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# The Web-Based Learning Program of Ergonomics as a Tool for Promoting Sustainable Well-Being at Work in a Large Company

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**Abstract**

Promoting sustainable well-being at work is challenging and requires changes and learning in an organization. The purpose of this study was to describe the web-based learning program of ergonomics, the Ergonetti, as a tool for promoting sustainable well-being at work in a large company from the viewpoint of the students. Data were gathered through individual theme interviews of 15 students (participants) who performed the ergonomics learning tasks within the company. The data were analyzed using inductive content analysis. Achieving sustainable well-being at work as taught in the web-based learning program of ergonomics required the investment of time and managerial support. Sustainable well-being at work, defined in terms of the understanding of ergonomics described by participants at the company, was shown to increase profitability of the company. However, for this to occur, managers need to understand

the demands of development work and be committed to it. Open discussions of development activities within the company facilitated the sharing of tacit knowledge and information, which was beneficial for development. The generalization of the present results should be done carefully due to small number of the participants.

**Keywords:** Organizational learning, Web-based learning, Sustainable well-being at work, Workplace health promotion

## 1. Introduction

In an information society, workplaces need to react to the market and the ever-increasing pace set by their competitors. In order to do this successfully, organizations must change more rapidly than their environments and competitors. This requires that the workers in the organizations be ready to learn and absorb new knowledge, and to develop their own competence (Ordoobadi & Wang, 2011; Paloniemi, 2006; Phusavat, Comepa, Sitko-Lutek, & Ooi, 2012; Tynjälä, 2008; Wild, Griggs, & Downing, 2002). It also requires that the employer take care of the workers' well-being such that they remain healthy in order to maintain or increase the organization's productivity. The promotion of sustainable well-being at work often requires changes at the organizational level, which must be supported by strong leadership (Dellve, Skagert, & Vilhelmsson, 2007; Heward, Hutchins, & Keleher, 2007) and learning within the organization (Pehkonen et al., 2009; Sirola-Karvinen, Jurvansuu, Rautio, & Husman, 2010). Web-based learning has proven to be important as a means of supporting learning in workplaces (Cheng, Wang, Moormann, Olaniran, & Chen, 2012; Tynjälä & Häkkinen, 2005; Wild et al., 2002). It is particularly useful for supporting the ongoing education of individuals, provides opportunities for life-long learning, and enables people to solve problems in their working lives (Tynjälä & Häkkinen, 2005).

Sustainable development and sustainability are closely related terms (Ramirez, 2012). Sustainable development was established as a concept in Brutland's (1987) report. It is defined as development that "[meets] the needs of the present without compromising the ability of future generations to meet their own needs". The concept of sustainability requires harmonious, bipartite global economic development. It should provide well-being and satisfactory, unburdened work to a large and growing population, while simultaneously avoiding polluting or wasting natural resources to the greatest extent possible (Ramirez, 2012). Attaining sustainability in an organization is a long-term goal, and should be regarded as an essential component of the company's operations. Leaders play a pivotal role in this endeavor because their support facilitates and encourages staff development (Haugh & Talwar, 2010; Sirola-Karvinen et al., 2010).

In order to learn sustainability, employees need to acquire new knowledge and change their work habits. Changes at the organizational level rarely proceed entirely smoothly, and so employee training should form a core part of a workplace learning strategy that encompasses sharing, evaluating, and reflecting on, knowledge. By contributing time and resources to training workers on sustainability, new knowledge can be embedded into an organization, fortifying its capacity for learning (Haugh & Talwar, 2010; Ramirez, 2012).

It is advantageous for managers to promote learning within their organization because it provides firstly, significant immaterial benefits by increasing employees' satisfaction with their work (Chiva & Alegre, 2009) while simultaneously increasing their competence and capacity for innovation, and, secondly, material benefits such as improved economic productivity (Alegre & Chiva, 2008; García-Morales, Lloréns-Montes, & Verdú-Jover, 2007; Goh, Elliott, & Quon, 2012; Kuo, 2011).

