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Position Paper: The impact of teachers' shortage on the European chemical industry

Introduction

In October 2023, the European Chemical Employers Group (ECEG) published its [position paper on “Labour and skills shortages in the European Chemical industry”](#). It examines the chemical sector’s challenges in attracting and retaining a workforce equipped with the necessary skills and competences¹.

It is our understanding that the lack of workforce with a STEM background in the EU is partially connected to teachers’ shortages, coupled with the lack of necessary competences and information on EU labour market needs.

Analysis and recommendations

This position paper provides recommendations and highlights several best practice examples from ECEG’s membership to address the abovementioned challenges. Readers are encouraged to review this paper alongside ECEG’s previous publications on labour and skills shortages in the sector, to gain a comprehensive understanding of the issues and proposed solutions.

About ECEG

ECEG, the European Chemical Employers Group, founded in 2002, is a recognised European Sectoral Social Partner, representing the chemicals, pharmaceuticals, rubber and plastics industries in Europe. Our sector provides approximately 3.3 million direct jobs in more than 94.000 enterprises.

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¹ The ECEG’s position paper on “Labour and skills shortages in the European Chemical industry” can be found at: https://www.eceg.org/files/ugd/977a5c_498212d19f6b4d31848d982d42f25fed.pdf, October 2023.

Identification of the problem

1. The EU worrying results in PISA 2022

In December 2023, the OECD released the results of the 2022 Programme for International Student Assessment (PISA), which showed a significant decline in the performance of EU students in basic skills such as mathematics, science and reading². The study indicated that nearly 30% of EU pupils failed to reach the minimum competence level in mathematics, and a failure rate of approximately 24.2% was reported for science³.

Several factors contributing to this decline were identified by the European Commission, namely:

- The **Covid-19 pandemic** as a primary factor. However, the decline in educational performance predates it, indicating deeper systemic issues.
- The impact of pupils' **socio-economic background** on their performance.
- The use of **digital tools** for learning activities and outside school contexts.
- **Outdated teachers' curricula** and the need to modernize the latter to align with new teaching environments and tools⁴.

The EU pupils' underperformance poses a direct threat to the future availability of a skilled workforce.

2. Teachers' shortage

The 2024 Belgian Presidency of the Council of the EU has been addressing the widespread challenge of teachers' shortage in its priorities, focusing on teachers' careers as a horizontal issue across the EU⁵. Teaching professionals represent around 6% of all EU employment⁶, with approximately 72,4% being women⁷. The Covid-19 pandemic led to a rapid growth of teaching professionals (Figure 1), and their numbers are expected to increase by about 6% from 2022 to 2035, although this trend varies by country⁸.

² OECD results are available at: <https://www.oecd.org/publication/pisa-2022-results/> (last access: July 2024).

³ Ibid.

⁴ European Commission, Directorate-General for Education, Youth, Sport and Culture, *The twin challenge of equity and excellence in basic skills in the EU – An EU comparative analysis of the PISA 2022 results*, Publications Office of the European Union, 2024, <https://data.europa.eu/doi/10.2766/881521> (last access: July 2024).

⁵ The programme of the Belgian Presidency of Council of the EU can be found at: https://belgian-presidency.consilium.europa.eu/media/3kajw1io/programme_en.pdf (last access: July 2024).

⁶ Cedefop (2023). "Teaching professionals: skills opportunities and challenges. Skills intelligence data insight" available at: <https://www.cedefop.europa.eu/en/data-insights/teaching-professionals-skills-opportunities-and-challenges-2023-update> (last access: July 2024).

⁷ Specific data regarding teaching professionals can be found at: <https://www.cedefop.europa.eu/en/tools/skills-intelligence/occupations?occupation=2.23#1> (last access: July 2024).

⁸ Cedefop (2023). "Teaching professionals: skills opportunities and challenges. Skills intelligence data insight".

Figure 1: Year-to-year employment change for teaching professionals (2013-2022)



Source: European Labour Force Survey. Employed persons by detailed occupation (ISCO-08 two-digit level). Own calculations.

According to the European School Education Platform, the increasing need for skilled teachers goes hand in hand with their widespread shortage in many Member States, areas and institutions. Several factors contribute to this problem, including demographic shifts, inadequate teachers' training programmes, and increased expectations on the educators⁹. At the same time this shortage is leading authorities to cut learning hours, increase class sizes, and lower recruitment standards – a counterproductive approach that negatively impacts the sustainability of the sector, causing many staff members to leave their jobs¹⁰.

3. “Train the trainers”: the need for up-to-date teachers’ curricula and training

In addition to the above challenges, teachers currently face a series of new ones:

- **Digital era students:** Educators must adapt to the new generation of students raised in the digital era.
- **Evolving teaching practices:** Continuous updates in teaching methodologies are necessary.
- **Discipline-specific knowledge:** Teachers need to update their knowledge to align with the current digital and green transitions’ needs.

Looking at the twin transitions, the [Council Recommendation to stimulate learning for the green transition and sustainable development](#) underscores that sustainability is a priority for the EU education policy. Moreover, the European sustainability competence framework, [GreenComp](#), defines 12 transversal and soft skills for educators to promote a green future. These include systems thinking, future literacy, adaptability, and collective and individual action¹¹.

