## Invited Symposium:

**Cognitive Skills and Lifelong Learning**

**Chair** Martin Ehler (WZB Berlin Social Science Center, Germany)

### Abstract

Learning during adulthood after initial education and training is a widespread and growing phenomenon in many countries. Especially the increasing pace of technological change and digitalization is likely to further fuel this trend. New technology has the potential to change the labor market as well as many other aspects of life. The result is that skills acquired during initial training no longer suffice to remain employable and to participate in social life. Therefore, skill acquisition later in life becomes more important to ensure that nobody is left behind. Therefore, many politicians and pundits advocate lifelong learning to ensure inclusive growth despite the challenges of digitalization. Yet, it is not clear whether current adult education and training programs and systems are capable to counteract the negative repercussions of digitalization. It is well known that access to adult training and education is unequally distributed. Less-educated and less-skilled people participate less often in training courses and other learning activities. Also, workers that are more likely to lose their jobs because of technological change are less likely to take part in learning opportunities. Thus, adult education and training programs often do not reach those most in need of skill acquisition later in life. At the same time, the benefits of existing learning arrangements for adults are often unclear. Many studies show that participation in further training courses does not lead to higher skills or better jobs. Against this background, this symposium aims to advance the knowledge on lifelong learning and cognitive skills. Based on new empirical results, we will discuss both the determinants of participation in lifelong learning and its effect on the development of cognitive skills. Also, we will discuss the acquisition and development of skills over the life course more generally. A special focus will be on cross-national comparative studies. Using results on participation and skill acquisition from different countries, we aim to assess the influence of institutions such as adult education and training policies. Furthermore, we will especially discuss lifelong learning among the most vulnerable groups such as less-skilled workers.

### Presentations

- **Title:** Does Learning Help Workers to Keep up with Technological Change? Cross-National Variance in the Effect of Further Training on Problem-Solving Skills.  
  **Authors:** Martin Ehler (WZB Berlin Social Science Center, Germany), Marie-Christine Fregin (ROA, Maastricht University, The Netherlands), Didier Fouarge (ROA, Maastricht University, The Netherlands), Mark Levels (ROA, Maastricht University, The Netherlands), Liisa Martma (Tallinn University, Estonia) & Rolf van der Velden (ROA, Maastricht University, The Netherlands)
- **Title:** Skills and Education as Factors of Participation in Non-Formal Learning.  
  **Authors:** Liisa Martma & Elu Saar (Tallinn University, Estonia)
- **Title:** Cross-National Variation in the Training Disadvantage of Less-Educated Employees: The Role of Job Allocation versus Skills.  
  **Authors:** Carla Hornberg, Heike Solga & Jan Paul Heisig (WZB Berlin Social Science Center, Germany)
- **Title:** Patterns and Predictors of Literacy and Numeracy Development During Adulthood: Longitudinal Findings from PIAAC-L and NEPS.  
  **Author:** Clemens Lechner (GESIS - Leibniz-Institute for the Social Sciences, Germany)

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Martin Ehler (WZB Berlin Social Science Center, Germany), Marie-Christine Fregin (ROA, Maastricht University, The Netherlands), Didier Fouarge (ROA, Maastricht University, The Netherlands), Mark Levels (ROA, Maastricht University, The Netherlands), Lisa Martma (Tallinn University, Estonia) & Rolf van der Velden (ROA, Maastricht University, The Netherlands)

Abstract
The demand for problem-solving and numeracy skills on the labour market is increasing due to technological innovations. To remain competitive, many workers have to acquire the needed skills. This may be achieved through non-formal and informal adult education and training. Yet, so far little is known about how well key information-processing skills (in the domains of digital problem-solving and numeracy) can be acquired in non-formal and informal learning environments and how this may be influenced by nation specific adult learning systems. Based on objective skills measurements for representative samples of workers in 26 countries from the OECD Survey of Adult Skills (PIAAC) we use information about involuntarily missed courses to identify the causal effect of courses on skills. Our results suggest that non-formal learning does not lead to higher problem-solving skills on average. Furthermore, we find no systematic cross-national variation in the effects. We discuss the possible conclusions of this finding and also the limitations of our analysis.

Skills and Education as Factors of Participation in Non-Formal Learning.