Web-based learning is knowledge management. Knowledge is information, and knowledge management is information processing that is done to improve company performance. Knowledge management can be regarded as a comprehensive phenomenon that concerns processes of learning, know-how, and development that take place at the level of the whole organization. A central problem in knowledge management is the fact that tacit knowledge is "hidden". This problem generally arises from an inability to recognize existing knowledge and apply it to company operations rather than from a lack of knowledge per se (e.g., Liu & Wang, 2009). One of the great advantages of web-based learning for companies and their clients is that it can highlight explicit knowledge, and especially the valuable tacit knowledge that exists in workplaces (Falconer, 2006; Liu & Wang, 2009; Randelin, Saaranen, Naumanen, & Louhevaara, 2013; Wild et al., 2002).

It is therefore essential for web-based learning environments to provide theoretical information on the topics they deal with, to support the integration of tacit knowledge, and to encourage cooperation and the sharing of experiences among coworkers (Falconer, 2006; Tynjälä & Häkkinen, 2005). Web-based learning in the workplace should satisfy facilitate individual learning while also supporting organizational learning (OL) in a way that ties learning to work performance and supports interaction between individuals (Wang, Ran, Liao, & Yang, 2010). Issues with knowledge sharing are widely acknowledged as a cause of problems when implementing web-based learning programs in large companies (Netteland, Wasson, & Mørch, 2007). According to Netteland et al. (2007), work in large companies should be associated with learning and the acquisition of new knowledge, both of which should be possible to share with coworkers. This will ensure that, to the greatest extent possible, employees will have similar views on the learning topic. Moreover, according to Cheng et al. (2012), employees' willingness to use web-based programs is increased by support from their employer, their work community, and the broader organization.

Web-based learning can be utilized to promote sustainable occupational well-being. The learning program of ergonomics, the Ergonetti, developed by the Open University of the University of the Eastern Finland (Ergonetti, 2013) is a functional, effective, and affordable tool that allows workplaces to promote sustainable occupational well-being through learning (Randelin et al., 2013). It is a web-based ergonomics education system (25 ECTS credit units) that was designed for use by working adults. An online tutor guides the studies, but students perform the learning tasks in a genuine work environment, which is either their own workplace or a target workplace of their own choice. The development cycle model for the learning program is based on (Kolb, 1984) experiential learning, which has been described as the heart of OL (e.g., Ramirez, 2012), and on the models of on-the-job-learning (Pohjonen, 2002). The model is efficient and can be used to easily identify developmental needs in work places and to

solve problems. Learning program enables workplaces to draw attention to even highly difficult problems relating to personal relationships in the work place or to professional competence of workers, and, above all, to solve those problems relating to cooperation among coworkers and managers (Pitkänen, Saaranen, Naumanen, & Louhevaara, 2010).

According to research by Randelin et al. (2013), the use of the ergonomics learning program by employees of small- and medium-sized enterprises (SMEs) increased the students' expertise in developing sustainable occupational know-how. Moreover, study via the ergonomics learning program created new collaborations and interactions within the workplace. Employees and management became committed to development work, discussing it openly with one-another and collaborating to develop ways of improving their working conditions. The tacit knowledge present in the workplace was unearthed by clarifying the developmental principles required to build up the work environment and the work organization through discussion.

In summary, the establishment of sustainable well-being at work through learning demands the investment of time, managerial support, the acquisition of new knowledge, changes to working habits, the maintenance of open discussion, and sharing knowledge. The positive impacts of such learning are as follows: workers' competence and health increases, the company's productivity improves, and the exploitation of tacit knowledge increases (Figure 1).

