



**HAL**  
open science

## Active ageing, development of skills and Long-life Learning at work

Catherine Delgoulet, Jean-Claude Marquié

### ► To cite this version:

Catherine Delgoulet, Jean-Claude Marquié. Active ageing, development of skills and Long-life Learning at work. First congress of FEES "Quality of life: social, economic & ergonomics challenges for ageing people at work", Oct 2010, Bruges, Belgium. halshs-00737478

**HAL Id: halshs-00737478**

**<https://shs.hal.science/halshs-00737478v1>**

Submitted on 1 Oct 2012

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Active ageing, development of skills and Long-life Learning at work<sup>1</sup>

Catherine Delgoulet\* & Jean-Caude Marquié\*\*

\*Laboratoire Adaptations Travail-Individus (LATI), Université Paris Descartes, France

\*\*Cognition, Langues, Langage, Ergonomie (CLLE), CNRS - Université Toulouse 2, France

Abstract: This paper presents directions worth being explored to improve skill development and long-life learning at work. It also highlights learning specificities of the older workers and difficulties they may encounter in training situations. Measures that come within an ergonomics framework are proposed.

## Introduction

The ageing of the work force in most of our societies (Parent-Thirion et al., 2007) has led many European countries to take steps to lengthen occupational life. In France, the activity rate of workers 55 years old and over is one of the lowest in Europe: 39% of them were active in 2009 (INSEE data). Generalizing and intensifying “*Lifelong training*” appears more and more as a necessary consequence of these changes. It is advantageous not only for employees who are encouraged to greater mobility and polyvalence (Gollac & Volkoff 2007), but also for unemployed people, as it makes it easier for them to find a job. However, in practice, much is still to be done to fully meet this goal.

In this paper we present a few ideas and facts about how work policies and organization can contribute to promote:

- greater access to training for older workers,
- training methods better suited to the adult’s characteristics,
- the integration of continuous learning and long term development opportunities in the job itself.

## Promoting greater access to occupational training for older workers

In Europe, especially in France, access to occupational training becomes more difficult with advancing age. This fact is old but still relevant (Fournier, 2004; Parent-Thirion et al., 2007). Trying to change it has several implications. It first requires changing representations and throwing off the yoke of negative

---

<sup>1</sup> Reference : Delgoulet, C., & Marquié, J.-C. (2010). Active ageing, development of skills and Long-life Learning at work. *First congress of FEES "Quality of life: social, economic & ergonomics challenges for ageing people at work"*, 10-12th of october, Burges (Belgium).

stereotypes, where they exist, both in employers and in employees themselves. In a European survey on aging workers (Walker & Taylor, 1992), 43% of employers perceived older workers as having learning difficulties. In other surveys (Le Minez, 1995; Collis & Mallier, 1999) employers also reported lack of willingness or ability to adjust to changes as being associated to older age. In a more recent survey, Gaudart and Delgoulet (2006) found that workers and unemployed persons over 40 were submitted to a more severe selection and had less access to certifying training and less chance to find a job at the end of the training. In addition to negative stereotypes, the integration of the trainee's experience may be problematic for the training staff. This is the case when the trainee's experience cannot be easily integrated into his/her project or when it is associated with painful experiences, such as unemployment. Some attitudes toward ageing workers can lead them to feel unfit for learning (Marquié et al., 1994) and to express less needs for future training courses (Lainé, 2002). Long-lasting lack of access to training may generate a feeling of being left out. However, there is now a broader social and political consensus than before about the need to increase the frequency and regularity of occupational training opportunities throughout the occupational lifetime (national and European programmes for "life-long learning"). Many psychological and social benefits are expected.

First, this is a condition for maintaining the worker's learning motivation because, as shown by extensive surveys on continuing training carried out in France (Fournier 2004), the less training the worker has received, the less he/she is willing to be trained, and vice-versa.

