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**Nordic-Baltic
PIAAC Conference**



**Nordic Council
of Ministers**



**Nordic Network
for Lifelong Learning**

EPALE
Electronic Platform for Adult Learning in Europe

 **PIAAC**
Nordic-Baltic

 **JYVÄSKYLÄN YLIOPISTO**
UNIVERSITY OF JYVÄSKYLÄ

Contents

Parallel session A: From classroom to career: Linking school grades, adult skills and labour market outcomes with combined PIAAC and registry data.....	6
Counting what counts: Wage returns to numeracy using register-linked Norwegian PIAAC data.....	6
Educational Pathways, Work Careers, and Adult Skills: Evidence from Finnish Register Data Linked to PIAAC II.....	8
Motherhood and Skills.....	9
Parallel session B: Advancing careers or changing direction: Implications of professional training and career change	10
More Training, Same Skills? Proficiency, Application, and Earnings in PIAAC Cycle 2 Singapore	10
Professional learning and training engagement of healthcare labour in Norway and Sweden	11
Career change in Finland as field-of-study mismatch: utilizing Programme for the International Assessment of Adult Competencies (PIAAC) data.....	12
Parallel session C: How history shapes adult skills: Studies on cohorts, educational reforms and survey quality	13
The long shadow of education policy illustrated by historizing PIAAC results – an exploratory case analysis	13
Age-group comparisons and competence profiles in PIAAC 2.....	14
Did Illiteracy Double in Poland? Response Processes and Interviewer Effects in PIAAC 2023.....	15
Parallel session D: Beyond cognition: The role of social and emotional skills in learning, work and wellbeing.....	16
Four Dimensions of Doctoral Expertise : Graduates’ Reflections on Learning During Doctoral Studies.....	16
Social and emotional skills of adults - PIAAC Slovakia	17
Personality modulates participation in learning, numeracy use and proficiency in Finnish adults	18
Parallel session E: PISA meets PIAAC: Insights from integrated analysis and cross-study interpretation	19
From School to Work: Helping Policymakers Interpret PISA and PIAAC Results Together	19

Relationship between literacy at age 15–16 and literacy, education, and employment at age 28–30.....	20
Are Teachers Getting Smarter? International Evidence on Changes in Teacher Cognitive Skills and Student Achievement	21
Parallel session F: The multidimensional roots of social (dis)advantage: How structural and individual characteristics shape inequalities from school to adulthood.....	22
Mapping Intersectionality in Adult Skills Across Nordic-Baltic Countries: An Intersectional MAIHDA Approach.....	22
School Belonging in a Tracked Education System: Evidence from Czech PISA 2018 and 2022.....	23
Like Parent, Like Child? Intergenerational Occupational Persistence in 31 Countries	24
Parallel session G: From office to construction site: Differences in work practices across occupations, industries and regions	25
Numerical and adaptive problem-solving skills of professionals in Finland and Baltic countries: analysis of the PIAAC Cycle 2 data.....	25
Literacy in construction work	26
The division of labor and routinization of work	27
Parallel session H: SYMPOSIUM: Beyond credentials: What adults can do, how accurately they judge it, and how they engage in learning in Nordic and Baltic countries	28
The Nexus Between Skills and Confidence in Skills in the Nordic-Baltic Countries	29
How Literacy Shapes Problem Solving as Populations Age: Evidence from Nordic and Baltic Countries	30
Skills Without Credentials: Adult Learning Participation Across the Life Course in Nordic and Baltic Countries.....	31
Patterns of learning engagement among high- and low-performing adults in Finland.....	32
Parallel session I: Belonging in a new home: What supports immigrant participation in host country society and labour market	33
Political efficacy and immigrant background, language-use and adult skills between two PIAAC Cycles.....	33
Immigrant subjective well-being, STEM education, and country of study: the case of Israel	34
A study of immigrant skills gaps based on PIAAC data and AI-enabled intervention pathways	35
From Transaction to Care: Digital Public Services for Migrants	36
Parallel session J: Determinants of good employment: How are skills, qualifications and contextual factors associated with adults' labour market outcomes	37

Vocational Education, Skills Use and Perceived Skills (Mis)match in the Czech Republic: Evidence from PIAAC	37
Parity of esteem? A job-task lens on the labour market fortunes of vocational graduates relative to academic graduates across two PIAAC cycles	38
Identifying Job Satisfaction Factors across Europe: A Machine Learning Approach Using PIAAC.....	40
Beyond Wages: How Task Structure and Workplace Support Shape Worker Outcomes Across Countries	41
Posters	42
Enabling Access to PIAAC Microdata: The OECD's Remote Code Execution Service.....	42
Strengthening basic skills through Nordic collaboration.....	43
Nordic Network for Lifelong Learning (NLL)	43
STATISTICS NORWAY	43
Decomposing Skill Change among Young Adults in Norway	43
PIAAC 2023: Adults with Low Information-Processing Skills in Estonia	43
Estonian Ministry of Education and Research.....	43
EPALE - Electronic Platform for Adult Learning in Europe	44
Skills Among Young Adults in Sweden, Statistics Sweden 2025	44
Skills among Foreign-Born Adults in Sweden, Statistics Sweden 2026	44

Parallel session A: From classroom to career: Linking school grades, adult skills and labour market outcomes with combined PIAAC and registry data

Counting what counts: Wage returns to numeracy using register-linked Norwegian PIAAC data

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Do wages reflect what people know, or what their credentials signal? This question is particularly relevant in Nordic labour markets, where compressed wage structures and coordinated bargaining are often thought to limit returns to individual skills. While human capital theory predicts that productivity-enhancing skills drive wages, most empirical research relies on education as a proxy, making it difficult to distinguish skill effects from signalling. This study uses PIAAC Cycle 2 data linked to Norwegian administrative registers to directly address this challenge. By combining detailed wage records with register-based education and school grades, and survey-based measures of numeracy, we can observe multiple dimensions of competence within the same individuals. This linked data structure represents a key contribution, as most PIAAC-based studies rely on self-reported outcomes and cannot separate early performance, formal qualifications, and adult skills. The analysis focuses on the intensive margin and examines whether returns to numeracy depend on skill use in the workplace. We estimate Mincer-type wage regressions and complement these with a descriptive four-group analysis based on combinations of high and low numeracy and school grades. This design enables us to directly compare individuals whose formal credentials and measured skills diverge. Preliminary results show that numeracy has a substantial independent association with wages. A one standard deviation increase in numeracy is associated with approximately 15 percent higher wages, controlling for education. At the same time, the education premium declines markedly when skills are included and disappears when early school performance is accounted for. The four-group analysis shows that individuals with high numeracy but low grades earn as much as or more than those with strong formal credentials. Finally, the return to numeracy is largely driven by whether these skills are used in the job. These findings provide new evidence on the relative importance of skills and credentials in a coordinated labour market with compressed wage structures. By leveraging linked survey and register data, the study offers a more precise empirical separation of skill and signalling effects than previous PIAAC research. For Nordic policy debates, the results highlight that improving skill levels is not sufficient: the economic value of skills depends on how they are utilized in the labour market. This underscores the importance of both skill formation and better alignment between education, job content, and skill use.

Educational Pathways, Work Careers, and Adult Skills: Evidence from Finnish Register

Data	Linked	to	PIAAC	II	
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We contribute to the literature by analysing how educational trajectories, school achievement, and labour market histories are associated with adult cognitive skills, using rich Finnish register data linked to the PIAAC II survey. We differ from previous work, particularly from studies such as Mannonen et al. (2024), by combining longitudinal administrative records on education, school performance, and employment histories with direct measures of adult literacy and numeracy. Our data consist of comprehensive Finnish population registers from 1987–2024, including detailed annual information on employment, unemployment, occupation, earnings, and educational attainment, complemented by school records on comprehensive school grades and matriculation examination results from 1990 onwards. These register data are linked to PIAAC II, enabling us to examine how early-life school performance, such as grades in language and mathematics, predicts adult literacy and numeracy skills. In addition, we analyse how educational level and field, as well as accumulated labour market experience, are associated with skills in the adulthood. The empirical analysis addresses two main research questions. First, to what extent do comprehensive school and matriculation exam grades predict (corresponding domains of) adult cognitive skills? Second, how do educational attainment, field of study, and detailed labour market histories relate to adult literacy and numeracy? By leveraging the longitudinal structure of the data, we can investigate heterogeneous educational pathways and career trajectories.

Our study provides new evidence on the role of both formal education and workplace learning in shaping basic information-processing skills in adulthood. It contributes to a more nuanced understanding of how different combinations of education and work experience are associated with skill proficiency and offers new insights into the long-term predictive power of school achievement for adult competencies.

Motherhood**and****Skills**

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Motherhood reshapes employment trajectories and may affect opportunities to maintain work-relevant skills. This presentation combines evidence from linked PIAAC-register data and a cross-national analysis. First, we link PIAAC Cycle 1 skill assessments to Austrian administrative records on births and labour-market histories, comparing post-birth employment and leave among mothers and fathers across numeracy levels. We complement these results with evidence from Swedish registers. In both countries, gender differences are larger than differences by skill level, although higher-skilled Austrian mothers return to employment faster. Second, using SHARE and the European Parenting Leave Policies (EPLP) dataset, we examine whether longer statutory leave is associated with mothers' numeracy later in life. One additional year of statutory leave is associated with 3–5 percent lower numeracy, mainly through longer career interruptions and fewer years in employment. Together, the findings show that extended leave is linked to modest differences in (later-life) skills.