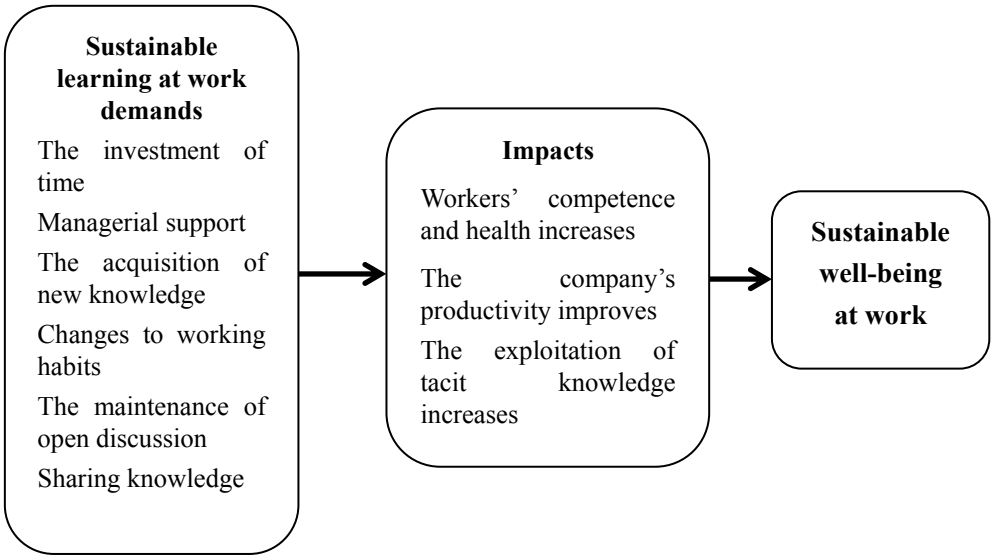


Figure 1. Learning demands and impacts to sustainable well-being at work (e.g., Falconer, 2006; Goh et al.; Haugh & Talwar, 2010; Pehkonen et al., 2009; Ramirez, 2012)

The purpose of this study was to describe the web-based learning program of ergonomics, the Ergonetti, as a tool for promoting sustainable well-being at work in a large company from the viewpoint of the students. Specifically, the aims were to describe the views of students of the ergonomics learning program on the importance of learning (1) to the students themselves and to other workers in the company, (2) to the organization and the working environment, and (3)

to the company's leadership. A further aim was to investigate the views of students on how learning occurred and was achieved in the workplace.

## 2. Materials and Methods

### *2.1 Participants and the Company*

The study targeted employees of a large Finnish company who participated in the ergonomics learning program between 2007 and 2009 (n=16). The data examined in this study were compiled in 2009 based on individual theme interviews of students two months after they had finished their ergonomics studies. The voluntary participants comprised 15 students - 14 men and 1 woman. The participants worked in different corporate offices located around Finland. Their average age was 46 (ranging from 35 to 58). Six of them had graduated from comprehensive schools and nine from high schools. In addition, one had studied at the university, five had graduated from vocational high schools, and four from vocational schools; beyond that, six of them had passed a managerial exam. The participants worked as designers at the company, and two of them were in managerial positions. On average, they had spent 26 years working at the company (ranging from 15 to 33 years).

The company is completely owned by the Finnish State. Its net sales in 2011 were 1,900.1 million Euros, and it is one of the largest domestic employers in Finland. The company also employs people in Northern and Central Europe, and in Russia. As of the end of 2011, the company employs around 27,500 professionals, of whom about 6,500 work outside Finland. More than 70 different nationalities are represented among its employees. The company manages important information and the flow of material for its customers, as well as dealing with postal communication, information logistics, and material logistics. It operates in Northern and Central Europe, and also in Russia. The company devoted itself to the participants' studies, paying for students' tuition and organizing shared meetings on the progression of developmental activities with the students.

### *2.2 Methods*

The themes of the interviews were derived from the aims of the study. Interview themes were given to the participants beforehand and all interviews were conducted according to the same pattern: the participants were asked to start with the first theme and after that continue freely. The interviews were conducted via mobile phone and lasted for 33 minutes on average (durations ranged from 20 to 40 min). Participants were asked to be in a quiet location at their workplace while participating in the interviews. All interviews were recorded and transcribed by a researcher (the first author). Each participant was given an opportunity to review the initial transcript of their interview and make any changes they considered necessary. The data from the resulting final transcripts were summarized in a 108 page document. The anonymity of the interviewees was maintained by removing any identifying information from the data before analyzing it. Potential ethical problems were addressed by having only one researcher deal with original data (e.g., Huberman & Miles, 1994). Moreover, interviewees were asked for their written consent to use the interviews for research purposes.