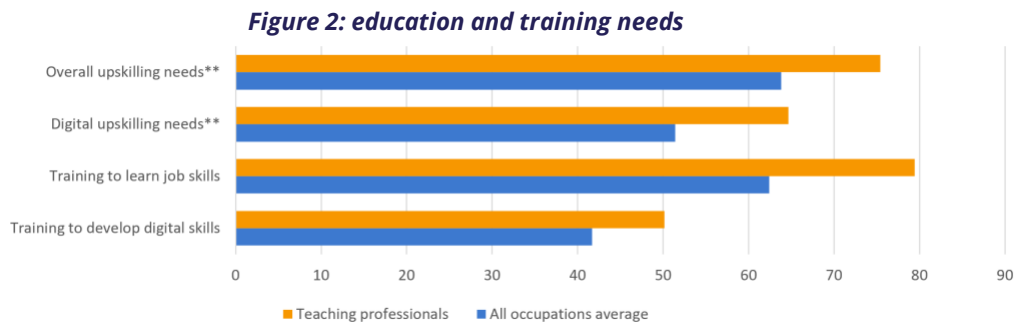
The ongoing digital and green transitions necessitate revising of teachers’ curricula to align with the requirements of sustainability and digital technologies. Up-skilling and continuous

⁹ News item , European School Education Platform (16 February 2024) available at: <https://school-education.ec.europa.eu/en/insights/news/teacher-trends-addressing-teacher-shortages#:~:text=According%20to%20current%20research%2C%20teacher,the%20delivery%20of%20excellent%20education.>

¹⁰ “Wanted: tens of thousands of teachers to staff Europe’s schools”, Jack & Cocco, 2022, Financial Times. Available at: <https://www.ft.com/content/116d8c88-aa3f-426f-aeb8-c0a0325c43bb> (last access: July 2024).

¹¹ “GreenComp The European sustainability competence framework”, Bianchi et al., 2022. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC128040> (last access: July 2024).

learning programmes for teachers are crucial to this end (See Figure 2). “Training the trainers” becomes an essential priority and a matter of competitiveness.



Source: *European Skills and Jobs Survey*. Microdata. Own calculations.
 Unless stated otherwise, it is a share of people reporting that a task/skill is part of their job.
 ** Share of workers reporting these needs to a great or moderate extent.

ECEG’s recommendations for action

Against this background, ECEG puts forward the following recommendations for actions at national, European and Social Partners’ levels:

For Member States:

- **Utilise European Commission’s tools** especially to enhance students’ basic skills. These include:
 - 1) Learning lab on Investing in Quality Education and Training.
 - 2) the Recovery and Resilience Facility (RRF), which allocates €73 billion for investment in education and skills from 2021 to 2026.
 - 3) Research projects on learning outcomes in basic skills funded by Horizon Europe.
- **Provide and implement teachers’ training programmes** on transversal skills and competences of sustainability, such as, the master’s degree programme in [Pedagogy and Teaching for Sustainability](https://www.uef.fi/en/degree-programme/masters-degree-programme-in-pedagogy-and-teaching-for-sustainability) offered at the University of Eastern Finland. This two-year programme covers sustainability from ecological, cultural, and social perspectives, while providing academic tools for developing students’ theoretical and empirical understanding of sustainability¹².

On a similar note, the Flemish Steering Group RTC (Regional Technological Centers), in collaboration with the chemistry and life sciences, technology, food, wood and textile sectors, launched the initiative “[Meet the expert](#)” to ensure that teachers stay up-to-date with the latest business developments and creates direct links between academic content and real-world applications¹³.

¹² <https://www.uef.fi/en/degree-programme/masters-degree-programme-in-pedagogy-and-teaching-for-sustainability> (last access: July 2024).

¹³ During thematic sessions, industry experts share their knowledge with secondary school teachers, primarily from technical and vocational schools.

For the academic year 2024-2025, [Federchimica](#) launched the national teacher training project in collaboration with CICAP¹⁴. The programme is an online training course, divided into 6-7 lessons taught by well-known scientists. It will cover the following sectors: adhesives, inks and paints, agrochemicals and fertilisers, biotechnology, food ingredients and plastics.

The German project “Schulpartnerschaft Chemie”, supported by Fund Chemical Industry (FCI), also focuses on upskilling teachers¹⁵.

- **Implement the Council Recommendation on Pathways to School Success**, which proposes a new framework for systemic action to guide Member States in developing their strategies towards school success¹⁶.
- **Develop national STEM strategies** involving various stakeholders, similar to the one developed in Finland¹⁷.
- **Initiate students’ curriculum reforms** to improve the acquisition of key skills such as digital literacy, as seen in Spain, Slovenia and Finland.

For the EU:

- **Promote and support Lifelong Learning Alliances**. The [European Schoolnet Academy](#), for example, is run by an alliance of European Ministries of education and it offers a catalogue of MOOCS (massive open online courses) for the professional development of teachers¹⁸.
- **Support collaborative work** and efforts among Member States in the field of education.
- **Conduct policy analysis and evaluation** of Member States’ education policies to identify strengths and areas for improvement.
- Support Member States through **peer measuring** and the **exchange of best practices**, as well as in building capacity for evaluation methodologies.

