

Competence measurement and key skills: Theoretical perspectives and two empirical applications from graduate research

In labour market research, economists have usually measured human capital by educational background, experience, or other simple quantifiable indicators. However, individual labour market performance is no longer solely dependent on initial education or experience, since occupations change rapidly and require continuous learning and development throughout the career. This implies that in order to measure or predict career success, one-dimensional indicators for competence, such as educational background or experience that economists have traditionally relied on, are no longer sufficient. Skills and knowledge have become the main factors in production, and the measurement of competences more directly is a logical step in determining and predicting labour market success more accurately and reliably. Parallel to the discussion on competence measurement, in recent years, a lot of research on 'key skills' or 'core competences' has emerged. The main problem with this strand of research is that the identification of key skills is mostly not supported by sound theoretical frameworks and methods.

The objective of this paper is a) to discuss competence measurement, b) to examine how key skills can be identified and c) to illustrate these issues with two empirical applications. The empirical illustrations represent possible approaches to the problems and serve two purposes: 1) To show that clear definitions, a sound theoretical basis and a consistent empirical approach lead to valuable insights and 2) To stimulate debate and research.

In the first part of the paper, we examine the literature on competences, which contains many different definitions of the competence concept. This is partly due to the fact that competences are relevant in a number of distinct research fields with different disciplinary roots. The literature on competences can roughly be divided into three perspectives on the meaning and operationalisation of competence: the educational perspective, the labour market perspective, and the human resources perspective. The differences between these perspectives are discussed and the relevant issues are summarised in a conceptual model. This model is used to select a measurement method which is applied to the first empirical application in the paper.

The second part of the paper deals with the issue of key skills. By reviewing the literature on key skills, the two main reasons for the existing confusion in the debate on key skills are identified: the approach of the concept from various theoretical backgrounds and international differences in key skill definitions. Next, a theoretical framework and an empirical criterion to determine which skills may be considered key skills are developed. This method is applied to a dataset of employed graduates from vocational education.

The empirical applications are presented in the third part of the paper. Competence measurement is addressed by comparing two measurement methods. We compare these methodologies in terms of efficiency from three perspectives: the average inter-item correlation, the amount of missing values, and the explanatory power of competences in wage regressions for the entire sample and the explanatory power of competences in labour market segment specific wage regressions (validity aspect). Overall, we find that the competence measurement methodology that is holistic and tailored to measure individual characteristics performs better and has a higher explanatory power in wage regressions than measurement that adopts a more

fragmented and job-based approach. The second empirical application focuses on the identification of key skills. Applying an economic definition of the key skill concept and disentangling the direct and indirect effects of skills on productivity, we find that problem-solving skills, independence, oral presentation/speaking skills, accuracy/carefulness and initiative/creativity may be considered key skills.

The paper concludes by summarising the main insights, by discussing a number of limitations and by outlining avenues for future research.

References

- Attewell, P. (1990) What is skill, *Work and Occupations*, 17(4), pp. 422–448.
- Becker, G. S. (1962) Investment in human capital: a theoretical analysis, *Journal of Political Economy*, 70(5), pp. 9–49.
- Bunk, P. (1994) Teaching competence in initial and continuing vocational training in the Federal Republic of Germany, *European Journal of Vocational Training*, 1(1), pp. 8–14.
- Bynner, J. M. (1997) Basic skills in adolescents' occupational preparation, *Career Development Quarterly*, 45(4), pp. 305–321.
- Dickerson, A. P. and Green, F. (2004) The growth and valuation of computing and other skills, *Oxford Economic Papers*, 56, pp. 371–406.
- Ellström, P. (1998) The many meanings of occupational competence and qualification, in: W. J. Nijhof and J. N. Streumer (Eds) *Key Qualifications in Work and Education* (Dordrecht: Kluwer Academic Publishers).
- Green, A. (1998) Core skills, key skills and general culture: in search of the common foundation in vocational education, *Evaluation and Research in Education*, 12(1), pp. 23–43.
- Hall, D. T. and Moss, J. E. (1998). The New Protean Career Contract: Helping Organizations and Employees Adapt. *Industrial Relations* 26(3): 22–37.
- Levy, F. and Murnane, R. J. (1999) Are there Key Competencies Critical to Economic Success?: An Economics Perspective (Deseco Expert Report) (Neuchâtel: Swiss Federal Statistical Office).
- Van Loo, J.B. and Semeijn, J.H. (2004) Defining and Measuring Competences: An Application to Graduate Surveys, *Quality & Quantity* 38: 331–349.
- Van Loo, J.B. and Toolsema, B. (2005) The Empirical Determination of Key Skills from an Economic Perspective, *Education Economics* 13, No. 2, 207–221.
- McNabb, R. (1987). Labour Market Theories and Education. In G. Pschacharopoulos (ed.), *Economics of Education, Research and Studies*. Pergamon Press, pp. 164–166.
- Melton, R. F. (1994). Competences in Perspective. *Educational Research* 36(3): 285–294.
- Spenner, K. I. (1990). Skill: Meanings, Methods and Measures. *Work and Occupations* 17(4): 399–421.
- Stevenson, J. (1996). The Metamorphosis of the Construction of Competence. *Studies in Continuing Education* 18(1): 24–42.
- Van Zolingen, S. J. (2002) The role of key qualifications in the transition from vocational education to work, *Journal of Vocational Education Research*, 27(2), pp. 217–242.