The data were evaluated using inductive content analysis (Huberman & Miles, 1994; Krippendorff, 2004; Kylmä & Juvakka, 2007), while the impact of the ergonomics learning program on sustainable well-being in the workplace was described from the viewpoint of the students.

At the initial stage, the data were read through several times in order to get a general view on it. At the second stage, questions that were in accordance with the aims of this study were posed to the data, and the resulting authentic expressions were transformed into simplified expressions. These simplified expressions were then combined, and sub-categories, upper categories, and main categories were defined according to their contents. The data were presented qualitatively for each research aims considered (Tables 1-4). Tables 1-3 present students' views on the importance of learning to the students themselves, to other workers in the company, to the organization and the working environment, and also to the company's leadership. Table 4 shows how learning occurs and is achieved in the workplace. In addition, the frequencies (f) of each authentic expression were calculated and are presented in the tables to show their prevalence. These analyses were performed using the Windows version of the atlas.ti 5.2 software package (atlas.ti, 2013).

## 3. Results

### *3.1 The Importance of the Learning Program of Ergonomics*

The **importance of the learning program of ergonomics to students themselves and to other workers in the company** were divided into the following three upper categories (Table 1): *the expertise of the students regarding ergonomics was increased; the ergonomics studying was interesting and had a positive transfer effect in the students' lives;* and *the ergonomics learning program increased employees' awareness of ergonomic issues, thereby improving their health.* These were combined into a single major category: The competence of students and employees was increased and their health was improved.

Table 1. The importance of the learning program of ergonomics to the students themselves and to other workers in the company (n=15).

| Subcategory | f* | Upper category | Main category |
|---|---|---|---|
| The students' proficiency was increased | 6 | The expertise of the students regarding ergonomics was increased | The competence of students and employees was increased and their health was improved |
| The students' knowledge on ergonomics was increased | 14 | | |
| The students' competence on ergonomics was increased | 12 | | |
| The students' credibility and authority in matters relating to ergonomics were increased | 5 | | |
| The students' knowledge on, and skills in, ergonomics were increased and can be utilized in the future | 7 | | |
| The students' consideration of employees' health was increased | 3 | | |
| Studying ergonomics was interesting in itself | 8 | The ergonomics studying was interesting and had a positive transfer effect in the students' lives | |
| Ergonomics studies had a positive transfer of learning in the students' own life | 12 | | |
| Employees' health was improved | 13 | The ergonomics learning program increased employees' awareness of ergonomic issue, thereby improving their health | |
| Employees got interested in, and learned more about, ergonomics | 5 | | |
| Employees' competence and understanding on ergonomics were increased | 4 | | |
| Development work became more humane | 5 | | |
| There was a positive decrease effect to workers' sick leave days | 10 | | |

*f (frequency) = number of authentic expression from the interviews. The same point might be expressed in different ways, and, therefore, every expression was counted separately.

The increase in participants' expertise meant that their knowledge, credibility and proficiency regarding ergonomics grew. They felt that they could continue utilizing their knowledge on ergonomics in the future. The ergonomics studying was considered interesting in itself, and participants felt that ergonomics studies had positive transfer effects in their own lives, e.g., by prompting them to think about ways of doing housework that would cause less strain than their current methods. The employees' increased awareness of ergonomic issues enabled them to spot potential problems in this area and encouraged them to intervene. This resulted in noticeable improvements in the employees' health, as demonstrated by reports that the number of sick leave days taken by employees had declined following the implementation of changes in their working practices to reduce their physical workloads.

The **importance of the learning program of ergonomics to the organization and working environment** were divided into the following three upper categories (Table 2*): working conditions were revised to promote safety; continuous development activities were initiated within the organization;* and *the ergonomics learning program's development cycle model was utilized in the company*. These were combined into a single major category: the profitability of developmental activities in the organization and the work environment was improved.

