegate in both young and old enterprises. Correct procedures reduce work stress and personnel's susceptibility to acute cardiovascular diseases. At the same time the probability of premature death caused by too much work decreases.

A new Finnish study on work and health reveals that every fifth employee thinks they need to hurry up very often to get their work done in time, and every third reports that they need to hurry up often. Upper white-collar workers usually find their work varied and think they have enough opportunities to use and develop their skills. On the other hand, their work seems to be busier, their tasks more difficult and their mental stress higher than with other employees. Lower white-collar workers also find their work busy, but their work tasks are less often too difficult (Piirainen et al 1997).

Good working atmosphere is more precious than gold

At present, multifaceted and ubiquitous mental and physical violence at workplaces haunts an increasing number of people (Warshaw and Messite 1996). Mental violence is usually described using the terms bugging, oppression, pressurising and bullying. According to recent studies, nine percent of employees within the European Community complains about threats or victimisation. A total of three million employees have been assaulted sexually. Six million employees have suffered physical violence and 12 million employees complain about mental violence (European Foundation 1997).

A study of workers at Boeing Co. found that those who do not enjoy their jobs are 2.5 times more likely to file back an injury claim than employees who enjoy their work (Tarbell 1997). A study of absenteeism and accidents, performed by University of Leuwen, Belgium, found that absenteeism and accidents stem from negative management and employee relations ("Accidents and management-employee relations"). These studies confirm what people know intuitively: when happy at work, people are healthier.

If management and employee relations are the root cause of injuries, what is the cure? As Tarbell (1997) cites, Lewis Millender prescribes this solution: Employers can appreciably decrease worker injuries and costs by regarding the employees as their most valuable asset and promoting job satisfaction. Open communication and worker input are important in developing a sense of pride and loyalty within the organisation.

Moreover, a 1996 American Management Association study showed that Millender's prescription works. The two-year study examined 80 companies that followed this strategy. It found that lost-time accidents decreased 69% while absenteeism, another barometer of management and employee relations, declined 84%. The companies did not employ the same company doctor, but the common link was a gainsharing system (see g in Endnotes). One ferrous products manufacturer reported a 12-percent absenteeism rate and 324 lost work days. One year after implementing a gainsharing system absenteeism had dropped to two percent and lost workdays stood at four.

Good health spells good business

It seems evident that more should be done on behalf of the development of working communities. Safe and sound workplace cannot be a burden, it is an advantage to all parties. Promoting worksite health and wellness should be a sound investment for the nation's well-being, vitality and health care cost containment (Edington et al 1997).

An expert meeting held in Florida, U.S, some time ago came to the unanimous conclusion that good health spells good business (Gregg 1997). Improving
the health of the population also creates the best preconditions for future health work. Good health of the employees provides a competitive edge and promotes productivity. The meeting therefore emphasised proper care in the collection of health data, comprehensiveness of the data, and better understanding of the connection between employees' health and productivity. The meeting also addressed occupational health issues in general, its economic significance, the side effects of drugs, etc. (cf. DeHart 1990).

Changes to promote ergonomics

The costs of proposed ergonomic enhancements must be accurately determined even though many such improvements cost less than US$ 500 (about FIM 2700), while a whopping 98 % cost less than US$ 5000 (about FIM 27000) Alexander 1995). In our own studies we have calculated that the average price of one realised measure to promote ergonomics in young enterprises with a maximum of five years of operation is FIM 2664-3854, and in old enterprises with at least six years of operation it is FIM 11180-15188 (Manninen et al 1993).

However, measuring costs and benefits related to ergonomic factors is not easy. This is primarily due to the fact that ergonomics are affected by multiple factors. They always involve the simultaneous combined effect of two or more factors, which makes measurement problematic (Van der Beek et al 1998).

Although ergonomic factors cannot be easily measured or their benefits assessed with accuracy, they should nevertheless not be overlooked. For example, in Australia the costs incurred by ergonomic factors to national economy exceed the costs incurred by sicknesses caused by coal dust and lead at work.

The positive effects of ergonomics in improving worker productivity, safety and comfort are well recognised. Worker productivity was found to improve most as a result of participative standard setting with feedback and monetary incentive. Studies have also shown that hard goals produce better performance than non goals or easy goals (Shikdar and Das 1995).

Investigations have also shown that the quality deficiencies have been three times as common for the work tasks with ergonomics problems, compared with the other tasks. Direct causes of quality deficiencies were such as discomfort from strained parts of the body, organisational factors and time pressure (Eklund 1995). Furthermore, the same study points out that an important factor for job satisfaction is the possibility for the workers to perform their tasks with high quality.

As Bao et al (1996) have shown, the realisation of the ergonomic potential in a rationalisation seems to depend on management culture, as well as factors outside the company. In this case, the company decided to direct efforts towards a short-term increase in work productivity at the expense of investments in education and organisational experiments. These short-term decisions were carried through in spite of the management acknowledging the competitive advantage in the long run of more thorough organisational changes aiming at production flow as well as human aspects. The example concretely demonstrates that without the commitment of the responsible manager or owner of the company itself any ergonomics intervention program will lead to minimal results or even fail entirely.

Ethical issues

An Australian study has calculated that the costs of investments and reshaping of the work cell equal three month's wages of one employee. After the reform, sick leaves decreased by 80 %, production increased 25 %, and the increased profits covered the investment costs in one year (Oxenburgh 1991, 1997).

A cost-benefit analysis concerning people tends to create ethical problems. For example, one question that is often brought up in the discussion is: can a worker's life or injured back be assessed at a price. In practice, enterprise management has to make such price assessments all the time, although this fact is not advertised. The problems involved in these assessments can be reduced to two key questions: how to quantisize health and safety, and how to measure losses that have not occurred.
Ethical problems and practical difficulties notwithstanding, economic assessment of costs and benefits is usually considered relevant and necessary. Therefore, it is nowadays an increasingly common procedure to determine the benefits that, for example, new laws (including their implementation costs) should produce. For example, in Australia it is an established procedure to assess the costs of proposed laws before enforcing it.

People are in again

Human resources are the fashionable theme of our times (Scrvan-Schreider 1990). “The performance of an enterprise equals the performance of its personnel” or “The quality of products depends on the quality of people” or “Nothing is as simple as humans: we must just pick the best ones”, these are examples of current slogans that are firmly rooted on reality.

Experience has so-far given rise to five principles for reaching quality (see b in Endnotes). Make sure that the employees are good (recruiting), they know what they should do (communication), do not waste time or energy (glasnost), they feel that they are appreciated (contact) and have confidence in fair play (self discipline). On the basis of this it is clear that both the feedback given by the management to the employees and the feedback given by employees to the management are equally important for the qualitative development of the enterprise and the personal development of the personnel. Furthermore, communication research results to workers is being emphasised increasingly, because of the need to notify study subjects and the responsibility to warn workers of potential workplace hazards. Most workers are pleased and view the notification as evidence of the company’s commitment to maintain a safe workplace (Collins and Coner 1994). Tepper (1980) has pointed out that although the obligation to inform workers about potential hazards in the workplace is shared by industry, government and labour organisations, the primary responsibility must rest with the employer. “However, information often fails to reach the premises that need it, and even if it arrives, it does not filter down to those who are most in need of it (Hudspith and Hay 1998).

The following example illustrates the significance of interaction and showing consideration to people: skin symptoms in the faces of people working with computer displays have for some time been studied around the world. The scientific discussion about this issue has been focused on the idea that the skin symptoms are primarily caused by electric and magnetic fields produced by the displays. However, the studies have achieved little in terms of eliminating the symptoms or finding effective remedies, because they have usually failed to consider the psycho-social environment of the workers, the mental atmosphere at the workplace. A newly published Swedish follow-up study that lasted almost ten years however establishes a connection between facial symptoms and psycho-social factors (Eriksson et al 1997).

Therefore, treatment should not focus primarily on the significance of the electric and magnetic fields produced by computer displays but consider the work organisation and its correct management as a whole. Existing observations suggest that there are multiple factors underlying the symptoms, and are related to poor communication atmosphere at the workplace, inadequate support from peers and superiors, tied-up nature of the work, relations with fellow workers and superiors, low job satisfaction, stressful work, and general technical stress. According to the Swedish researchers, poor working atmosphere and frustration in one’s own job impair people’s ability to tolerate somatic symptoms.

Start from your own workplace

Today, ergonomic methods call for the participation and input of workers or users of the products. It has been established that involving these people leads to more comprehensive identification of problems and more successful solutions (Tyson 1996).

Several large American enterprises such as Ford, Chrysler, General Motors (GM) and IBM, have recently taken considerable efforts to improve ergonomics. The reasons are found in rapidly increasing monetary compensations paid to workers because of injuries or sick leaves, on the one hand, and on the increased interest of the labour union in working environments. GM offers its engineers basic courses in ergonomics. In addition, it has defined ergonomic requirements for hand tools and
production equipment, and the designers of cars are taught to consider how cars are built and not only how they work. At present GM's ergonomic experts work in close cooperation with product development (Oxenburgh 1991, 1997).

The main point in such development work is that the specification of costs is limited to one concrete work cell, department or small enterprise. To get the best results, those who use the development model for the first time should start from a familiar environment, preferably their own workplace (see h in Endnotes).

For example, the methods to determine exposure levels of workers using lead or vinyl chloride are rather cheap and accurate. Sicknesses caused by exposure are also rather well-known and specific. In other words, in these cases it can be presumed with some certainty that the costs and benefits of measures taken can be calculated for each job with high accuracy. Enterprise and job-specific cost/benefit analysis can be applied regularly to action plans for labour protection, follow-up of their realisation and to planning activities to maintain high working capacity. The examples of this report also illustrate how cost/benefit thinking can be used in different cases, and how improvements in labour protection and ergonomics in individual work cells may increase profits rather than incur extra costs. Additional evidence to encourage workplace-specific reforms is provided by the observation of The Millionairs Game in this report that even a small improvement in worker's satisfaction with the ergonomics of their workplace will rapidly and considerably increase general work satisfaction.

Developing a program focused on preventive measures

The principles laid down by the EU Commission for controlling and reducing work-related risks include the development of a preventive program, elimination of risks at their origin, adapting work to individuals, adapting to technical developments, providing topical instructions and information to employees and efforts to control risks by means other than the use of personal protective equipment (AHG 1994).

Prevention is largely based on risk assessment. Despite unequal resources, the main principle is that assessment is conducted in the same way in all enterprises, disregarding enterprise size. The assessment covers the workplace and all of its functions, even those occurring outside regular working hours. The purpose of the risk assessment is to facilitate employers' efforts to take effective measures to protect their employees and their health and to eliminate risks. Risk assessment alone is often sufficient to invoke new ideas of risk management. Usually the fastest and most reliable way to establish what is really going on and what are the actual risks involved in each workplace and task, is to ask the workers themselves.

For systematic and consistent risk assessment and elimination, enterprises are encouraged to draw up a preventive program. The program should cover the technologies used, organisation of work, social relations, and effects of work environment-based factors. The health and safety goals determined by the program should be taken into account when developing and designing the workplace, and they should be discussed with the employees or their representatives. The program should be updated and revised at intervals in connection with changes and reforms made in the enterprise. A skilfully designed program may play a key role in promoting qualitative development and productivity in the enterprise.

Senses may make sense

According to a study by the American occupational health institute (NIOSH) there are about 70 million white-collar workers around the world for whom the quality of the indoors environment is very important. However, indoors conditions that cause non-diagnosable diseases may be very difficult to identify. Job satisfaction, own perceptions and experiences of the working environment have a decisive impact on the well-being of workers. As observing the standards concerning the quality of indoor air is currently an exception rather than a rule, the optimisation of job satisfaction, own sensory perceptions, and empirical data gain added importance in design and measures to improve ergonomics (Grandall and Sieber 1996, Malkin et al...
People are in fact rather accurate gauges: with the exception of radioactivity, we are quite capable of evaluating all kinds of physical and chemical factors in our environments through our senses. We always make the final analysis of the environment and its quality from a personal viewpoint. In this respect, the patient is the best doctor (Manninen 1977ab, 1995). People's own estimates of the concrete features of indoor space and working environment such as illumination, smells, vibration, thermal and noise conditions, are rather accurate and reliable (e.g. Punnett et al 1988). People themselves act as gauges and are able to estimate (measure) the noise level at their work cell even at an accuracy of a few decibels. In fact, the principle of conventional noise meters is based on the operation of human ear and sound perception. Using simple rating scales anybody can evaluate ambient noise as well as other features of the environment (Manninen 1979).

Guidelines of the EU Commission

As stated earlier, SMEs are the largest source of employment in the European Union. In addition, medium-sized, small and very small undertakings (less than 250 employees) produce the most innovations (i.e. 66.5 %). An analysis reveals that the sectors with the greatest growth in research investment are also those where most jobs are being created (European Commission 1996a). To remain in the innovation race they have to rely on knowledge developed elsewhere. They find it especially difficult to keep pace with all developments. An additional problem is that SMEs are insufficiently technology-literate to identify and articulate their needs to potential suppliers of technology. This means that a translation process is needed before technology can become accessible and usable to them.

This is a two-way translation problem. First, the question (need) of the SME has to be translated. Secondly, the answer (the technology to be applied) has to be translated to be of use to the SME (Louzada 1995). An effective and efficient infrastructure is needed to promote innovation at the broad basis of the business pyramid (the SME). This should have the ability to activate and maintain the following processes: awaking the SME, identification of the need for knowledge in the SME, transfer of available knowledge towards the SME, reinforcement of the innovative potential of the SME, active support of innovation process, awareness of technological and industry-specific developments.

