

# Impact of Generative AI on the Acquisition of Competencies in Educational Institutions of the Vienna Chamber of Commerce and Industry: GenAI in Future Education

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## ABSTRACT

The aim of this research project is to develop scientifically based recommendations to support the educational institutions of the Vienna Chamber of Commerce and Industry (WKW) in effectively integrating Generative Artificial intelligence (GenAI) into their programmes. The educational institutions include the University of Applied Sciences for Management and Communication (FHWien der WKW) for the tertiary sector, two schools (Tourism College MODUL Vienna and Vienna Business School – VBS) in the field of high school education and a further education institution for further adult education (Institute for Economic Promotion – WIFI Vienna). The project examines the current change of the job market through AI and investigates the impact of Generative AI on students' competency acquisition, as well as strategies for its effective utilisation in educational settings. The central research question of this project is as follows: What strategies might be employed to ensure the effective utilisation of Generative AI in the educational institutions of the WKW, with a view to enhancing learners' competency acquisition and integrating it meaningfully into future education? To evaluate the present utilisation of GenAI among educators and learners, the study will employ questionnaires, workshops and practice-oriented experiments. Based on the findings of this research, an AI Info Hub will be established as a central resource platform. Its purpose is to provide educators and learners with up-to-date information, best practices, workshops, and support for integrating AI into teaching and learning processes. By comprehensively understanding and addressing the challenges and opportunities of AI in education, this project will empower educational institutions of the WKW to promote the acquisition of competencies that enable effective human-AI collaboration. Ultimately, this will contribute to improving the quality of education and preparing learners for future work environments in which AI is an integral component.

**Keywords:** Artificial intelligence, Human-AI collaboration, Educational institutions, Competences, Future education

## INTRODUCTION

The rapid advancement of Generative Artificial Intelligence (GenAI) technologies has begun to reshape various sectors, including education and the labor market. The emergence of sophisticated AI models like GPT-4 has intensified discussions around the integration of AI in educational settings (OpenAI, 2024; 2023; OpenAI et al., 2023). As AI becomes increasingly integrated into professional environments, there is a pressing need for educational institutions to adapt their curricula and teaching methodologies to prepare learners for this evolving landscape (Zawacki-Richter et al., 2019). According to the OECD Skills Outlook 2023, AI is fundamentally altering the skills required in the workforce, which leads to significant shifts in educational practices (OECD, 2023). The Vienna Chamber of Commerce and Industry (WKW - Wirtschaftskammer Wien; <https://wko.at/wien>) oversees a range of educational institutions - including the University of Applied Sciences for Management and Communication (FH Wien der WKW; [www.fh-wien.ac.at](http://www.fh-wien.ac.at)), Tourism College MODUL Vienna (<https://modul.at>), VBS - Vienna Business School (<https://www.vbs.ac.at>), and the WIFI - Institute for Economic Promotion (<https://www.wko.at/wifi-economic-promotion>) adult education center – that face the challenge of integrating GenAI into their programs to enhance competency acquisition among students and educators.

Despite the potential benefits of GenAI, there is a notable gap in understanding its impact on competency development within educational settings. However, without effective strategies for integrating AI technologies, educational institutions risk falling behind in equipping learners with the necessary skills for AI-integrated work environments (Akinwalere and Ivanov, 2022). Current perceptions of AI in the labor market emphasize efficiency and innovation, yet its application in education remains underexplored (Holmes, Bialik, and Fadel, 2023). This gap underscores a significant problem: without effective strategies for integrating GenAI, educational institutions risk failing to prepare students for future work environments where AI is integral.

Austria's Federal Ministry of Education, Science and Research (BMBWF) has taken significant steps to integrate Artificial Intelligence (AI) into the country's education system. Through its AI Initiative, the ministry provides schools with foundational knowledge about AI, practical tools, and guidelines to enhance teaching and learning processes. This initiative emphasizes ethical considerations, data protection, and the meaningful use of AI technologies in classrooms (eEducation Austria, 2024). Additionally, the BMBWF has developed detailed resources, such as teaching materials and assignments available through its Eduthek platform, to support educators in implementing AI across various subjects (BMBWF, 2024). These efforts highlight the ministry's proactive approach to preparing Austrian schools for the opportunities and challenges of AI integration.

Educational institutions under the Vienna Chamber of Commerce and Industry (WKW) currently lack a comprehensive strategy for integrating Generative AI into their teaching and learning processes, potentially hindering learners' ability to acquire competencies essential

for future workplaces that heavily utilize AI technologies. This concern is echoed by organizations such as the World Economic Forum (<https://www.weforum.org>), which emphasizes that AI and automation are reshaping the skills required in the labor market, necessitating educational reforms (World Economic Forum, 2023). Additionally, Pedró et al. (2019) highlight the importance of aligning educational practices with technological advancements.