Table 2. The importance of the learning program of ergonomics to the organization and working environment (n=15)

| Subcategory | f* | Upper category | Main category |
|---|---|---|---|
| Work tools were developed | 4 | Working conditions were revised to promote safety | |
| Working conditions were improved | 8 | | |
| Employees' work safety was improved | 5 | | |
| Development activities must be maintained | 2 | | |
| The impacts of development activities can be seen in the long run | 11 | | |
| The impacts of development activities can be seen in the long run and demand budgeting | 2 | Continuous development activities were initiated within the organization | |
| Development activities became more efficient | 5 | | |
| Development activities became continuous in the working community | 3 | | The profitability of developmental activities in the organization and the work environment was improved |
| The development solutions have been sustainable | 5 | | |
| The productivity of work has improved | 4 | | |
| Customer benefits were better taken into account in the company | 12 | | |
| The transferability of the ergonomics learning program's development cycle model must be thought about within the company | 3 | The ergonomics learning program's development cycle model was utilized in the company | |
| The ergonomics learning program's development cycle model is transferable to different jobs or other companies either directly or by applying it | 14 | | |
| Utilizing the ergonomics learning program's development cycle model became more frequent | 5 | | |
| The ergonomics studies had a positive transfer effect within the company | 9 | | |

*f (frequency) = Number of authentic expression from the interviews. The same point might be expressed in different ways, and, therefore, every expression was counted separately.

Safer working conditions were created by developing new tools to assist the workers in doing their jobs and by improving their working conditions. For example, manual sorting of packages and other objects is an important employee function in the organization. A new type of chair was designed to reduce the strain caused by this work. The adoption of a continuous development approach within the organization had a positive effect on productivity of work. When employees are healthier, productivity increases. Participants of the ergonomics learning program consistently reported that employees who were in good physical condition worked to higher standards, and that this was beneficial for the business and its customers. It should be noted that a movement towards continuous development was already underway within the organization when this study was conducted, and that various beneficial changes had already been implemented. However, the participants generally felt that it would only be possible to accurately evaluate the impact of development activities over a longer period of time. Nevertheless, many participants reported that the ergonomics learning program's development cycle model had proved to be useful, and most of the students stated that its operational model would be either directly transferable, or applicable, to different types of work or other companies.

The **importance of the learning program of ergonomics to the company's leadership** was divided into the following two upper categories (Table 3): *some managers' awareness of development activities was increased and they became committed to development work;* and *some managers' awareness of development activities and their requirements should be*

*increased*. These were combined into a single major category: managers must be committed to development activities and understand the demands of development work.

Table 3. The importance of the learning program of ergonomics to the company's leadership (n=15)

| Subcategory | f* | Upper category | Main category |
|---|---|---|---|
| Managers were actively involved in development work and their knowledge on ergonomics was increased | 6 | Some managers' awareness on development activities was increased and they were committed to development work | Managers must be committed to development activities and understand the demands of development work |
| Managers were committed to development work | 3 | | |
| Managers should have time for development work and they should know more about ergonomics | 9 | Some managers' awareness on the requirements of development activities should be increased | |
| Managers should commit themselves to development work | 3 | | |
| A high turnover in managers and leadership made development work difficult | 8 | | |
| Management should still be interested in Ergonetti development work in the future | 6 | | |
| Managers should be interested in the development work itself, not only the costs | 7 | | |

*f (frequency) = number of authentic expressions from the interviews. The same point might be expressed in different ways, and, therefore every expression was counted separately.

Getting leaders to commit themselves to development work was considered important. Participants felt that some of the managers were actively involved in, and were committed to, development work, whereas others were less engaged. Managers of the second kind were less amenable to the implementation of developmental work. High rates of turnover among managers and the company's leadership, together with the high workloads of people holding such positions, were also noted as factors that made development work more difficult.