The current infrastructure is too complex. Different units are still too isolated from each other. One still cannot speak in terms of an infrastructure about seamless transitions between different units as seen from the perspective of the target group (Louzada 1995). A growing number of SMEs (small- and medium-sized enterprises) now have to operate under more difficult conditions due to international competition. The European Community offers SMEs an opportunity to obtain support for technological innovation through its research and technological development (RTD) programmes, most of which make provision for technology stimulation measures specifically designed for SMEs in order to overcome difficulties in obtaining information, determining their requirements, finding partners or funding investment (European Commission 1996b). European Commission has recently published an official program for the European Union concerning the safety, hygience and health in workplaces. The various procedures included in the program are meant to be realised within five years in the member countries and on Community level. The program came to force officially in January 1996 and it ends in December 2000. The program is important, for example, due to the fact that it aims at finding other than legislative measures to develop workplaces and work.

The program states that the European Union is currently undergoing a period of profound changes. In the near future, technology, skills and know-how will change rapidly. This change has a far-reaching significance to the development of business and society. The program also notes that the economy of the European Union will be based increasingly on information. Even today the development of information technology gives us an idea of future society where information and information transfer and dissemination are of primary importance.

The new five-year programme of the Commission emphasises information services in the development
of workplaces. This is necessary, on the one hand, to make the EU laws on occupational health and safety better known to the workplaces. On the other hand, more efficient information transfer is also needed to address the development needs of small- and medium-sized enterprises more effectively in the future. The program includes some completely new measures to this end; they are targeted primarily to small- and medium-sized enterprises.

Small enterprises are not familiar with the Internet

On one hand, the Commission stresses the importance of the development of personal skills in work organisations and acquisition of all kinds of knowledge to improve productivity and job satisfaction. On the other hand, the Commission also finds it important to help SMEs to exploit the challenges posed by changes and turn more competitive. New procedures and methods should also be adopted in the sphere of work.

The starting point is that working life is undergoing a transition, and its diversity increases all the time while its predictability decreases. In the world of labour markets, working organisations and individuals diversity and flexibility must increase. We must learn to operate in more insecure environments. Above all the change towards a new information society requires the development of instruments, the creation of networks and cooperation, as well as experimentation and training that takes place at the workplace. In an information society, finding, selecting, processing and reproducing the relevant information is crucial. Learning, adapting and applying new skills in different situations are basic skills in modern society. Filtering out irrelevant information is a must.

A project named DEUS - the development of European enterprise - gathered information about how micro- and small enterprises have started using the Internet. In practice the DEUS project focused on the very smallest enterprises, the micro-enterprises.

The results show that very few European micro-enterprises uses Internet. To gain access to the Internet, each micro-enterprise needs make investments of about FIM 18000. If, for example, half of these sixteen million European enterprises did want to start using the Internet in the near future, the required capital outlay would add up to about FIM 54 billion.

The research report further notes that enterprises are not particularly keen about the Internet, because it is considered only a new technology, its procurement and operating costs are perceived too high, since most enterprises lack the know-how to install and service the required hardware and software (and expert help is considered too difficult to get and expensive), many enterprises do not have the time to use the Internet and have no personnel who could make effective use of it, or they simply cannot afford to acquire a connection.

Despite the brave new prospects opened up by information technology, the fact is that today the development of enterprises must rely on the conventional and more familiar media. It should be borne in mind that the full potential of these media has not yet been exploited, and there is still plenty of room for innovative media-oriented development.

Economic significance of information

Information society is meant for people. Information capital grows every year because people learn new things. Thus the bottomline of an enterprise is boosted by training, experience and measures to promote job satisfaction and personal development, while low job satisfaction or non-commitment of people have an adverse effect. Information is the primary, and sometimes even the only asset of an enterprise. To be more specific, the asset is the people who have the information. This view is also expressed in many documents of the European Commission and in the five-year program for 1996-2000 [COM(1994)347final]. Above all, the five-year program underlines that the economy of the European Community will be based increasingly on information.

Entrepreneurs and managers are faced with constant choices, which are based on the best knowledge available. They must also know when their own know-how, skills or time do not suffice. Both the employees and the manager need to improve their preparedness to learn new things on a continuous basis.
On the other hand, it is generally known that employees who are satisfied with the internal communication are also more satisfied with their jobs, and more motivated, than others. Enterprises with a participant atmosphere achieve almost double the level of others. In this light we can only guess how much of the most valuable asset, mental resources, are wasted in enterprises because of non-communication and authoritative management.

Workplaces play a key role in all economic activity. Top performance and innovation are characteristic of work organisations that have an encouraging and tolerant atmosphere and appreciate professional and personal development. Competitiveness originates on workplace level as a result of the cooperation of skilful, knowledgeable, and motivated employees. Correct motivation and encouragement turns individual skills and know-how into collective ones, which enable enterprises to reach objectives and goals which today may seem remote or even impossible.

Today's working life is characterised by constant change and life-long need to learn new things. Promoting people's readiness to learn and the functionality of the working community as a whole requires an open communication atmosphere, unobstructed flow of information and opportunities for the personnel to have real influence. Superiors and subordinates must be able to discuss issues related to the development of the workplace openly. A healthy working environment, good workplace atmosphere and a socially and mentally sound working community can only be created by the cooperation of all members. Modern preventive labour protection also requires a lot of new information to be available at the workplaces.

Starting point of The Milliards Game

As this comprehensive introduction attempts to prove, information on the working life is extensive and multi-disciplinary. In practice it encompasses the whole spectrum of human knowledge. The vast amount of available information as such forces us to consider, how the information should be processed and edited to be useful to small enterprises.

Determining the relationship between what small firms think and feel about health and safety matters and their knowledge and understanding of the issues involved is fundamental to any strategy to promote health and safety in such businesses. General attitudes to health and safety will condition small firms' receptiveness to information and other interventions aimed at securing change. Information, publicity and specific interventions by regulators and others can have significant effects in changing attitudes. A better understanding of what small firms think and know about health and safety is critical (Bibbings 1995).

It is evident in the light of what was said in the foregoing that traditional training is for many reasons poorly suited to small enterprises. They need a completely new approach. As a working hypothesis of the entire project is that one means to attain results is new kinds of training and development projects that differ from the conventional, institutional training, that correspond to the real development needs of the enterprises and that are realised in cooperation with the parties involved.

On the basis of the conclusions about unnecessary costs of billions of marks, difficulties in accessing information, obstacles to training and conventional approaches, The Milliards Game set out from the premise that a central role in the training and updating of managers and employees and the qualitative development of enterprises is played by the media, which in suitable combinations and correctly used can support the messages of other media and bring newest information available at the very site and to the very persons who need the information and apply it to practice.

The Milliards Game aimed at building a communication model and a related development and training model for the needs of the very smallest enterprises. The starting point was the limited resources and difficulties of small enterprises to follow development and keep up-to-date. The situation calls for more fruitful cooperation between enterprises, experts and authorities. In its present form such cooperation is irregular and arbitrary.

The training of labour is calculated to cost tens of thousands of Finnish marks per person. Well-planned and effective communication is a good way to reduce costs and slow-down the turnover of labour. One
objective of The Milliards Game was getting favourable changes in attitudes converted into actions, getting people to adopt new procedures to promote the success of the enterprise. The final result could be achieved by two ways: reduction of costs and improvements in quality and production.

Material and methods

Realisation of The Milliards Game

The Milliards Game started on 1 April 1995 and ended on 31 March 1998. It was financed by national funds and the European Social Fund (ESF). It was part of ESF's Objective 4 Program aimed at developing the readiness of employees to adapt to changes in business and to improve the business opportunities of small enterprises.

The Milliards Game was a new kind of multi-purpose training project consisting of several information dissemination channels; its main objective was transmitting and recycling new information, ideas and experiences suitable for Central-Finland based small- and medium-sized enterprises, and development of cooperation between enterprises, experts and authorities using existing media. The project was realised using mass communication methods characteristic of the prevailing media culture. The general principle of the project is illustrated in Figure I.

Throughout the project the main theme was the procedures of organisations. The realisation proceeded according to the principles of editorial work: certain guidelines were approved for the duration of the entire project but details were not fixed and were decided in editorial sessions. The general themes of the project were management, creative and productive working community, healthy and safe working community, the individual and the working community, ergonomics, design and development of working and production environments, EU terminology and directives on working environments, promotion of working capacity, industrial labour protection economy, information systems and new information, industrial safety, services offered by the authorities for the qualitative development of business operations, quality systems and labour protection programs, and communication in working community. The themes were further divided to subheadings as in the contents of textbooks. The table of contents is presented in the Endnotes (i). As a whole the project dealt with many topics that had not been addressed too frequently in previous training projects in Finland.

Program production of The Milliards Game

The producers/authors of the project were responsible for the production of programs. A team of three produced and edited the visual, textual and statistical material and published and distributed the printed matter. Both the planning and practical implementation of the project were fine examples of teamwork where the special skills and know-how of the participants were put to best possible use. The Milliards Game specifically aimed at attaining its goals by the combined use and combined effects of different media. The products and programs of The Milliards Game are characterised in Figures 2 and 3.

Radio broadcasts

During the project a total of 103 radio programs were produced and broadcast for the first time, and about as many were retransmitted at the frequency of Yle/Radio Central Finland, 99.3 MHz. The first program was broadcast in August 1995 and the last in March 1998. The half-hour long programs consulted with a total of 300 experts from a couple of hundreds of working communities and organisations located around Finland, some even abroad. The experts included authorities, researchers, university people and union representatives, but also skilled workers from different fields and company managers. Almost every radio program was based on a visit to one or several workplaces. According to the national radio listener survey each program reached about 60 000 listeners. Starting from December 1996, enterprises were mailed the bulletin Advance Information on the Radio Programs.

Poster publication

A total of 15 issues of the poster publication, i.e., an
Fig. 1. The general principle of The Milliards Game
Fig. 2. Program production of The Milliards Game

Fig. 3. Products of The Milliards Game
edited four-colour poster (60x85 cm), were produced. It was posted to a total of 100 enterprises and was estimated to reach about 5000 readers. The enterprises were also a plastic wall mount for attaching the poster publication. The last poster publication repeated the central exhortation of The Milliards Game - more effective use of the most important asset of every workplace - people.

Newspaper

Three issues of a tabloid newspaper were edited and printed. The total circulation of the newspapers was 50 000. It was mailed to every Central Finland-based enterprise and organisation. The first newspaper came out in October 1995 and the last in the spring of 1998.

Company visits

During The Milliards Game the producers visited about two hundred enterprises and workplaces. Material for the project's radio programs, publications and video films were gathered in these visits, The Milliards Game was introduced to the enterprises and issues related to working life were also discussed more generally. These visits induced the idea to supplement the use of the media by adding planned and goal-oriented company visits with personal contacts to the “tools” of The Milliards Game. The visits would include a training session arranged by an expert in the field according to the general guidelines of The Milliards Game. Here too, training was brought to the workplace.

The company visits and lectures were realised by the project leader in every 32 enterprises involved in the intensive follow-up in the spring of 1997 (for more details see j in Endnotes). The lectures and discussions that took on average two and a half hours were participated by a total of 250 employees and managers.

Videos

Two training videos were made to invoke discussion at the workplaces. The video Omen on aina avoin (My door is always open) dealt with management and good work, and it was produced in both Finnish and English in 1996. The duration of the video was 18 minutes. The video Se tärkein voimavara (The main asset), which discussed the motivation of employees and their commitment to constant improvement, was produced in 1998. Its duration was 13 minutes. The videos were reproduced in 210 copies.

Besides the target enterprises of The Milliards Game the videos were donated for training purposes to other enterprises, development companies, libraries and cooperation partners interested in the subject. In accordance with its primary purpose, the video was presented by the producers in several training or lecture occasions, fairs and company visits. In enterprises the videos were mainly presented in connection with in-house discussions, excursions, trips and other joint activities.

Other activities

Before starting regular program production, the first training session was arranged for the enterprises who volunteered for The Milliards Game in May 1995 in Jyväskylä. Correspondingly, on the last day of the project in March 1998, a training session was arranged for enterprises where the results were presented to managers and possible further projects were discussed. During the project several training and lecture sessions were arranged, for example, in connection with various fairs in Jyväskylä. The occasions were participated by hundreds of employees.

Each enterprise also received a folder for collecting the material to be circulated among the personnel. At the end of the project every cooperation partner and enterprise included in the intensive monitoring received The Milliards Game certificate of honour.

To expand its horizons beyond national level The Milliards Game at its early stage also charted small- and medium-sized enterprises in Europe. Based on this charting, an extensive review was published in English. It was posted around the world and to the 250 Central-Finland-based enterprises who ordered it in the training occasion arranged beforehand by The Milliards Game (see a in Endnotes).

Assessment of effects

To assess the effects of The Milliards Game, data
were collected on three levels: from the general public, from three branches of industry and a small number of enterprises. The data were derived from a questionnaire mailed to Central-Finland-based enterprises representing the metal industry, building construction, and service stations, in 1995 and 1998 (n=124 and n=225), from an inquiry (n=60) presented to managers and employees during company visits in the spring of 1997, which dealt with their use of the media, from inquiries to and interviews of business managers in 1995, 1996 and 1997 (n=32, n=32, n=31), and from the results of a national radio listener survey (n=1500).

