### Paper Session: Skill use and skill mismatch

**Chair**
Corinna Kleinert *(Leibniz Institute for Educational Trajectories, LIfBi, Bamberg)*

**Presentations**

1. **Title:** Examining PIAAC-L to examine skill loss among adults with VET.
   **Authors:** Huacong Liu *(Shanghai Jiaotong University, China)*, Steve Reder *(Portland State University, USA)* & Frank Fernandez *(University of Florida, USA)*

2. **Title:** Non-conventional pathways and credential accumulation behaviours in postsecondary education in Canada: Statistical portrait and evaluation of labour market outcomes.
   **Authors:** Xavier St-Denis *(Institut National de la Recherche Scientifique, Canada)*, Yacine Boujija *(Université de Montréal, Canada)* & Stephen Sartor *(University of Western Ontario, Canada)*

3. **Title:** Getting it right: Identifying literacy and numeracy skill mismatch in OECD countries using the job analysis method.
   **Authors:** Sandra Pérez Rodriguez *(Maastricht University, The Netherlands)*, Rolf van der Velden *(Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands)*, Tim Huijts *(Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands)* & Babs Jacobs *(Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands)*

4. **Title:** Measuring numeracy skills mismatch with PIAAC data.
   **Authors:** Tina Dulam *(HU University of Applied Sciences Utrecht & Utrecht University, The Netherlands)* & Kees Hoogland *(HU University of Applied Sciences Utrecht, The Netherlands)*
1. Examining PIAAC-L to examine skill loss among adults with VET.

Authors
Huacong Liu (*Shanghai Jiaotong University, China*), Steve Reder (*Portland State University, USA*) & Frank Fernandez (*University of Florida, USA*)

Presenter
Huacong Liu (*Shanghai Jiaotong University, China*)

Abstract
Previous literature found that vocational education may facilitate school to work transition at labour-market entry, but over the life-cycle, vocational programs may lead to lower adaptability to technological and structural change, therefore faster depreciation rate of human capital among vocationally educated individuals (e.g. Hanushek et al. 2017; Woessmann 2019). For instance, using the Swiss Labor Force Survey, Weber (2014) finds that in Switzerland, human capital depreciation rates are higher for vocational education (“skill-specific”) than for academic education ("concept-based"). These studies often use wage changes to estimate human capital depreciation rather than direct measures of skills, therefore they do not address why human capital depreciation rates differ across individuals with different types of education. In addition to focusing on skill formation, policymakers and researchers should consider skill loss or the potential for workers to lose skill over time. Using data from Germany’s PIAAC-L study, we focus on addressing two research questions: Do skills evolve differently among individuals with vocational education and training (VET) than with general education? How do skill practices at work and at home affect skill changes of individuals with VET vs. general education? We use ordinary least squares estimation to analyze cases with non-missing data in the 2012 and 2015 survey waves. We regress literacy skill as assessed in 2015 on 2012 literacy and key independent variables (e.g., age, VET). In the full version of the paper, we examine multiple measures of skill use, including skill use at work and skill use at home. Based on our findings, we discuss the importance of supporting skill use and preventing skill loss across the life course.
2. Non-conventional pathways and credential accumulation behaviours in postsecondary education in Canada: Statistical portrait and evaluation of labour market outcomes.

Authors
Xavier St-Denis (Institut National de la Recherche Scientifique, Canada), Yacine Boujjia (Université de Montréal, Canada) & Stephen Sartor (University of Western Ontario, Canada)

Presenter
Xavier St-Denis (Institut National de la Recherche Scientifique, Canada)