Second, increasing the frequency of training is a means of maintaining learning skills. Learning involves specific skills, which can be lost if they are not used. In a field study on age differences in learning railway maintenance skills, we found a significant negative relationship between the time elapsed since the worker's last training experience and the learning performance: the more distant the previous training experience, the poorer the performance (Delgoulet & Marquié, 2002). This was even truer for the most abstract part of the tests that assessed learning performance. This suggests that skills involved in generalisation and abstraction are those most affected by disuse. A related issue concerns the relationship between training and overspecialisation at work. Even in highly-qualified working populations, overspecialisation involves several risks with regard to personal and occupational development. For instance, it has been found that compared to younger ones, older pilots from 25 French and foreign airline companies being trained to fly the Airbus A320 on a flight simulator in France (Amalberti, Pèlerin, & Racca, 1991) exhibited slower progression rates (as assessed by the number of additional training sessions requested), and greater failure rates in the final examination. One interesting result of the study was that the A320 training seems to have been easier for pilots who had moved around in the previous few years. Indeed a positive correlation was found between failure rates in the final examination and time spent on the most recently piloted aircraft model. Note that

more frequent moving around between different aircraft models also implies more frequent training opportunities.

A third expected benefit of the increased frequency of the workers' training is that it would allow them to compensate for any initial inequalities in education. Indeed, people with lower academic credentials are also those with the lowest rates of access to training, in both the public and private sectors (Perez, 2002; Fournier, 2004). Occupational training policies thus maintain initial disparities and may even increase them because of some cumulative processes at work.

Fourth, regular training was reported in earlier work such as that of Davies & Sparrow (1985), as counteracting seniority-related obsolescence and preserving performance levels at a relatively greater extent in the older workers.

### **Promoting training methods better suited to the older and experienced worker's characteristics**

Once obstacles preventing senior workers from accessing formal training courses have been overcome, older and experienced workers may still encounter specific learning difficulties in these situations. From studies conducted in real-world training situations and experimental studies carried out in the laboratory, we can extract some recommendations or research directions whenever our knowledge is too scarce.

One important measure for older learners consists in making errors less dramatic for them during the learning process, by convincing them that making errors is necessary to progress. Adopting such a view is less easy for them, as was observed in a real training session on learning how to use a word processor (Baracat & Marquié, 1994). Techniques derived from the Signal Detection Theory were applied to assess the decision criteria used by young and older trainees, when judging and deciding whether procedures that were submitted to them, and which they were expected to execute in a subsequent phase, were right or wrong. The older trainees (age range of participants: 25-55) exhibited stricter decision criteria, especially at the beginning of the training week. This means that they made a higher proportion of omission errors, which revealed a greater reluctance to commit to an action when they were not entirely sure that the proposed procedure was correct. This attitude was interpreted as reflecting a higher level of anxiety in this learning situation compared to the younger trainees, an interpretation whose plausibility was confirmed in subsequent studies. This was observed, for instance, in a four-week training course on accounting and office automation (Delgoulet, Marquié, Escribe, 1997) where the older trainees showed significantly higher anxiety throughout the first three weeks, with learning anxiety being assessed by the Spielberger state anxiety test. The same was observed in a one-week training course for railway operators, who were trained to use magnetoscopic techniques for maintaining bogie trucks (Delgoulet & Marquié, 2002). Beyond the fear of errors, learning anxiety may also come from the above-

mentioned lack of practice in training settings, from previous unsuccessful training experiences, or from a generational complex, with older people comparing themselves to younger ones who are supposedly or actually better prepared.

There are domains where age is associated with negative stereotypes. In these cases, trainers are therefore required to use compensatory measures to increase or consolidate the older trainee's self-efficacy beliefs. New technologies may be an instance of such a domain, as shown by the results it obtained in experiments using feeling-of-knowing (FOK) tasks (Marquié & Huet, 2000; Marquié, Jourdan-Boddaert & Huet, 2001). The FOK is a prospective judgment of one's ability to retrieve a particular piece of information that cannot be brought to consciousness at that moment. For two semantic knowledge domains, general and computer-related, FOK ratings were recorded in young and older adults, after test difficulty was equated across age groups. The older adults were found to be less confident than the young ones when rating their FOK, but only for computer-related items, not for general knowledge items. Thus, although their actual knowledge in the computer domain (as in the general domain) was exactly the same as the young participants, the older participants significantly underestimated their knowledge only in the domain where negative age-related stereotypes are present. We believe that this type of judgement bias may have deleterious consequences in learning situations, because people do not make an appropriate effort to mobilise the relevant cognitive resources and do not persevere as much if they do not believe that they possess these cognitive resources.