### *3.2 How Learning Occurred and was Achieved in the Workplace Through the Learning Program of Ergonomics*

The students' views on how learning occurred and was achieved in the workplace were divided into the following five upper categories (Table 4): *by utilizing the students' previous (positive) experiences with development activities, in conjunction with the students' motivation and by thinking ahead of development activities in the workplace*; *with the assistance of agents within the company who supported the students*; *by acting on the basis of the ergonomics learning program's methods*; *by making workers and managers involved, guiding workers, and giving them responsibility*; and *by having discussions*. These were combined into a single main category: learning in the workplace occurred and was achieved by methods that were supporting and committing.

Table 4. How learning occurred and was achieved in the workplace through the learning program of ergonomics

| Subcategory | f* | Upper category | Main category |
|---|---|---|---|
| By thinking ahead | 2 | By utilizing the students' previous (positive) experiences with development activities, in conjunction with the students' motivation and by thinking ahead of development activities in the workplace | |
| By increased motivation | 3 | | |
| By increased thinking | 5 | | |
| By students' previous, positive experiences, and their long work experience | 11 | | |
| The support of, and set meetings with, fellow students or student group promoted learning | 21 | With the assistance of agents within the company who supported the students | |
| Support from employer promoted learning | 11 | | |
| Getting involved in the activities during working hours promoted learning | 12 | | |
| Support from the industrial safety delegate promoted learning | 6 | | |
| Support from occupational health care promoted learning | 5 | | |
| Persevering work advances development activities | 6 | By acting on the basis of the ergonomics learning program's methods | Learning in the workplace occurred and was achieved by methods that were supporting and committing |
| Faults are more easily noticed and people are more likely to intervene to them | 7 | | |
| The ergonomics learning program's measurements were used to reveal opinions and to fix ergonomics issues | 2 | | |
| With the ergonomics learning program's development cycle model | 3 | | |
| By concretely trying things out and going through with them | 8 | | |
| Employees received more one-to-one guidance on taking ergonomics topics into account in their work | 4 | By making workers and managers involved, guiding workers, and giving them responsibility | |
| Employees were given more responsibility in ergonomics issues | 7 | | |
| By making employees and management committed to development work | 12 | | |
| By utilizing multiculturalism in the work community | 2 | By having discussions | |
| By having more discussions (between students) | 3 | | |
| By having more discussions (in the work community) | 12 | | |
| By having more discussions (with management) | 3 | | |

*f (frequency) = number of authentic expressions from the interviews. The same point might be expressed in different ways, so every expression was counted separately.

Participants of the ergonomics learning program found that their previous positive experiences with development work and their extensive work experience helped in furthering activities and validating expenses. However, it was noted that it was necessary for participants to be committed and motivated to study in order for developmental activities to be conducted, since this encouraged students to share what they had learned with others. Furthermore, thinking about the demands of development work became more common; for instance, participants considered the ergonomics studies to be a good example of how one should think about development and cause-and-effect relationships before starting work on development activities. Participants received support for their studies from different agents in the company (e.g., from fellow students and their employer), and this helped them in advancing their studies. According to the participants, the methods taught in the ergonomics learning program were useful in guiding the progression of developmental activities.

Participants also acknowledged that ergonomic development must be done over extended periods of time and that quartile thinking is not applicable to ergonomics. The development cycle model of the ergonomics learning program was also useful for identifying flaws in existing systems. For example, participants noted that it had been useful in fixing issues that

had been recognized as problems 10 years ago. The process-like learning and concrete development work of the ergonomics learning program was functional and useful. Learning took place at work, and was considered to occur in stages by participants. First, participants familiarized themselves with the demands of development activities with the ergonomics learning program's library material, and only after this was there consideration on how development activities could be carried out.

Moreover, participants felt that learning occurred when they were able to get other workers interested in development work. Learning also took place in the company when employees and management became involved in and were made responsible for development. For example, getting managers involved worked well when topics were initially prepared by upper management and were then systematically passed down to workers. Multiculturalism was also highlighted as being important for development work, since workers with foreign backgrounds were considered to be more likely to intervene in problem areas than Finnish workers. Active confidential discussions among employees concerning ergonomic issues also helped to promote learning. It was possible to involve employees in development work by discussing even difficult topics openly and honestly, and by taking workers' different viewpoints into account.

