

**This is an electronic reprint of the original article.  
This reprint *may differ* from the original in pagination and typographic detail.**

**Author(s):** Tikkanen, Tarja; Nissinen, Kari

**Title:** Participation in job-related lifelong learning among well-educated employees in the Nordic countries

**Year:** 2016

**Version:**

**Please cite the original version:**

Tikkanen, T., & Nissinen, K. (2016). Participation in job-related lifelong learning among well-educated employees in the Nordic countries. *International Journal of Lifelong Education*, 35(3), 216-234. <https://doi.org/10.1080/02601370.2016.1165749>

All material supplied via JYX is protected by copyright and other intellectual property rights, and duplication or sale of all or part of any of the repository collections is not permitted, except that material may be duplicated by you for your research use or educational purposes in electronic or print form. You must obtain permission for any other use. Electronic or print copies may not be offered, whether for sale or otherwise to anyone who is not an authorised user.

# PARTICIPATION IN JOB-RELATED LIFELONG LEARNING AMONG WELL-EDUCATED EMPLOYEES IN THE NORDIC COUNTRIES

## Abstract

The purpose of this study was to explore participation in job-related lifelong learning (LLL) among high-educated mature workers and compare it across four Nordic countries. While this group generally is very active in LLL, the centrality of knowledge work in society, rapid pace of skills-renewal, and due rising learning demands on all qualifications levels, necessitates a better understanding of the patterns of and factors affecting their skills development. The paper builds on theories learning motivation, human capital, and workplace learning. Data from the Survey of Adult Skills (PIAAC) by the OECD was used. Besides high participation rates, systematic level differences in participation were found across the countries. The logit regression analyses revealed clear differences between countries in the models explaining participation, suggesting limited support to a single “Nordic model” of LLL. Furthermore, predictors of participation commonly found among adult population, low-educated, and/or younger adults, appeared less valid among high-educated.

Keywords: lifelong learning, basic skills, tertiary education, Nordic countries

Participation in job-related lifelong learning among well-educated employees in the Nordic countries.

International surveys, such as Adult Education and Labour Force Surveys (LFS) by the European Union (EU), the International Adult Literacy Survey (IALS), the Adult Literacy and Life Skills Survey (ALL), and the Survey of Adult Skills (later referred to as PIAAC) by OECD, have repeatedly confirmed the accumulation hypothesis in educational participation (Tuijnman, 1991), proposing that participation in educational activities in adulthood is positively related to individuals' educational background. Those who already have the highest levels of education tend to continue taking up learning opportunities over the entire adult lifespan (Desjardins, Rubenson & Milana, 2006), especially in job-related learning (Knipprath & De Rick, 2015). Thus, educational background commonly explains a great deal of variation in adults' participation in learning activities (Dieckhof et al., 2007; White, 2012). Instead of using education as a background variable, as is most common in participation research, we used it to separate a special sub-population for a closer analysis from within in regards their participation patterns: workers with tertiary-level qualifications, further limited to those aged 45-64 years, and to the four Nordic countries participating in the OECD's Programme for the International Assessment of Adult Competencies (PIAAC): Denmark, Finland, Norway, Sweden.

Indeed, this is a rather special sub-population in terms of education and lifelong learning (LLL). According to Eurostat (2015), the proportion of adults with tertiary education is high (33%) in these countries, and higher than in most other European countries (EU28 average, 26%), especially among females (36% and 26% respectively), and even among older adults (45-64 years) (32% and 22% respectively, among females 35% and 22% respectively). Not surprisingly, their participation rates in LLL<sup>1</sup> are also high, the highest in Europe and well above the EU's Education and Training 2020 benchmark of 15% (European

Commission, 2014) - indeed, were already when this benchmark was set in 2009. While the reference period for participation is different in PIAAC and in the Labor Force Survey by the Eurostat (four weeks and 12 months, respectively), they both show corresponding differences in participation rates for the Nordic countries vs. other countries, albeit with a lower ratio in PIAAC (Tikkanen, 2016). The difference to the rest of Europe is particularly pronounced among older adults: among those aged 55-74 years the participation rate (24%) was more than twice the EU28 average (11%), also among women (30% and 14% respectively). Most of the participation is job-related (Aldridge & Hughes, 2012; Desjardin & Rubenson, 2013; OECD, 2013).

Most of research on LLL – and for good reasons – has been targeted to low-qualified workers and less motivated learners. While high-educated definitely are an “unproblematic” group on the context of LLL, there are at least two reasons calling for better understanding of their participation behaviour, also in international comparison. Firstly, there is a rising learning demand across all levels of qualifications (Blossfield et al., 2014), due to an increasing share of knowledge work, rapid skills renewal, and strong focus on innovation and development, paralleled with an ageing work force and growing skills shortages (also in public sector). Hence, a need for a strong focus on continuous skills development of all workers and to adapt to changes throughout working life careers (OECD, 2013). Secondly, there is a growing concern among policy makers for the labour market mismatches and the competences behind the qualifications (Desjardin & Rubenson, 2011; OECD, 2013).

Proficiency of adults with the same level of educational attainment have been shown to vary substantially among countries, suggesting that higher education is not likely to instill learners with the same level of basic key competences across countries (European Commission, 2014; OECD, 2013).

Mature workers are a group of special interest here in regards LLL. On one hand they may be in risk of skills obsolescence or lack of new skills, due formal education in young age (most likely). On the other hand, theories of workplace learning propose that most of occupational learning and development during one's career takes place in the context of work (e.g. DeFilippi & Arthur, 1994), suggesting that those with longest working careers potentially have been exposed to more learning than their younger counterparts. The former suggests that mature workers' learning needs might be more pronounced than those of their younger colleagues, while the latter does the opposite. It is against this dilemma and tension that we wish to focus in particular to high-educated mature workers.

The purpose of the study is to increase our understanding of participation in job-related LLL among high-educated workers in four Nordic countries. By adjusting for human capital we can learn more about the patterns in and factors affecting their continuous skills development, and similarities and differences in these across the four Nordic countries. The text is structured into five main parts. Presentation of the research questions is followed by a brief description of the Nordic context and theories on learning participation. The third part describes the research methodology, followed by the research findings. Implications of the findings are discussed against the "Nordic model" of lifelong learning.

### **Research questions**

The following two research questions have been guiding the study:

1. To what extent do demographic, individual, job-related characteristics and skills use at work explain participation in job-related learning among these adults?
2. To what extent are the above mentioned effects different across the four Nordic countries, if any?

### **The 'Nordic model' of lifelong learning**

It is not uncommon in research to uncritically generalize research findings and theories across cultures. As Rees and others (1997) have underlined, ‘place and history must play a central role in any adequate theorization’ on LLL (p. 485). Indeed, the rationale for limiting the study to the Nordic countries is the apparent homogeneity of these countries in terms of political, cultural and historical context and development. Thus, the high level of education and participation rates are to be understood in the context of the ‘the Nordic model’. While there are some economic and political differences between the Nordic countries (Calmfors, 2014), it is the similarities that are more striking (Andersen, et al., 2007). It is the social (equality) and economic (efficiency) system that is most typically referred to as the Nordic model (Andersen et al., 2007). Yet, it has important implications also to other areas in society, such as education.