Parallel session B: Advancing careers or changing direction: Implications of professional training and career change

More Training, Same Skills? Proficiency, Application, and Earnings in PIAAC Cycle 2 Singapore

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Lifelong learning systems invest substantially in adult training, on the assumption that training raises workers' skills and labour markets reward those skills. Yet PIAAC evidence repeatedly shows that adult training has weak or non-significant associations with measured cognitive proficiency once educational attainment is controlled. This raises a long-standing puzzle: if training does not raise measured skills, through what channel does it generate labour-market value? This study examines an alternative: training generates value not by raising measured proficiency but by increasing the application of skills at work. PIAAC distinguishes two related but separate constructs. Cognitive proficiency is what individuals can demonstrate under standardised assessment in literacy, numeracy, and adaptive problem solving. Workplace skill use is how frequently and complexly individuals apply those capabilities at work, through reading, writing, numeracy, ICT, learning, task discretion, and influencing others. Two workers with similar literacy scores may engage very differently with reading at work: one routinely interpreting technical reports, the other rarely opening a document. Labour markets may reward differences in application more than test performance itself. The study uses Singapore's PIAAC Cycle 2 public-use microdata (OECD, 2024). The analytic sample is working-age adults aged 25-65 not in full-time education ($n = 4,256$); earnings analyses use employees (n approximately 2,927). Cognitive proficiency was measured across three domains using ten plausible values combined via Rubin's (1987) rules. Skill use was captured through seven IRT-scaled behavioural indices. Path models linked qualifications, training, proficiency, skill use, and earnings, controlling for age, gender, immigrant background, parental education, and occupation. Robustness checks confirmed the pattern. Four findings emerge. First, training has no significant independent association with cognitive proficiency once qualifications and occupation are controlled. Second, qualifications remain the dominant predictor of skills, workplace outcomes, and earnings. Third, training is significantly associated with six of seven skill-use domains: trained workers do not test as more proficient, but report greater engagement in complex workplace practices. Fourth, when skill-use variables are added, the training coefficient on earnings attenuates by approximately 36%, suggesting workplace application is an important pathway through which training is associated with labour-market outcomes. The cross-sectional design limits causal interpretation. Findings nonetheless suggest the labour-market value of adult training operates through workplace application as much as through skill acquisition itself. Results converge with parallel Singapore evidence (Sheng, Chia, and Sadik 2025) on credential persistence and job design.

Professional learning and training engagement of healthcare labour in Norway and Sweden

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Demand for care workers will increase due to Europe's ageing and steadily declining population. Recent data suggests that the number of people over 50 in need of long-term care will increase by around 21% between 2020 and 2050. However, the healthcare labour force is constantly shrinking. Around 40% of current medical staff are close to retirement age. For instance, the Norwegian healthcare system has faced persistent recruitment and staffing challenges in nursing and long-term care for decades (Hedlund Quintanilla et al., 2026). The number of people over the age of 80 in Norway is expected to increase by over 250,000 between 2020 and 2040 (Helsepersonellkommissjonen, 2023). At the same time, Norway experienced a shortage of 2,350 nurses in 2015, and it is estimated that this gap will widen significantly. In this context, professional on-the-job training and continuous upskilling and specialisation training programmes are considered vital for attracting and retaining a skilled healthcare workforce. This is particularly important in the highly feminised employment sector where there is high dropout and turnover due to the psychological strain of the demanding work tasks and the overlap with family obligations.

Against this background, this paper will discuss comparative data for healthcare workers in Norway and Sweden, illustrating how the following indicators are interlinked:

- the national distribution of their competences (key competences: literacy, numeracy, problem-solving)
- their training engagement and investment (financial and timely resources)
- their perceptions of further training needs

This investigation focuses on two countries at the forefront of adult training: Norway and Sweden. They have the highest participation rates in Europe, particularly among women in professional training. The analysis will use the latest secondary data sets provided by the OECD PIAAC study and the European Social Survey. This research has been conducted by the author within the MSCA Project SCILLED (Strategies for Competence Integration and Lifelong Learning in European Destinations), funded by the Marie-Curie Initiative of the European Commission from 2025 – 2027.

Career change in Finland as field-of-study mismatch: utilizing Programme for the International Assessment of Adult Competencies (PIAAC) data
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This presentation examines how career change can be identified and profiled using Finnish PIAAC data. The aim of the research is to illustrate how different methodologies can help identify sections from the PIAAC data beyond the intended research questions, in this case by identifying individuals from the data who have changed careers. Career change is a rather ubiquitous term in both literature, media and policies relating to work, careers and education. A single linear continuum does not accurately represent the reality of modern careers, as career change is an ever more common and expected part of them. Rather, modern career theory emphasizes career as an ongoing, lifelong process with many different roles and positions, as changes in jobs and careers have become accepted and necessary. Education is essential to career change, since it inherently requires transition into a new occupation or field where previous skills are largely irrelevant and new training is undertaken. Since career change can be seen as a process beginning from intentions to change career until having successfully done so, the PIAAC data cannot measure the entire process of career change. PIAAC data also does not specifically address the status of participants' career change, so utilizing the data in this regard is done with further measures by identifying field-of-study mismatch. Field-of-study mismatch occurs when workers educated in a particular field work in another – while this does not cover career change as an ongoing process, the mismatch does capture cases where an individual has spent time, effort and resources in getting an education in a particular field yet they have ended up working in another. The mismatch is derived by filtering the ISIC-classification of job of the participants against the field of education variable. This mismatch in the PIAAC data has previously been examined from the perspective of e.g. labour supply and demand, or qualifications mismatch, but not career change. Career change has been examined regarding e.g. the motives of the change, specific fields or individual cases, but the PIAAC data offers a new perspective of adult skills and background variables to the Finnish context of career change. The data has its limitations, as the PIAAC data was not collected with any explicit career change variables. However, the profiles of career changers found in the unique data set can be utilized to frame further research into career change, illustrate associations between career change and the skills and background characteristics of the participants, as well as to examine policies relating to working life and lifelong learning.

Parallel session C: How history shapes adult skills: Studies on cohorts, educational reforms and survey quality

The long shadow of education policy illustrated by historizing PIAAC results – an exploratory case analysis

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Historising PIAAC means to analyse the production machinery that has brought about the measured cross-sectional skills in the population over the decades since the oldest cohorts have started school in the 1950s. This illustrates the dimension of this big machinery that includes the formal education careers plus all subsequent learning experiences. Thus, PIAAC indicates the results not of current practices but of very different structures and policies over time. The aim of the study is a stylized exploratory in-depth analysis of traces of past educational structures and policies in the age-specific profile of PIAAC results. The background for this national in-depth analysis is a previous comparative analysis of the first round of PIAAC that traced measured skills to the two educational reform waves, expansive-egalitarian in the 1960s-70s, and neoliberal in the 1980s-90s. Austria was compared to selected countries from different welfare regimes (Nordic, Liberal, Continental). Focus was on understanding the Austrian model of skill formation in comparative terms. Quite diverse results for countries were gathered. Now, the second wave of PIAAC is used to look more detailed into the Austrian case (might be exemplary for other cases). The stylised framework fits into a broad theoretical landscape including the political economy of skill formation, redistributive and cultural political economy, historical institutionalism, and complexity theory. The methods use a national case analysis because the specific education structures must be identified. Part 1 provides a multifactorial understanding and reconstruction of the development of educational structures and policies, based on selected stylised factors: reform-dynamic, resources, demography, migration, expanding participation, assessment. Part 2 confronts this historical model with the PIAAC results from the first and second wave, using indicators of aggregate 5-years age-groups (scores for skills level and percentile-rates for skills distribution). PIAAC indicators are analysed by the age groups at the two waves, and by a quasi-cohort comparison that follows some age groups up to the second wave. A main result and a tool for interpretation is a detailed time-specific model of the main educational changes over the affected decades since the 1950s, related to long-term skills outcomes (of course belated with all changes and effects after formal education). A basic result is the high reform dynamic, so the PIAAC population was educated over time in five different education structures. Marked long term effects of these reforms are not found. Austerity phases do not show marked declines of PIAAC results, and expansion of upper-level education does neither show dampening skill levels nor increase of inequality. A small tendency of neoliberal policy shift indicates decline of skills rather than improvement. The analysis is preliminary and shows what can be learned from historizing PIAAC.