On the basis of the data collected in accordance with the general objectives of the project were used for assessing such things as how different media (radio, poster publication, newspaper, video, lecture) are suited for different types of small- and medium-sized enterprises, workplaces and working environments, what kind of obstacles there are to the use of different media, and whether a single or combined use of the media produces significant added value in terms of invoking reactions, interest, favourable changes in attitudes, or launching development measures. Considering the overall duration of the project, and interpreting a model for assessing workplace training (the so-called 4-level assessment model of Kirkpatrick), the above assessments can primarily be used for measuring the first level of effects - to gain experiences and identify reactions and impressions in working communities (Kirkpatrick 1994).

The general interest and feedback received by The Milliards Game have also been documented continuously on the basis of phone calls to the toll-free service number, spontaneous contacts by mail or fax, personal visits to workplaces by the people in charge of The Milliards Game and comments received during those visits.

Postal inquiry in 1995

The Milliards Game both started and ended by a postal inquiry. The so-called basic questionnaire used in the first postal inquiry was mailed in May 1995 to every Central Finland-based metal, building construction and service station enterprise. On the basis of registered data of Statistics Finland there were a total of 622 enterprises representing these three fields in Central Finland in 1995.

The building construction and metal branches were selected on the basis of the results of a training and development project and a subcontractor project carried out in Central Finland between the years 1992 and 1994 (see Manninen 1994, Manninen et al 1993). The results showed that there is a considerable need for qualitative development in metal and building construction firms. To make the results of The Milliards Game more generalizable, service station enterprises were included, because they involve a great variety of jobs from sales and restaurant services to car maintenance. For this reason the number of various work-related symptoms and the need of qualitative development is particularly pronounced in service stations.

On the basis of the data given by the managers who completed the questionnaires correctly and returned them in time, the producers of The Milliards Game selected the enterprises that reported to be willing to receive information and experiences transmitted by different media for the duration of The Milliards Game, that according to the manager employed at least five persons and provided a possibility to listen to the radio both to the employees and to the management. In 1995 a total of 21.7 % of the entrepreneurs and managing directors returned their questionnaires in time. Because of incomplete information, 14 questionnaires (9.6 %) had to be rejected, thus the number of accepted questionnaires was 124.

Target group of follow-up

Participation in The Milliards Game was completely voluntary. No unconditional commitment was required. The producers stressed that active observation of the messages given by the project would be beneficial to the enterprises. No enterprise would lose in The Milliards Game but everybody could win. Exploiting the potentials of the project would only require active participation, self-initiative and interest. Of course, the basic precondition was that the personnel had the opportunity to use their working hours for listening the radio broadcasts and reading the publications. This was important because the principles of the European Social Fund (ESF)
stipulated that employees should be given the opportunity to use their working hours for getting education, and this time was also taken into account while determining the internal financing shares of the enterprises. The enterprises were also asked to appoint a contact who would inform other members of the working community about what was going on in the project. It was the producers' intention to follow-up this little target group by annual interviews and inquiries more effectively than the rest of the enterprises representing the three branches. The purpose of the follow-up was to provide material that would help in the internal development of the project and give the producers feedback on the effects of the program production.

Soon after the collection of the basic data, delimitation of the enterprises and first contacts three enterprises said they would drop out of the project. The reasons given by the managers were heavy workload, lack of resources and uncertainties in operation due to handing the business over to the next generation. The enterprises that dropped out represented each of the three branches. After this 32 target enterprises remained that would receive products of The Milliards Game, 16 metal, 9 building construction and 7 service station enterprises. In the middle of the project one construction enterprise went bankrupt, which naturally prevented it from continuing active participation in the project. This is why the number of observations of the target group enterprises is either 32 or 31.

On the basis of the information collected from the basic questionnaire in May 1995, the metal enterprises who volunteered to receive messages of The Milliards Game and were interested in cooperation employed a total of 595 persons full-time (and 33 persons part-time), the building construction enterprises employed 287 persons full-time (and 1 part-time) service station enterprises employed 60 persons full-time (and 16 part-time). The total number of employees in the enterprises was 951 full-time and 50 part-time employees. As a whole, in May 1995 there were 74 metalworking enterprises in Central Finland that employed more than five persons full-time, while the corresponding figure for building construction enterprises was 62 and for service station enterprises 15. The enterprises selected for The Milliards Game thus represented 21.8% of the enterprises of this magnitude and was generally highly representative of these enterprises.

Evaluations made afterwards suggest that the motives of the managers who volunteered to receive messages of The Milliards Game varied between branches. In metal enterprises the main incentive was most often problems experienced in the workplace atmosphere. Service station managers, in turn, were mainly interested in the possibility to receive information. Service stations usually depend on the information provided by their own business chain and local entrepreneur associations. The managers were generally interested in finding a more general perspective.

The classification of the managers who volunteered to receive messages of The Milliards Game further shows that about half of them are fact-oriented or individualists. The other half are more socially oriented and prefer a wide perspective. Generalising it can be stated that small enterprises generally have a lot of fact-oriented managers, while medium-sized enterprises have a greater share of socially oriented managers and the managers of large enterprises have a more general orientation.

The Milliards Game had a greater number of enterprises under intensive survey than, for example, typical research projects on the productivity of the working environment. The large number of enterprises included in the intensive survey was justified because the results and effects were expected to appear slowly, after several years. This is the case, for instance, in measuring the effects on the basis of workplace accidents, since official statistics on accidents take three years to complete.

Postal inquiry in 1998

The questionnaire for the postal inquiry that concluded the project was mailed in January 1998 to the enterprises representing the three branches that had started their operation by April 1995. In both inquiries, the name and address data were drawn from the business register of Statistics Finland. According to the registered data, the number of Central-Finland-based enterprises in these three branches in 1998 was 716.

Both in 1995 and in 1998 the postal inquiry was
addressed directly to the entrepreneurs and managing directors, and they were also asked to fill in the questionnaire personally and return it in the return envelope. One written reminder was sent for each inquiry.

By the deadline in 1998, a total of 32.9% of the entrepreneurs and managing directors had returned their questionnaires. All except four were men. 11 questionnaires (4.8%) had to be rejected because of incomplete data, so the total number of accepted questionnaires was 225. The response rate was considerably higher in the second inquiry compared to the first one.

The results of the inquiry made in 1998 showed that a considerable share (41.8%, n=94) of the managers reported that they had heard of The Milliards Game and knew its products. 21.3% (n=48) reported that they had both listened to the radio broadcasts and read the publications of The Milliards Game. 18.7% (n=42) reported they had only listened to the radio broadcasts and 1.8% reported they had only read the publications. 50% of the enterprises are located in the Jyväskylä region, 36% in northern and 14% in southern Central Finland.

The total number of employees in the enterprises that followed The Milliards Game, entrepreneurs and managing directors included, was 1027. They employed on average 11 persons. Most enterprises (80%) were operating at full capacity, and one fifth (20%) at reduced capacity. No enterprises had suspended their business operation. Half of the enterprises (51%) had been in business for more than 10 years, a generous third (35%) 6-10 years, and the rest (14%) under 5 years. The enterprises were divided between the three branches so that 55% represented the metal industry, 33% were building constructors and 12% were service stations.

Moreover, the results of the postal inquiry made in 1998 show that other managers (57.3%, n=129) knew The Milliards Game only by name and two managers had never even heard of it. Out of their enterprises, 59% were located in the Jyväskylä region, 28% in northern Central Finland and 13% in southern Central Finland. The number of employees in the enterprises whose managers knew The Milliards Game only by name was 1912, entrepreneur and manager included. They employed on average 15 persons. The employment situation in these enterprises was virtually similar to the situation in the enterprises whose managers were interested in The Milliards Game: 77% were operating at full capacity, 15% at reduced capacity and 5% had suspended their operation. Half of the enterprises (49%) had been in business for more than 10 years, less than one third (31%) 6-10 years, and one fifth (20%) under 5 years.

Results

Postal inquiries

Economic development in enterprises

The enterprises that volunteered to receive the messages of The Milliards Game had on average grown during the project. About one in four enterprises displayed a particularly strong growth, and the biggest growth rates were recorded for the biggest among the small enterprises. These enterprises doubled their personnel between 1995 and 1998. During the project, the enterprises (n=31) had recruited a total of 185 new employees by the end of 1997. With the exception of service stations, growth rates were high also in terms of turnover.

Compared to the situation three years ago, the employment situation in the enterprises of these three branches has remained largely unchanged. The biggest difference is observed in the improved profitability of business operation. In 1995, 69% of the enterprises reported profitable or highly profitable operation, in 1998 the figure was up to 75%.

However, the development has not been similar in all three branches. Economic success seems to have improved all the time in metalworking enterprises, despite the rapid growth and heavy investments. Year 1995 was rather gloomy for building construction, but 1996 was much better. In the spring of 1997, when the material for The Milliards Game was recollected, the situation in industry and building construction was already better than expected. By contrast, the economic situation of service stations seemed to have grown even worse. In their case the future development is affected not only by domestic demand but also by the severe competition. Underlying this development are the increasing
number of unmanned stations and changes in the ownership and business policies of the oil chains.

Status, family relations and hobbies of the managers

During the three years the status of the managers in the enterprises, their family relations and appreciation of the home and family have not changed. In 1995 the share of owner-managers was 85 % and that of hired managers 15 %, while the corresponding figures for 1998 were 86 % and 14 %. Both in 1995 and 1998 a majority of the managers were married or cohabiting and considered their home and family to be of central importance to their work.

On the other hand, during the three years the leisure activities of all managers had increased considerably. Hunting, fishing and backpacking had increased by 22 %, and keep-fit exercises, jogging and spectator sports had increased by 15 %. However, the priorities of leisure activities had not changed. The number of managers engaged in competitive sports remained small or had even decreased (Table 1).

In 1995, 65 % of the managers did keep-fit exercises, jogging and spectator sports, but by 1998 their share is up to 80 %. Hunting, fishing and backpacking came second, in 1995 they were listed by 37 % and in 1998 59 % of the managers. In 1998, one difference in the leisure activities of managers was that those interested in The Milliards Game were also generally more interested in associations (34 %/27 %).

During leisure activities the thoughts of the managers were often (71 %) or sometimes focused on work. A comparison of all managers shows that the workload and concerns of the managers had generally remained unchanged during the three years. However, if the material for 1998 is divided into two parts, it turns out that 10 % of the managers interested in The Milliards Game think about their work during out-of-work time less frequently than other managers.

More information is needed

During the three years the need of product development information has increased significantly (Table 3). The managers need of information on occupational health has also increased. On the other hand, the need of information on EU directives and other international issues and recruiting and use of labour now has a lower priority than before.

A clear difference in the answers of the managers is also that in 1998 they needed more information on a greater variety of things than in 1995. In 1995, they stressed two and in 1998 four things, of which they needed more information. The four most important things that more than half of the managers nowadays emphasise are the development of working methods, economic issues, product development and business management.

The other thing, of which more information was wanted, was in five cases taxation, in four cases marketing, while the following were mentioned once: business presentations, cooperation between enterprises, business operation, indicators of competitiveness and their changes, work legislation, running down an enterprise, and financing channels.

Training and development measures

The comparisons show that during the past three years the enterprises have adopted a very active approach to developing their operation. In a majority (71 %) of the enterprises training and development measures were taken in 1997 by either external or
**Table 1.** Leisure activities of managers in 1995 and 1998. Activities are listed in order of prevalence in the form of percentages based on the affirmative answers of managers

<table>
<thead>
<tr>
<th>Leisure activities of managers in 1995</th>
<th>%</th>
<th>Leisure activities of managers in 1998</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Keep-fit exercise, jogging, spectator sports</td>
<td>65</td>
<td>1. Keep-fit exercise, jogging, spectator sports</td>
<td>80</td>
</tr>
<tr>
<td>2. Hunting, fishing, backpacking</td>
<td>37</td>
<td>2. Hunting, fishing, backpacking</td>
<td>59</td>
</tr>
<tr>
<td>3. Reading, studying</td>
<td>31</td>
<td>3. Reading, studying</td>
<td>54</td>
</tr>
<tr>
<td>4. Association activities</td>
<td>23</td>
<td>4. Association activities</td>
<td>30</td>
</tr>
<tr>
<td>5. Painting, sculpture, music, etc.</td>
<td>10</td>
<td>5. Painting, sculpture, music, etc.</td>
<td>16</td>
</tr>
<tr>
<td>6. Competitive sports</td>
<td>7</td>
<td>6. Competitive sports</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table 2.** Needs and resources for developing working conditions and occupational health in enterprises in 1995 and 1998. The prevalence of factors indicating development needs is characterised by the affirmative answers of the managers

<table>
<thead>
<tr>
<th>Development needs and resources in 1995</th>
<th>%</th>
<th>Development needs and resources in 1998</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for improvement in working conditions</td>
<td>88</td>
<td>Need for improvement in working conditions</td>
<td>92</td>
</tr>
<tr>
<td>Health and accident risks are known</td>
<td>86</td>
<td>Health and accident risks are known</td>
<td>89</td>
</tr>
<tr>
<td>Own resources sufficient for acquiring information</td>
<td>38</td>
<td>Own resources sufficient for acquiring information</td>
<td>58</td>
</tr>
<tr>
<td>Able to use expertise in development</td>
<td>59</td>
<td>Able to use expertise in development</td>
<td>68</td>
</tr>
</tbody>
</table>

**Table 3.** Need of more information reported by managers in 1995 and 1998. The needs are listed in order of importance as percentages based on the affirmative answers of the managers

<table>
<thead>
<tr>
<th>Managers need more information in 1995</th>
<th>%</th>
<th>Managers need more information in 1998</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the development of work methods</td>
<td>59</td>
<td>On the development of work methods</td>
<td>72</td>
</tr>
<tr>
<td>Economic issues</td>
<td>57</td>
<td>Economic issues</td>
<td>68</td>
</tr>
<tr>
<td>EU directives, etc.</td>
<td>46</td>
<td>Product development</td>
<td>63</td>
</tr>
<tr>
<td>Business management</td>
<td>42</td>
<td>Business management</td>
<td>54</td>
</tr>
<tr>
<td>Recruiting and use of labour</td>
<td>39</td>
<td>Occupational health</td>
<td>47</td>
</tr>
<tr>
<td>Industrial safety</td>
<td>37</td>
<td>EU directives, etc.</td>
<td>46</td>
</tr>
<tr>
<td>Occupational health</td>
<td>33</td>
<td>Industrial safety</td>
<td>45</td>
</tr>
<tr>
<td>Product development</td>
<td>29</td>
<td>Recruiting and use of labour</td>
<td>38</td>
</tr>
<tr>
<td>Something else</td>
<td>12</td>
<td>Something else</td>
<td>7</td>
</tr>
</tbody>
</table>
internal experts. Earlier, in 1995 only 48% of the enterprises reported that they had corresponding reform or development projects aimed at improving the quality of the working environment, work methods, workplace atmosphere, etc.