Whether there is a single overarching ‘Nordic model’ to adult education is disputable (Tuijnman and Hellström, 2001; Vinther-Jørgensen et al., 2013) - and in the context of LLL an issue of interest also in this study. Nevertheless, besides high participation rates and volume per capita, there are certain ‘patterns’ of adult education and training that are distinctive to the Nordic countries: high public share in financing, as well as high share of public providers and of personal interest in education (Rubenson & Desjardins, 2009; Tuijnman, 2003). It has been pointed out that the Nordic countries have inspired the adult lifelong learning policies in the European Union and the OECD, rather than the other way around (Ehlers et al., 2011; Vinther-Jørgensen et al., 2013), and, that in a European context, this a region with the best developed and well-functioning adult education system (Vinther-Jørgensen et al., 2013). Aside from cross-country cooperation, broad cooperation within the countries between all stakeholders is one of the key aspects in and success factors for lifelong and life-wide learning in the Nordic region (Ehlers et al., 2011). As Rubenson and Desjardins (2009) have suggested with the Bounded Agency Model, the structural conditions shared

within the Nordic welfare regimes can affect a person's capability to participate in LLL by helping them to overcome barriers. The latter, as such, are not different from other countries, but in other type, less supportive regimes they may hinder participation.

However, the Nordic model is not without its challenges (Calmfors, 2014), and there are significant differences in the degrees of commitment to the shared Nordic values by each individual country (Warner-Søderholm, 2012). Consequently, regardless of high levels internationally, results from the PIAAC have shown significant cross-country differences in participation rates in LLL and basic skills: the former are lower in Norway than in the other Nordic countries, while literacy skills are very high in Finland but below the OECD average in Denmark in the whole adult population (16-64 years) (OECD, 2013). It might be reasonable to expect these differences to be smaller with a subpopulation of high-educated workers and in job-related LLL only.

### **Theoretical background**

There are a range of theories from different disciplines, explaining participation in job-related learning and training. Indeed, inter-disciplinary approach is necessary to understand the complex phenomena of adults' participation in job-related LLL learning. Adult education (AE) theories, predominantly drawing from psychology and sociology and influenced largely by humanistic views (Sandlin, Wright, Clark, 2011), have increased our understanding of a range of individual factors, motivators and deterrents, of participation. The emergence of human resources (HR) development theories, building on psychology, economics and systems theory (Swanson, 2001), broadened the former explanations to factors related to work and work organizations. Human capital theory, the dominant approach to job-related adult learning (Desjardin & Rubenson, 2011), views learning and training as investments in human resources, returns leading to increased productivity of individual workers (Fouarge & Schils, 2009). Thus, job-related learning is considered as crucial for the

value creation in knowledge economies (Livingstone & Guile, 2012; Lundvall & Lorenz, 2012). Not surprisingly then, theories on work-related factors in learning participation have become dominating – as they are in this study. In the following, we describe individual and work-related variables included in the analysis in the light of AE and HR theories. It is important to note that these theories predominantly build on empirical work with general adult population and that we know little of their applicability on higher educated, mature adults - the target group in our study.

### **Individual characteristics**

One of the individual factors included are *basic skills* (human capital) in literacy, numeracy and problem-solving in technology rich environments. The Survey of Adult Skills has shown that basic skills are generally of crucial importance in adults' participation in labour market and education and training, but also in social and civic life (OECD, 2013, 28). High proficiency in these skills is strongly related to education, as well as *age*, and to some extent *gender* (OECD, 2013, 211). Age is also negatively associated with participation in lifelong learning (e.g. Aldridge & Hughes, 2012; Boeren, Nicaise, Baert, 2010; Tikkanen, 1998), commonly explained with human capital theory as lower net returns of investments (ROI theory) in training due to shorter payback period in older ages, thus discouraging both workers and employers from investing in training (Fourarge & Schils, 2009). High-educated professional workers, who typically engage more often in activities related to literacy and numeracy than occupational workers with less education, have higher proficiency in these skills than those who use these skills less (OECD, 2013, 24). The “use it or lose it” hypothesis (Desjardin & Warnke, 2012) can explain this, as discussed later related to skills use at work. Against the large variation in these skills also within different qualification levels (OECD, 2013), we are interested in finding out whether this variation is associated with participation in LLL among high-educated.



As suggested by Bourdieu's theory of cultural reproduction, *cultural capital* in one's childhood has been found to relate strongly to one's socio-economic status later in life, which again influences on a person's further involvement in educational and cultural activities (Boeren, Nicaise, Baert, 2010; Desjardin, et al., 2006). It has been suggested that LLL in adulthood is more influenced by learning opportunities, motivation and learner identity than determined by initial social background (Gorard et al., 1998 – quoted in White, 2012). Yet, the inter-correlations between these factors have their counterpart in the accumulation hypothesis (Tuijnman, 1991) in explaining adults' participation: prior learning experiences and qualifications accumulate in the context of lifetime barriers and opportunities (Gorard, Rees, & Fevre, 1999). Research here is inconclusive. While Rees and others (1999) suggested that in the UK the strong 'learner identities' developed early in life carry an effect to lifelong learning, the study by Støren (2012) with high-educated young adults showed that in Finland and Norway parental education level had no effect in participation in work-related lifelong learning five years after graduation. The latter study did not incorporate indirect effects, which of course are a theoretical possibility.

Positive learning *attitudes* and learning dispositions are among the strongest predictors of participation in LLL (Boeren et al., 2010; Maurer, 2002), reinforcing the 'virtuous cycle' of education (White, 2012). The theory of reason action (Ajzen & Fishbein, 1980) suggests that a person's intentions determine his or her behavior, while intention, in turn, is depending on his/her attitude toward the behavior. While high-educated overall tend to have positive learning attitudes, Støren (2012) found that their importance varied between countries: among well-educated young adults they were significant predictors of participation in Finland but not in Norway.

Our analyses included also *job satisfaction*, *health* and *income*, all found to be positively associated with education (Eurofound, 2012a, Verhofstadt & Omey, 2003). The

effect of these variables can be understood both under motivation theories (e.g. Maslow's hierarchy of needs) and the rational choice theory. The latter proposes that people always seek to maximize welfare and minimize costs when pursuing goals, and to this end they always calculate the costs and benefits of any action, before making a decision (Scott, 2000). Income can function as an important motivator and an extrinsic reward for participation. It is reasonable to expect that health may affect participation, taken the well-documented changes in working conditions, such as increased work intensity with tight deadlines and high speed, parallel with an ageing workforce (Eurofound, 2012a). The gender differences found in the relationship between job satisfaction and LLL (Georgellis & Lange, 2009) have been explained by the strongly gender-segregated labour market and related disadvantage in learning opportunities in female dominated occupations.