Age-group comparisons and competence profiles in PIAAC 2

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Working-age competencies are societal concern reshaped by technological change, globalization, and volatile markets (Marillo et al., 2024). Knowledge-intensive jobs require strong cognitive and personal skills (Giddens, 2007), while weakening social structures and guidelines contribute to uncertainty and reflexive imperative (Bauman, 2007; Archer, 2012). Workforce consists of generations with differences in education and socialization background. Although assessments such as PIAAC enable cross-national comparisons, generational differences as historically constituted patterns have received less in-depth research. Nordic countries offer a useful comparison. Despite shared welfare-state roots, Finland, Sweden, and Denmark differ in demographic, economic, education and adult-learning arrangements. Using PIAAC 2 country datasets, we operationalize “pseudo-generations” via OECD 10-year age bracket (AGEG10LFS) found in Finnish, Swedish and Danish sets. In addition, cluster analysis is used to identify subgroups of adults in the named datasets utilizing plausible values for literacy, numeracy and adaptive problem solving variables. Generated competence profiles are then compared against background variables to find potential differences in generational and national levels. The goal is to form historically grounded interpretations of how education systems and working life have shaped competence across cohorts. Age is analyzed using the OECD 10-year age-group classification, for which, the approximate birth-year ranges are derived to connect cohort patterns to period-specific contexts of schooling and work. Illustrative preliminary generational cohort framings:

- 16–24: digitalized schooling; distance learning; high-speed networks/AI (Gen Y / iGen).
- 25–34: expanded higher education; mobile technologies (Millennials).
- 35–44: educated during restructuring; adulthood in a digital world (Xennials/Millennials).
- 45–54: industrial–post-industrial transition; early internet-era working life (Gen X).
- 55–65: schooling largely pre-digitalization (Baby Boomers).

Analyses are conducted in R. Proficiency comparisons use OECD plausible values (e.g., PVLIT1–PVLIT10 for literacy and corresponding numeracy/adaptive problem-solving PVs).

Research questions are:

1. How do proficiency levels differ by cohort in Finland, Sweden, and Denmark?
2. What cohort-specific competence profiles emerge?
3. Which background factors help explain the differences?

As preliminary findings, K-means clustering on PVAPS1–10 identified three groups with clearly separated proficiency levels high, medium and low. Age distributions differed significantly across proficiency profiles, with a small-to-moderate association. Group comparisons indicated that younger adults (≤ 44) were over-represented in the high-APS cluster, whereas the 55+ group was markedly over-represented in the mid-APS cluster and strongly under-represented in the high-APS cluster.

Did Illiteracy Double in Poland? Response Processes and Interviewer Effects in PIAAC 2023

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PIAAC Cycle 2 results show a sharp decline in functional literacy in some countries. In Poland, the share of low-skilled adults appears to have doubled. This raises a basic question: does this reflect a real change in skills, or is it partly shaped by how the assessment was administered? The two are not easily separable in low-stakes, home-based settings. Observed performance reflects not only underlying proficiency, but also how respondents engage with tasks and how the session is conducted. Consequently, part of the recorded performance reflects the measurement process itself. We use Polish PIAAC 2023 national data and combine item-level process indicators with operational fieldwork metadata not available in public files, including interviewer identifiers and detailed timing. Because standalone process indicators cannot establish whether careless or insufficient effort responding (C/IER) is structured by fieldwork conditions, we model clusters of response signals. These include compressed response times, item omissions, and atypical response patterns. We estimate mixed-effects models to capture interviewer-level variation and finite mixture models to identify latent response profiles. We distinguish between the interviewer-paced Background Questionnaire (BQ) and the self-administered Direct Assessment (DA) to locate where response quality deteriorates and how interviewer effects extend beyond direct interaction. This distinction turns out to be consequential for interpreting the observed results. Despite extensive quality assurance measures implemented nationally and internationally, the results show clear and systematic variation in indicators of survey quality in the Polish data. Behaviour consistent with C/IER is frequent and structured rather than random. This behaviour varies across interviewers and clusters around specific administration patterns in both BQ and DA components. This indicates that problematic responding is not only a function of individual motivation or ability. It is partly shaped by the fieldwork process itself. When response-process indicators and administration features are modelled jointly, measurement-related distortions are substantial. Cross-cycle differences in PIAAC therefore cannot be interpreted solely as changes in population skills. They also reflect variation in how performance is produced and recorded. Linking process indicators with operational survey data is therefore not optional for interpretation; it changes the substantive conclusion.

Parallel session D: Beyond cognition: The role of social and emotional skills in learning, work and wellbeing

Four Dimensions of Doctoral Expertise: Graduates' Reflections on Learning During Doctoral Studies

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Social and emotional skills of adults - PIAAC Slovakia						
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Aim was to provide an overview of social and emotional skills (BIG V) of Slovak adults in comparison with selected EU countries and England. We explored BIG V characteristics by gender, age, adult and parental education, non-formal education, and numeracy. We focused on classifying adults into profiles to identify vulnerable groups. We also explained Life satisfaction using personality traits, employability and health. Our goal was to provide recommendations to improve lifelong learning for decision makers. Background: We used PIAAC 2023 data where Big V model of personality was measured by BFI-2 S questionnaire: Agreeableness, Conscientiousness, Emotional stability, Extraversion, Open-mindedness. There is growing evidence that Stability, Curiosity, Compassion and Consciousness significantly influence academic performance, employability and adaptation to economic and technological changes. These traits are also associated with relationships, physical and mental health as well as with Life satisfaction. Methods: We made analysis in statistical software SPSS and AMOS. We used descriptive and comparative analysis, t- tests, ANOVA, correlation & regression analysis, clustering and AMOS structural modeling. Results showed that higher life satisfaction was associated with more Optimism, Calmness, Energy, and Stability. The structural model showed that Life satisfaction was explained by health, employment status and by personality traits, particularly Conscientiousness, Emotional stability and Agreeableness. Socio-emotional skills also varied by age. Young adults (16–35) scored lower in Conscientiousness (Organization, Productiveness), Agreeableness (Respectfulness, Compassion) and Emotional stability (Stability) than older adults (45+). Profile analyses identified several vulnerable groups. The most vulnerable were youngsters (16–24) with primary education and people with at most primary education who had below-average scores of majority personality characteristics. The largest gaps between low and highly educated adults were in Openness, Stability and Conscientiousness. One third of older people (55 +) were also vulnerable, because they had low education and did not participate in further education and their Extroversion, Openness and Stability were also low. Conclusion For Slovak Ministry of Education - Lifelong learning department we recommend including social and emotional training into formal and nonformal education particularly in upskilling and reskilling programs. Focus should be on strengthening Consciousness, Emotional stability, Agreeableness and Openness. We suggest free of charge training for all vulnerable groups. Effective strategies should include targeted outreach of adults and financial incentives such as individual learning accounts.

Personality modulates participation in learning, numeracy use and proficiency in Finnish adults

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Participation in formal, nonformal and informal lifelong learning is related to higher proficiency in key information processing skills, such as numeracy. The data from the second cycle of the Survey of Adult Skills (PIAAC CY2) measuring these skills includes a brief (Big Five) personality trait scale to chart individual social skills. Personality is known to modulate learning performance and motivation in many ways, but it remains an often-overlooked factor in the context of positive learning behavior in lifelong learning. Using the Finnish data ($n = 4,061$), we explored in Finnish work age adults how individual personality traits predict participation in training, numeracy skill use at work and numeracy proficiency, for numeracy skills' high societal significance. Regression models showed that openness, extraversion, and emotional stability positively predicted participation in nonformal lifelong learning. Of the traits, openness, extraversion and agreeableness positively predicted numeracy use at work, and openness and emotional stability numeracy proficiency. Slight negative associations were observed for agreeableness and conscientiousness with numeracy proficiency. These results may be interpreted according to the motivational sensitivities specific to each trait. Openness is characterized by intellectual curiosity; individuals high in this trait find learning intrinsically rewarding and motivating, which may explain their elevated participation, skill use and proficiency levels. Extraverted individuals may be most motivated by the social aspect of training, as their high participation rate does not translate into higher numeracy skill proficiency levels. The predictive relevance of emotional stability may best be understood negatively: individuals disposed to negative emotionality typically show lower levels of learning motivation and performance. The results may indicate how participation in nonformal training and skill use at work are enabled or constrained by specific motivational and emotional factors, determined by constitutional differences in adults' personalities. Individual personality traits may thus bear relevance for understanding adults' employability, identifying individuals at risk, as well as protective and risk factors for participation in lifelong learning, necessary for inclusive lifelong learning opportunity design.