¹⁴ The *Comitato Italiano per il Controllo delle Affermazioni sulle Pseudoscienze* (CICAP) is a research centre and recognised training institution, founded by Piero Angela and aimed at popularising science and combating fake news.

¹⁵ <https://www.vci.de/fonds/schulpartnerschaft/seiten.jsp> (Last access: July 2024).

¹⁶ Council Recommendation of 28 November 2022 on Pathways to School Success and replacing the Council Recommendation of 28 June 2011 on policies to reduce early school leaving (Text with EEA relevance) 2022/C 469/01 available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022H1209%2801%29> (last access: July 2024).

¹⁷ The Finnish STEM Strategy (“Luma Strategy 2030”) has been developed and published by the Ministry of Education and Culture of Finland, together with an action plan to implement it. The documents are available at: https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/164953/OKM_2023_22.pdf?sequence=1&isAllowed=y (last access: July 2024). The aim of the Strategy and the Action Plan is to ensure that there is science and mathematics competence and understanding in society, in order “to promote wellbeing and growth that is socially, ecologically and economically sustainable”.

¹⁸ For example, ‘[Exploring Nature-Based Solutions in Your Classroom Rerun](#)’ is addressed to primary and secondary school teachers, who wish to take sustainability education forward in the classroom. The ‘[Unlocking the Power of AI in Education](#)’ provides teachers with basic understanding of artificial intelligence on the conceptual level, in production and use of educational data, and through the lens of ethical challenges.

- **Promote Cross-European Programmes** on teachers' training, such as the [Erasmus+ Teacher Academies](#), which supports innovation and development in teacher training, including digital, sustainable, and inclusive competences. Notably, the European Education Area target of creating 25 such academies by 2025 has been met ahead of schedule.

For Social Partners:

- Participate in the **update of teachers' curricula and training programmes**. In light of current and future technological and digital developments in the chemical industry, ECEG, [Ledarna](#) (Swedish Federation of managerial staff in the chemical industry) and [FECCIA](#) (European Federation of Managerial Staff in the Chemical and Allied Industries) have developed a curricula framework on digital skills for the chemical industry. This framework is designed for [academia vocational training institutes](#), offering courses for the chemical, pharmaceutical, rubber and plastics sectors¹⁹.
- Engage in the **development national STEM Strategies** and participate in **national initiatives**, such as the "[mint - Zukunft schaffen](#)" or the "[nationales mint Forum](#)" in Germany.
- **Promote the importance of skills intelligence**²⁰ in aligning educational outcomes with industry needs. In February 2024, ECEG's Belgian member, [essenscia](#), organised its first seminar on talent management, where numerous companies and various stakeholders debated the talent management within the chemical sector. A follow-up seminar is expected to take place in autumn, focusing on the relationship between the sector and higher education institutions. This seminar will also explore the concept of business-critical roles and future competencies, as well as the role companies can play in developing curricula and training programmes. Additionally, the seminar will address how collaboration between the sector and universities can be enhanced, particularly in the field of research.
- **Encourage company representatives to teach in VET institutions** in order to find sustainable ways to foster up-to-date knowledge for VET education. In the Belgian dual teaching ("dual lesgeven"), industry professionals, in addition to their jobs, teach part-time in secondary education institutions. They share their practical experience, help to address the teacher shortage, and inspire more students to pursue scientific and technical studies and careers²¹.

¹⁹ The curricula were developed in the framework of the social partners' project "*Identifying and Meeting Digital Skills Needs in the European Chemical, Pharmaceutical, Rubber, and Plastics Industry*". It was also developed an in-depth research, available at: https://www.eceg.org/files/ugd/977a5c_45e9b1536b8245bfa90bf1602a2a7db4.pdf and a supporting document to the curricula framework, available at: https://www.eceg.org/files/ugd/977a5c_ee6a7fbb75eb4aa98e3520c5a1d2e20a.pdf (Last access: July 2024).

²⁰ Identifying, analysing, synthesising and presenting quantitative and/or qualitative skills and labour market information.

²¹ More information is available at: <https://www.essenscia.be/dual-lesgeven/> (Last access: July 2024).

In Germany, a prize is awarded by the chemical employers' associations, [BAVC](#) and [VCI](#), together with the FCI to VET teachers, who have demonstrated outstanding and innovative approaches towards teaching.

ECEG calls on European policymakers to consider these recommendations in close collaboration with Member States and responsible national institutions. Efficiently addressing teacher shortages and enhancing teacher training will positively impact the availability of the future workforce and the competitiveness of the sector.

Conclusion

The challenges identified in the ECEG's position paper underscore the critical need for targeted interventions to address labour and skills shortages in the European chemical industry. By focusing on improving educational outcomes and addressing teacher shortages, the EU can better prepare a future workforce that meets the demands of sustainability and digitalization in the workplace. The recommendations and best practices highlighted in the position paper provide a roadmap for achieving these goals.