In every third enterprise (33%) external experts provided training in information technology, in every fourth enterprise (24%) they arranged quality training and in every fifth enterprise (19%) they provided training on technological upgrading. In every fourth enterprise in-house training concentrated on technological upgrades (29%), quality training (27%), expansion and renovation of production (23%) and realisation of product development (22%). Other training and development activities realised by external experts were exports, marketing, financial accounting, risk assessment and environmental systems (Table 4).

As a whole, external experts realised 324 (on average 2.1) training and development measures in the enterprises in 1997, while in-house experts realised 373 (on average 2.4) training and development measures. Roughly one third do not have any training and development measures running.

Enterprise development

All except two managers saw the best security for the economic stability of their enterprises, their families and themselves to lie in maintaining their enterprise/workplace competitive. There was an almost equally complete consensus that maintaining the workplace competitive required every member of the working community to have comprehensive and up-to-date know-how.

Self initiative and correct information play a key role in the development of working environments and working communities. During the past three years have reached an even higher consensus of this. Usually investments in improvements of working community repay themselves in the future, of which the managers were also more convinced in 1998 than in 1995. A majority of the managers also think that discussing work and working environments in public also promotes the qualitative development of enterprises.

Modern media provide an effective way to make information that is useful for the development of enterprises available to the enterprises. Some changes can however be observed to have taken place during the three years. It is evident that the managers now single out the media most suitable for the development.

This result is consistent with the results of assessments of the suitability of different media. As already stated, instead of television, videos and information networks people tend to prefer more conventional communications such as radio, newspapers and company visits. Compared to the situation three years ago, managers today are less overwhelmed by the complexity or extent of laws and regulations concerning working environments and occupational health (Table 5). After all, these belong to the key issues that have been addressed extensively by The Milijards Game. A majority of the managers (64%) think that the usefulness of the media in this kind of projects could be improved by workplace-specific introduction courses. This result is fully in agreement with the results obtained by the inquiry made during the company visits of the spring of 1997 (see the discussion of the introduction courses into media below).

More support and attention to small enterprises

Two thirds (62-65%) of the managers think that they receive enough information on labour protection and occupational health from labour protection authorities and occupational health personnel. In other words, 38% of the managers do not receive enough information from labour protection authorities and 35% do not receive enough information from occupational health personnel. A total of 96 managers (43% at all respondents) regard the information flow as inadequate. Every third (31%) manager does not receive sufficient information from either party.

This is particularly harmful to the development of working environments because more than a half (56%) of these enterprises not reached by official labour protection and occupational health information have poor or inexistent own resources for the acquisition of such information. A significant part (43%) of these managers also report that they cannot exploit available expertise in the development of their
Table 4. Training and development activities realised by external and internal experts in 1997. The prevalence of the training and development activities in the enterprises is characterised on the basis of the affirmative answers given by the managers in 1998.

<table>
<thead>
<tr>
<th>By external experts</th>
<th>%</th>
<th>By internal experts</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information technology training</td>
<td>33</td>
<td>Technological upgrading</td>
<td>29</td>
</tr>
<tr>
<td>Quality training</td>
<td>24</td>
<td>Quality training</td>
<td>27</td>
</tr>
<tr>
<td>Technological upgrading</td>
<td>19</td>
<td>Expansion/renovation of production</td>
<td>23</td>
</tr>
<tr>
<td>Expansion/renovation of production</td>
<td>14</td>
<td>Realisation of product development</td>
<td>22</td>
</tr>
<tr>
<td>Realisation of product development</td>
<td>12</td>
<td>Information technology training</td>
<td>19</td>
</tr>
<tr>
<td>Labour protection program</td>
<td>11</td>
<td>Labour protection program</td>
<td>18</td>
</tr>
<tr>
<td>Management training</td>
<td>11</td>
<td>Workplace atmosphere charting</td>
<td>9</td>
</tr>
<tr>
<td>Workplace atmosphere charting</td>
<td>8</td>
<td>Reform of wage forms</td>
<td>9</td>
</tr>
<tr>
<td>Introduction of teamwork</td>
<td>7</td>
<td>Introduction of teamwork</td>
<td>8</td>
</tr>
<tr>
<td>Reform of wage forms</td>
<td>4</td>
<td>Management training</td>
<td>4</td>
</tr>
<tr>
<td>Something else</td>
<td>5</td>
<td>Something else</td>
<td>1</td>
</tr>
<tr>
<td>Nothing</td>
<td>29</td>
<td>Nothing</td>
<td>29</td>
</tr>
</tbody>
</table>

Table 5. Managers' responses to the claims presented in the questionnaires of 1995 and 1998 concerning self-initiative, costs, benefits, and the media in the development of the workplace and working environment. The managers' responses to the presented claims are characterized on the basis of their affirmative answers.

<table>
<thead>
<tr>
<th>Claims</th>
<th>In 1995 (%)</th>
<th>In 1998 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent and useful actions for the qualitative development of working environments are achieved by encouraging the people at workplaces to take initiative and providing them with correct information</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>The costs of and contributions made for qualitative development in enterprises can be regained as various benefits in the future</td>
<td>86</td>
<td>90</td>
</tr>
<tr>
<td>In general, talking about issues related to working environments and working communities in public would serve to encourage people to develop their work and working environments</td>
<td>93</td>
<td>92</td>
</tr>
<tr>
<td>The laws and regulations concerning working environments and occupational health are so complicated and wide in scope that they call for a new method of information dissemination that would reach even the smallest enterprises</td>
<td>84</td>
<td>80</td>
</tr>
<tr>
<td>Modern media (radio, television, press) provide effective channels for making information useful for the development of enterprises available to them.</td>
<td>82</td>
<td>70</td>
</tr>
</tbody>
</table>
During the three years the number of managers receiving sufficient information and occupational health has decreased by one percent and the number of those receiving enough information of labour protection by six percent. The managers who consider the received information insufficient usually manage enterprises employing 1-4 persons or are self-employed entrepreneurs. Out of all such dissatisfied entrepreneurs and managers of small enterprises, 69% do not receive enough information of occupational health or labour protection. Out of all managers dissatisfied with the availability of information on occupational health and/or labour protection, 12% manage enterprises of 1-4 employees established less than 5 years ago, 22% manage enterprises established 5-10 years ago and 36% manage enterprises older than 10 years.

The managers receiving insufficient information are classified by the size and age of the enterprise in the European fashion into enterprises employing 1-9 and those employing more than 10 persons (Figure 4). It is worth noting that the number of managers receiving insufficient information grows with the age of the enterprise. Half of them work in enterprises older than 10 years. This association is also true for enterprises employing more than 10 persons.

Listening to the radio at the workplace

During the three years daily radio listening at the workplace during working hours has become more common among both managers and employees. The increase in daily radio listening is ten percent among entrepreneurs and managers and 18% among workers. In 1998, a total of 62% of the managers report that the management listens to the radio and 80% report that their employees listen to the radio. There is no difference in the listening frequency between the seasons, people do listen to the radio equally often in spring and in autumn; this is the opinion of 93% of the managers who report radio listening in their enterprise.

In 129 enterprises (in 57% of the enterprises) both the management and the employees listen to the radio daily at the workplace (Figure 5). In most enterprises employing 1-9 persons (87%) both the managers and employees listen to the radio. In enterprises employing more than 10 persons both the managers and employees listen to radio much less frequently (13%).

In every fifth (20%) of all enterprises the employees do but the management does not listen to the radio at the workplace (Figure 6). Out of the enterprises that employ more than 10 persons, almost 60% report that only the employees listen to the radio. The prevalence of radio listening increases tens of times in enterprises employing 10-49 persons when the age of the enterprise grows from five years to over 10 years.

Computers, e-mail and information networks

A majority of Central-Finland based enterprises (69%) use computers or e-mail services. Although they are typical media used in modern communication, data transfer and processing, their use varies according to company size. While they are commonly used in almost all (96%) enterprises with more than 10 employees, only 71% of the enterprises with 5-9 employees and 57% of the enterprises with 1-4 employees use them.

Managers generally (70%) consider information networks (such as the Internet) a good thing, but do not find it useful for their enterprise. There are even more managers (76%) who think that today's development needs in enterprises are much more down-to-earth than the introduction and exploitation of information networks. Managers of enterprises with more than 10 employees consider the introduction of information networks the least useful. As many as 87% of them share this view. As a whole, only 7 managers of the bigger enterprises using information technology regard information networks as very suitable media. This is significant, because these are the very managers who have the most personal and enterprise specific experiences of information networks.

To maximise the use of computers and information networks in small- and medium-sized enterprises, a majority of the managers (71%) think that the information available in the networks (research data in different languages, network publications, statistical data and data on partnership, research and development programs) should at least be made available to the enterprises in a summarised, easily...
Fig. 4. Percentages of managers receiving too little information on occupational health and labour protection issues according to the age and size of the enterprise (n=97)
Fig. 5. Prevalence of listening to the radio at the workplace during working hours (%) among managers and employees according to the size and age of the enterprise (n=129)

ACES 10 (1-2) 1998
Fig. 6. Prevalence of listening to the radio at the workplace (%) among employees according to the size and age of the enterprises (n=45)

ACES 10 (1-2) 1998

31
Suitability and combined use of the media

Over one half (52%) of the managers of enterprises (n=129) where both the management and the employees listen to the radio daily at the workplace consider radio a very suitable medium. The managers interested in The Milliards Game (n=94) consider radio (48%), newspapers (44%) and company visits and lectures (43%) as very suitable media with a view to the reform and development of work and production environments and invoking discussions, ideas and incentives related to them.

The three media were also singled out as very suitable by the managers (n=131) who knew The Milliards Game only by name or did not know the project at all. The priorities of the very suitable media (radio 34%, newspapers 32%, company visits and lectures 30%) is also the same, although the differences between the media are not as strong as with the managers interested in The Milliards Game. Here too, the less suitable media were television, information networks and video.

In the answers of all managers (n=225) the priorities of the very suitable media are radio (40%), newspapers (37%) and company visits with lectures (36%), television (27%), information networks (19%) and video (18%).

The significance of radio as a medium increases with decreasing workplace size. Especially in small enterprises of 1-4 employees, family enterprises or one-man enterprises radio is very popular. In enterprises of 5-9 employees, the managers saw radio equally suitable as newspapers and company visits with lectures. Although the employees of big workplaces listen to the radio more often than the managers, the managers find the most suitable way to disseminate information to be company visits and lectures. They rate radio and newspapers the second most suitable way (Figure 7).

Company visits in 1997

During the visits to enterprises in the spring of 1997 the participants were asked to detail their views on the media used in The Milliards Game, or, more generally, their opinion of the role of information in the operation and competitiveness of their enterprise and workplace (see also j in Endnotes).

Radio is effective

The inquiries concluding the visits to enterprises also charted the opinions of the employees. The results show that both the managers and the employees find radio programs interesting and useful, if they listen to radio at all (Figure 8). The people who listen to the radio broadcasts of The Milliards Game during work, while driving or at home in the evening consider radio a very suitable provoker of conversation and new ideas. Those who listen to the radio programs find the poster publication and the newspaper the second most suitable media. Those who for some reason do not listen to the programs of The Milliards Game regularly find visits to enterprises the most suitable provoker of conversation and new ideas. They too find newspapers the second most suitable medium. As the results of the inquiry that concluded The Milliards Game in 1998, managers of bigger enterprises listen to the radio at the workplace less frequently than the employees. In this respect the results obtained during visits to enterprises are consistent with the results of the postal inquiry.