Parallel session E: PISA meets PIAAC: Insights from integrated analysis and cross-study interpretation

From School to Work: Helping Policymakers Interpret PISA and PIAAC Results Together

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This paper discusses a question of central relevance to education, skills and employment policymakers: how should results from the Programme for International Student Assessment (PISA) and the Programme for the International Assessment of Adult Competencies (PIAAC) be read in conjunction? Its core objective is to provide policymakers with a more rigorous and nuanced framework for interpreting both assessments together, so that international skill data can more effectively inform decisions about education systems, vocational pathways, adult learning, and workforce development. The analysis is based on a comparison of cross-sectional data from PIAAC Cycle 2 and multiple PISA Cycles. It uses sample restrictions and pseudo-cohort approaches to identify the degree to which country-level performance in adolescence is associated with adult skill outcomes. Across multiple analytical perspectives, PISA and PIAAC results paint a broadly coherent picture of countries' relative skill performance, in particular when PIAAC data are restricted to young adults close in age to PISA participants and when recently arrived migrants are excluded from the comparison. The alignment is strongest in mathematics and numeracy. This consistency suggests that both assessments capture a common underlying construct of cognitive skill that persists across different testing conditions and methodologies and reinforces confidence that both instruments provide reliable signals of national skill levels. However, meaningful differences remain. Several countries perform better or worse in PIAAC than would be predicted based on their PISA performance. The strength of association between the two assessments also declines as the time elapsed between them increases, suggesting that the influence of initial schooling becomes progressively harder to isolate as adult experiences diversify. For policymakers, this underscores the importance of sustained investment in learning opportunities beyond compulsory education. Methodological differences between the two surveys - including between school-based and household setting, motivational conditions, and questionnaire structures - introduce sources of variability that policymakers should be aware of when interpreting apparent discrepancies. Not all differences between PISA and PIAAC results reflect genuine changes in skill levels; some are attributable to design features of the assessments themselves. Looking ahead, the OECD is exploring ways to strengthen the methodological alignment between PISA and PIAAC, with the aim of enabling more precise inferences about lifelong skill development. Such developments would significantly enhance the analytical value of both programmes and their collective contribution to evidence-based skills policy.

Relationship between literacy at age 15–16 and literacy, education, and employment at age 28–30

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Using combined PISA-PIAAC-data we address the following questions:

- How are young people's reading skills at age 15–16 (measured by PISA) related to their reading skills at age 28–30 (measured by PIAAC)?
- What is the relationship between reading skills at age 15–16 and the likelihood of being employed or in education at age 28–30?
- What characterizes the young people who improve or worsen their position in the skill distribution over time?

The analysis draws on data from PISA and PIAAC, two large-scale international assessments of literacy. Individuals who participated in PISA-2009 were included in the sample for PIAAC Cycle 2. This means that for a group of individuals, proficiency in literacy is measured both when they were 15-16 years old and when they were 28-29 years old. About 1200 respondents from PISA-2009 participated in PIAAC-2022/2023. The PISA-PIAAC data are combined with administrative register data on education, employment and income for the period 2009-2023. The measurement scales used in PISA and PIAAC have not been designed to be linked psychometrically, and direct comparisons of the level of literacy in PISA and PIAAC, is not advisable. One method we use is to divide the respondents into three groups in 2009 and 2022/2023 respectively, using tertiles, and examine, for example, how the young people who are in the lowest part of the distribution in 2009 are placed in the distribution in 2022/2023. The findings indicate a fairly clear relationship between reading performance at age 15–16 and outcomes later in life. For example, many of those with the weakest reading skills in PISA are also those who score lowest in the PIAAC assessments 14 years later. Moreover, reading skills at age 15–16 are strongly associated with later-life outcomes in education, employment, and self-rated health. Among individuals with the lowest PISA reading skills, 39 percent have completed or are enrolled in higher education 14 years later. By comparison, this applies to 84 percent of those with the strongest reading skills. The proportion receiving transfer income (excluding student grants) at some point between the PISA and PIAAC assessments is markedly higher among low-performing individuals than among high-performing individuals (80 percent versus 62 percent). The development in reading skills from age 15 to the late twenties varies by gender, origin and level of education. For example, immigrants and descendants of immigrants have experienced less positive development in reading skills than individuals of Danish origin from PISA to PIAAC. Young people who pursue higher education—especially long-cycle higher education—have also experienced more positive development in reading skills than those with only compulsory schooling or a vocational education.

Are Teachers Getting Smarter? International Evidence on Changes in Teacher Cognitive Skills and Student Achievement

Sebastian Reinartz, Halle Institute for Economic Research (IWH), Germany
Eric A Hanushek, Stanford University, USA
Andreas Schleicher, OECD, France
Simon Wiederhold, Halle Institute for Economic Research (IWH), Germany

Teacher cognitive skills shifted notably over the last decade. Using PIAAC Cycles 1–2 for 25 countries, we document how the level, dispersion, and relative standing of teachers’ numeracy and literacy evolved within countries. The descriptive evidence reveals large heterogeneity: some countries saw teacher-skill declines of about one standard deviation, while others improved; and teachers’ position within the tertiary-educated workforce moved by 15+ percentile ranks in several countries—consistent with substantial changes in selection into teaching. We then ask which policies and labor-market conditions (e.g., relative teacher wages, outside options for high-skilled women, and teacher status) are associated with these shifts. In a

second step, we relate these country-level changes in teacher skills to changes in student achievement using rich PISA microdata in mathematics and reading. For identification, we exploit within-country variation across subjects and over time, testing whether students in countries where teachers gained in numeracy relative to literacy also improved more in math relative to reading. Data on subject-specific skills in PIAAC for the overall population and for detailed occupations enables a set of robustness checks and placebo tests that help separate changes in teacher skills from broader skill changes within countries. Understanding how and why teacher skills evolve internationally—and whether these changes translate into student achievement—matters for policies aimed at strengthening teacher quality and improving educational outcomes.

Parallel session F: The multidimensional roots of social (dis)advantage: How structural and individual characteristics shape inequalities from school to adulthood

Mapping Intersectionality in Adult Skills Across Nordic-Baltic Countries: An Intersectional MAIHDA Approach

Ronny Scherer, University of Oslo, CEMO & CREATE, Norway

Although inequalities in adult foundational skills—numeracy, literacy, and adaptive problem solving—are well-documented, research has predominantly examined social group differences one axis at a time. This obscures how gender, age, migration background, educational attainment, and employment status operate simultaneously to produce compound patterns of (dis)advantage. Intersectionality theory offers a more realistic account of how social positions interact; yet quantitative applications in adult skills research remain scarce. The Nordic-Baltic countries present a particularly instructive setting: despite strong institutional commitments to equity, meaningful skill gaps persist, and whether these reflect intersectional concentrations of disadvantage is largely unknown. In this study, we drew on PIAAC Cycle 2 data and took an Intersectional Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (I-MAIHDA) approach to quantify intersectionality across the five social characteristics above. The Variance Partition Coefficient (VPC) quantified the degree to which skill variation was attributable to stratum membership. Country-specific estimates were synthesized meta-analytically to quantify between-country heterogeneity and identify possible explanatory variables. Four country-level moderators were examined: the EIGE Gender Equality Index, adult education participation rates, gender-by-migration employment gaps, and Inglehart-Welzel self-expression values. We further examined whether intersectionality patterns were correlated across domains, probing whether compound disadvantage operates as a general phenomenon or manifests differently by skill. We expect intersectionality to vary across both countries and outcomes, with adaptive problem solving showing the strongest stratification given its unequal distributional preconditions. Countries with greater gender equality and broader adult education access are hypothesized to show attenuated intersectional concentration. Cross-domain correlations are expected to be moderate, suggesting a shared structural basis alongside meaningful domain-specificity. The findings will address whether aggregate equity indicators adequately capture the distributional complexity of adult skills, and whether intersectionality in foundational competencies constitutes a coherent cross-domain construct. By integrating intersectional quantitative methods with cross-national meta-analysis, this study advances both the measurement and explanation of skills inequality—with direct implications for targeted policy investment. School Belonging in a Tracked Education System: Evidence from Czech PISA 2018 and 2022.

School Belonging in a Tracked Education System: Evidence from Czech PISA 2018 and 2022

Using PISA 2018 and 2022 data from The Czech Republic, this study examines school belonging in a highly tracked education system. The Czech Republic is a useful case because PISA students are distributed across several school types at age fifteen: basic schools, vocational schools, four-year gymnázia, and selective multi-year gymnázia. These tracks differ not only in academic orientation, but also in socioeconomic composition and students' duration of membership in a given school setting. The study addresses three questions: (1) To what extent do school track, school socioeconomic composition, gender, and individual SES explain school belonging among 15-year-olds in the Czech Republic? (2) How is school belonging associated with academic achievement? and (3) Do these patterns remain stable across the 2018 and 2022 PISA cycles? The analytic sample included 6,884 students in 328 schools in 2018 and 8,209 students in 418 schools in 2022, after excluding special schools and cases missing key covariates or weights. School belonging was modelled as a latent construct using the six PISA belonging items. Two-level structural equation models were estimated in 'lavaan', with students nested within schools and student weights applied. Student ESCS was decomposed into within-school and between-school components to distinguish individual SES from school socioeconomic composition. Achievement models used all ten plausible values across reading, mathematics, and science, with estimates pooled using Rubin's rules. Results show that school belonging is patterned more consistently by socioeconomic position and gender than by school track. Higher individual ESCS was associated with stronger belonging in both 2018 and 2022. School-average ESCS also predicted belonging in both cycles, indicating that students in more socioeconomically advantaged schools reported stronger belonging, net of their own SES. Gender was significant in both years: boys reported stronger belonging than girls after controls, and this adjusted gender difference was substantially larger in 2022. School-track differences were less stable. In 2018, students in multi-year gymnázia reported lower belonging than students in basic schools, while vocational and four-year gymnázium students did not differ significantly from basic-school students. In 2022, the pattern shifted: vocational and four-year gymnázium students reported stronger belonging than students in basic schools, while multi-year gymnázium students no longer differed significantly. These results do not support a simple peer-continuity explanation in which longer membership in the same school setting leads to stronger belonging.