Aligning with the OECD's recommendations (OECD, 2023), this project aims to develop practical strategies for incorporating GenAI into educational programs and establish an AI Info Hub to support educators and learners. By doing so, the WKW institutions will be better positioned to navigate the challenges and leverage the opportunities presented by AI technologies.

This paper will provide an overview of the challenges and research questions related to the implementation of Generative Artificial Intelligence in Vienna's educational institutions under the Vienna Chamber of Commerce and Industry. The central research question addressed is: *What strategies might be employed to ensure the effective utilisation of Generative AI in the educational institutions of the WKW, with a view to enhancing learners' competency acquisition and integrating it meaningfully into future education?*

This project's roadmap will be outlined in this paper, including the methods and objectives designed to address the central research question. A research institute of public discourse on GenAI competencies will be described, as well as surveys, focus groups, and practical experiments within WKW institutions. Initial findings from the external analysis will be presented, to identify key competency areas essential for effective GenAI integration. The paper will discuss these findings and provide an outlook for future work, including the continuation of longitudinal studies, the implementation of additional surveys and experiments, and the development of an AI Info Hub to support educators and learners. The objectives for this research project are:

- 1. Analyze Competency Requirements for GenAI in Public Discussion:**  
Conduct a network and a discourse analysis of competencies related to GenAI as discussed in public and professional media. This identifies a multifaceted set of requirements that the educational sector should address to meet market demands effectively.
- 2. Assess the Current State of AI Utilization in Education:**  
Analyze the current state of learners and educators within WKW institutions regarding the use of AI in teaching and learning. This includes examining familiarity with AI tools, existing practices, and challenges in integrating AI into the classroom.
- 3. Investigate GenAI's Impact on Competency Acquisition:**  
Research the impact of GenAI on student learning outcomes, competence development in practical experiments and assignments.
- 4. Develop Integration Strategies and AI Info Hub:**  
Design and implement strategies for integrating GenAI into education, enhancing teaching and learning. Establish a centralized AI Info Hub to provide resources, best practices, and support.

The research will employ a mixed-methods approach:

- **Network and Discourse Analysis:** An external research institute will carry out a network and discourse analysis to examine the current market and media discussions surrounding GenAI.
- **Questionnaires/Workshops:** Surveys and focus groups workshop will be conducted at WKW educational institutions to collect data from educators and learners regarding current GenAI usage and perceptions.
- **Practice-Oriented Experiments:** Practical experiments will be conducted with selected students at WKW educational institutions to observe the direct effects of GenAI integration on competence acquisition, using self- and peer-assessment sheets for evaluation, observation and tracking of learning progress.

Based on the findings, the project will establish an AI Info Hub as a central resource for all WKW educational institutions. This hub will facilitate the dissemination of best practices, offer training workshops, and provide ongoing support for integrating AI into curricula. By addressing these objectives, the research aims to empower WKW institutions to navigate the challenges and leverage the opportunities presented by GenAI.

## **GENERATIVE AI COMPETENCY REQUIREMENTS IN PUBLIC DISCUSSION**

The analysis of competencies related to Generative AI in public discussion reveals a multifaceted set of requirements that the educational sector should be addressing. Based on existing literature and together with a research institute IMWF Austria (<https://imwf.at>) the project team has identified five critical competency areas: technical knowledge, soft skills, information literacy, ethics and law, and application expertise. The following is a detailed explanation of the institute's approach.

IMWF leverages publicly available data from diverse sources to ensure a comprehensive view of the discourse around GenAI competencies. The primary sources include:

- **Online Journalism:** Articles and reports from reputable media outlets.
- **Social Media Platforms:** Posts, discussions, and user-generated content.
- **Websites and Blogs:** Industry-specific platforms, forums, and organizational pages.

These sources are scanned for relevant content using a search query designed to focus on GenAI and competency-related terms. The data spans a 24-month period (April 2023 to March 2024 and April 2024 to March 2025 – ongoing research) across the German-speaking region. The following techniques were utilized for the analysis of the collected data:

- **Named Entity Recognition (NER):** Identifies key organizations, institutions, and stakeholders mentioned in the data.
- **Topic Modeling:** Categorizes and differentiates key themes and discussions around AI competencies.

- **Media and Audience Reach Analysis:** Measures the visibility and frequency of topics to understand their prominence and public impact.