However, with a view to the acquisition of new personal skills and the development of the working environments, it is not crucial which medium originally gave the idea. But it is essential that the people in the enterprises do follow the information on a regular basis and know what issues of personal or workplace interest the news now offers. One service station manager puts it: “it is important that we follow the media and learn to pick the relevant information that we can apply in our own work. Ultimately it always serves our own interests.” A good way to ensure the availability of information is to listen to the retransmissions or cassette copies of the programs at a convenient time. If even this is not possible, you can always ask somebody else to listen to the program and summarise it to you. If even this cannot be arranged, it is always possible to read the poster publication or newspapers.

Introductory courses to the use of media

In general, enterprises and working communities can
make the better use of new information and recycled experiences, the higher the number of people who have an opportunity to follow the media. To make the best use of available information, Central Finland based enterprises want to increase the combined use of various electronic and graphic media, such as radio, newspapers, videos and visits by experts in their own development and training projects. According to a majority of both the managers and employees (63 %) the usefulness of the media can also be improved by arranging introductory courses on the use of the media at workplaces. Such training is considered necessary irrespective of whether the enterprise has made efforts to improve the preconditions for the use of the media. The managers and employees with the most favourable attitude to the introductory courses are those of metalworking enterprises, while service station entrepreneurs have a more negative attitude than other entrepreneurs (Figure 9).

Special ways to make radio listening more effective

Besides the workplace-specific introduction courses and improvement of the preconditions for following the media, the personnel of the enterprises feel that listening to the radio could also be made more effective in the following way. A majority of the managers (72 %) think that the effectiveness and availability of radio programs could be further improved by making cassette copies or cassette copies accompanied by written summaries and supplements. Almost an equal share of the employees (71 %) are in favour of cassette copies and written summaries. Moreover, almost all (80 %) of the service station managers and employees share this view. Another means to improve radio listening preconditions suggested by the employees (68 %) is establishing a special enterprise/workplace channel. A special channel is desired above all by the employees of the metal industry (76 %), managers of building firms (70 %) and a majority (71 %) of the managers and employees who listen to the radio regularly. Most employees of building firms (86 %), in turn, stress the importance of receiving written summaries of the radio programs in advance. On the other hand, a small minority of the employees and managers favour the establishment of a special program register. Only a couple of persons suggested some other means to make radio listening more effective. People's views on enhancing radio listening did not differ by company size.

Internal communication atmosphere does count

Besides the improvement of the preconditions for following external information sources, it is also important that within the enterprise and the working community information, opinions and ideas and experiences can be expressed freely and communicated without delay, distortion or obstruction from one person to another. Enterprises with an open and effective communication atmosphere are also considerably more willing to receive new information and ideas via mass media than enterprises of the same size with an ineffective communication atmosphere (Figure 10).

Differences between enterprises can be even fivefold. Most of the small enterprises with less than 19 employees and a good internal communication atmosphere are expanding their operation, engaged in exports, or subcontracting to big enterprises. The particular commitment of their personnel to maximising the benefits and support gained by following different media reflects the positive example set by the manager and his favourable attitude towards the use of media and related introduction courses. When the number of personnel increases, differences in the attitudes towards the media between managers and employees also increase. In enterprises of more than 20 employees and an effective or ineffective communication atmosphere the employees are considerably more eager to enhance the exploitation of the media than the managers.

Summarising the results it can be stated that small enterprises with a good and effective communication atmosphere are eager to receive new information and influences. In small companies the need to maximise the benefits of the media is particularly dependent on the manager's favourable attitude (see also k in Endnotes).

In this light it is important with a view to the development of different working communities that the new information, ideas and experiences of proven procedures are available to all members of the
Fig. 7. Managers' and entrepreneurs' opinions of the suitability (%) of different media for workplaces of different sizes (n=225)
Listen to radio

Do not listen to radio

Fig. 8. Opinions of managers and employees who do or who do not listen to radio regularly during work (%) on very suitable media (n=60)
Combined use is more effective

A majority of the managers and employees think that media used in suitable combinations support each other and give added weight to the messages. On the other hand, the effects of the combined use depend on the level of activity and on the effect in question. For example, 77% of the respondents think that the best provoker of ideas and discussion is radio listening combined to reading of poster publications and company visits. This result coincides with the views of the managers presented above under the results of the 1998 questionnaire. A somewhat smaller share of the personnel in the enterprises think that radio listening combined to company visits alone are effective in provoking discussion and inducing ideas. On the other hand, assistance and support for development measures can best be received by the combined use of radio, poster publication, newspaper, company visits and videos. This view is shared by 68% of the managers and employees. Radio, poster publication and company visits together are second most effective (67%) in assisting reform and development measures.

Effective observation of the program and news flow is also best ensured by flexible combined use of several media. It is a well-known fact that one's own interest and commitment notwithstanding, the nature of the work or situation may determine, whether an interesting idea can be captured by listening to the radio, from an expert during a visit or by reading newspapers. Sometimes ambient noise may make radio listening impossible. In other words, when used separately radio, newspapers or company visits may suit some situations, branches of industry and enterprises better than some other. Therefore we should bear in mind the results of both the postal inquiry and the inquiry during the company visits indicating that radio, newspapers and company visits are very suitable media to be used in combinations.

Ergonomic aspects and prevention of accidents

To assess the effectiveness of the messages of The Milliards Game the producers decided in their editorial meeting of 1996 to pay special attention to the ergonomic aspects of the work and working environment (see d, i in Endnotes). For measurement reliability, the decision was not disclosed to others. Besides popularising the concept of ergonomics and transmitting good examples special emphasis was also placed on the ways in which everybody can take initiative to improve the preconditions of work at their workplaces, how ergonomics and prevention of accidents are related and what benefits improved ergonomics may bring. Ergonomics were discussed repeatedly in the radio programs, poster publication and newspapers during the autumn of 1996. Ergonomic messages were most frequently transmitted via radio.

The information collected during the first and second half of 1996 and 1997 shows that the interest in ergonomics increased greatly among the target group. Once started, the improvement of ergonomics still continued in 1997. The keenest interest in ergonomics arose in metalworking and service station enterprises. The interest was reflected above all in considerable improvements in the working environment.

The most permanent effects of the information flashes could be recorded for metalworking enterprises. In 1996 metalworking and service station enterprises also paid much more attention to the prevention of accidents than in 1995. The favourable development in the prevention of accidents in metalworking enterprises also continued in 1997. By contrast, in building construction firms the information flashes concerning ergonomics and the prevention of accidents had a much weaker effect in both 1996 and 1997. Compared to the situation in 1995, the prevention of accidents in building construction did not seem to improve at all in 1996. Likewise, the development of ergonomics in building construction enterprises in 1997 seemed to revert to the level of 1995 (Figure 11).

The change in the managers satisfaction in the development of ergonomics is particularly pronounced in the enterprises where both the employees and the manager regard radio as a very suitable medium to provoke discussion and ideas (Figure 12). The increase in the manager's satisfaction was particularly high where the employees considered radio a very suitable medium
Fig. 9. Promotion of the use of media in relation to occupational status by branches of business (n=60)
Fig. 10. Promotion of the use of the media in relation to company size and communication (n=60)
and received new ideas via it. A highly positive
development was originated by the information
flashes in 1996 and was still going strong in 1997.
The results indicate that radio has a considerable
influence on development measures in particular in
enterprises with several ergonomic faults and poor
working conditions. Likewise, a combination of two
media, one of which is radio, seems to provoke ideas
and discussion, resulting in increasing satisfaction
among managers.

The managers satisfaction with the prevention of
accidents does not increase as strongly in the
enterprises where the employees and the manager
consider radio as a very suitable medium (Figure 13).
The managers satisfaction with the prevention of
accidents grows most in the enterprises where the
employees list two very suitable media, one of which
is radio. As in the case of ergonomics, in the case of
the prevention of accidents, the managers' satisfaction also changes least between 1995 and
1997 in the enterprises where out of the media used
by The Milliards Game (excluding radio) only some
other single medium is considered very suitable or
where no medium is considered a suitable provoker
of discussion and ideas.

The management of ergonomics, the prevention of
accidents and general satisfaction with the working
conditions have significant correlations. In particular
during the information flashes of 1996 even a
relatively small increase in the general satisfaction
with the ergonomics of the work and the workplace produced a marked increase in the satisfaction with
the working conditions. This association is
characterised in more detail in the corresponding
figure (Figure 14). When the managers' satisfaction
with the development of ergonomics increases by
one unit from 2 (passable) to 3 (satisfactory), their
general satisfaction at the workplace increases by 1.6
units. Both in the case of the development of
ergonomics and the prevention of accidents the growth of the general satisfaction level slows down
once the satisfactory level (3) has been reached
(lower part of Figure 14).

This leads us to the conclusion that even small
changes and improvements made under poor
conditions markedly increase the general satisfaction
with the working conditions. On the other hand, in
good conditions increasing the general satisfaction in
the working conditions requires a considerable
increase in the development of ergonomics and
prevention of accidents.

Improving the preconditions for using the media

It is obvious that the main point in ensuring the
reception and application of messages is that the
enterprise makes active efforts to improve the
preconditions of using and following the media. While the preconditions of using the media are
improved, it is also ensured that the messages, ideas
and information reach the very people who need
them at the workplace. This, in turn, improves the
application of ideas, promotes ergonomics and every
kind of development of the working environments.

As shown in the figure, the change in the managers' satisfaction or dissatisfaction with the development
of ergonomics is related to the development of the
preconditions for using the media (Figure 15). If the
employees feel that the preconditions for using the
media have not improved, the ergonomic messages
have not reached the employees, and no
improvement in the ergonomics of the work and
working environments has been achieved. This, in
turn, reflects in an increase in the managers' dissatisfaction from 1995 to 1997. The same relation
is also displayed in the managers' satisfaction with
the prevention of accidents (Figure 16).

Interviews

Attitudes towards development

The results of the interviews made in the enterprises
in the autumn of 1996 show that the attitudes had
turned more favourable since 1995, i.e., in one year,
in over a half of the target group companies (Figure
17). The most favourable development had taken
place in the metal industry and the least favourable
development in service stations.

A significant statistical correlation can be found
between the development of attitudes and the support
given by The Milliards Game to the development
work. Almost a half of the enterprises (44 %) report
that The Milliards Game has also supported other
development activities during the previous year.
Most support has been given to service stations, and
Fig. 11. Change in ergonomics and prevention of accidents in three years (1995 - 1997) among the target group enterprises \((n = 31)\). The change has been characterized by the differences in the arithmetic group means of the target enterprises. Basic period of comparison is the year 1995.
Fig. 12. Change in the managers' satisfaction with the managements of ergonomics in three years (1995-1997) in the target group enterprises in relation to the employees' and managers' assessment of the suitability of different media for provoking new ideas and inspiring conversations. The change has been characterized by the differences in the arithmetic group means of the target enterprises. Basic period of comparison is the year 1995.
Radio is a very suitable medium (n = 21)

Employees 95/96
Employees 95/97
Managers 95/96
Managers 95/97

Two very suitable media, one is radio (n = 20)

Employees 95/96
Employees 95/97
Managers 95/96
Managers 95/97

Two or more very suitable media (n = 23)

Employees 95/96
Employees 95/97
Managers 95/96
Managers 95/97

One or no suitable medium (n = 21)

Employees 95/96
Employees 95/97
Managers 95/96
Managers 95/97

Fig. 13. Change in the managers' satisfaction with the prevention of accidents in three years (1995-1997) in the target group enterprises in relation to the employees' and managers' assessment of the suitability of different media for provoking new ideas and inspiring conversations. The change has been characterized by the differences in the arithmetic group mean values of the target enterprises. Basic period of comparison is the year 1995.
Fig. 14. Association between satisfaction with working conditions, management of ergonomics and prevention of accidents among managers during 1996 and 1997 (pooled values; n=58, n=59)
Fig. 15. Change in the managers' satisfaction with the managements of ergonomics during three years (1995-1997) with respect to the employees' and managers' opinion of how the preconditions of using and attending to media had been improved in the enterprises (n=60)

Fig. 16. Change in the managers' satisfaction with the prevention of accidents during three years (1995-1997) with respect to the employees' and managers' opinion of how the preconditions of using and attending to media had been improved in the enterprises (n=60)
reorganisation of work has been the project type that has received the most support. The Milliards Game has also been helpful to enterprises expanding their operation.

Furthermore, many enterprises noticed that the ideas of The Milliards Game supported the work already under way in the enterprise. According to the managers, in one enterprise out of four The Milliards Game is found to be helpful for their existing development work and every tenth enterprise reports that The Milliards Game has helped in launching a development project.

In general, the effects of The Milliards Game appeared to have an inverse correlation with company size: the change of attitudes was visible above all in the smallest enterprises.

Listening to the radio in the Jyväskylä region

In the light of the feedback received and the survey made by the research company Finnpanel Oy Ltd. an increased interest in and favourable attitude towards the development of working environments and working communities can also be found among the general public, i.e. among thousands of listeners in Central Finland. The listener survey interviewed 250 - 300 listeners four times per year, which makes a total of 1500 people living in Central Finland.

According to the results of this national radio listener survey, on Thursday mornings between 9 and 10 the programs of The Milliards Game broadcast at the frequency 99.3 MHz of Radio Central Finland attracted as many listeners as all the other channels in the Jyväskylä region together (Figure 18).

Discussion

The Milliards Game has been a great challenge to the producers: the main idea of the project has been to develop a communication method and find the media that in versatile combinations are suitable for disseminating information to small enterprises. Thus the project has primarily sought a solution to the central problem of conventional institutionalized training: how to contact the trainees. This is not only a Finnish problem but one of global dimensions.

