

BRIDGING EDUCATION AND LABOUR-MARKET DATA: LINKING CURRICULUM ORIENTATION WITH ADULT SKILLS – A METHODOLOGICAL FRAMEWORK

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Abstract

Understanding how the orientations of national curricula influence individuals' skills and labour-market outcomes later in life remains a central question for both education economics and policy design. While many European education systems have shifted from knowledge-based to competence-based curricula over the last decades, evidence of their long-term effects on adult competences and employability is still scarce. This paper presents a methodological framework for linking indicators of curriculum orientation in compulsory education with adult skills data from the OECD's *Programme for the International Assessment of Adult Competencies* (PIAAC). Building on education policy information from *Eurydice* and TIMSS 2023, the framework proposes a cohort-based linkage design that connects the schooling experiences of specific age groups with their later skill profiles in PIAAC 2022. This approach allows for examining whether exposure to competence-based curricula during schooling years is associated with higher problem-solving competences in adulthood, as well as with more favorable labour-market outcomes such as employment status or occupational skill use. The paper discusses major conceptual and methodological challenges in bridging education and labour-market datasets, including temporal alignment across surveys, differences in competence definitions, and cross-national variation in curriculum implementation. It also outlines strategies for operationalising curriculum orientation as a system-level variable suitable for cross-country comparative research. Preliminary descriptive analyses for a subset of EU member states illustrate the feasibility and policy relevance of this approach. By integrating curriculum policy data with adult skills assessments, this framework contributes to understanding the long-term effectiveness of competence-based education reforms. It provides a foundation for future empirical research on how early educational design choices translate into lifelong learning outcomes and labour-market resilience. Therefore, this study aligns with END 2026's focus on curriculum innovation, assessment, and educational policy, offering a framework how to bridge education research, economics of education, and workforce development.

Keywords: *Curriculum orientation, competence-based education, PIAAC, education-labour linkage.*

1. Introduction

Education systems across Europe face the twin challenge of equity and excellence, i.e., ensuring high levels of competence while reducing socioeconomic inequalities in learning outcomes. International student assessments such as PISA, TIMSS, or PIRLS have been showing an ongoing decline in learning outcomes of European students. In PISA, the results have been worsening since 2009 for mathematics and since 2012 for reading and scientific literacy. With increased globalisation and digitalisation, it becomes more necessary than ever to be able to navigate one's surroundings. Being exposed to fake news requires a tool, a strategy to handle and process information and assess its trustworthiness. As it is not possible to know all the facts by heart, one needs to learn the processes to the strategy. Therefore, purely knowledge-based teaching is no longer seen as sufficient to equip young learners with the transferable skills that allow them to learn and apply the strategies.

Competence-based education has become a cornerstone of the EU-level education strategy with the shift from knowledge-oriented to competence-based curricula (CbC) taking up pace since the 2010s. Curriculum orientation is a central feature of national education systems that may influence both average performance and equity. However, the effectiveness of competence-based curricula has not yet been systematically investigated. To conduct such investigation, it is necessary to (1) find key elements of CbC, (2) operationalise the concept, and (3) collect the information needed to categorise curricula appropriately.

This paper will provide a framework covering these three steps. Chapter 2 will contain definitions for competences, competence-based education, and competence-based curricula. Chapter 3 links curriculum orientation to later life achievements such as employment. Chapter 4 proposes an operationalisation approach including sources that can be used for data collection, as well as a description of the identification process. Chapter 5 concludes.

2. Competences and competence-based curricula

The most prominent definition of competences, that has also been adopted by the OECD, was formulated by Franz E. Weinert in 2001:

“[T]he cognitive abilities and skills available to individuals or that they can learn in order to solve specific problems, as well as the associated motivational, volitional and social readiness and abilities to successfully and responsibly apply problem-solving skills in variable situations.” (Weinert, 2001)

Other definitions of competences are, for example “higher-order skills and behaviours that represent the ability to cope with complex, unpredictable situations” (Westera, 2001, p. 80), “the ability to meet complex demands successfully through the mobilization of mental prerequisites” (Rychen & Salganik, 2003, p. 4), or “connected pieces of knowledge, skills and attitudes that can be used to adequately solve a problem” (Baartman et al., 2007, p. 2). All these definitions make it clear that competences go beyond mere knowledge, but also exceed skills. Instead, there is a non-cognitive part to them, making competences more holistic and a prerequisite for flexibility, adaptability, and resilience.