### **Work-related characteristic**

In line with experience-based learning in theories on workplace learning (e.g. Argyris & Schön, 1974; Marsick & Watkins, 1990), *skills use at work* was our main job-related characteristic of interest. On the side of lack of skills and competence, the phenomenon of skills underutilization has been found widespread (Desjardin & Warnke, 2012; OECD, 2012). Skills use has been explained with the 'use it or lose it' and the 'intellectual challenge' hypotheses, complex tasks being linked with high level of cognitive skills, even after controlling for education, thus suggesting that skill content may be an even stronger determinant of participation than educational attainment or literacy proficiency (Desjardin & Warnke, 2011; 2012; OECD, 2013). Thus, high-educated professional workers' considerations for LLL are premised on combinations of opportunities, motivation and capability/capacity (self-efficacy, personal agency), also later in their careers, in ways which may be quite different from those available for workers in jobs and occupations requiring less education (Tikkanen & Billett, 2014).

*Skills mismatch* between individual's skills and qualifications vis-à-vis those required by one's job have shown to relate to participation. Workers with high skill levels with matching jobs as well as in a deficit mismatch situation, are most likely to participate in employer financed training (Desjardin & Rubenson, 2011). Støren (2012) found that among high educated, being horizontally mismatched (with wrong education for the job) and over-educated, reduced likelihood of participation in Finland and Norway, while in Norway being under-educated increased it.

Other work-related characteristics found as predictors of participation in LLL are *sector, company size, job position, working time, and job autonomy* (Dieckhoff et al., 2007; Noe & Wilk, 1993; Russ-Eft, 2002; Støren, 2012). However, their relative importance seems to vary between countries, even within similar type of education systems and welfare regimes. For example, Støren (2012) found these factors as more important predictors of participation among high-educated in Finland than in Norway. Participation rates were higher among professionals and in higher managerial occupations than in other occupations (Whyte, 2012), as well as in large firms, while they were lower in part time work (Dieckhoff, et al., 2007). Besides in working time, there are gender differences in participation by sector, women working predominantly in public sector, especially in education and health services, while men predominantly in industry.

## **Method**

### **Data and the sample**

This study is a part of large research project *Realizing the workforce skills reserve* (SkillsREAL) financed by the Norwegian Research Council. The data used in the analysis here are from the PIAAC (*Programme for the International Assessment of Adult Competencies*) by OECD (2013a). PIAAC is a continuation to the previous adult education surveys by OECD: the *Adult Literacy and Lifeskills Survey* (ALL) and the *International Adult*

*Literacy Survey* (IALS). The data was collected with stratified random sampling, in face-to-face computer-assisted tests and interviews of around 166.000 adults, aged 16–64 years, from more than 20 countries (OECD, 2013), between August 2011 and March 2012.

The analysis presented here is limited to a sample of adults with tertiary education (ISCED 5–6), aged 45 years and older, employed (12 months prior to the survey), and living in Denmark, Finland, Norway or Sweden. The resulting number of cases in the analysis was N=3383. The weighted share of women in the sample (55,3%) was slightly higher than that of men, being significantly higher in Finland (59,8%) than in Norway (49,6%) and Denmark (53,8%) (table 1, all figures are weighted to eliminate possible bias due to sampling design and/or nonresponse). This suggests that especially in Finland, but also in Sweden, (56,6%), a majority of the high-educated employees, aged 45–64 years, are females. As expected, the share of youngest age group was highest (32,3%) and that of oldest was lowest (18,4%) in the data. The weighted age distributions by country (table 1) suggest that achieving tertiary education has progressed largely at the same pace in these countries, except somewhat slower in Finland (the share of the oldest age group, 14,8%, is significantly lower than in Norway and Sweden, near 21%).

## Measures

**Dependent variable.** The main response variable in the analysis is participation (yes/no) in job-related lifelong learning (LLL), defined as *participation in formal or non-formal AET [adult education or training] for job-related reasons in 12 months preceding survey*. Participation in formal AET included taking studies in schools, colleges, universities or other education institutions that were work-related. Non-formal AET included open or distant learning courses, organized learning activities for on-the-job training or training by supervisors or co-workers (planned periods of training, instruction or practical experience), seminars or workshops, and courses and private lessons.

**Independent variables.** The independent variables were demographic variables age and gender, basic skills (literacy, numeracy and problem solving in technology-rich environments), and some other individual characteristics, job-related characteristics, and skills use at work. The demographic variables were age and gender. In our analyses we used age classified into 5-year intervals: 45–49, 50–54, 55–59, and 60–64 years.

**Literacy.** In PIAAC ‘literacy’ was referring to the reading of written texts, also digital texts, but not measuring comprehension of written texts or of producing of spoken language. The assessment was carried out either as computer-based or paper-based, and the results showed no systematic differences between these two types of scores after controlling for socio-demographic factors (age, educational attainment, immigrant background and gender) (OECD, 2013, 62). Literacy proficiency is presented on a 500 point scale.

**Other individual characteristics.** Other individual characteristics included in the analysis were cultural capital, income, learning attitudes, and health. Two variables were used to measure cultural capital: parents’ (or guardians’) highest education level and number of books at respondent’s home. The former was categorized into three levels: less than secondary (=1), secondary (=2), and tertiary (=3). Number of books had five categories (1=10 or less, 2=11–50, 3=51–250, 4=251–1000, 5=1000+). As income measure we used respondent’s annual net earnings before taxes and deductions, categorized into quintiles (Cummins, et al., 2015). *Learning attitudes* were measured with an index derived from a set of six questions about learning motivation and strategies. Although the data set consists of high-educated only, Table 1 shows that there are differences in learning attitudes across the countries. The mean values are highest in Denmark and Finland, while significantly lower in Norway ( $p < .001$ ). *Health* was measured based on self-assessment of one’s health status. A 5-point scale was used: excellent, very good, good, fair, and poor.

***Job-related characteristics.*** Five job-related characteristics were used: company size, position, working time, sector, and work autonomy. *Company size* was measured with the number of employees (1=1–10; 2=11–50; 3=51–250; 4=251–1000; 5=1000+). *Working time* was measured as number of weekly hours. To distinguish different levels of work engagement, we classified the number of working hours into three categories: 1= 0–35 hours, 2= 36–44 hours, and 3= 45 hours or more. *Job-position* was based on the International Standard Classification of Occupations (ISCO), recoded into a dichotomy with managers vs. others. *Self-employment* was treated as a separate variable (1=self-employed, 0=other). The *job-sector* variable separated employees in public and private sector. For *work autonomy* we used an index derived from four variables describing task discretion at work.

***Skills use at work.*** To create an overall measure for the use of skills at work, we computed a principal component (average=0 in the whole data) of the variables measuring reading, writing and complex problem solving at work. To measure the match/mismatch between individual's skills and qualifications with those required by one's job, we used two PIAAC measures of mismatch (OECD, 2013). The first was *skills mismatch* based on the literacy skills, categorized into under-skilled, over-skilled and matching. The second was *qualifications mismatch*, indicating match between one's education and that demanded by the job, categorized as over-educated, under-educated, and matching with regards to the job. Since our data consisted of high-educated people only, there were only four under-qualified persons altogether, and these were combined with category 'matching'. Thus, in the analyses the variable was used as a dichotomy over-educated (=1) or not (=0). Most workers in the sample were matched both in terms of their skills and qualifications (table 1). Distributions of the independent variables in the sample by country are shown in table 1.