A real challenge has also been the fact that the realization of the project has been mainly in the hands of a group of only three persons, who have worked hard to define the preconditions of good work. The experiences gained from the realization of The Milliards Game are significant, for instance, because in Finland products related to the development of working environments and communities are published and distributed by several agents and units without giving much consideration to the overlaps in their products, the effectiveness of individual products or their applicability to their target.

The Milliards Game has by its procedure proven that it is possible to reach the very firms that are particularly problematic in terms of the availability of conventional institutionalized training and that were specifically targeted by the original plan of this training and development project.

On the other hand, the project was able to show that extensive and coordinated editorial work to make the contents of scientific publications known and understood can be realized with relatively small resources and making extensive use of distance working. The Milliards Game was realized by three full-time professionals working in Jyväskylä and Tampere. The project also revealed that a qualified "interpreter" is needed between the producers and recipients of information, irrespective of the channel or medium used. This intermediating agent between the producer and the recipient may considerably enhance the flow and understandability of information.

However, in this kind of work success is not granted. Above all it requires mutual trust, openness and appreciation of the professional skills of everybody, the same things the producers of The Milliards Game have emphasized in their messages to the personnel of Central-Finland-based enterprises. It is also encouraging to note that such excellent results could be achieved without giving any financial support to the enterprises or requesting a written commitment (see also m in Endnotes).

Positive examples are encouraging

Throughout the project the main theme was the
procedures of organisations. The realisation proceeded according to the principles of editorial work: certain guidelines were approved for the duration of the entire project but details were not fixed and were decided in editorial sessions. All in all, the project dealt with many themes that are crucial for the competitiveness and feasibility of enterprises but have been addressed rather little in previous training projects in Finland.

The target groups of The Milliards Game were the general public, all Central-Finland based enterprises, enterprises of three branches and, representing them, a small group of enterprises included in the intensive monitoring and information consisting of metalworking, building construction and service station firms. Generalizing, it can be stated that during its three years of operation The Milliards Game has transmitted information, ideas and experiences to hundreds of enterprises and thousands of people. The main goal has been to encourage, induce and use the media to support people to take an active role in the development of their own work and working environment, to take care of their own health and safety and those of others, and thus promote the competitiveness of their enterprise and working place in the European domestic market.

One of the goals of The Milliards Game was to convey changes from the attitudinal level of personnel to the operational level and, thus, to people's new modes of action which in the final end means a more successful enterprise. The means included the dissemination of information and experiences and examples of cost reductions, improved capacity to function and efficiency, good workmanship, product and working life. Instead of examples that are intended to arouse guilt or are otherwise negative, a conscious effort was made during the project to present primarily positive examples and effective tried solutions. When deciding the content, the producers have proceeded from the view that positivity is a better motivator of people than negativity. The apparent positive change in attitudes towards the development tells us that this goal was actually attained during the project. It shows that the mode of dealing with subjects was the correct one.

**The method enables reaching the trainees**

Although the general attitude towards The Milliards Game has been favourable, the impacts have been inversely proportional to enterprise size. They are apparent in the smallest units that are led by fact-oriented managers. For that reason, and due to the differences in the work cultures of large and small firms, activity of The Milliards Game type suits small enterprises better than big ones.

This is a significant discovery since the majority of Finnish enterprises are small. The economic weight of information as well as the diminishing amount of occupational health and safety information provided by authorities to small enterprises stress the need of communicating information by modern media. The lack of official channels as well as the scarcity of resources have often caused that dispersed small workplaces have in effect been left outside statutory monitoring or occupational health care to fend for themselves. The 1995 postal inquiry of The Milliards Game already showed that half of the enterprises had had no contact with occupational health care professionals or employment authorities for months, or even years. The same amount of time had lapsed in the case of about two-thirds of the enterprises since their last contact with a labour protection authority or a labour relations expert (Manninen 1995).

**Preconditions for use of various media**

Radio, the print media and company visits distinguished themselves as the most suitable forms of communication. The print media of The Milliards Game consisted of a newspaper-type tabloid and a poster publication. Although the poster publication is a totally new product and was well received by the work community, it would seem best for the future to publish also smaller leaflets that the recipient may take along. It is important to keep the content of the tabloid businesslike while the issues dealt therein can be classified by themes or fields of activity.

In addition to presentations, the efficacy of company visits can also be boosted by campaigns and demonstrations that are brought as near to the
Fig. 17. Development of attitudes during one year (from 1995 to 1996) in the target group enterprises (n=32)

Fig. 18. Listening to radio in the Jyväskylä region in Thursday mornings at 9-10 in year 1996 (n=1500)
target enterprises in industrial areas and parks as possible. In the case of mass meetings and coordinated visits by experts, it is necessary to develop as functional frameworks as possible—technically as well as from the viewpoint of interaction. In order to increase people's opportunities to listen to radio broadcasts at workplaces in the future, we should look into possible cooperation with equipment manufacturers and give some thought to broadcast schedules. It is essential that workplaces reach joint decisions on the use of radio broadcasts in the development of their own activity. The marketing of radio use in general and advance information on programme content should also be increased. The digitization of radio in the near future that will open completely new vistas is in special need of media support.

In order to make workers listen more to radio, the possibility of broadcasting programmes intended to improve work communities a little earlier on weekday mornings, should be studied. Likewise, repeat broadcasts on evenings could start earlier. People could also be made more active listeners by recording programmes on cassettes and by making summaries of them as well as by providing advance bulletins of the type tried out in The Milliards Game.

In a similar vein, people at workplaces should consider the possibility of altering their own modes of action to support media use. Would it be possible to take the coffee break when programmes dealing with the development of the working life are on the radio. Ultimately, almost everything can be rearranged if people want it. As seen before, the views of management play a major role also in this respect.

Generalizability and reliability of results

The results of the reports and the drawn conclusions are mainly based on responses from management. The reason is simply that there is no comprehensive address and contact data register on the employees of small firms of the kind that exists on enterprises and their management. Moreover, the employees of small enterprises are often also unorganized, which means that the membership records of unions are of little help. Whether we are dealing with research, collection of information or a company visit, the head of the company must agree to it. The hearing of only one party in matters concerning the entire work community may skew the results to some extent, but goes again to show the crucial role the manager plays, especially in a small enterprise.

Despite the difficulties in collecting impartial information, the permanence of managers' responses and the consistency of the responses of managers and employees can be evaluated on the basis of the postal inquiries of 1995 and 1998 and the inquiry conducted during company visits in 1997.

In connection with both company visits and postal inquiries management considered radio, the print media and company visits involving presentations as suitable forms of communication that could improve their enterprises, generate ideas and provoke discussion. Both managers and employees were of the opinion that a competitive enterprise and workplace could best provide a secure livelihood for them and their families. Likewise, the parties are in total agreement that maintaining the competitiveness of the enterprise and workplace requires versatile and up-to-date knowledge of each member of the work community. The consistency of views was also corroborated by the fact that the majority of managers and employees thought that the efficacy of listening to the radio could be boosted by recording programmes on cassettes and by summarizing them on paper. Moreover, a majority of managers and employees believe that using the right combinations of various media make for more effective communications and support each other.

The responses by management and employees differ most with respect to the concrete measures designed to enhance the use conditions and monitoring of the media. Managers of bigger enterprises considered company visits as useful forms of communication while the managers and employees of small firms largely did not. Likewise, managers of bigger enterprises listen less to the radio than employees. More generally, as the number of employees increases, the differences in the attitudes of managers and employees towards more intensive use of the media increase. In bigger enterprises, with
a stifling communications atmosphere, employees are especially interested in making utilization of the media more effective through, for instance, training.

A sign of the reliability and consistency of managers' responses is probably also that the number of those among them engaging in competitive sports has remained quite stable throughout the three years (7% vs. 5%). The number of employees and employment situation indicated by managers in the postal inquiry correspond to the data of the pertaining register of Statistics Finland and the interviews with managers at their place of work.

**Information networks require development**

The needs and uses of information vary by the business ideas, age or size of an enterprise. The motto of The Milliards Game has been: the more information sources relevant to its operations, and the wider the scale of the information crucial to its development work, that an enterprise can monitor and utilize, the more viable it can be. It is characteristic of a successful enterprise to know more, earlier and better than competitors.

Thus, information in itself is not essential to success, but the ability to use it creatively and to communicate effectively. One must be capable of seeking and analyzing information, of discerning what in the flow of information is useful. In order to find the desired information, one must know what kinds of information reserves exist and how the information is organized. Information searches are necessary to avoid needless work.

The concept of the Information Superhighway was introduced at the advent of the information society. It is based largely on English-language Internet-based information networks. It has been reiterated that the World Wide Web (WWW) is rapidly becoming one of the most important sources of information and media for communication. Activity of this sort is expected to help solve problems faced by SMEs. Moreover, the Internet is discussed widely in public and one enterprise in three resorts to external information technology training. Yet, the results show that according to managers, information networks — contrary to expectations — do not presently aid everyday development work even in those enterprises that make wide use of computers and e-mail.

A partial explanation may be the insufficient language proficiency of managers and the abundant, illogical and disordered information published in the networks. Currently very few web sites are designed with users in mind and actually tested for usability and other quality dimensions (Battison and Whitehand 1996). Working hours are also wasted searching for information, which also limits net-surfing in the same way as participation in traditional training. The results of the European DEUS research programme, already presented in the introduction, do thus correspond quite well with our results (DEUS 1997).

**Information must reach the recipient**

In this decade occupational safety has become an ever more significant means of enterprise development and is considered in the planning of workplaces and the work itself in all branches of business—not just in industry as earlier. The new situation presents many interesting challenges from the viewpoint of communications. Labour protection-related communication is much needed as many small firms are not used to pay attention to labour protection concerns. Thus, it is important to measure the efficacy and impact of communications methodology.

According to the official information-transmission model, the employees of a work community should get labour protection information primarily from the labour protection personnel and organization, occupational health care personnel or union representatives. Yet, this model is not applicable to small work communities which have no labour protection personnel or union representatives or a labour protection organization. In a micro-enterprise the significance of the manager, as a communicator who enhances the flow of information and discusses matters and listens to employees, is of utmost importance also in this respect. When employees are informed and kept up-to-date on, for instance, all work-related health and accident risks they feel that
the employer is interested in their welfare (e.g. Collins and Conner 1994, Inoue et al 1996, Kubota et al 1997). The managers of small enterprises are like gatekeepers of information as they decide whether to pass on the information they receive through various channels (e.g. Shoemaker 1991).

The central problem of communication, the message reaching the recipient, is the concern here. Throughout the project it could be noticed how important it is to try to make communications understandable. Especially a medium such as the radio that produces information that cannot be revisited requires that the communicator applies himself thoroughly. Therefore, the actor operating between the information producers and receivers—here The Milliards Game project and its radio programmes and publications—cannot be a mechanical transmitter of information. It is not enough to find a channel to the receiver. The information must be worked so that the receiver, first of all, wants to receive it and, secondly, can understand it. Practice and experience have earlier shown, as well as The Milliards Game, that this issue that appears so simple and self-evident requires extensive expertise, deep involvement and specialized skills. With respect to the foregoing, The Milliards Game provided clear indications that goal-oriented communication and a professional grasp of the media culture can open the way to otherwise all but unreachable units while also getting through a satisfactory amount of information to the end user.

This, for its part, heightens the empirical feel created by the dozens of company visits during the project: especially in micro-enterprises it is crucial that they can immediately realize the available benefits. Even if any concrete benefit would be available to the enterprise only later on, it must be certain of it before any measures are undertaken. This, again, requires — especially when information and its transmission is of key importance — that all related communication is competent, believable, concrete and understandable from the start (see also 1 in Endnotes).

**Cooperation and understanding**

The Milliards Game has been a unique, systematic and sustained training and development undertaking which has dealt with the issues of the working life, especially qualitative factors, in the broadest possible sense of the word. It was actually surprising to note that the diverse issues connected with work have not been discussed understandably, openly and focusing specifically on that subject matter. The necessity of delineating the present situation of the Finnish working life, where we are and where we ought to be, has been proven. The type of communication represented by The Milliards Game has seemed especially significant in this time of transition from recession to boom where many people have indicated their insecurity, uncertainty and need for information. Information has been required not only to cope with the working life and to improve one’s skills, but also to understand the ongoing development in society. In such a situation, information production that focuses on the working life and uses various tools has proven its worth.

The fundamental factors underlying the innovativeness of The Milliards Game have been the purposeful and goal-oriented use of means of communication, their joint use, and the discovery of the right form for the information to be conveyed to improve its penetration. The Milliards Game has provided a significant solution for the problems in cooperation experienced in various fields. Very often the cooperation necessary in important matters is frustrated by either physical or mental distance or both. People may refuse to cooperate merely due to reasons of personal chemistry. In The Milliards Game various types of cooperation (work communities-authorities-experts) has been possible in the media. Various parties have contributed their share to media professionals who have compiled them by the existing means of communication.

**Development of communications**

The results of this project with regard to the content of communications indicate that increasing knowledge of special groups, specific audiences as well as the ability to produce information easily applicable in the workplace is required. One vital goal should therefore be to learn more about specific audiences. This applies to communication by expert
communities as well as work communities. It also appears that increasing cooperation between expert communities and workplaces is needed as the supply of information does not fully match the demand. Workplaces expect examples of actual activity and practicality more than general information.