In summary, participants of the ergonomics learning program obtained new knowledge and their expertise and competence on ergonomics was increased. Moreover, other employees of the company also became more informed about ergonomic issues. This increased awareness had a positive influence on the health of the participants and those working for the company. The profitability of the company was improved by the development of safer working conditions and the adoption of a continuous development approach that utilized the development cycle model of the ergonomics learning program. On the other hand, the development activities of the ergonomics learning program were considered to require the investment of time, resources, and commitment. The support and commitment of multiple agents within the company, together with open discussion between employees at various levels, was essential for learning and the progression of development activities.

## 4. Discussion

### *4.1 Discussion of the Methodology*

The purpose of this study was to describe the web-based learning program of ergonomics, the Ergonetti, as a tool for promoting sustainable well-being at work in a large company from the viewpoint of the students. A key research objective was to study the quality of the phenomenon rather than its quantity, and so fewer participants were involved than would have been required in a quantitative study (e.g., Draper, 2004). Since it was essential to collect data that would provide as much information on the research questions as possible, only individuals with prior experience of the research topic were chosen as participants (e.g., Conelly & Yoder, 2000).

The use of qualitative content analysis provided a more thorough understanding of the importance of the ergonomics studies and of students' views on how learning occurred in the company, than could have been achieved using a quantitative method. Moreover, the use of an

inductive approach rather than a deductive one ensured that all relevant expressions were included in the analyses (Huberman & Miles, 1994).

Generalization of the results presented herein may be difficult and should be done carefully due to the small number of participants. Therefore, all relevant quotations were considered in the analyses. The main problem of qualitative content analysis relates to the difficulty of achieving adequate data-reduction during the analytical process (e.g., Weber, 1985). However, the raw data obtained in this work are sufficiently extensive (108 pages) to mitigate the impact of this problem. The potential impact of this problem was further reduced by the fact that the first stage of the analysis, i.e. the reduction of the data, was conducted by a single researcher (the first author), with the remainder of the authors only becoming involved in the subsequent analytical steps.

### *4.2. Discussion of the Results*

The study's results were primarily positive. Development activities were initiated and progressed in parallel with the investigation. All participants had worked for the company for long periods of time, and were able to utilize their experience and their knowledge of how the company operates in their development work. They volunteered to participate in the ergonomics learning program, and were motivated to learn about ergonomics and improve working conditions before their studies began. The ergonomics learning program offered a variety of approaches to solving problems in the company's operations (e.g., Tynjälä & Häkkinen, 2005).

Successful web-based learning environments must provide theoretical information on the learning topic while promoting interaction between students and knowledge sharing (Falconer, 2006; Tynjälä & Häkkinen, 2005). As might be expected, participation particular in these ergonomics studies increased students' theoretical understanding of ergonomics as well as their practical competence and expertise within this field (see also Ordoobadi & Wang, 2011; Phusavat et al., 2012). The development cycle model of the ergonomics learning program proved to be useful to the participants and was subsequently adopted for other tasks in the company. A key advantage of the ergonomics learning program's model is that it "forces" participants to discuss things with one-another and interact, and makes them solve problems together as they arise. In these discussions, employees became more aware of problematic issues and learned how to deal with them. In this way, new knowledge was embedded into the company, reinforcing the organization's capacity for learning (e.g., Haugh & Talwar, 2010; Ramirez, 2012). In large companies, the inability to share knowledge sometimes creates problem that hinder the implementation of learning programs (Netteland et al., 2007). However, no such issues were encountered in this study and knowledge was successfully shared at the national level.

Promoting sustainable well-being at work demands organizational changes (Dellve et al., 2007; Heward et al., 2007). In the company examined in this study, methods were changed, and new working techniques and tools were developed. This development work helped to reduce the physical strain imposed on employees. The resulting improvements in health and safety at work decreased the number of sick leave days taken by employees. The development activities

of the ergonomics learning program therefore had a positive impact on the company's profitability, since it is widely accepted that when employees are healthier and are happy with their work rather than merely being satisfied (e.g., Allegre & Shiva, 2009), profitability improves. Participants noticed that developing sustainable well-being at work requires a long-term investment of time and commitment (e.g., Haugh & Talwar, 2010; Sironen-Karvinen et al., 2010).