[Table 1 approximately here]

## Data analysis

Data was analyzed using software packages SPSS and SAS. Specific SAS macros provided by the PIAAC Consortium and tailored to follow the methodological principles (use of plausible values, variance estimation by replication methods (Rutkowski, et al. 2010)) of the PIAAC study were particularly employed. Approximate confidence intervals and *t* tests were used in assessing statistical significance of differences between countries as well as group differences within and between countries in basic descriptive statistics.

Effects of literacy skills and other independent variables on the participation in LLL were analyzed by binary logistic regression models, fitted for each country separately. For comparative purposes we included exactly the same predictors in each country's final model. The predictors of multiple regression models were first selected from all independent variables by backward elimination approach, then validating the result with stepwise selection method. The variables not statistically significant in any country were dropped from the final models. Correspondingly, the variables showing significance in at least one country were included in each country's model.

## **Results**

### **Participation in job-related LLL**

As expected, majority (73%) of the high-educated workers had participated in formal or non-formal adult education for job-related reasons during the last 12 months (table 2). However, these rates were significantly higher ( $p < .05$ ) in Denmark (77%) and Finland (76%) than in Norway (70%) and Sweden (68%). Participation rates were higher among females than males in all countries (table 2). However, the gender difference was statistically significant only in Norway ( $p < .05$ ), where it also was the largest, about 8 percentage units.

*[Table 2. approximately here]*

Age trend in participation was negative in all countries (figure 1). However, it was statistically significant only in Denmark ( $p < .05$ ), Finland ( $p < .05$ ), and Norway ( $p < .001$ ). The difference between the youngest and oldest age group was the largest in Norway (18 percentage units) and the smallest in Denmark (about 9 percentage units). In Norway the drop in participation between the two oldest age groups was also steepest (12 percentage units).

[Figure 1. approximately here]

Participation varied also by the individual and the job-related characteristics. Of the *individual factors* learning attitudes, parents' education and number of books at home (cultural background) as well as skills mismatch were *not* significantly related with participation in any of the countries. In contrast, compared to those who had not participated, basic skills were systematically on a higher level in all the countries among those who had participated in LLL (figure 2). Yet, the difference was statistically significant only in Finland and only in literacy ( $p < .05$ ) and numeracy skills ( $p < .05$ ). In problem solving the difference was marginally significant ( $p < .10$ ) and that only in Denmark and Finland. Job satisfaction was (positively) related to participation only in Sweden ( $p < .05$ ), where the participation rates were below 50% on the two lowest job satisfaction levels vs. 70% on the highest. Contrastingly, income was positively associated to participation in all countries ( $p < .001$ ,  $p < .01$  in Sweden), participation being about 50% among individuals in the lowest income quintile vs. 72%–82% in the highest.

Of the *work- and skills-related factors* participation was significantly and positively associated with working time ( $p < .01$ , in Denmark  $p < .05$ ) and skills use at work ( $p < .001$  in Denmark and Finland,  $p < .01$  in Sweden,  $p < .05$  in Norway) in all countries. For example, in Sweden participation rate among those working a maximum of 35 hours week was 51%, while it was 77% among those working at least 45 hours a week. Job position and company size were significantly associated with participation in all countries but Sweden. Not



surprisingly, participation rates were highest among managers (83%, 86% and 76% in Denmark, Finland, and Norway respectively), while lowest among self-employed (from 39% in Norway to 62% in Denmark). The difference in participation rates between smallest and largest companies was between 15–22 percentage units. Sector was a significant factor in all countries ( $p < .01$ ) but Finland, the rates being 12–14 percentage units higher in public sector (5 in Finland). Work autonomy, while not significant in Denmark and Finland, was positively associated with participation in Sweden ( $p < .05$ ) and, surprisingly, negatively in Norway ( $p < .01$ ). In Norway participation rates among individuals with the lowest task discretion at work (in the lowest quintile) was 73% vs. 61% with the highest task discretion. Education mismatch was significantly related to participation in all countries but Sweden. Over-educated participated 12, 23, and 32 percentage units less in Norway, Finland and Denmark, respectively, than those with education matching to their jobs.

Of all the possible subcategories in our analysis, the participation rates were the highest among those working in the largest (1000+ employees) companies and those with highest skills use at work (both at 86%), both in Denmark. Correspondingly, they were the lowest among self-employed in Norway (39%) and those with the lowest job-satisfaction and work autonomy, both at 46% and in Sweden.

### **Explaining participation in LLL among high-educated in the Nordic countries**

A preliminary analysis with one-predictor logit models (not presented here) showed that with the exception of cultural capital, all of the independent variables were statistically significant predictors of participation, albeit not all of them in all countries. Literacy, numeracy and problem solving scores were significant ( $p < .05$ ) in Denmark and Finland but not in Norway or Sweden. Skills use at work, working time, and income were significant predictors in all countries. Sweden differed from the other countries with a clearly smaller number of statistically significant predictors in the one-predictor model. Interestingly,

Sweden was also the only country where learning attitude was a predictor of participation, albeit only on level  $p < .10$ .

The results from the multiple logit regressions revealed several differences between countries in patterns explaining participation in LLL for well-educated workers in the four countries. No two countries had exactly the same significant independent variables in the model (table 3). Consequently, none of the independent variables were significant predictors in all the four countries, but two of them were common in all but one. Firstly, with the exception of Sweden, those who used more of their basic skills at work also participated more in LLL. Secondly, work in public sector had positive effect on participation in all countries but Finland. In all countries the non-significant independent variables, omitted from the final models, were basic skills, cultural background, learning attitudes and job satisfaction, as well as job position and skills mismatch. Next we shall describe the country-wise explanatory models in more detail.

*[Table 3 approximately here]*

In Denmark the strongest predictors of participation in LLL were – in order of strength – job sector, skills use at work, qualification mismatch, company size and health. Adjusted for other factors, the odds of participation in LLL was 1.5 times larger in public than in private sector. Furthermore, individuals using their skills at work frequently, with an education matching their work, working in large organisations, and having good health were most likely to participate. They also tend to belong to the youngest (45–50 years) age group, but the age effect was not significant at 5% level.

In Finland none of the individual characteristics variables were significant in the multiple regression model and it included fewest significant predictors of all the countries. Skills use at work was the strongest predictor, and its effect was also the strongest of all variables in all countries: an increase of one standard deviation in the skills use increased the

odds of participation by 1.6. In addition, those with matching education with their jobs were more likely to participate than over-educated. Participants were also likely to be females with very good health, but these effects were not significant at  $p < .05$ . Finland was the only country where sector was not a significant predictor.

The model in Norway had more significant predictors than the other countries' models. Norway was also the only country where significant predictors included gender, job autonomy (negative effect), and income. After the latter two, sector was the third strongest predictor. The other significant predictors were skills use at work and age. Thus, public sector employees, who had high incomes and low job discretion, were females, relatively young (45–50 years) and used their skills a lot, were most likely to participate in LLL.