The Milliards Game was carried out on the terms of the prevailing media culture. This meant, for instance, that the radio programmes did not sound like training or educational programmes. They were edited spoken programmes dealing with the development of the work community. Similarly, a newspaper-like publication was substituted for the project text book. This was intended, for instance, to reach the public that radio and the print media already had. Yet, it also involved the risk that it will take time for the recipients of the information to conceive the communications as information that is applicable to their own work and work community. In the future, the significance of the media as a distribution channel of training and useful development information should be stressed.

There is already a tradition of using newspapers as a teaching aid in schools; the next step could be the planned use of the news media in extramural education. On the electronic communications side, The Milliards Game is doing just that and based on the experiences it would seem important that special attention be given to the form of communication in the hardware environment of new technology as distribution and programme production is digitized in the near future. The transfer of classroom teaching as such to the new distribution channel will not work in the digital world. Yet, the only possibility of maintaining the nation's high level of know-how and of providing citizens with the capabilities to cope with changes at work and elsewhere, is to create efficient and functioning new learning environments for the needs of lifelong learning and training. Joint use of mass communications and mass media will have a distinct role in that development. It must become crystallized and be implemented through successful interaction of content, form and technology.

*Continuous multiform training in communication*

The Milliards Game has proven that regular, coordinated and continuous multipurpose training is required to develop the work organizations of SMEs. Further intensification of the activity and improvement of the media results in the least delays in information interpretation, transmission, application and preplanned communication with large groups of people and between different sources of information. Just in the monitored workplaces, representing three branches of business, more than a thousand managers and employees expressed their interest for studying issues related to the work community and the working environment either by using all modes of communication of the project jointly or by combining them flexibly.

The Thursday morning radio broadcasts of The Milliards Game have won an audience in the Jyväskylä region that is as large as that of all other radio channels combined. The general interest in the development of working environments and work communities resulting from the interest in the large listening audience among the general public is also one reason why the majority of company managers want to get hold of the final report of The Milliards Game. Should similar projects be launched in Central Finland in the near future, more than half of the managers have indicated that at least their company is interested in them. All in all, the goals of the project were attained to our satisfaction, and in several instances the recipients characterized the activity as necessary. For instance, each radio programme of the project drew feedback of some kind and not a single response questioned the relevance of the activity, although the feedback could include critique of presentation or content.

Until recently, solutions and measures to control occupational hazards had received only marginal attention in the professional and scientific press. Effective, proven solutions need to be available for designers of production processes, to professionals in occupational safety and health, to managers, to workers and to their representatives. The mechanisms to get the right information at the right target audience is the key word. As issues in industrial hygiene become more complex and uncertain risk communication will undoubtedly play an increasing important role in the education of workers and management in occupational environment. McMahan and Meyer (1996) point out that experience in the
industrial hygiene field is an important factor in industrial hygienists' effectiveness in communicating risk. This is ultimately important because the industrial hygienists appear to tailor their communication styles to their audiences, using simplified language and media when communicating risk to workers and scientific language and media when communicating to managers. According to the same authors one possible explanation as to why industrial hygienists communicate more technically to managers is that they wish to blend into their organizational environment.

Professional communication of information must also be paid attention for the reason that poor communication vis-à-vis occupational and environmental risks has been shown to frustrate both communicators and recipients. Small enterprises, which have to fight for their survival and be cost-conscious and strive for efficiency, have different requirements for communication than large ones. In other words, small enterprises that possess meager resources, knowledge and skills must derive the largest possible benefit from information (see 1 in Endnotes). On the other hand, communicators often state in their defence that laymen and poorly trained managers do not grasp technical issues and that individual delusions lead to distortions and inaccuracies when assessing risks. In order to be able to function effectively, communicators must identify the constraints related to the assessment of scientific risks (inaccuracy and unreliability of information) and find ways of presenting complicated information in understandable form.

Communicators can hone their skills by visiting enterprises and by familiarizing themselves with working life. Thereby they can get the feel of the proper means of expression and the impacts that information has on work communities.

The Milliards Game did just that by stressing interaction and by using different media simultaneously. All in all, the information and experiences collected in connection with The Milliards Game provide a sound basis for intensifying and expanding this type of coordinated communication, reinforced by company visits, to all branches of business and small work communities. Personal business contacts can ensure that the latest information relayed through the media is actually received by enterprises and applied in keeping with their true needs.

Increased participation

Successful execution of development measures and, especially, the bringing about of permanent changes requires that employees themselves have an interest in acquiring, absorbing and utilizing information. Naturally, openness, encouragement and cooperation between individuals are crucial for learning in the workplace. They create a fruitful environment for the tools of training and development offered by projects such as The Milliards Game. If the will exists, there are never insurmountable difficulties in the way of arranging opportunities for reading, deliberating on the preconditions for receiving radio and video programmes, or consciously creating an uninhibited atmosphere for discussion.

The results of foreign campaigns indicate that company-specific decisions to take part in workplace-specific health promoting undertakings or studies depend on, for instance, enterprise size, whether the expenses of participation are reimbursed, and the enterprise's financial standing. It also seems that enterprises with previous experience from earlier collective activity are more ready to participate in new undertakings—e.g. voluntary health promotion campaigns (Sörensen et al 1991, Biener et al 1994). It may further be assumed that the degree to which people participate and commit themselves to workplace communities development projects and various campaigns depends on the employment relationship: short, irregular and fixed-term employment obviously serves to strengthen their sense of detachment and thereby presumably make them less committed and more indifferent towards the development of the enterprise and work organization.

The participation rate cannot be increased even in workplace-specific health examinations without intensifying efforts. In large enterprises employing 1500 to 3500 people, where health examinations have been free to employees, generally 75 % to 95 % have participated. Experience indicates that a participation rate of 75 % to 85 % requires four consecutive, intensified campaigning-like rounds of examinations over three to four weeks. Five consecutive examinations ("waves" of screening) are
required for 90% to 99% participation (Erfurt and Holtyn 1991).

The experiences from The Milliards Game showed that the activeness of an enterprise's participation is primarily related to its management and work culture, not so much to any technical aspect or its size category. For instance, no systematic differences due to season, branch of business or content of programming with regard to the intensity with which employees listened to the radio during working hours could be observed. Instead, differences seemed to be connected with the internal features of the work community and the manager's personality. In particular, the behaviour and views of managers are reflected in whether other members of the work community take part in the project. It is abundantly clear that managers' personalities and attitudes have a major impact on the reception of communications and the creation of conditions inducive to learning in the workplace. It is a misconception to believe that an enterprise of a few people could have anyone else except the manager without authorization from above, deciding whether to make investments aimed at qualitative development, acquisitions or ergonomic improvements.

On the other hand, at the start of The Milliards Game one could observe the suspicion and caution the entrepreneurs running the SMEs felt towards external influences as already noted in several other instances. In discussions with the entrepreneurs, quite understandable explanations for these attitudes, based on experiences, were given. The creation of an atmosphere of trust and openness under such conditions requires exceptional skills and first-rate know-how. In the meantime, one should, for instance, be prepared for contradictions between words and deeds that may complicate the implementation of development projects as well as the evaluation of impacts. This is plainly something that researchers, experts and authorities, who know little about the practical working life, should remember as they approach small enterprises and collect and interpret information on individuals and enterprises.

In addition to the flexible use of communications media and improvement of learning conditions, the general enhancement of people's ability to work and well-being at workplaces requires an open communications atmosphere and an opportunity for personnel to have a say. Superiors and employees must be able to discuss openly matters related to the development of the workplace. The creation of a healthy work environment, a good work atmosphere and a socially and mentally thriving work community requires the cooperation of everyone. Under such conditions even timid and fixed-term employees tend to be drawn into the activity. Our results indicate that this has been correctly understood especially by the managers of many small enterprises that are expanding their operations, engaged in exports or that are subcontractors to large companies.

In order that enterprises may develop qualitatively, other stimulation besides openness, trust, genuine cooperation and appreciation of business activity is also needed. In order that the latest research data and experiences from good practices relayed via the media could genuinely take root and provide maximum benefits on the enterprise level, most of the managers and employees targeted by the information gathering of The Milliards Game consider that it would be useful for SMEs to create a system that encourages and rewards those managers and employees who actively seek and apply new information. The same group of issues was already referred to in, for instance, the documents of the EU Commission. This type of acknowledgement and encouragement could also be provided, in addition to direct pecuniary rewards, in the form of lower insurance premiums or acquisition prices of new machinery.

Need of further research

One area worth looking into is the scarce research on the use of labour protection publications and campaigns. An abundance of material is being produced and campaigns are often extensive and have large budgets, but so far internal information collection and evaluation has not been made an integral part of them to any larger extent. The most important fields of further research are, thus, the accessibility and impacts of communication materials. In that connection we should not only consider the viewpoint of the authorities, but also those of workplaces and personnel. After all, the work done in workplaces and its impacts are what
matters. The seriousness of the situation is also verified by the observations that two-thirds of chemical users were unaware of the relevant legislation (Ogden 1998) and that micro enterprises relied heavily on information from suppliers and personal experience and rather less on information from sources such as trade associations and health and safety executives (Topping et al 1998).

On the other hand, it can be argued that the communication related to labour protection is marked by complacency as the response rates to questionnaire studies on that subject have been low. This is an important consideration for further research if questionnaires are to be used to gather information. Also, a better method of distributing questionnaires than mailing should be devised — they could be filled out in connection with events and company visits. Based on the company visits in spring 1997, the best way is to combine questionnaire studies and interviews. As the respondents could ask the attendant expert more detailed questions, the loss of information from unanswered questions and difficulties in answering were avoided. A full 100 percent response rate was attained this way and responses were received from all those initially targeted. This method could also increase the correspondence between the results of interviews and postal inquiries, the lack of which worries, for instance, Blatter et al (1997).

In order to be able to use the means of communication more effectively, we also need more knowledge of the mechanisms of learning and, especially, of that form of learning which is known to take place unnoticed; received information just somehow transforms into knowledge under favourable conditions. Knowledge of that process is highly important for goal-oriented producers of information, for instance, because the working life changes constantly.

In the future, it would be useful to ponder the experimental possibilities suited for The Milliards Game-type activity and means that are radically different from traditional ones. They could improve enterprises' readiness to receive information and allow maximal utilization of sources of information by them. This is highly necessary since the road to a microenterprise is known to be rocky, and the majority of enterprises consists of just these smallest ones employing a few people.

Acknowledgements

The Milliards Game was a top-priority project in Finland and was partially financed by ESF (Code 950031). The authors wish to acknowledge warmly all the enterprises, organizations, the University of Jyväskylä and the hundreds of individual people who have in various ways participated in the project and offered their expertise for the program production of The Milliards Game. Especially heartfelt thanks to Professor Tapio Vaherva, Associate Professor Kalevi Olin and Head of Labour Department Keijo Lipén for the genuine interest in the project and their many ideas that were very helpful in the implementation. Many thanks also to Yle/Radio Central Finland, Hetimex Oy Ltd, and the Häme Labour Protection Department, whose cooperative spirit made the project possible. The authors also wish to thank Mr. Seppo Siuro for editing and proofreading the text.

Endnotes

a) Background material for Introduction. To gain a wider than national perspective The Milliards Game as during the starting phase of the project also charted small- and medium-sized enterprises in Europe. In 1996 an extensive review was completed concerning the significance of small- and medium-sized enterprises as creators of workplaces and employment, innovation, preconditions of operation, industrial safety and occupational health, management, personnel training needs and training methods, knowledge of occupational health issues and support measures addressed by the EU to these enterprises. The review written in English
is based on a total of 146 documents and research reports (Manninen 1996). The information presented in the Introduction were also picked from the newly published fifth annual report on the preconditions of business operation in Europe. Most of the reports statistical data are based on the results of the enterprise study made in 1997 (The European Observatory for SMEs 1997).

b) Quality. Quality has been defined as fitness for use (Juran 1974). The definition places emphasis on the consumer. According to Bergman and Klefsjö (cited in Eklund 1995) the quality of a product or service is its ability to satisfy the needs and expectations of the customers. The manufacturing workers in a company are regarded as internal customers by these authors, which means that they are included in the above definition.

c) Environmental management systems. Environmental management systems- specification with guidance for use (BS EN ISO 14001:1996); the corresponding Finnish standard SFS - EN ISO 14001 and Specification for environmental management systems (BS 7750:1994) have also been published in Finnish (BS 7750:fi).

d) Ergonomics. Today ergonomics is seen as a two-sided coin. On one hand, ergonomics is an applied science. It takes information about human capabilities and limitations from various basic sciences, such as anatomy, physiology, psychology, sociology and biomechanics. This information is then used to develop methods and tools that allow for the quantification and qualification of the physical, psychological and psychosocial stressors placed on people and to develop design guidelines and criteria that should allow for the production of tools and products and the design of work tasks and environments, which do not exceed a person's physical or psychological capabilities. On the other hand, ergonomics is a method or an approach that involves the systematic evaluation of the various stressors on workers by the design of the work task, tool, product, environment, organizational structure, etc. Also, and probably more importantly, this systematic evaluation must determine how the different components of the work system (worker, tasks, products, tools environment, organization, etc.) interact with each other and whether this interaction results in the worker being exposed to different or increased stress levels. Today, the ergonomics method also calls for the participation of and input from workers or users. It has been found that by involving these people, problems are more fully identified and solutions are more successful (Tyson 1996).

e) Ergonomic deficiencies. Ergonomic deficiencies are characterized by a number of well-defined and well-recognized manifestations: extreme posture, excessive force, concentration of stress, static loading, pain and/or discomfort, and high incidence of occupational disease and/or disorders. The first four manifestations can be considered as early warnings; the remaining two are the final outcome, occurring only when responses to correct the existing deficiencies are inadequate.

f) Price of a job. The ministry of labour in Finland has calculated that the average price of a job in 1997 was FIM 344 000. If the administrative costs of government are excluded, the average price is 297 000. By adding the cumulative effects of production and consumption on employment, the unit cost can be calculated at an average of FIM 202 000 per man-year (Ministry of Labour 1997).

g) Gainsharing. Gainsharing is a compensation bonus system that offers the entire workforce an incentive to improve company performance. The company sets a goal (some percentage) for how people costs should compare to the value of goods or services they produce. Via gainsharing, the employer and employees benefit by working together. When employees work together to improve output, they receive higher pay - the predetermined percentage of value produced. Linking company costs with the financial incentive of gainsharing creates peer pressure within work groups. Team members ensure that jobs are performed correctly the first time - without waste due to rejects, rework, accidents, injuries or faulty output (Tarbell 1997).
h) Oxenburgh and Liukkonen models. The Australian Maurice Oxenburgh and the Finnish Paula Liukkonen have for years been developing different calculation and assessment models of costs and benefits. The models are today used as examples and a basis for applications and further research (Liukkonen 1990, Oxenburgh 1997).