Various types of experience are strongly associated to ageing at work. This includes "technical experience", namely know-how and skills related to specific occupational tasks, but also "job or unemployment experience" and "the experience of one's own ageing". These three dimensions of experience are too often forgotten in the training course design. Formal technical knowledge may be partly taken into account through the prerequisite skills to attend a vocational course, but technical know-how and the other two dimensions of experience are generally little recognized. The message carried by the vocational training system can be summarized this way: "*Forget all you have made and learned before*", a message that older workers find sometime unacceptable (Delgoulet, 2001) or take with resignation. Moreover, failing to take into account these cognitive dimensions leads to many troubles in learning situations for older and experienced workers (Gaudart, 2000a; Delgoulet, 2001; or the presentation of Cau-Bareille, et al. at this congress): poor understanding, conflict with trainers, wide gap between actual work activity and the knowledge that it is transmitted in the training course, etc.

Training methods little suited to the older trainee's specific characteristics in terms of time pressure, mental overload, especially at the beginning of a training programme, lack of connection with the worker's own experience, etc, are also a

cause of lack of motivation for these populations. Many studies (see Paumès Cau-Bareille & Marquié, 1998 for a literature review) have shown that the older trainees succeed when learning conditions are well suited.

### **Promoting the integration of continuous learning and sustainable development opportunities in the job itself**

Working and learning are too often opposed to each other. Narrowing the links between the two, in the many aspects of the relationship, is a major way of combating qualification obsolescence, and of maintaining and even increasing the worker's cognitive and motivational potential. This implies, first, a work organisation that actually makes room for formally programmed training sessions, such as those devoted to learning new tasks in companies where job rotation is highly encouraged. In organisations under pressure, these in-service training sessions are often the first to be abandoned when time constraints are too great, as reported in field studies by ergonomists (e.g., Gaudard, 2000b). This also implies that the work organisation provides workers with opportunities to experience more or less structured thinking and social exchange about their job practices and working conditions. We have learnt from cognitive psychology that competence does not progress through piling up knowledge, but rather through the close integration of new knowledge within existing knowledge. This is an active, deliberate and effortful process. This also requires a meta-cognitive effort that makes procedural knowledge, which is encapsulated and clearly unconscious, become declarative, namely accessible to consciousness and thus modifiable. Such opportunities are insufficiently provided in the workplace, especially for the older workers (Molinié, 2002). Moreover, some current work organisation trends, such as task individualisation, increasing time pressure, and tracking down and chasing idle time lead to the elimination of several of the informal but quite necessary occasions when the worker can perform this "unproceduralisation". Doing such a meta-cognitive job increases awareness of all the accumulated skills. It allows workers to re-appropriate their skills, to improve or consolidate their self-confidence and thus their ability to take up new occupational challenges. It has also been shown that not perceiving one's job as "allowing to learn new things" is associated with a higher probability of "not feeling capable" to stay in one's job until retirement (Molinié, 2005).

Moreover, current literature on the psychology of ageing and work provides more and more evidence that formal and informal learning occasions in and out of work may also contribute to protecting the worker from cognitive ageing, to some extent (Schooler, Mulatu, & Oates, 1999). In a recent study this hypothesis was examined by using data from the VISAT (ageing, health and work) longitudinal study (Marquié, Jansou, Baracat, et al. 2002). Data concerned 3 237 workers who were seen three times in a ten-year interval and were between 32 and 62 years old at baseline. Cognitive stimulation received at work was assessed on the first measurement occasion through a score computed from seven items, including:

- occupational training opportunities,
- qualifying aspects of the job, with items referring to the cognitive richness of the work content and to whether the job allowed workers to increase their abilities (e.g., "My job enables me to learn new things"),
- cognitive effort, with items reflecting a more intensive aspect of the work (e.g., "Having to hold a lot of information in memory at the same time").

Cognitive efficiency was assessed three times (at baseline and at the two follow-ups) through episodic verbal memory and processing speed tests. Results showed that greater mental stimulation received at work was associated with higher levels of cognitive functioning, and with a more favorable change over the ten years. These results were obtained after adjustment for age, education, sex, occupational status, intellectual ability, and a variety of other possible confounders. The study thus supports the hypothesis that exposure to jobs that are mentally demanding but offer learning opportunities increases the level of cognitive functioning and possibly attenuates age-related decline (Marquié, Rico Duarte, Bessièress, Dalm, Gentil, & Ruidavets, in press).