Competence-based education, as opposed to traditional instruction approaches, bases its credentials on activities that can be observed (instead of learning hours), assessments on criteria of skills-mastery (instead of standardised testing that compares students with one another), curricula on balance of a few key objectives (instead of segments), time structures on flexibility (instead of fixed progression time), content on modules (instead of group-based instruction), focus on students (instead of teachers), and testing on immanent assessments (instead of having only one final assessment in the end). The alternatives to this outcome-focused approach fall mostly under “reflective learning”, that is more process-oriented, and input-focused teaching (Lassnigg, 2016).

Competence-based initiatives should provide a description of the competence, indicators for measuring this competence, and a standard on how to interpret the results (Jones et al., 2002). Consequently, a competence-based curriculum needs to define the targeted competences to ensure a common understanding. Instruction strategies, which shape the learning context, need to be designed according to this definition (Soare, 2015).

Therefore, competence-based curricula need to refer to the approaches of competence-based education to describe how which transferable competences should be met, while also offering targets and indicators for measuring whether the competences have been met.

3. Bridging curriculum orientation and life achievements

Competence-based curricula aim to foster transferable skills that exceed domain knowledge. They provide key objectives of the competences to be acquired by young learners, which are no longer prescriptions of the content that is to be taught in each subject, but rather describe the desired learning outcomes in an integrated, cross-sectional way. As competences consist of knowledge, skills, and attitudes, the desired learning outcomes clearly encompass cognitive as well as non-cognitive skills. Consequently, these competences should become visible in contexts where problem solving is required. One key area that requires such problem solving is the workplace. Students with strong transferable competences acquired through cross-spatial learning in school should become high-skilled workers that manage to navigate workplace situations effectively.

Additionally, the transferability of competences should decrease mismatches between learned skills and those needed for work. Traditionally, the learned skills were subject-specific and students did not learn to combine knowledge from different areas together to solve entirely different problems. Stepping beyond knowledge and application towards a holistic understanding of the matter therefore gives students cognitive flexibility. Consequently, the perceived mismatch between what they learned and what they are supposed to do should be much smaller. Therefore, adults taught under competence-based curricula should show higher problem-solving skills, but also less skills-mismatch.

4. Proposed operationalisation

4.1. Curriculum orientation

To map the existence of competence-based curricula in Europe, several sources can be used. The analysis can be conducted on two main sources, namely comparative overviews from Eurydice and the TIMSS 2023 country briefs, with national documents filling in gaps.

To analyse the curricula of EU education systems, the Eurydice data collection offers insightful information. For each of the 43 included European countries, the Eurypedia covers topics such as organisation and governance; funding in education; details on the different education levels; teachers and education staff; management and other education staff; quality assurance; educational support and guidance; mobility and internationalisation; and ongoing reforms and policy developments. Additionally, for each country a range of legal and official policy documents and a glossary are provided.

The second source is the Trends in International Mathematics and Science Survey (TIMSS). For each cycle, experts for each participating country draft descriptions of the national education systems. The TIMSS 2023 country briefs cover an overview of the education system, details on the mathematics and science curricula for both, fourth and eighth grades, information on initial and continuous teacher education, progress monitoring of students' learning, and special initiatives introduced in mathematics and science education. Overall, these briefs give a well-structured review of the education systems. However, there might still be countries for which it does not become clear whether the curriculum is competence-based, or when the competence-based curriculum has been introduced. For these cases the national curriculum documents can be used.