The costs used in these computerized calculation models include wages and rewards paid to the employees, taxes, insurances, unexpected leaves, costs incurred by reduced production and low quality of products, cost of training new employees, costs incurred by poor working procedures, costs incurred by inadequate working conditions and costs incurred by investments necessary for modifications and production down-time. Costs are usually expressed per one man-hour. The models enable retrospective or prospective cost calculations.

When the basic situation has been delimited and the costs charted, the analysis can proceed to the benefits to be gained. In, for example, there is a need to reduce manual handling of goods and loads, it can be expected that the benefits are visible as reduced absenteeism, lower turnover of labour, lower insurance costs, reduced overtime and increased production. There are often several means and procedures that yield the ideal end result in terms of benefits to be gained. One factor that helps selecting the means is the knowledge of the payback time. In the calculation models the payback time in years is obtained by dividing the total cost of necessary modifications by total benefits to be gained.

i) The themes of The Milliards Game. The Milliards Game included the following issues or themes:

Management
- Good management
- Training for management
- Self-management
- Safety-oriented management - quality-oriented management
- Change management
- Significance management

Creative and productive working community
- Mental loading
- Feedback and rewarding
- Commitment
- Teamwork
- Responsibility, trust and openness

Safe and sound working community
- Diseases, morbidity
- Quality of and impurities in indoor air
- Combined effects
- Air conditioning
- Accidents during work and commuting
- Familiarization with work
- Work clothes
- Wages, form of wages
- Working hours, part-time, shift work, irregular work, breaks
- Out-of-work time, recovery
- Participant engineering
- Organization of work
- First aid
Training potential of vocational schools
Internal traffic
Social rooms, meals
Cleanliness and order

**Individual and working community**
Ageing worker
Working alone
Trainee
Health behaviour of individuals, alcohol, drugs
Employees' rights
Young worker
Employees on a posting, mobile work

**Ergonomics**
Work ergonomics
Sedentary work
Standing work
Working on scaffolding
Ergonomics of work cell
Ergonomics of tools
Ergonomics of protective agents
Ergonomics of protective equipment
Ergonomics of information

**Development and design of work and production environments**
Constant improvement
Design of work cell
Information transfer
Material handling
Lifting and carrying
Physical factors
Noise and its prevention
Lighting and its improvement
Colours and interior decoration
Thermal conditions and their improvement
Vibration and its elimination
Radiation and protection against it
Chemical factors
Carcinogenic agents
Dusts
Solvents
Vapours, gases
Acids, alkalis, corrosive agents
Paints
Oils
Biological factors
Microbes, bacteria

**EU terminology**
Directives and standards
Legislation on competition
Monitoring
Maximum permissible limits
Programs
Operation of the EU organization

**Improvement of working capacity**
Occupational health care
Exercise, activity to maintain working capacity
Keep-fit exercise
Rehabilitation

**Labour protection economics of enterprises**
Monitoring and calculating methods
Examples of benefits

**Information systems and new information**
Databases
Information producing organizations
Publications

**Industrial safety**
Fireproofing
Electrical equipment, electric safety
Operation safety
Product safety
Pressure vessels
Safety markings
Maintenance and service
Procurement
Storage
Accounting
Insurances

**Services provided by the authorities for qualitative development of business operation**
Financing and monetary support
Consultation, monitoring

**Expert services**
Product development
Testing
Research
Measurement
Risks, risk assessment

**Quality systems and labour protection programs**
Standardization
Certification
EU programs

**Information flow in working community**
Internationalization and domestic and external market of EU
EU laws on female labour
Women and the EU
Environmental protection
Discharges, waste
Air protection
Environmental programs
Networking
Regional cooperation
Cooperation within branches of business
Subcontracting

j) Company visits. During the spring the project manager (Olavi Manninen) visited each one of the 32 enterprises included in the intensive monitoring. The visit included a lecture on the subject Information on information plus feedback of earlier enterprise-specific studies. Altogether, the lectures were attended by 250 managers and employees.

The operating environment of small enterprises is illustrated by the fact that only one enterprise had a special conference room. Usually the lectures were given in the manager's room, an office room, public relations room, coffee room, canteen, corridor or lounge, locker room, wash room, anteroom to sauna or warehouse. Likewise, almost all enterprises lacked audio-visual equipment. Therefore the lecturer brought his own audio-visual equipment.

A company visit took on average two and a half hours. In several enterprises the manager and the employees were carried away with the discussion so that it could last three or even four hours. This was particularly true for the enterprises where the manager had stated “one hour should be enough for getting the message through”. The same managers who in advance stressed the scarcity of available time were the ones who were the most satisfied with the outcome of the visit. An inquiry after the visit revealed that a total of 64% of the managers thought that the visit had many kinds of impacts. The results of the inquiry made in 1998 also show more generally that in particular the managers of bigger enterprises appreciate company visits and related personal meetings.

The outline of the lecture was as follows:

Motto: Value added of information and viability of enterprise
Utilization of information
Information in working life
Newspaper survey
Research of the Amsterdam-Haarlem innovation centre
Contact study in 1982 vs. contact study in 1995
Examples of annual costs
Conclusions: new approaches
An European perspective
EU's five-year program
Enterprise development 2000
Good product
Good work
Workplaces play a key role
Shared information and changes
Ingredients of a cooperative atmosphere
What? How? Open questions
The company visits verified that a media-based project reaches the people to be trained. Albeit there are differences between enterprises in their level of activity in following the messages of The Milliards Game, none of the target group enterprises wanted to quit or remain passive. The interest of the workplaces towards the project is illustrated by the fact that the project manager met a friendly welcome in every enterprise. The written down opinions of how the members of the working community could increase their own active contribution and speed up information flow in their working community also provide convincing evidence of the induced willingness to receive messages. In the opinions of the employees and managers, spontaneous participation in The Milliards Game could be increased, for example, in the following ways: discussions and discussion groups to be organized at the workplace, personnel and cooperation meetings to be arranged, recreation days with information sessions to be offered to the personnel, radio broadcasts to be recorded, and audio and video cassettes be circulated, communication inside the company to be enhanced, ideas to be pumped to different groups, common meetings on the themes of The Milliards Game to be organized for the enterprises of one area, time to be reserved for following The Milliards Game products, the efficiency of reading, listening and viewing videos to be improved, and the distribution of printed matter to different departments and work cells to be enhanced. In addition, the participants made many proposals for themes, which were included in The Milliards Game products.

k) Efficiency of internal communication. The internal communication atmosphere of the enterprises was also evaluated according to their attitudes towards the company visits, lectures and feedback sessions. The results were computed separately from the managers' and employees' responses.

In short, we can state that a small enterprise with a good and effective internal communication atmosphere is willing to receive new information and ideas. The particular commitment of their personnel to maximising the benefits and support gained by following different media reflects the positive example set by the manager and his favourable attitude. Most of these small enterprises are expanding their operation, engaged in exports, or subcontracting to big enterprises. In enterprises with a poor and ineffective communication atmosphere both the managers/entrepreneurs and the employees had a negative attitude towards introductory courses to the use of media. Along with the increasing number of personnel, the differences between the managers and the employees in their attitudes towards enhancing the use of the media increase: In bigger enterprises with a poor and ineffective communication atmosphere the employees are considerably more eager to enhance the exploitation of the media through training than the managers.

To assess the efficiency of internal communication in enterprises, an experimental communication coefficient was calculated for each enterprise. The formula was based on the number of people who attended to the training session offered during the company visit:

\[
\text{Communication coefficient } \% = \left[ \frac{1(\text{manager/entrepreneur}) + 1(\text{contact/trustee})}{\text{number of participants}} \right] \times 100.
\]
If only the managing director attended to the company visit and the number of employees was 50, the resulting communication coefficient was 2% (i.e. \([1+0] \times \frac{1}{50} \times 100 = 2\)). By contrast, if besides the manager and contact/trustee 24 out of the total personnel of 25 attended, the resulting communication coefficient was 192% (i.e. \([1+1] \times \frac{24}{25} \times 100 = 192\)).

On the basis of the communication coefficient derived from this computational experiment the 32 enterprises were divided into enterprises with a poor internal communication atmosphere (communication coefficient under 29%) and enterprises with a good communication atmosphere (communication coefficient exceeds 30%). This division was based on the assumption that, for instance, in an enterprise of 60 employees, the low limit of internal communication can be considered to be that the company visit is attended to by the manager/entrepreneur, a contact/trustee and every fifth employee.

On this scale, among the enterprises included in the intensive monitoring (n=32) 40% had a poor internal communication atmosphere and 60% had a good atmosphere.

The mathematical basis of the communication coefficient of course gives rise to various interpretations and claims that things should be weighed in a different way. Anyway, the information used for calculating the coefficient are true, not imaginative, and independent of the responses.

I) *Small work sites.* Smaller work sites are characterized by informal, flexible structures; workers often report that there is less bureaucratic "red tape" and a "family-oriented" corporate culture prevails. In a small business, one person's voice is likely to carry much weight, and managers may be highly motivated to accommodate individual needs. Yet because of the small size, resources in terms of both time and money are likely to be scarce, and a given person may function in several roles. Thus, small work sites often also share a "survival orientation", meaning that there is a high demand for cost justification and measures of effectiveness (Sorensen et al 1991).

m) *Experiences gained during the project.* The Milliards Game was one of the first projects of this kind in Finland that has advanced to the implementation phase. For this reason especially the beginning involved a lot of general considerations among the authorities to realise the program, and this was reflected in the slowing down of individual projects, too.

One ambiguous point was the value added tax imposed on the projects. Although the rules of the game have already been fixed, the procedure varies between different parts of the country. As an actor subjected to value added tax, the organization implementing The Milliards Game has throughout the undertaking been compelled to observe the same v.a.t. conventions as in its other business operation. This has meant that a considerable part of the financing addressed to the program goes to taxes. This does not seem to make very much sense and does not serve the national development strategies.

However, the most central problem in the implementation is related to the practical financing mechanism. According to the present rules of the game, the producer gets the financing share afterwards on the basis of verifiable costs. In practice this means that the project with wages and purchased services must be implemented several months before receiving the financing. It is evident that small actors cannot afford this. Therefore, this practice may drop many innovative and significant producers out if the payment method is not revised. In the case of The Milliards Game these problems could be overcome and an undertaking of this length could be concluded successfully only by the mutual cooperative spirit of the producer and the financier and the admirable persistence of both.
References

Finnish-language references used in the project

Miktor Oy, Helsinki


Mättiainen E, Saarinen E (1990) Muutostekijät. WSOY, Juva
Seppälä A (1994) Työsuojelutoiminta ja terveydenhuollon ohjaamistervo. Työterveyslaitos, Helsinki
WSOY, Juva


STK-STTK RANK Rationalisointineuvottelukunta (1990) Suunnitellen merkitys yrityksen menestymiseen ja työympäristön kehittämiseen. Teollisuuden Kustannus Oy, Tamprint/Algraphics Oy, Tampere


Valtiovarainministeriö ja valtionhallinnon kehittämiskeskus (1994) Opiskellen Euroopan yhteisöön. Painatuskeskus Oy, Helsinki


Vartiovaara I (1987) Burnout henkinen pahoinvointi. WSOY Graafiset laitokset, Juva


Foreign language references used in the project


British standard BS 8800 (1996) Guide to occupational health and safety management systems. BS 8800:fi. This translation of BS 8800 into Finnish has been made by Finnish Standard Association with the approval of the British Standards Institution. Helsinki
Bylund B (1996) Ohälsan kostar 60 miljarder (In Swedish). Miljön på jobbet 5:4-7
Eklund JAE (1995) Relationships between


Manninen O (1977a) Ratings of discomfort due to noise and inadequate illumination at work. Report M31/77. Department of Public Health Sciences. University of Tampere
Oxenburgh MS (1991) Increasing productivity and profit through health and safety. North Ryde, NSW, Australia: CCH International


Åkerstedt T (1996) Karolinska Institute, The National Institute of Psychosocial Factors and Health, Solna, Sweden

Received 15.06.1998/15.08.1998