Like Parent, Like Child? Intergenerational Occupational Persistence in 31 Countries

Marco Paccagnella, OECD, France

Using data from the OECD Survey of Adult Skills (PIAAC) we document the prevalence of intergenerational occupational persistence in 31 countries. We define occupational persistence as working in the same occupation as at least one parent when the respondent was 14, measured at the ISCO 1, 2 and 3-digit levels. Occupational persistence is widespread: 28% of adults are occupational followers, meaning that they work in the same broad occupation (ISCO 1-digit) of at least one of their parents. Narrowing the definition of occupations at the ISCO 2-digits, the share of occupational followers falls to 11%, and to 7% when occupations at the ISCO 3-digit level are considered. In all countries observed occupational persistence is higher than what would be observed under independence of occupational choices across generations. Occupational persistence is higher in asset- and family-based production and less frequent in fast-growing and emerging occupations such as ICT. Occupational inheritance is gendered and increases with parental education. On average, differences in earnings and job satisfaction between occupational followers and non-followers are small and not statistically significant.

Parallel session G: From office to construction site: Differences in work practices across occupations, industries and regions

Numerical and adaptive problem-solving skills of professionals in Finland and Baltic countries: analysis of the PIAAC Cycle 2 data
Mareks Niklass, University of Latvia, Latvia

This presentation examines the numeracy and adaptive problem-solving (APS) skills of professionals (an occupational group defined at the 1-digit level of the International Standard Classification of Occupations (ISCO)) in Finland and the Baltic countries. Professionals are typically required to hold at least a college degree to enter their occupation, and access to these professions is often strictly regulated by law and professional associations (e.g., for doctors, lawyers, and teachers). Once employed, professionals are generally expected to participate in further training, and for many, lifelong learning has become an integral part of their professional careers and ethos. The presentation aims to identify factors that account for cross-country differences in numeracy and adaptive problem-solving scores using data from PIAAC Cycle 2. Professionals in Finland achieve significantly higher scores in both numeracy ($M = 328.21$, $SE = 1.62$) and APS ($M = 370.77$, $SE = 1.45$) tests. Corresponding results in Estonia are somewhat lower (numeracy: $M = 312.47$, $SE = 1.29$; APS: $M = 288.02$, $SE = 1.08$). Scores in Latvia (numeracy: $M = 289.34$, $SE = 2.38$; APS: $M = 266.64$, $SE = 2.04$) and Lithuania (numeracy: $M = 268.41$, $SE = 2.16$; APS: $M = 244.35$, $SE = 1.73$) are clearly more modest. Across all countries examined, more than 80% of professionals hold at least a college degree. More than 90% were employed during the week preceding the interview, and close to 90% had an indefinite employment contract. In other words, professionals in Finland and the Baltic countries are predominantly employed in stable white-collar jobs. What factors account for these differences in skill levels? While older respondents and women tend to score lower in numeracy and APS tests, these effects are relatively weak compared to work-related factors captured by questionnaire items, such as how often respondents take measurements, read or create charts, or use specialized software or programming languages at work. For example, 36% of Lithuanian professionals reported never using specialized software at work, compared to only 14% of Finnish professionals. In conclusion, the results suggest that what matters most is whether—and how often—numeracy and ICT-related skills are used in the workplace.

Literacy	in	construction	work
Sari Sulkunen, Professor, Department of Language and Communication Studies, University of Jyväskylä,			Finland
Joonas Mannonen, National Project Manager (PIAAC Finland), Finnish Institute for Educational Research,		University of Jyväskylä,	Finland
Kari Nissinen, Vice-Director, Finnish Institute for Educational Research, University of Jyväskylä,			Finland

Adult surveys show that literacy practices on average have not had as important role in blue-collar work as in expert or white-collar work. Yet, the global labour market trends and advanced technology have introduced new field-specific literacy practices even for blue-collar workers. Moreover, currently literacy is considered to encompass multimodal resources such as language, images, sounds, videos, gestures, and material objects. Thus, blue-collar workers, too, have various needs to update their skills. Using PIAAC Cycle 2 data, this study focuses on exploring literacy and learning activities of European elementary and semi-skilled blue-collar workers in the field of construction – a particularly interesting high-risk field in which safety at work requires accurate and frequent communication and reporting. Construction workers' activities are compared with those of workers in other industries to examine the extent to which these activities are field-specific. Moreover, the study examines the associations between various activities and skills. In the analysis, we employ descriptive statistics to provide a timely and holistic description of construction workers' literacy and learning activities and skills, and regression analysis to examine the extent to which the selected activities contribute to workers' literacy skills. Intervening variables, such as age, education, and immigrant status will be controlled for. The results will be discussed from the perspectives of textualisation of work, its professional requirements, and life-long learning opportunities.

The division of labor and routinization of work
Peter Njekwa Ryberg, Jönköping International Business School, Sweden

This paper examines how the division of labor affects the routinization of work at the level of individual workers. Building upon the theory that the division of labor is limited by the extent of the market, I examine how the local density of economic activity impacts task specialization and in turn routine intensity. To measure task specialization and routine intensity of individual workers, I utilize the Swedish 2011/2012 and 2022/2023 cycles of the Programme for International Assessment of Adult Competencies (PIAAC) Survey of Adult Skills, which encompass detailed accounts on work-related tasks and skills. I link workers to geocoded establishments using longitudinal linked employer-employee microdata, to measure the density of economic activity in the area where they work. To test the proposed hypothesis, I use a mediation analysis regression framework where average treatment effects are obtained using an instrumental variable correlated random coefficients model. Historical data on railway passenger traffic, linked to the geography of the workers in my sample, instruments contemporary density and task specialization. The results indicate that density has a positive direct average treatment effect on task specialization, which fully mediates the relationship between density and routine intensity. Increasing density-induced task specialization by one standard deviation leads to an average increase of routine intensity by 7 percent. The average treatment effect is heterogeneous by codifiability of tasks, occupation, education, and industry, and grows in size at increasing levels of density. The findings show how a finer division of labor yields a greater routine intensity in carrying out work-related tasks. Insights into how the organization of work influences its quality, drawn from the usage of PIAAC data in combination with microdata, can deepen our understanding of worker autonomy, monopsony power, and well-being.

Parallel session H: SYMPOSIUM:

Beyond credentials: What adults can do, how accurately they judge it, and how they engage in learning in Nordic and Baltic countries

Session Moderator: Kadriye Ercikan, Senior Vice President, ETS Global Research

This session brings together four papers that examine how adult skills function in Nordic and Baltic countries. Each paper takes a different angle on a shared question: what do we learn when we look beyond credentials and test scores to understand how adults use, perceive, and build on their competencies? The first paper examines whether adults accurately assess their own skills by comparing perceived and actual performance. The second traces how foundational literacy supports problem solving as people age. The third investigates whether skilled adults without formal credentials still find their way into further learning. The fourth examines differences in engagement in formal, non-formal, and informal learning within and between skilled and low-skilled adults in Finland. Together, they use PIAAC data to provide a more comprehensive view of adult skills systems—linking proficiency, self-perception, and learning engagement—and to argue that policy should focus not only on formal qualifications, but on what adults can do, how they understand their abilities, and how they continue to develop them over time.

The Nexus Between Skills and Confidence in Skills in the Nordic-Baltic Countries
Usama Ali, Principal Measurement Scientist, ETS Research Institute
Irwin Kirsch, Ralph W. Tyler Chair in Large-Scale Assessment, ETS, Emeritus

This study examines the relationship between adults' proficiency in literacy and numeracy and their confidence in their performance using data from the Programme for the International Assessment of Adult Competencies (PIAAC). For the first time, PIAAC Cycle 2 collected self-reported measures of perceived performance—how well respondents believed they performed on the assessment—as well as the level of effort they reported exerted, and notably elicited these judgments after completion of the cognitive assessment. This post-assessment design provides a more direct basis for comparing perceived and actual performance. We leverage these measures to assess the alignment between perceived and actual performance, operationalized through proficiency levels.

Building on a substantial body of research on metacognitive calibration and self-assessment accuracy, which shows that individuals often misjudge their own performance, this study examines the extent to which such patterns emerge in adult skills data. Using a two-way classification that links perceived performance to actual proficiency, we identify patterns of under- and over-confidence. Individuals who report low perceived accuracy despite demonstrating higher proficiency are classified as under-confident, while those reporting high perceived accuracy with lower proficiency are considered over-confident.

The analysis explores these patterns across Nordic-Baltic countries and examines variation by domain and demographic characteristics. Given that a substantial share of adults—often around 30 percent or more—perform below proficiency Level 3, patterns of over-confidence among lower-performing individuals may have important implications. The findings contribute to the literature by extending evidence on confidence calibration to adult populations in large-scale assessments. From a policy perspective, systematic miscalibration may affect human capital development: under-confidence may reduce engagement in lifelong learning and limit skill utilization, while over-confidence may lead to suboptimal educational investments and labor market decisions. These results highlight the importance of incorporating non-cognitive constructs, such as confidence and self-assessment accuracy, into the interpretation of PIAAC results and the design of policies aimed at improving adult skills and workforce adaptability.