Similarly to Denmark, sector was the strongest predictor of participation in Sweden: compared to private sector the odds of participation among workers in the public sector were 1.5 times larger. Age and health were also significant predictors in Sweden. Thus, the youngest workers (45–50 years), with good health and working long hours in public sector, were most likely to participate in LLL. In addition, they were often over-educated females with high work autonomy, but the effects of these two variables were not quite significant at 5% level. Sweden was also the only country where skills use at work was not significant in the multiple regression. However, it turned non-significant only after working time and income were included in the model. This suggests that in Sweden skills use at work is particularly (and positively) associated with working time and income. Working time was a significant predictor of participation only in Sweden, those working long hours participating more likely. In a way, it seems to have taken the role of skills use observed in the other three countries.

### **Discussion**

We have explored the impact of a range of individual and job-related characteristics, as well as of skills use on participation in job-related LLL among well-educated workers. The

main findings showed, firstly and not unexpectedly, that the annual participation rates were very high in all countries. Secondly, the variables and models explaining participation in each of country were different, with a slight exception of sector and skills use at work. The similarities and differences are discussed in the following.

Regardless of the fact that the sample represented mature workforce (45–64 years), in Denmark and Finland more than three out of four, and in Norway and Sweden close to 70% had participated in job-related LLL. Besides the similarity, participation across the countries appeared twofold, Denmark and Finland being significantly different from Norway and Sweden. On the one hand the finding supports both the accumulation hypothesis (Tuijnman, 1991) and the Bounded Agency Model (Rubenson & Desjardins, 2009). According to the latter the Nordic welfare states seem to be effective at resolving barriers of participation, particularly job-related ones. On the other hand, our findings support the results by Støren (2012), showing level differences between the Nordic countries: participation rates in job-related training among young well-educated in Finland were above (71%) and in Norway below (53%) the average among 13 European countries (64%).

However, in contrast with previous studies, and somewhat surprisingly, in this study the participation rate in Sweden was on a par with Norway, which traditionally has had the lowest participation rates in the Nordic countries (e.g. Tikkanen, 2014; Tikkanen & Billett, 2014). In earlier studies with total adult population Sweden has ranked on the top along with Finland (Rubenson & Desjardins, 2009) and with high-educated mature adults (55–74 years) (e.g. Tikkanen, 2014) with Denmark. This suggests that their well-educated mature adults may participate less in LLL than younger adults and/or persons with lower qualifications. Thus, the interplay between the structural conditions facilitated by the Nordic welfare states and individuals' interpretations of their opportunities and the world (the Bounded Agency Model - Rubenson & Desjardins, 2009), may, on one hand, play out differently among high-

educated than among low-educated workers, as suggested also by Støren (2012). On the other hand, these conditions appear to produce somewhat different outcomes across the Nordic countries. Indeed, these conditions themselves differ to some extent across them (Calmfors, 2014).

While females participated more than males in all countries, the difference was significant in Norway only, before other variables were controlled for. The between-country differences in participation rate appeared similar regardless of gender and age. A negative age trend was observed in all countries, although in Sweden it was not statistically significant. Yet, also in the oldest age group 60–64 years the participation rates were internationally very high, around 60–70%. Thus, high education may have a counter-effect on the commonly reported negative age-effect in participation in LLL: investments in continuous skills development are favored both by employers and employees, when skills and qualifications already are high, as suggested by the human capital theory (Desjardin & Rubenson, 2011).

However, in the multiple regressions both gender and age were significant only in Norway, age being significant also in Sweden. Thus, in contrast to Denmark and Finland, these findings suggest that in Norway and Sweden participation is still negatively biased by age, as it is by gender in Norway, regardless of the long-held, strong value of egalitarianism, central in the ‘Nordic model’. In Sweden the age effect on participation was particularly strongly related to health: younger people understandably tend to be healthier. In Norway, there was almost a 20 percentage units’ difference in participation rates between the youngest and oldest age groups. Thus, in Norway and Sweden the significant age-participation effect found does give some support to the ROI-theory (Fourarge & Schils, 2009): all other things being equal, even among high-educated workers - employees, employers, or both - willingness to invest in LLL appear to decrease by age.

Overall, high skills use and work in public sector had the strongest effect on participation. The former indicates that skills use in the knowledge-intensive, learning-conducive (Skule, Reichborn & Leren, 2002), professional, managerial and technical occupations of the high educated workers in this study, feeds new learning needs, thereby contributing to a virtuous learning cycle. When it comes to public sector, in the Nordic countries their investments in LLL of their employees are generally higher than in private sector, especially in high-educated, female-dominated occupations, such as teachers and nurses (e.g. Pohjapää, 2008; Wiborg, Sandven & Skule, 2011). Country-wise, however, the strongest predictors were different. Furthermore, none of the factors predicted participation significantly in all countries (although work in public sector and skills use at work were close). While we did find cross-country differences in the three basic skills and that higher skills were systematically associated with higher participation rates, none of them was a significant predictor of participation in any of the countries, *ceteris paribus*. This was also the case with the skills mismatch. Yet, the findings indirectly support earlier studies (Desjardin & Rubenson, 2011; Støren, 2012), which showed the high-skilled workers with matching jobs as the most active participants in job-related LLL, in that most of the subjects in our study had high skills and matching jobs (70–78%), and most of them had participated in LLL (73%). Also, our findings showed that matching qualifications increased participation in Denmark and Finland. Nevertheless, the logistic models explained only about 11–16% of the variation in participation (Table 3), suggesting that there are a range of other factors in play when well-educated workers choose whether to participate in LLL or not.

Thus, exploring participation among high educated workers against a range of individual and work-related factors, we found, on the one hand, limited support to just one Nordic model of LLL. Rather, the findings indicate that “the mechanisms promoting work-related training are not similar - or do not have the same strength” across the countries, as

Støren (2012, 19) concluded in her study on participation, albeit with young well-educated adults and only including Finland and Norway of the Nordic countries. On the other hand, regardless of these differences, the high participation rates in all the countries, even if with significant variation, are a powerful indicator of a high degree of homogeneity across the Nordic countries. The latter becomes particularly distinctive seen in relation to participation rates in other European countries and beyond. Besides generally high level of education and supportive structural conditions, it has been pointed out that human resources management policies and organizational practices in the Nordic countries, are conducive to organizations' ability to provide a fertile environment for learning and problem-solving, which again stimulate the "pro-innovation organizational practice", also strong in the Nordic countries (Lorenz & Lundvall, 2009, 176). The impact is likely to be especially strong among high-educated.

Finally, regarding theories on LLL, we found, interestingly that a number of predictors, commonly found important in studies using general and/or low-educated adult population – skills, attitudes, cultural capital and job position, for example, as described earlier in this paper – appeared non-significant in the case of well-educated mature workers. This suggests that understanding participation in job-related LLL among well-educated may call for different explanations than those found among persons with lower qualifications and/or younger adults. This hypothesis should be investigated further in future studies.

Future studies need to expand the scope of predictors to address work-specific factors in further detail, for example, different occupational branches and compensation policies, and also characteristics of jobs and workplaces, including conditions enabling and constraining learning participation and skills use in different occupations. Also, there is a need to explore further the differences found between the four Nordic countries, and their

relatedness to differences in national LLL policies, as well as learning and working conditions and cultures.