Some of the managers were committed to development work, but the high workloads and staff turnover at the managerial level presented problems. Some new managers had little awareness of ergonomic issues and were therefore not committed to development work. As Dellve et al. (2007) and Heward et al. (2007) have noted, good leadership is essential for the promotion of sustainable well-being at work. Changes in leadership that introduce a lack of commitment can therefore be very problematic in large organizations. In a previous study (Randelin et al., 2013), it was found that managers at various SMEs were genuinely committed to development work of the ergonomics learning program, but there were no changes in the leadership of the studied companies during the course of that work. The company studied in this work is currently devoted to developing its leadership, and stated in its Annual Report that "we will also pay increased attention to supervisors' communication skills and their aptitude for their tasks. A supervisor's role as a messenger and motivator will continue to play an increasingly important role. Leadership was selected as one of our strategic focal points in 2011."

Participants also felt that learning occurred in the workplace when their existing knowledge and long work experience were utilized both within the company and to meet the demands of development activities. They first familiarized themselves with the demands of the ergonomics learning program's development activities by acquiring new knowledge (e.g., Haugh & Talwar, 2010), and only after this had been achieved was there consideration of how development activities could be implemented. Support from managers, the working community, and the organization increases employees' motivation to use web-based programs (Wang et. al., 2010). In particular, the support of fellow students, study groups, and managers were identified as having a very strong impact on employee motivation. Similar results regarding managerial support have been reported by Cheng et al. (2012) and Pehkonen et al. (2009). While not all managers were necessarily committed to development work (for example, some did not participate in activities such as development meetings) the vast majority of the participants felt that they got adequate support from their leaders. The provision of support within the company was also emphasized. Most of the students were able to study during working hours, and the student group frequently gathered to discuss the ergonomics development work even though the students lived and worked in different places in Finland. Participants also held discussions via telephone and e-mail, and encouraged each other in their studies.

With shared discussions in the workplace made it possible to get input from every employee involved in development activities, and, therefore to make use of the tacit knowledge in the company (e.g., Falconer, 2006; Liu & Wang, 2009; Randelin et al., 2013; Wild et al., 2002). It was also interesting that multiculturalism facilitated learning within the company. According to the company's Annual Report for 2011, all employees are treated as equals without regard for their gender, age, origin, cultural background, beliefs, education, work experience, or area of

expertise. Tolerance and multiculturalism are advanced via development in areas such as supervisory work, recruitment, and induction.

### *4.3 Limitations*

Despite the richness of the data gathered, this work had some limitations. First, it is possible that different results may have been obtained if participants from multiple companies or from different professional fields had been surveyed. However, the participants worked in different corporate offices at various locations in Finland, all of which differed slightly in terms of their working methods and workplace environment. Second, the focus of this study was on the students' points of view. It may have been interesting to have interviewed other actors involved in the process, such as workers who participated in the development work. Third, there was little relevant information on the research topic in the peer-reviewed literature, and so this work was necessarily based in part on conceptual papers and literature reviews that have not been through peer review. However, material of this type was only used after careful consideration, and only as a source of information on subjects that have a direct bearing on the study. Fourth, one researcher (the first author of this article) performed the basic analysis (simplified expressions, sub-categories) presented herein. However, other authors commented on the realization of the analysis in its different stages, and were involved in naming the categories (upper categories, main categories).

## 5. Conclusion

The implementation of sustainable well-being at work as taught in the ergonomics learning program requires the investment of time and managerial support. Sustainable well-being at work was described in terms of increases in students' understanding of ergonomics issues and competence in addressing them. This increased understanding among the students was shared with other employees and ultimately improved the company's profitability. Tacit knowledge in the workplace was exposed by open discussions about development activities, which facilitated information sharing within the company.

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