The national documents have the advantage that they show the actual legal and or policy text behind the respective reforms. However, they have the disadvantage that they do not include information on the extend of implementation. This implementation status needs to be derived from the previous two sources.

Together, the three sources allow to assign for each country whether there is a competence-based curriculum in place or not.

4.2. Life achievements

The OECD's survey on adult skills, PIAAC, offers a rich dataset on adults aged 16 to 65. The data not only include participants' skills in literacy, numeracy, and adaptive problem-solving but also their education level and family background, as well as skills use at home and at work. For each participating country, a representative sample is selected that allows cross-country comparison of the results.

4.3. Bringing the data together

The publicly available data from PIAAC 2022 includes specific 10-year cohorts. This allows to not only compare countries with competence-based curricula and those without, but also cohorts within countries that have already been taught under CbC with the previous cohort. The youngest cohort (16–24-year-olds in PIAAC 2022), mostly experienced CbC during their schooling time, while the second-youngest cohort (25–34-year-olds) was taught predominantly in knowledge focused teaching settings. Therefore, using the PIAAC 2022 data together with the classification derived from the Eurydice/TIMSS can allow to draw (careful) conclusions on the long-term effects of competence-based curricula. Evidence for the effectiveness of competence-based curricula could be assumed in the following cases:

- If the youngest cohort in CbC countries has better results in terms of their later life achievements (adaptive problem-solving skills, income, employment, etc.) than the youngest cohort in non-CbC countries.
- If the youngest cohort in CbC countries has better results in terms of their later life achievements (adaptive problem-solving skills, income, employment, etc.) than the second-youngest cohort in CbC countries.

To ensure that potential effects were not caused by external factors, a variety of control variables (e.g., GDP/capita, education spending, teacher education) should be included in any statistical models. The findings would also need to be cross-checked by comparing the second-youngest CbC cohort with the second youngest non-CbC cohort but also by comparing the youngest non-CbC cohort with the second youngest non-CbC cohort. A comparison with PIAAC 2012 data could be insightful as well. If the effects were only substantial when the youngest CbC-cohort is involved, the framework could be applied and extended in further research.

5. Conclusion

The proposed framework shows how the design of the national curriculum can be linked to later life outcomes. It offers an operationalisation approach for curriculum orientation that allows to draw from different sources to derive a binary variable for competence-based or not competence-based curricula. Combining this variable with PIAAC 2022 data of two cohorts allows to draw first conclusions on the effect of competence-based curricula for achievements in life after school. The next step is to use the data to check the framework for robustness.

References

- Baartman, L. K. J., Bastiaens, T. J., Kirschner, P. A., & van der Vleuten, C. P. M. (2007). Evaluating assessment quality in competence-based education: A qualitative comparison of two frameworks. *Educational Research Review*, 2(2), 114-129..
- Jones, E. A., Vorhees, R. A., & Paulson, K. (2002). Defining and assessing learning: Exploring competency-based initiatives. *NCES2002-159, Council of the National Postsecondary Education Cooperative Working Group on Competency-Based Initiatives*. Washington, DC.
- Lassnigg, L. (2016). Competence-based education and educational effectiveness. In M. Mulder (Ed.), *Competence-based vocational and professional education: Bridging the worlds of work and education* (pp. 667–693). Cham: Springer International Publishing.
- Rychen, D. S., & Salganik, L. H. (2003). *Highlights from the OECD Project Definition and Selection of Competencies: Theoretical and Conceptual Foundations (DeSeCo)*. Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 21-25, 2003).
- Soare, E. (2015). Perspectives on designing the competence-based curriculum. *Procedia – Social and Behavioral Sciences*, 180, 972–977.
- Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen & L. H. Salganik (Eds.), *Defining and selecting key competencies* (pp. 45–65). Hogrefe & Huber Publishers.
- Westera, W. (2001). Competences in education: A confusion of tongues. *Journal of Curriculum Studies*, 33(1), 75–88. <https://doi.org/10.1080/00220270120625>