## References

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, N. J.: Prentice Hall.
- Aldridge, F., & Hughes, D. (2012). *NIACE Adult Participation in Learning Survey*. Leicester: National Institute of Adult Continuing Education (England and Wales).
- Andersen, T. M., Holmström, B., Honkapohja, S., Korkman, S., Söderström, H. T., & J., Vartiainen (2007). *The Nordic model. Embracing globalization and sharing risks*. The Research Institute of the Finnish Economy (ETLA). Helsinki: Taloustieto Oy.
- Argyris, C., & Schön, D. A. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco: Jossey Bass.
- Blossfield, H.-P., Kilpi-Jakonen, E., Vono de Vilhena, D., & Buchholz, S. (Eds.) (2014). *Adult learning in modern societies: An international comparison from a life-course perspective*. Cheltenham: Edward Elgar.
- Boeren, E., Nicaisa, I., & Baert, H. (2010). Theoretical models of participation in adult education - the need for an integrated model. *International Journal of Lifelong Learning*, 29(1), 45-61.
- Calmfors, L. (2014). How well is the Nordic model doing? Recent performance and future challenges. In T. Valkonen, & V. Vihriälä (Eds.), *The Nordic model – challenged but capable of reform* (pp. 17-90). Copenhagen: Nordic Council of Ministers.
- Cummins, P. A., Kunkel, S. R., & Walker, R. M. (2015). *Adult Education and Training Programs for Older Adults in the U.S.: National Results and Cross-National Comparisons Using PIAAC Data*. Retrieved 06.09.2015, from <http://miamioh.edu/cas/academics/centers/scripps/research/publications/2015/>.

- DeFilippi, R. J., & Arthur, M. B. (1994). The Boundaryless career: A competency-based perspective. *Journal of Organizational Behavior*, 15(4), 307-324.
- Desjardins, R., & K. Rubenson (2011). *An Analysis of Skill Mismatch Using Direct Measures of Skills*. OECD Education Working Papers, No. 63, OECD Publishing.  
<http://dx.doi.org/10.1787/5kg3nh9h52g5-en>
- Desjardin, R., & K. Rubenson (2013). Participation Patterns in Adult Education: the role of institutions and public policy frameworks in resolving coordination problems. *European Journal of Education*, 48(2), 262-280.
- Desjardins, R., Rubenson, K., & Milana, M. (2006). *Unequal Chances to Participate in Adult Learning: International Perspectives*. Paris: UNESCO.
- Desjardins, R., & A. Warnke (2012). Ageing and skills: A review and analysis of skill gain and skill loss over the lifespan and over time. *OECD Education Working Papers*, No. 72, Paris: OECD.
- Dieckhoff, M., Jungblut, J.-M., & O'Connell, P. J. (2007). Job-Related Training in Europe: Do Institutions Matter? In D. Gallie (Ed.) *Employment Regimes and the Quality of Work* (pp.77-104) New York: Oxford University Press.
- Ehlers, S., Wärvik, G.-B., Larson, A., & P.-O. Thång (2011). *Effektive strategier for livslang læring i de nordiske lande [Effective strategies for lifelong learning in the Nordic Countries]*. Copenhagen: Nordic Council of Ministers.
- Eurofound (2012a). *The 5<sup>th</sup> European Working Conditions Survey: Overview report*. Luxembourg: Publications Office of the European Union.
- Eurofound (2012b). *Trends in job quality in Europe*. Luxembourg: Publications Office of the European Union.
- European Commission. (2014). *Education and training monitor 2014*. Luxembourg: Publications Office.

Eurostat (2015). Analyses carried out by the authors for this article with the Eurostat open databases, available at <http://ec.europa.eu/eurostat/data/database>.

Fouarge, D., & Schils, T. (2009). The effect of early retirement incentives on the training participation of older workers. *Review of Labour Economics and Industrial Relations*, 23(1), 85-109.

Georgellis, Y., & Lange, T. (2009). Participation in continuous, on-the-job training and the impact on job satisfaction: longitudinal evidence from the German labour market. *International Journal of Human Resource Management*, 18(6), 969–985.

Gorard, S., Rees, G., & Fevre, R. (1999). Patterns of participation in lifelong learning: do families make a difference? *British Educational Research Journal*, 25(4), 517-532.

Gorard, S., Rees, G., Fevre, R., & Furlong, J. (1998). Progress towards a learning society? Patterns of lifelong learning. *Innovations in Education and Teaching International*, 35(4), 275–281.

Knipprath, H., & deRick, K. (2015). How social and human capital predict participation in lifelong learning. A longitudinal data analysis. *Adult Education Quarterly*, 65(1), pp. 50-66. doi: 10.1177/0741713614561855

Livingstone, D. W., & Guile, D. (Eds.) (2012). *The knowledge economy and lifelong learning. A critical reader*. Rotterdam: Sense Publishers.

Lorenz, E., & Lundvall, B.-Å. (2009). Measuring creativity in the European Union. In E. Villalba (Ed.), *Can creativity be measured* (pp. 157-181). Luxembourg: Publications Office of the European Union.

Lundvall, B.-Å., & Lorenz, E. (2012). Innovation and competence building in the learning economy: implications for innovation policy. In B. T. Asheim & M. D. Parilli (Eds.), *Interactive learning for innovation. A key driver for clusters and innovation systems* (pp. 33-71). London: Palgrave Macmillan.

- Marsick, V., & Watkins, K. (1990). *Informal and incidental learning in the workplace*. London: Routledge.
- Maurer, T. J. (2002). Employee Learning and development orientation: Toward an integrative model of involvement in continuous learning. *Human Resources Development Review*, 1(1), 9-44.
- Noe, R. A., & Wilk, S. L. (1993). Investigating of the factors that affect employees' participation in developmental activities. *Journal of Applied Psychology*, 78(2), 291-302.
- Norden (2015). *Nordic gender equality in figures 2015*. ANP 2015:733. Copenhagen: Nordic Council of Ministers.
- OECD (2013). *OECD skills outlook 2013*. First results from the Survey of Adult Skills. Paris: OECD Publishing.
- OECD (2014). *OECD Employment Outlook*. Paris: OECD Publishing.
- Pohjapää, K. (2008). Työsuhte ja koulutus ratkaisevia aikuiskoulutukseen osallistumisessa [Employee relation and education crucial in participation in adult education]. *Hyvinvointikatsaus [Welfare Review]* 3/2208. Statistics Finland.
- Rees, G., Fevre, R., Furlong, C. J., & Gorard, S. (1997). History, place and the learning society: towards a sociology of lifetime learning. *Journal of Education Policy*, 12(6), 485-497.
- Rubenson, K., & Desjardins, R. (2009). The impact of welfare state regimes on barriers to participation in adult education: A bounded agency model. *Adult Education Quarterly*, 59(3), 187–207.
- Russ-Eft, D. (2002). A Typology of training design and work environment factors affecting workplace learning and transfer. *Human Resources Development Review*, 1(1), 45-65.