Finally, learning situations can be seen from two points of view in the occupational context. Older workers are learners when they face new situations or difficulties in their job, but also when they train colleagues. Because of the demographic trends and the senior employment agreements in France, a new learning dimension has to be considered: the transmission of skills and the tutorial system. The intergenerational transmission of knowledge and know-how is a real opportunity for older workers to be recognized, to share their own knowledge and to learn much through this interaction. However, studies conducted so far (Delgoulet et al, 2009; Thébault et al., 2009; Cloutier et al., 2009) have revealed several features of the working organization likely to hinder learning and deteriorate working conditions: lack of skilled people in teams, insufficient time to take care of new comers, lack of training of tutorial skills for experienced workers, lack of time formally devoted to transmission, etc.

## **Conclusion**

Long life learning is perfectly feasible, but it takes a “*conditional approach*” according to working and training conditions (Delgoulet et al., 2005). Useful information is already available for improving access to training and more suitable training methods for older workers. However, on most of the issues outlined in this paper, much research effort must still be accomplished to better understand measures most likely to develop the worker’s technical and non-technical skills throughout his/her entire occupational life. One major way of achieving this goal is to favour the “*learning organisation*” (Sen, 1999), where working and learning are no longer opposed, and where the continuous development of human capabilities is seen as a profitable long-term investment

both for the worker and the company. Health has also cognitive components. Maintaining and increasing competence all over one's occupational life contributes to health preservation. We believe that the ergonomics approach and the "activity" framework (Daniellou & Rabardel, 2005) may help to identify the best learning conditions, both in formal training courses and at work, that allow older workers to maintain motivation and competence.

## References

- Baracat, B., & Marquié, J. C. (1994) Training middle-aged for new computer technology: a pilot study using SDT in a real-life word-processing learning situation. In J. Snel, & R. Cremer (Eds.) *Work and aging: a European prospective*, Amsterdam: Taylor & Francis, pp.197-211.
- Cau-Bareille, D., Delgoulet, C. & Gaudart, C. (à paraître). When learning difficulties and specificities of older workers stand to show training deficiencies. In *FEES 2010 Congress*, 10 to 12<sup>th</sup> of October in Bruges, Belgium.
- Cloutier, E., Fournier, P.-S., Ledoux E., Gagnon, C. I., Beauvais, A., & Vincent-Genod C. (2009). Penetrating professional culture: An essential key for novices for accessing the prudent and professional know-how of experienced film industry workers. *Proceedings of The XVIIth Trienal congress of IEA*, Beijing (China), the 9-14th of August.
- Collis C., & Mailer T. (1999). Gradual retirement in Britain: problems and prospects, *Proceedings of ICOH « Healthy and productive ageing »*, 192-202, La Haye.
- Daniellou, F., & Rabardel, P. (2005). Activity-oriented approaches to ergonomics: some traditions and communities. *Theoretical issues in Ergonomics science*, 6(5), 353-357.
- Davies, D. R., & Sparrow, P. R. (1985). Age and work behaviour. In N. Charness (Ed.). *Aging and human performance*, Chichester: John Wiley & Sons, Ltd, pp. 293-332.
- Delgoulet, C. (à paraître). Apprendre pour et par le travail : les conditions de formation tout au long de la vie professionnelle. In C. Gaudart, A. Molinié & V. Pueyo (Eds.), *La vie professionnelle : âge, expérience et santé à l'épreuve des conditions de travail*. Toulouse : Octarès.
- Delgoulet, C. (2001). La construction des liens entre situations de travail et situations d'apprentissage dans la formation professionnelle. *PISTES*. 3(2). [www.unites.uqam.ca/pistes](http://www.unites.uqam.ca/pistes)
- Delgoulet, C., Marquié, J.-C. (2002). Age differences in learning maintenance skills: a field study. *Experimental Aging Research*, 28, 25-37.
- Delgoulet, C., Gaudart, C. & Chassaing, K (2009). Job entry and on-the-job skills acquisition in the construction sector, *Proceedings of The XVIIth Trienal congress of IEA*, Beijing (China), the 9-14th of August.