How Literacy Shapes Problem Solving as Populations Age: Evidence from Nordic and Baltic Countries

Andrew McEachin, Senior Research Director, Policy Research Center, ETS

This study examines how literacy relates to problem-solving proficiency among adults in Nordic and Baltic countries, using Cycle 2 of the Programme for the International Assessment of Adult Competencies (PIAAC). We ask three questions: how problem-solving proficiency varies with literacy across the full distribution of adult skills; how this relationship differs within and between countries in the region; and how it looks different for younger versus older adults.

We take a distributional approach rather than comparing means or proficiency-level shares. We model problem-solving performance at each point in the literacy distribution, and we let the shape of that relationship vary by country and by age group. This approach shows where along the literacy distribution the problem-solving gradient is steepest, and which adults depend most on literacy to navigate information-rich tasks. Nordic and Baltic countries share strong basic-schooling traditions but differ in labor market structure, migration, and adult learning systems. Comparing them separates patterns specific to one country from patterns shared across the region.

PIAAC Cycle 2 covers working-age adults across several decades of birth cohorts. This lets us compare younger and older respondents within the same survey. We ask whether adults with weaker literacy show a wider problem-solving gap between older and younger respondents, and whether adults with stronger literacy show a narrower one. This is a cross-sectional comparison, not a within-person trajectory. Even so, it shows how literacy and adaptive competence line up across the adult population a country has today.

PIAAC already identifies who has low literacy. The contribution here is to show how literacy gaps constrain the adaptive, information-rich problem solving that labor markets increasingly demand, and how that constraint looks different across age groups. The findings bear directly on lifelong learning. If problem solving rests heavily on literacy, adult learning systems, workforce training, and upskilling initiatives cannot assume a floor of basic skills that many adults have not reached. The results also point forward: absent change in primary and secondary schooling, today's adult literacy distribution previews tomorrow's adult problem-solving capacity. By showing where foundational literacy most constrains adaptive competence, the paper identifies concrete leverage points for policy that would widen who keeps learning and adapting as Nordic and Baltic populations age.

Skills Without Credentials: Adult Learning Participation Across the Life Course in Nordic and Baltic Countries

Anita Sands, Lead Policy Research Analyst, Policy Research Center, ETS

Adult participation in lifelong learning remains a central policy priority across OECD countries, yet recent evidence points to stagnation in participation rates and persistent inequalities across population groups. These disparities are particularly pronounced among older adults and other underrepresented groups. While credential level is consistently one of the strongest predictors of participation in adult learning, and prior research highlights the role of assessed skills, far less is known about whether participation reflects individuals' assessed skill capacity when it diverges from formal qualifications.

Using PIAAC Cycle 2 data from Nordic and Baltic countries, we examine whether participation in adult learning reflects demonstrated proficiency or continues to track formal credentials. We focus in particular on adults who perform at Level 3 or above in literacy or numeracy despite holding lower formal qualifications and compare their participation patterns to those of higher-credentialed adults with weaker assessed skills. Drawing on descriptive and multivariate approaches, the analysis considers participation in formal and non-formal learning, job-related training, employer sponsorship, and unmet demand. The Nordic and Baltic countries vary in adult learning infrastructure and institutional context, providing comparative leverage for examining whether credential-based sorting operates similarly across different systems.

The paper asks whether adult learning participation is more closely aligned with individuals' foundational skills or with formal credentials, and whether credential-based sorting creates misalignment between adults' capacity and their access to learning opportunities. We then examine age-group differences in these dynamics given documented declines in employer investment and participation with age.

If participation tracks credentials more than demonstrated skills, current approaches may overlook a substantial group of adults and reinforce existing inequalities while limiting the efficiency of investment in adult learning - with implications that extend beyond this regional context.

Patterns of learning engagement among high- and low-performing adults in Finland

Joonas Mannonen, National Project Manager (PIAAC Finland), Finnish Institute for Educational Research, University of Jyväskylä, Finland

Kari Nissinen, Vice-Director, Finnish Institute for Educational Research, University of Jyväskylä, Finland

Raija Hämäläinen, Professor, Department of Education, Faculty of Education and Psychology, University of Jyväskylä, Finland

Bram De Wever, Professor, Department of Educational Studies, Faculty of Psychology and Educational Sciences, Ghent University, Belgium

Evidence from the second cycle of the Survey of Adult Skills (PIAAC CY2) indicates that, on average, engagement in different forms of learning is a strong predictor of proficiency in information-processing skills. At the same time, learning trajectories do not correspond linearly with proficiency levels: not all skilled adults are highly educated or actively engaged in learning, and not all low-skilled adults are disengaged from learning altogether. Moreover, the learning trajectories that most effectively support skill development may differ across population segments according to background characteristics. This complexity suggests that effective skills policy cannot rely on uniform assumptions about learning and proficiency. Instead, it requires a more nuanced understanding of participation patterns in formal, non-formal, and informal learning across proficiency levels.

This paper responds by mapping common patterns of engagement in formal, non-formal, and informal learning among skilled adults in Finland. In parallel, it analyses patterns of limited participation and gaps in learning that are commonly found among low-skilled adults. By examining mismatches between learning engagement and skill outcomes, the study seeks to identify policy-relevant leverage points for reducing skill inequalities that emerge early in life and accumulate throughout adulthood.

We employ Finnish PIAAC CY2 data and hierarchical cluster analysis. Skilled adults were defined as those scoring at the two highest proficiency levels in each of the three skill domains assessed in PIAAC CY2—literacy, numeracy, and adaptive problem solving ($n = 1,121$). Conversely, low-skilled adults were defined as those scoring at the three lowest levels in each domain ($n = 825$). To identify dominant patterns of learning engagement among skilled and low-skilled adults, we use educational attainment, participation in non-formal adult education and training, parental education, learning at work and skill use at and outside work as clustering variables. A broad range of background characteristics is then employed to describe the resulting clusters and to analyze differences within and between the groups of skilled and low-skilled adults.

The findings contribute new insights into the lifelong development of information-processing skills in Finland and offer implications for policymakers designing national lifelong learning strategies that effectively reach diverse segments of the adult population.

Parallel session I: Belonging in a new home: What supports immigrant participation in host country society and labour market

Political efficacy and immigrant background, language-use and adult skills between two PIAAC Cycles

Saida Essert (Mamedova), University of Hamburg, Germany
 Anke Grotlüschen, University of Hamburg, Germany

Political participation is essential for democratic governance. In a democracy, citizen's feelings of political efficacy enable institutions to be effective, while effective governance helps maintain high political trust. The enablers and hindrances to beliefs about the democratic system and one's role in it, then, is an existential question for democracies. In this work, we aim to expand the literature on the individual and contextual factors related to political efficacy in a cross-country comparison over time. We consider a complex interplay of individual- and contextual-level factors that are associated with external political efficacy. External political efficacy has long-established links to socio-economic and socio-demographic individual characteristics. A small pool of research also includes foundational adult skills, such as literacy or numeracy. Moreover, previous research recognizes that individuals do not live in isolation. We live in societies that shape our beliefs. Economic inequality, state of democracy, and public support for populist parties, are, among others, the contextual factors that have been shown to be related to political efficacy. We use data from the Program for International Assessment of Adult Competencies (PIAAC) combined with the information from other databases for country-level context to examine changes between the two cycles of PIAAC, 2012 and 2023. Our aim was to analyze all 27 countries that participated in both cycles of PIAAC. After exclusion based on the data availability, we end up with fourteen countries, including Austria, Belgium, Czechia, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Lithuania, Poland, Slovak Republic, Spain. Our results indicate that, controlling for age, education and other socio-demographic factors, in 2023 adults with immigrant history and various language backgrounds, on average, fail to differ in their political efficacy either in Germany or in the cross-country analysis. We found that while higher literacy in the official language is associated with higher political efficacy in the cross-country European context higher political efficacy now requires higher literacy abilities than those needed in 2012. Including contextual factors, our analysis shows that adults living in more democratic and more economically equal countries continue having higher political efficacy. We also found that the relationship between political efficacy and the voter support for right-wing political parties in the elections have a positive relationship. Political efficacy and the voter support for left-wing political parties in the elections have a negative relationship. These findings update and deepen previous research on the relationships of political efficacy to individual- and context-level factors.