- Rutkowski, L., Gonzalez, E., Joncas, M., & von Davier, M. (2010). International large-scale assessment data: Issues in secondary analysis and reporting. *Educational Researcher*, 39(2), 142-151.
- Sandlin, J. A., Wright, R. R., & Clark, C. (2011). Reexamining theories of adult learning and adult development through the lenses of public pedagogy. *Adult Education Quarterly*, 63(1), 3-23.
- Scott, J. (2000). Rational choice theory. In G. Browning, A. Halcli, & F. Webster (Eds.). *Understanding Contemporary Society: Theories of The Present* (pp. 126-138). London: Sage.
- Skule, S. & Reichborn, A. N. & Leren, I. J. (2002). *Learning-conducive work: A survey of learning conditions in Norwegian workplaces*. CEDEFOP Panorama Series.
- Støren, L. A. (2012). Who attends work-related training five years after graduation? A comparison across European countries. *International Journal of Lifelong Education*, iFirst Article, 1–25. DOI:10.1080/02601370.2012.733972
- Swanson, R. A. (2001). Human resources development and its underlying theory. *Human Resources Development International*, 4(4), 299-312.
- Tikkanen, T. (1998). The age-participation relationship revised. *Adult Education Quarterly* 49(1), 15-27.
- Tikkanen, T. (2014). Lifelong learning and skills development in the context of innovation performance: An international comparison. In B. Schmidt-Hertha, S. Jelenc Krašovec & M. Formosa (Eds.), *Learning across generations: Contemporary issues in older adult education* (pp. 95-120). Rotterdam: Sense Publishers.
- Tikkanen, T. (2016). Nordic countries. In B. Findsen & M. Formosa (Eds.) *International Perspectives on Older Adult Education* (pp. 321-331). Rotterdam: Sense Publishers.

- Tikkanen, T., & Billett, S. (2014). Older Professionals, Learning and Practice. In S. Billett, C. Harteis & H. Gruber (Eds.) *The Springer International Handbook of Research in Professional and Practice-based Learning* (pp. 1125-1160). Berlin/Heidelberg: Springer.
- Tuijnman, A. (1991). Lifelong education: A test of the accumulation hypothesis. *International Journal of Lifelong Education*, 10 (4), 275–285.
- Tuijnman, A. C. (2003). A 'Nordic model' of adult education: What might be its defining parameters? *International Journal of Educational Research*, 39(3), 283-291.
- Tuijnman, A. C., & Hellström, Z. (2001). *Curious minds: Nordic adult education compared*. Copenhagen: TemaNord 2001:9. Copenhagen: Nordic Council of Ministers.
- Verhofstadt, E., & Omev, E. (2003). The impact of education on job satisfaction in the first job. University of Gent Working Paper 2003/169, March. Downloaded 7.7.2015 at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.195.5928&rep=rep1&type=pdf>.
- Vinther-Jørgensen, T., Armangué, L., Andersen, T. J., Lauridsen, S., Mogensen, M., Rishede Philipsen, M., & Høxbroe Jeppesen, L. (2013). *Education for adults* [in Danish] TemaNord 2013:575. Copenhagen: Nordic Council of Ministers.
- Warner-Søderholm, G. (2012). Culture Matters: Norwegian cultural identity within a Scandinavian context. *Sage Open*. October-December 2012: 1–12. DOI: 10.1177/2158244012471350
- White, P. (2012). Modeling the 'learning divide': Predicting participation in adult learning and future learning intentions, 2002–2010. *British Educational Research Journal*, (38)1, 153–175.
- Wiborg, Ø., Sandven, T., & Skule, S. (2011). *Livslang læring i norsk arbeidsliv*

2003-2010 [*Lifelong learning in the Norwegian working life 2003-2010*]. Report 5/2011.

Oslo: NIFU.

Table 1

*Weighted distributions/averages of the background variables in the PIAAC sample by country*

Variable		Denmark n=1249	Finland n=850	Norway n=714	Sweden n=570	All n=3383
<i>Gender (%)</i>	Females	53,8	59,8	49,6	56,6	55,3
<i>Age (%)</i>	45-49 years	30,9	33,6	33,2	31,7	32,3
	50-54 years	29,7	26,6	23,6	24,6	26,0
	55-59 years	22,2	25,0	22,2	23,0	23,2
	60-65 years	17,2	14,8	20,9	20,6	18,4
<i>Literacy proficiency (mean)</i>		287	300	295	299	295
<i>Numeracy proficiency (mean)</i>		301	299	303	302	301
<i>Proficiency in problem-solving in technology rich environments (mean)</i>		285	283	287	289	286
<i>Learning attitudes (mean)</i>		2,5	2,5	2,3	2,4	2,4
<i>Cultural capital</i>						
<i>Parents' education (%)</i>	< secondary	34,0	53,8	26,3	42,7	39,2
	Secondary	31,9	32,4	38,0	19,8	30,5
	Tertiary	34,1	13,8	35,7	37,5	30,2
<i>Number of books at home(%)</i>	< 11	4,4	5,1	2,1	2,6	3,6
	11-25	7,9	11,3	5,4	5,4	7,5
	26-100	25,9	33,8	27,1	25,4	28,1
	101-200	21,5	18,8	19,3	22,5	20,5
	201-500	26,2	21,0	27,6	23,6	24,6
	500+	14,0	10,0	18,5	20,5	15,8
<i>Income (quintiles)</i>		3,78	3,62	3,80	3,74	3,70
<i>Health</i>	Excellent	24,9	14,7	22,4	23,6	21,4
	Very good	45,1	31,7	38,4	35,0	37,6
	Good	21,0	41,4	28,6	32,6	30,9
	Fair	7,7	11,5	9,7	8,1	9,3
	Poor	1,3	0,7	0,9	0,7	0,9
<i>Work-related variables</i>						
<i>Job position</i>	Manager (%)	28,4	30,4	38,9	39,5	34,3
	Self-employed (%)	10,6	11,9	8,1	11,9	10,6
<i>Company size (%)</i>	1-10	22,8	28,2	21,9	25,3	24,9
	11-50	29,3	32,0	24,6	28,1	28,4
	51-250	28,9	23,7	27,3	23,1	25,4
	251-1000	9,3	11,3	12,5	12,4	11,4
	1000+	9,7	5,8	13,8	11,1	10,0
<i>Working time (mean)</i>	All	39,4	39,2	38,5	40,6	39,4
	Females	36,8	37,7	36,0	39,5	37,5
<i>Work autonomy (mean)</i>		2,49	2,39	2,32	2,39	2,40
<i>Sector</i>	Public (%)	53,4	46,9	54,6	56,3	52,8
<i>Skills use at work (mean)</i>		0,37	-0,19	0,54	-0,48	0,0
<i>Skills (literacy) mismatch (%)</i>	Under-skilled	6,5	4,4	8,6	9,2	7,2
	Over-skilled	10,9	7,9	8,8	6,0	8,4
<i>Qualifications mismatch (%)</i>	Over-educated	14,0	13,9	12,9	15,5	14,1



Table 2

*Participation rates in LLL by gender and country among high-educated workers (%)*

Gender	Denmark	Finland	Norway	Sweden	All
Females	78,2	78,6	73,7	70,3	75,2
Males	75,2	73,2	65,8	64,5	69,7
All	76,8	76,4	69,7	67,8	72,7

PARTICIPATION IN JOB-RELATED LIFELONG LEARNING AMONG WELL-EDUCATED EMPLOYEES IN THE NORDIC COUNTRIES

Table 3

Multiple logit regression models on participation in LLL in the four Nordic countries (Beta = standardized regression coefficient).