Abstract
This study uses the Longitudinal and International Study of Adults (LISA), a longitudinal survey including all Canadian respondents to the PIAAC, to explore the educational trajectories and credential accumulation behaviours of Canadians who participate in postsecondary education. We also evaluate the skills and labour market outcomes for those who engage in conventional (linear) and non-conventional pathways in postsecondary education. Little is known about the differences in short- and long-term outcomes between students who follow conventional education pathways and those who do not. This is especially true to the extent that non-conventional pathways are likely to involve a return to schooling later in life, gaps of non-participation to postsecondary education between degrees, and reverse transfer pathways (the attainment of a second degree at a level below the first degree). The LISA helps to address the limitations of prior literature to the extent that it includes the full postsecondary education history of respondents, in addition to all PIAAC survey variables. This data is also integrated with personal income tax data since 1982. This additional set of longitudinal and administrative data sources will contribute to the detailed evaluation of labour market outcomes such as earnings and labour force attachment as a compliment to the information available in the survey data. Preliminary results provide evidence that people persist in postsecondary education throughout the life course much beyond their mid 20s. Our main contribution is an exploration of the full and complete postsecondary education history that extends throughout individuals’ life course, which enables us to describe the range of postsecondary pathways and evaluate their association with particular labour market outcomes such as income, skill use, and skill mismatch. We also investigate the role played by family background in these dynamics. Our analysis is enhanced by a linkage to detailed data on the income of the parents of LISA respondents. Finally, we explore the interaction between cognitive skills and different types of pathways in postsecondary education.
### 3. Getting it right: Identifying literacy and numeracy skill mismatch in OECD countries using the job analysis method.

**Author**
Sandra Pérez Rodriguez (*Maastricht University, The Netherlands*), Rolf van der Velden (*Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands*), Tim Huijts (*Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands*) & Babs Jacobs (*Research Centre for Education and the Labour Market/ Maastricht University, The Netherlands*)

**Presenter**
Sandra Pérez Rodriguez (*Maastricht University, The Netherlands*)

**Abstract**
Skill mismatches have large negative effects on productivity, job satisfaction, and other outcomes. To design an optimal skills policy, governments need to rely on accurate data on the incidence of skill mismatches. The Programme of the International Assessment of Adult Competences (PIAAC) is currently the most important data source providing excellent and unparalleled information for a large number of countries on the possessed literacy and numeracy skills of workers, but countries lack equivalent information on the required skills in those domains. Hence, it has been complicated to use the data to objectively identify skill mismatches in these areas. In this paper, we use the Job Analysis Method (JAM) to assess the required skill levels of literacy and numeracy for all 4-digit ISCO08 unit groups of occupations in the same metric as was used in PIAAC. JAM is often considered the ‘gold standard’ in mismatch research. It involves the use of occupational experts to rate the skill requirements in the different occupations. Using JAM to identify required skill levels for literacy and numeracy as measured in PIAAC has never been done before, and the paper thus presents the first results on the incidence of skill shortages and skill surpluses in these key information-processing skills across different OECD countries and across different occupations and sectors. We provide estimates for the proportions of well-matched, overskilled and underskilled workers per country, and compare these with estimates based on alternative methods. We also compare JAM with other methods in explaining wage differentials, as well as job satisfaction. We finalise by discussing the policy implications of the JAM in contrast to already existing methods.
4. Measuring numeracy skills mismatch with PIAAC data.

Authors
Tina Dulam (HU University of Applied Sciences Utrecht & Utrecht University, The Netherlands) & Kees Hoogland (HU University of Applied Sciences Utrecht, The Netherlands)

Presenter
Tina Dulam (HU University of Applied Sciences Utrecht & Utrecht University, The Netherlands)

Abstract
Numeracy is gaining importance worldwide as one of the crucial basic skills for adults to cope with the digitalised and technologised 21st-century society. Having an adequate numeracy level will increasingly determine the successful participation of individuals in their roles as citizens and professionals. The aim of this study is to inform national policymakers on lifelong learning especially regarding numeracy and the mismatch of skills. We assess the incidence of numeracy skills mismatch for several countries that participated in the first cycle of the PIAAC survey. To do so, we apply the method of Brun-Schammé and Rey (2021), according to which a person is overskilled if the proficiency score is higher than one standard deviation above the median and underskilled if the score is lower than one standard deviation below the median of the corresponding two-digit occupation classification and training profile. Furthermore, we use the PIAAC data, to explore the potential determinants of being mismatched by studying 1) at micro-level the relationship between mismatch and the educational background, labour market entry, age, and the use of numeracy skills, and 2) at macro-level the relationship between mismatch and the education system. To do the latter, we make use of indices on the tracking and vocational orientation system of countries. These indices were constructed by Bol and Werfhorst (2017) with data from the OECD and UNESCO. We aim to apply the same technique, slightly adapted, using the second cycle PIAAC data in the forthcoming years to see how numeracy mismatch develops over time and to support policy making on numeracy education to reduce this type of mismatch.