Immigrant subjective well-being, STEM education, and country of study: the case of Israel

Maiia Kim, Tel Aviv University, Israel
Anastasia Gorodzeisky, Tel Aviv University, Department of Sociology and Anthropology, Israel

This paper is the first attempt to examine whether immigrant status, defined by the country where immigrants received their qualifications (country of origin versus country of destination), and fields of study (STEM or non-STEM), are associated with subjective well-being (SWB). The theoretical framework of the study is based on social production function theory, the theory of human capital transferability, Bourdieusian social reproduction theory, and the hypothesis of effectively maintained inequality. STEM education is conceptualized as a status symbol in society. The hypotheses suggest that 1) destination-country-educated immigrants demonstrate lower SWB than native-born citizens but higher SWB than origin-country-educated immigrants, 2) STEM graduates have higher SWB compared to non-STEM graduates, and 3) immigrant status has a lower influence on SWB among STEM graduates compared to non-STEM graduates. Israeli PIAAC data (Cycle 2, 2024) were used to answer the research questions. Israel is an interesting case for such an examination due to the very large immigrant population that has arrived in the country since the 1990s and the “elite” status of STEM fields in society. Separate analyses were conducted for the full sample and the employed subsample of Israeli citizens. The multivariate analysis was based on linear regression models, including interaction effects to capture differences in the effect of immigrant status on SWB across fields of study. The findings show that the country where Israeli immigrants received their education is related to their SWB, but not in the expected way. In the full sample, both Israeli-educated and foreign-educated immigrants report lower SWB than native-born Israelis, but there is no difference between these two immigrant groups. Among the employed, foreign-educated immigrants do not differ from native-born Israelis in their level of SWB, while Israeli-educated immigrants demonstrate lower SWB than native-born Israelis. The specific demographic composition of the Israeli immigrant population might explain this. A significant proportion of Israeli-educated immigrants represent 1.5 generation immigrants from the Former Soviet Union, whose parents frequently suffered in Israel from very poor economic conditions, especially after retirement, regardless of their level of education. Thus, the relatively lower SWB of these immigrants might be caused by concern for their elderly parents and the need to help them financially. Second, despite the importance of education for SWB, as explained by social production function theory and the Bourdieusian conceptualization of STEM education as a status symbol, it does not appear to translate directly into relatively high SWB. Challenging and stressful working conditions in the Israeli STEM sector might explain this. Third, in line with the expectations based on human capital transferability theory, which posits that less language-dependent and less country-specific STEM skills are more successfully transferable to the host country’s labor market, STEM education was found to mitigate the SWB disadvantage associated with immigrant status in Israel.

A study of immigrant skills gaps based on PIAAC data and AI-enabled intervention pathways

Weiyei Feng, University of Jyväskylä, Finland

This study uses data from the Programme for the International Assessment of Adult Competencies (PIAAC) to examine why a substantial proportion of immigrants—despite holding higher education degrees—face persistent difficulties in translating their human capital into labor market advantages. Specifically, we analyze gaps between immigrants and native-born populations in literacy, numeracy, and problem-solving skills in technology-rich environments. Against the backdrop of rapid artificial intelligence (AI) advancement, the study further explores how emerging AI technologies can help bridge these gaps through personalized learning and targeted interventions. We investigate the potential of AI-driven systems—including adaptive learning platforms, automated skill assessment tools, and language support applications—to deliver scalable, cost-effective, and individualized training. The analysis focuses on how such tools can accelerate skill acquisition, enhance employability, and reduce structural inequalities in host-country labor market. Based on these findings, the study proposes policy recommendations aimed at leveraging the rapid development of AI systems to compensate for the limitations and inherent biases of human instruction, reduce the underutilization of immigrant skills, and promote economic mobility within inclusive labor markets.

From Transaction to Care: Digital Public Services for Migrants
 Nils Ehrenberg, University of Vaasa, Finland
 Uttishta Varanasi, Aalto University, Finland

Public service development for migrants in Nordic countries is increasingly digital first, aiming to leverage digital technologies to deliver more efficient services. Effective two-way integration of migrants and communities requires trust, care and community; values that are harder to replicate through the focus on efficiency through this digital-first approach. We argue that an emphasis on infrastructure of care can help improve the efficacy of adult learning and support more robust labour market integration for migrant workers. As Nordic-Baltic markets undergo transformation in the face of new technologies, green movements, and demographic changes, the design of public services such as employment and education become sites of democratic and economic consequence. The current deployment of public services has largely proceeded under more transactional logics of efficiency and economy, measuring success through the velocity and quantity of task completion. However, this focus on completing “transactions” can risk eroding social cohesion, which may result in a decline of institutional trust, especially in communities considered more marginal. The recent, increased emphasis on using AI in public service provision has further intensified the drive for efficiency over other values. Drawing on empirical work in the city of Espoo consisting of 17 qualitative interviews (conducted in English and Somali) and workshops with migrant mothers. The interviews were thematically analysed based on digital literacy, agency, and identity. We observed how the mothers ambitions and agency are described as “check-lists”, and the use of AI being perceived as a matter of efficiency rather than improved services. We propose that new digital public services should be based on logics of care, rather than efficiency which often results in a transactional process. By reframing the underlying logic of digital services we consider how digital services function as a part of integration in Finnish society. This involves re-framing the ‘customers’ of a service from simply receiving the service and towards considering them as active and agentic members of society. We argue that treating public services, such as adult education, as vital, societal investments rather than a more transactional correction of labour market mismatch is a necessary political reorientation.

Parallel session J: Determinants of good employment: How are skills, qualifications and contextual factors associated with adults' labour market outcomes

Vocational Education, Skills Use and Perceived Skills (Mis)match in the Czech Republic: Evidence from PIAAC
Petra Holeckova, National Pedagogical Institute, Czech Republic

The study focuses on Czech adults with vocational education without “maturita” (graduates of an apprenticeship program, ISCED 2011 353), using the second cycle of PIAAC data. Apprenticeship programs have traditionally held a strong position in the Czech Republic, even though the literature suggests that dual tracks of academic and vocational learning reinforce educational inequalities and worsen the prospects of apprenticeship program graduates over the life cycle. The main objective of this study is to investigate how graduates of apprenticeship programs in the Czech Republic are affected by their educational background in terms of skill acquisition and labour market outcomes. Specifically, the study aims to: (1) examine the relationship between educational attainment, economic activity, and the subjectively perceived mismatch between skills and labour market demands among adults; (2) analyse how graduates of apprenticeship programs perceive educational requirements for their professions, particularly whether a high school diploma is viewed as a requisite for current job; and (3) identify which skills adults consider mismatched with their current position. Descriptive statistics and binary logistic regression are used to address these objectives. Graduates of apprenticeship programs are statistically more likely than adults with higher education to be economically inactive. However, those who are employed tend to assess their skills as adequate or exceeding the requirements of their positions. In the Czech Republic, a segment of the labour market remains composed of occupations that offer limited opportunities to use and develop foundational skills. This dynamic has the potential to widen the gap between adults at the lowest and highest skill levels, which may pose a challenge to social cohesion. Due to the absence of data on perceived skill deficits in personal life, it is not possible to directly evaluate how adults view their skills outside their current occupations. A further limitation is introduced by the cross-sectional design of PIAAC, although the findings from the second cycle are consistent with results from the first cycle and the IALS survey.

Parity of esteem? A job-task lens on the labour market fortunes of vocational graduates relative to academic graduates across two PIAAC cycles

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This investigation examines the labour market fortunes of vocational graduates relative to academic graduates, focusing on their access to meaningful employment and equitable wages across two cycles of PIAAC in six countries. Analysis is ongoing; this abstract presents preliminary findings, with full results to be shared at the conference if accepted. Understanding vocational outcomes is key to assessing whether non-elite education provides sustainable pathways into skilled jobs that are sustained over time for meaningful opportunities in the middle of the labour market. However, such analyses are challenging due to selection into education tracks—that is, individuals entering vocational versus academic routes may differ systematically in ability, preferences, and entry into job types (Shavit & Müller, 2000). In this regard, following Araki (2020), PIAAC is especially valuable because it:

- measures workers’ literacy and numeracy proficiency independently of their qualifications;
- assesses job task requirements separately from workers’ credentials;
- enables systematic cross-country comparisons over time using the same variables for vocational outcomes to be analysed across different national institutional contexts.

For a more contextually grounded assessment, this study examines the labour market fortunes of vocational graduates across six countries selected using the ‘varieties of capitalism’ framework (Hall & Soskice, 2001) that captures how different institutional systems shape skill formation and employment outcomes. The six countries are grouped as follows:

Type	of	system	Countries
Developmental	states	Singapore,	South Korea
Coordinated	market	economies	Finland, Sweden
Liberal	market	economies	US and UK

Results for Singapore show a decline in the relative fortunes of vocational graduates between PIAAC cycles: even those with high skill proficiency are less able to access high-task jobs, and when they do, they earn less than their degree-holding counterparts. This occurs despite sustained national efforts to promote skills development over the life course through the SkillsFuture movement. One explanation is Singapore’s deeper integration into the global economy in the last decade that expanded demand for roles linked to APAC headquarters and R&D functions. These jobs tend to prioritise degree credentials, increasing their value as a positional good and disadvantaging vocational pathways. In contrast, Finland has been able to grow opportunities for vocational graduates between PIAAC cycles. One explanation is the structure of Finnish economy that focuses on creating home-grown innovations in contrast to Singapore’s global hub strategy.