Factor	Denmark			Finland			Norway			Sweden		
	Beta	SE	OR	Beta	SE	OR	Beta	SE	OR	Beta	SE	OR
Age group	-0,14 <sup>a</sup>	0,09	0,9	-0,15	0,09	0,9	-0,23*	0,09	0,8	-0,24*	0,11	0,8
Gender (male)	-0,11	-0,11	0,9	-0,20 <sup>a</sup>	0,11	0,8	-0,24*	0,10	0,8	-0,21 <sup>a</sup>	0,12	0,8
<i>Individual characteristics</i>												
Income(quintile)	0,22	0,17	1,2	0,04	0,15	1,0	0,31**	0,15	1,4	0,19	0,15	1,2
Health	0,20*	0,10	1,2	0,19 <sup>a</sup>	0,10	1,2	-0,07	0,10	0,9	0,29**	0,11	1,3
<i>Job-related characteristics</i>												
Company size	0,24*	0,11	1,3	0,06	0,12	1,0	0,00	0,10	1	-0,04	0,12	1,0
Working time	-0,01	0,12	1,0	0,20	0,13	1,2	0,12	0,12	1,2	0,35**	0,11	1,4
Work autonomy	-0,02	0,09	1,0	-0,11	0,12	0,9	-0,30**	0,10	0,7	0,25 <sup>a</sup>	0,15	1,3
Sector (public)	0,40***	0,09	1,5	0,03	0,12	1,0	0,29**	0,11	1,3	0,41**	0,13	1,5
<i>Skills use at work</i>												
Skills use at work	0,29*	0,14	1,3	0,45***	0,11	1,6	0,25*	0,12	1,3	0,17	0,12	1,2
Over-qualified	-0,26*	0,09	0,7	-0,20*	0,10	0,8	0,03	0,10	1,0	0,21 <sup>a</sup>	0,12	1,2
R <sup>2</sup> (Nagelkerke)	13,4			12,9			16,4			10,9		

\*p<.05; \*\*p<.01; \*\*\*p<.001. <sup>a</sup> p<.10. Note: Age group and income were considered as single quantitative ("scale") variable instead of dummies. Preliminary data analyses suggested that higher-order (nonlinear) effects were not likely to provide large gains in the model fit, compared to the linear effects alone.

PARTICIPATION IN JOB-RELATED LIFELONG LEARNING AMONG WELL-EDUCATED EMPLOYEES IN THE NORDIC COUNTRIES

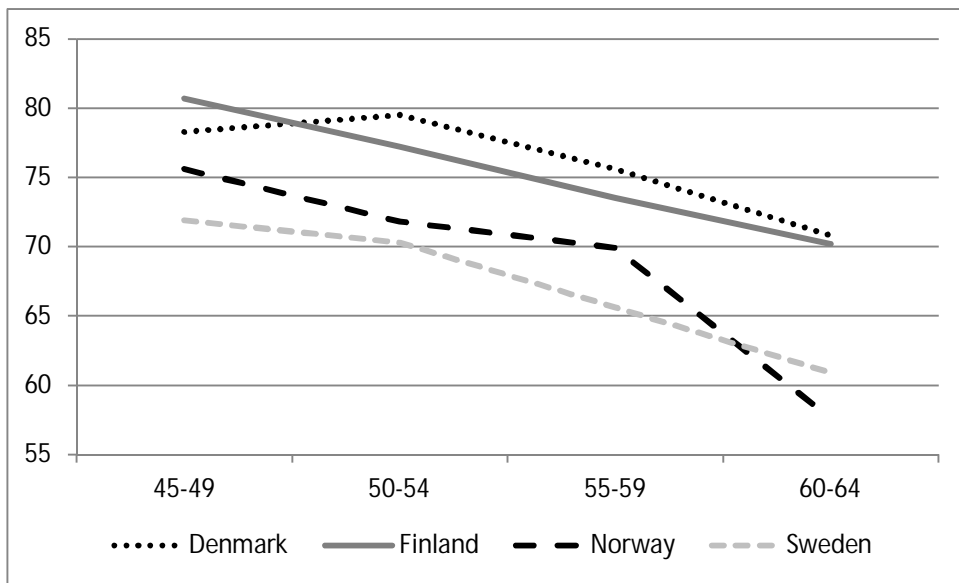


Figure 1. Participation rates by age-group and country (%)

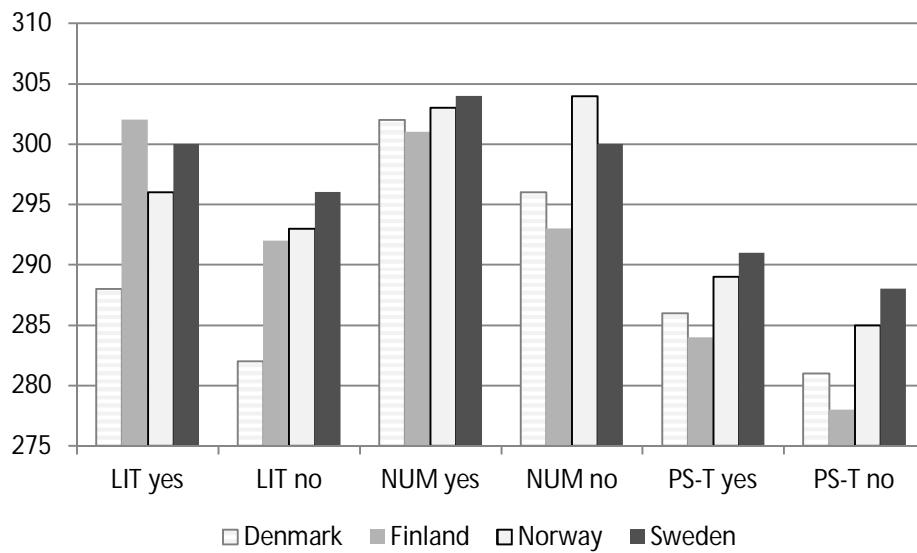


Figure 2. Basic skills scores in literacy (LIT), numeracy (NUM) and problem-solving in technology-rich environments (PS-T) by participation (yes/no) and by country

---

<sup>i</sup> According to the definition by the EU, lifelong learning refers to persons of the indicated age-groups who stated that they received education or training in the four weeks preceding the survey (European Commission, 2013). The OECD definition of adult education and training participation refers to persons who stated that they participated in formal (towards a certificate, diploma, degree, etc., incl. distance and open education) or non-formal (e.g. on-the-job training, seminars, workshops, private lessons, etc.) organized education or training in the 12 months preceding the survey (PIAAC, 2013).