- Delgoulet, C., Marquié, J.-C., & Escribe, C. (1997). Training older workers: relationships between age, other trainee characteristics and learning anxiety. *Arbete och Hälsa*, 29, 70-78.
- Delgoulet, C., Millanvoye, M., & Volkoff, S. (2005). Les « capacités » des travailleurs vieillissants : une approche conditionnelle. *Futuribles*, 314, 5-23.
- Fournier, C., 2004, Continuing training in the private sector put to the test of age. *Training & Employment, CEREQ*, 54, 1-4.
- Gaudart, C. (2000a). Quand l'écran masque l'expérience des opérateurs vieillissants : changement de logiciel et activité de travail dans un organisme de services. *PISTES*, 2-2. <http://www.pistes.uqam.ca/v2n2/articles/v2n2a4.htm>
- Gaudart C. (2000b). Conditions for maintaining ageing operators at work – a case study conducted at an automobile manufacturing plant. *Applied Ergonomics*, 31(5), 453-462.
- Gaudart, C., & Delgoulet, C. (2005). Life long training: between theory and practice. The example of a French training agency. In, G.Costa, W.J.A. Goedhard & J. Ilmarinen (Eds.), *Assessment and promotion of work ability health and well-being of ageing workers* (pp. 359-364), the Netherlands: Elsevier.
- Gollac M., & Volkoff S. (2007). *Les conditions de travail*. Repères, La Découverte, Paris
- Lainé, F. (2002). Les seniors et la formation continue : un accès en général limité mais avec de grandes différences selon les situations professionnelles. *Premières Informations et Synthèses*, 12(1).
- Le Minez, S. (1995) Les entreprises et le vieillissement de leur personnel : faits et opinions, *Travail et Emploi*, 63, 23-40.
- Marquié, J. C., & Huet, N. (2000). Age differences in feeling-of-knowing and confidence judgments in two semantic knowledge domains. *Psychology and Aging*, 15(3), 451-461.
- Marquié, J. C., Jourdan-Boddaert, L., & Huet, N. (2002). Do older adults underestimate their actual computer knowledge? *Behaviour & Information Technology*, 21(4), 273-280.
- Marquié J.-C., Thon B., & Baracat B. (1994). Age influence on attitudes of office workers faced with new computerized technologies. *Applied Ergonomics*, 25(3), 130-142.
- Marquié, J. C., Rico Duarte, L., Bessières, P., Dalm, C., Gentil, C., Ruidavets, J. B. (In press). Higher mental stimulation at work is associated with improved cognitive functioning in both young and older workers. *Ergonomics*.
- Marquié, J. C., Jansou, P., Baracat, B., Martinaud, C., Gonon, O., Niezborala, M., Ruidavets, J. B., Fonds, H., & Esquirol, Y. (2002) The VISAT (ageing, health, & work) prospective study: overview and methodology. *Le Travail Humain*, 65, 243-260.
- Minni, C., & Topiol, A. (2003) Les entreprises face au vieillissement de leurs effectifs, *Economie et Statistiques*, 368, 43-63.

- Molinié, A.F. (2002) Age and working conditions in the European Union, Report of European Foundation for the Improvement of Living and Working Conditions. [www.fr.eurofound.eu.int/////publications/EF02106.htm](http://www.fr.eurofound.eu.int/////publications/EF02106.htm)
- Molinié, A.-F. (2005). Se sentir capable de rester dans son emploi jusqu'à la retraite. *Pistes*, 7 (1), [www.unites.uqam.ca/pistes](http://www.unites.uqam.ca/pistes)
- Parent-Thirion, A, Fernandez Macias, H., Hurley, J., & Vermeylen, G. (2007). *Fourth European working conditions survey*. European Foundation for the Improvement of Living and Working Conditions. Luxembourg. <http://www.eurofound.europa.eu/publications/index.htm>
- Paumès Cau-Bareille, D., & Marquié, J.C. (1998) Ageing workers, learning and job training, in J.C. Marquié, D. Paumès Cau-Bareille, S. Volkoff (Eds), *Working with age* (pp. 297-312). London : Taylor & Francis.
- Pélegrin C., & Amalberti R. (1993). *Coordination des pilotes dans les glass-cockpits : quelques effets de l'expertise et de la culture*. OACI, Washington, avril.
- Perez, C. (2002). Continuing training in the public service. *Training & Employment (CEREQ)*, 48, 1-4.
- Schooler, C., Mulatu, M. S., & Oates, G. (1999) The continuing effects of substantively complex work on the intellectual functioning of older workers. *Psychology and Aging*, 14, 483-506.
- Sen, A. (1999). *Development as freedom*, Oxford: Oxford University Press.
- Thébault, J., Gaudart, C., Cloutier, E., & Volkoff, S. (2009). Skills transmission between experienced and new hospital workers. *Proceedings of The XVIIth Trienal congress of IEA*, Beijing (China), the 9-14th of August.
- Walker, A., & Taylor, P. (1992). *The employment of older people: employers' attitudes and practices*. ESRC Conference on "Past, current and future initiatives on ageing", London, May.