Identifying Job Satisfaction Factors across Europe: A Machine Learning Approach Using PIAAC

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Job satisfaction is one of the central outcome in labour economics, reflecting both individual well-being and labour market efficiency. Despite an extensive empirical literature, there is limited evidence on how the relative importance of its determinants varies across European countries. This study addresses this gap by exploiting the data of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), which provides harmonised, cross-country data combining information on individuals' cognitive skills, job-task content, education, relative income, personal and workplace characteristics. The richness of PIAAC enables a consistent assessment of job satisfaction drivers while accounting for individual and country level heterogeneity. The analysis focuses on several key dimensions determined in the previous literature. First, it examines education and skills mismatch, addressing whether over-qualification or skill underutilisation is associated with lower job satisfaction. Second, it considers the role of training, exploring whether access to skill development mitigates dissatisfaction linked to mismatch. Third, we explore career progression opportunities and intrinsic job characteristics -such as autonomy, task content, and managerial support - alongside with extrinsic factors including compensation and relative compensation as comparing to profession average. Fourth, we take into account health self-assessment and personal characteristics. Together, these dimensions provide a comprehensive framework for understanding job satisfaction as a multidimensional outcome shaped by both intrinsic and extrinsic job attributes across Europe. We contribute to the existing literature by applying tree-based machine learning approaches, specifically random forests and boosted forests, to identify the relative importance of job satisfaction factors across countries. Unlike conventional parametric models, these methods flexibly capture nonlinearities and high-dimensional interactions between determinants without imposing restrictive functional form assumptions. This is particularly relevant in the context of job satisfaction, where the interplay between individual characteristics, job attributes, and institutional factors is likely complex and heterogeneous. The methodological approach allows for a data-driven ranking of determinants within each country, thereby uncovering cross-country differences in job satisfaction. By combining the richness of PIAAC data with flexible machine learning techniques, our study offers new insights into the heterogeneity of job satisfaction determinants in Europe and provides a complementary perspective to the existing econometric literature.

Beyond Wages: How Task Structure and Workplace Support Shape Worker Outcomes Across Countries

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This paper examines how work is structured and supported across countries using data from the second cycle of the Programme for the International Assessment of Adult Competencies (PIAAC). It applies a two-dimensional lens that distinguishes between (i) skill use in tasks, reflecting the content of work, and (ii) workplace resources and organisational conditions that support how work is carried out. Using this approach, the paper analyses patterns across PIAAC participating countries, with selected comparisons to Nordic economies where data is available. The findings show that while higher-skill sectors and professional roles tend to perform relatively well internationally, they do not always exhibit correspondingly high levels of task discretion. More notably, substantial gaps are observed in lower-skill sectors and among non-professional workers, where outcomes are significantly weaker in Singapore compared to comparable sectors in countries such as Finland. These differences suggest that alternative ways of organising work, particularly in lower-skill contexts, can yield more supportive and developmental work environments. The analysis also highlights that the role of wages is limited. In Singapore, higher wages are primarily associated with job satisfaction, while job design and workplace resources show stronger and more consistent relationships with social outcomes such as social trust and political efficacy. Across countries, greater task discretion is consistently associated with higher levels of job satisfaction. At the same time, the paper acknowledges that PIAAC provides only a partial view of health and social outcomes, and that these measures should be interpreted with caution. Overall, the findings suggest that differences in how work is organised - particularly in terms of task structure, autonomy, and workplace support—play a critical role in shaping worker outcomes. The paper discusses implications for understanding variation across sectors and countries, and highlights the importance of organisational practices in supporting more inclusive and developmental forms of work.

Posters

Enabling Access to PIAAC Microdata: The OECD's Remote Code Execution Service

Anja	Meierkord,	OECD,	France
Francesco	Avvisati,	OECD,	France
Marco	Paccagnella,	OECD,	France

This presentation highlights the purpose, design, and use cases of the Remote Code Execution (RCE) Service, a secure tool that enables approved researchers to conduct advanced statistical analyses on the PIAAC Restricted Use Files (RUFs). The core objective is to inform the research and policy community about the analytical possibilities that this service opens up, and to illustrate how it compares to existing data access pathways.

PIAAC data are available through different sources and in different formats. Public Use Files are freely available and can be downloaded from the OECD PIAAC Website. They do not contain all the information collected in the survey, as countries had to exclude or coarsen certain variables to comply with national data protection laws. National research or scientific use files offer more granular country-level data but are restricted to single-country analysis and vary in their content. The international Restricted Use File contains the full set of variables collected through PIAAC but is only stored at the OECD and is normally not accessible to external users.

To facilitate analysis of this comprehensive dataset, the OECD has set up the RCE Service. Through the RCE Service, researchers can analyse data from the international RUF remotely by submitting code that is then run on the data. Users do not have direct access to the microdata, thus preserving the confidentiality of survey participants.

From a data governance perspective, the RCE Service represents a structured approach to balancing scientific access with participant confidentiality - a model of increasing relevance as concern for data protection grows. For researchers and policymakers, it substantially expands the analytical frontier: enabling more robust modelling, finer-grained subgroup analyses, and comparative work across all PIAAC-participating countries that would not be possible using publicly available data alone.

Strengthening basic skills through Nordic collaboration

Nordic Network for Lifelong Learning (NLL)

Johanni Larjanko, NLL Finland / Bildningsalliansen
Antra Carlsen, NLL Head-coordinator

NLL strengthens adults' basic skills in the Nordic region by connecting policy and practice and supporting implementation through cross-sector collaboration. The poster presents NLL examples across workplace learning, outreach to hard-to-reach groups, capacity building, and integration-focused basic literacy.

STATISTICS NORWAY

Decomposing	Skill	Change	among	Young	Adults	in	Norway
José Manuel	Arencibia	Alemán,	Statistics	Norway,	Norway	Norway	Norway
Maja	Kalcic,	Statistics	Norway,	Norway	Norway	Norway	Norway

Within the broader context of declining reading and numeracy skills across most participating countries between PIAAC Cycles 1 and 2, Norway stands out as one of the few countries showing improvements. Young adults in Norway, in particular, experienced relatively large gains in average reading and numeracy skills. This study explores the extent to which these developments are associated with changes in the composition of the young adult population across cycles and with changes in skill levels within population subgroups.

PIAAC 2023: Adults with Low Information-Processing Skills in Estonia

Estonian Ministry of Education and Research

The author of the research is Mari Liis Reis. But the poster has been prepared by Triin Savisto and Riia Eratalay. Both are affiliated with the Estonian Ministry of Education and Research.

This poster examines adults with low literacy skills in Estonia using PIAAC 2023 data. It identifies the demographic, educational, linguistic and labour market factors associated with low literacy skills, showing that older age, lower education, weaker Estonian language proficiency, first-generation immigrant status and employment in low-skilled occupations are key risk factors. The findings highlight the heterogeneity of low-skilled adults and suggest that adult learning policies should be tailored to different learner profiles rather than relying on one-size-fits-all approach.

Based on Räis, M.L. (2025). PIAACi uuringu aruanne: madala infotöötlusoskuste tasemega täiskasvanud

EPALE - Electronic Platform for Adult Learning in Europe

EPALE is Europe's largest multilingual platform for adult learning professionals. It enables networking and sharing good practices as well as disseminating project results across Europe. EPALE is co-funded by the European Union.

Skills Among Young Adults in Sweden, Statistics Sweden 2025

Annica Wallerå and Lotta Larsson, Senior Analysts, Statistics Sweden

This poster presents findings from a Statistics Sweden report on literacy and numeracy skills among young adults aged 16 to 34 in Sweden. The report examines variation in skills by gender, age, socio-economic background, educational attainment, migration background, and early skill achievement as measured by grade point averages at the end of lower secondary school.

The poster focuses on adults aged 25 to 34 and explores how skills acquired in lower secondary school are associated with numeracy proficiency 10 to 20 years later, using data from PIAAC. The analysis examines the relationship between early and later skills while taking educational attainment and other demographic factors associated with skill variation into account. The findings provide a description of the long-term association between early skills and skills in adulthood, after completing upper secondary education and entering working life.

Skills among Foreign-Born Adults in Sweden, Statistics Sweden 2026

Marit Jorsäter and Lotta Larsson, Senior Analysts, Statistics Sweden

This poster presents findings from a Statistics Sweden report on literacy and numeracy skills among foreign-born adults aged 16 to 65 in Sweden. Results from PIAAC 2023 show that, on average, native-born adults have higher literacy and numeracy skills in the Swedish language than foreign-born adults. However, the foreign-born population is highly heterogeneous, comprising individuals who migrated at different stages of life, for different reasons, and with diverse educational and labour market backgrounds.

The report examines variation in skills among foreign-born adults by gender, educational attainment, length of residence in Sweden, age at arrival, and the Human Development Index (HDI) of their countries of origin. The poster focuses on literacy skills and explores how these factors are associated with proficiency in the Swedish language. The findings provide insights into the diverse pathways associated with literacy skills among foreign-born adults and contribute to a better understanding of the factors associated with literacy skills in Swedish.

Nordic Council of Ministers
Malene Vangdrup and Frida Månsson

As one of the conference funders, the Nordic Council of Ministers will present its Vision 2030 and broader work, as well as initiatives within the education and labour market sectors.

Nordic-Baltic PIAAC Network

This poster presents the Nordic-Baltic PIAAC Network, its objectives, member countries, organization, key achievements, and planned activities. It highlights the network's role in promoting collaboration, knowledge exchange, and comparative research on adult skills across the Nordic and Baltic region.