Authors
Lisa Martma & Ellu Saar (Tallinn University, Estonia)

Abstract
Theoreticians concerned with job-related non-formal education make explicit distinctions between supply and demand of skills (see for example, Oosterbeek 1998) and explore why, from a policy perspective, the labour market places importance on observing certain conventions. Distinguishing between job requirements and skills of workers would provide an insight into the determinants of training gap. Nevertheless, the supply side, specifically the human capital approach, which has tended to underplay the demand side of the labour market has dominated research. Only a few empirical studies have attempted to separate the impact of supply and demand factors on participation in adult education (see Altonji and Spletzer, 1991; Desjardins, 2014; Desjardins & Rubenson, 2011; Korpi & Tählin, 2008; Saar & Räisä, 2017). We are planning to extend previous analyses via the Programme for the International Assessment of Adult Competencies (PIAAC) dataset, which contains direct measures of skills, as well as skill use at work, allowing us to analyse the impact of the supply of skills and the demand for skills. The aim of this study is to understand better the relationship between participation in adult job-related training and workers' skills profiles, as well as the extent to which those skills are used in jobs and how this relationship differs in countries with different skill formation regimes. Our finding confirms the conclusion of Desjardins and Rubenson (2011) that the content and nature of work are more important factors than influence participation in learning compared with employees' skills and level of education. Skills and educational attainment therefore have no independent value without
putting them to use. Although skills are important, their value regarding participation in learning is dependent on the demand for the skills in the labour market. If there are not enough skill-intensive jobs, then there is also no need for the employers to provide training and for the employees to acquire additional skills.


Authors
Carla Hornberg, Heike Solga & Jan Paul Heisig (WZB Berlin Social Science Center, Germany)

Abstract
Worker training can be considered an important aspect of labor market inequalities. Less-educated adults show the lowest rate of participation in adult education and training. Our understanding of less-educated workers' training disadvantage is still limited, however. To contribute new insights, this study addresses the more general question of the role of job placement (e.g., job tasks, work contracts, or economic sector) for participating in job-related non-formal training—compared to worker characteristics, such as their actual skills or motivation to learn. Thus, we examine the extent to which the training disadvantage of less-educated workers is explained by the simple fact that they perform different jobs than better-educated workers, and how much differences in job allocation contribute to the large cross-national variation of less-educated workers' training disadvantage. Our study uses data from 27 countries that participated in the Programme for the International Assessment of Adult Competencies (PIAAC). We find that in all countries, differences in job allocation by educational attainment contribute significantly to the training disadvantage of less-educated workers, above and beyond skills differentials and other worker characteristics. Moreover, accounting for differences in job allocation and workers' skills at the individual level markedly reduces cross-national variation in less-educated workers' training disadvantage—yet here, skills differentials between less- and intermediate-educated workers are more important than job allocation. Educational and labor market institutions moderate the impact of job allocation and skills differentials between less- and intermediate-educated workers on less-educated workers' training disadvantage.

Patterns and Predictors of Literacy and Numeracy Development During Adulthood: Longitudinal Findings from PIAAC-L and NEPS

Author
Clemens Lechner (GESIS - Leibniz-Institute for the Social Sciences, Germany)

Abstract
In view of demographic ageing and rapid technological change, questions about how basic competences such as literacy and numeracy develop during adulthood are gaining in importance: To what extent can adults' literacy and numeracy still change beyond traditional schooling age? Does change involve gains or losses, and how prevalent and large are these gains or losses? Even more important, what factors may drive change in competences? Due to the lack of longitudinal data on adults' competences, these important issues are far from fully resolved. This talk reports on a series of studies that leveraged the unique potential of two German large-scale assessment surveys conducted in Germany to cast light on adult competence development: PIAAC-longitudinal (PIAAC-L) and the National Educational Panel Study (NEPS). Both surveys offer repeated measures of adults' literacy and numeracy spaced
three to six years apart. They also offer information on a variety of potential drivers of skill change such as labour market participation, participation in further education and training, or skill use, thus allowing for insights into how these factors may relate to competence development over time. Findings from these studies suggest that literacy and numeracy are not set like plaster during adulthood. Instead, these competences continue to change even over relatively short time periods of three to six years and even after accounting for measurement error through plausible value (PV) methodology. Gains and losses are equally possible, although typically at different ages. Skill use (or “practice engagement”), labour market participation, previous educational attainment, and cognitive ageing – but not participation in further education – emerge as robust predictors of change in competences over time. Findings are contrasted from previous cross-sectional findings, and avenues for further research are identified.