The analysis identifies competencies into distinct thematic fields, which were defined with care in advance based on existing literature. These thematic fields included technical knowledge, soft skills, ethical considerations, and application expertise. The focus on these categories helps isolate the specific areas where competencies are most discussed or required. Analysts review and interpret the data, ensuring that the automated processes yield actionable insights. This step avoids potential biases or inaccuracies that might arise from relying solely on computational tools. Audience reach metrics were employed to quantify the extent to which specific topics are discussed across a range of media types, including online journalism and social media. Trends are mapped on a quarterly basis to track the evolution of discussions and identify areas of interest that are either increasing or declining. This method provides a granular understanding of:

- **Core competency requirements** (e.g., ML knowledge, ethical considerations, LLM applications).
- **Sector-specific demands** (e.g., healthcare, education, marketing).
- **Trends over time**, helping stakeholders predict future needs and focus areas.

By combining technical tools like NER and topic modeling with expert human analysis, this research delivers actionable insights that educational institutions of WKW can use to refine their curricula and strategic focus.

Interim Results (from April 2023 to March 2024):

- **Technical Knowledge:** Core technical competencies, such as machine learning (ML) expertise, cloud computing, and workflow automation, dominated discussions until March 2024 in public and professional domains. These competencies highlight the growing demand for individuals' adept at integrating GenAI into data processing and operational systems.
- **Soft Skills:** Soft skills, particularly human expertise in complementing AI systems, stood out as essential. Abilities such as analytical thinking, creativity, and social skills are repeatedly emphasized, showcasing the irreplaceable value of human judgment and collaboration in AI-augmented settings. These findings align with WKW's vision of fostering human-AI collaboration.
- **Ethics and Law:** Ethical considerations and regulatory knowledge form a crucial aspect of GenAI competencies. The study highlights the public perception of the importance of understanding privacy laws, ethical AI usage, and the broader societal impact of AI integration.
- **Application Expertise:** The growing importance of practical GenAI applications, such as prompting for LLMs and coding automation tools, was less prominent in public discourse, at least for the period under consideration (April 2023 – March 2024).

The interim results of this external analysis represent a significant step forward in our comprehension of the competencies required to navigate the evolving landscape of Generative AI. By identifying key topics such as technical expertise, soft skills, ethical considerations and application proficiency, this study establishes a robust foundation for further exploration. These findings are of value in guiding the subsequent phase of this research. The forthcoming internal study will investigate the most effective methods for acquiring the identified critical competencies, comparing learning outcomes achieved with AI tools against those achieved without their use. This approach shall provide educators and learners with practical insights, ensuring that Generative AI is integrated meaningfully into teaching and learning processes.

## **AI UTILIZATION IN EDUCATION AND THE IMPACT OF GENAI ON COMPETENCE ACQUISITION**

The internal research component of this project investigates how Generative Artificial Intelligence (GenAI) is perceived and experienced by educators and learners within the educational institutions of WKW. It also examines how GenAI influences competency acquisition in practical experiments. Employing surveys, focus groups, and experiments, the research evaluates the extent of GenAI integration into teaching and learning while identifying strategies to foster relevant competencies. This comprehensive approach spans diverse educational settings and participant demographics.

### **Surveys and Focus Group Workshops to Assess the Current State of AI Use in Educational Institutions**

Questionnaires were administered exclusively to learners across WKW institutions, including MODUL Vienna, VBS, FHWien der WKW and WIFI Vienna. Surveys have been completed at VBS and MODUL. These surveys aim to provide baseline data on learners' awareness, application, and perceived challenges of using GenAI in education. The questionnaire comprises four sections:

1. **General Information:** Demographics, including institution, age, educational background, and work experience.
2. **Personal Experience with GenAI:** Familiarity with and usage of GenAI tools in academic or personal contexts.
3. **GenAI in Education:** Experiences with GenAI in educational settings, its perceived usefulness, and current integration into education.
4. **Opportunities and Challenges:** Learners' views on the potential and limitations of GenAI in education.

Focus group workshops have been conducted with educators from each institution, with five to seven participants per session. These discussions explored educators' perceptions and practical experiences with GenAI, providing qualitative insights into its utility, challenges, and potential for integration. Participants from varied disciplines and professional experiences contributed to a broad understanding of how GenAI can be meaningfully

incorporated into pedagogical practices. In the final evaluation, we will analyze the discrepancies in perceptions and awareness, as well as the present utilization of GenAI by learners and educators. The final evaluation will analyze discrepancies in perceptions and awareness, as well as the current utilization of GenAI by learners and educators.

### **Practical Experiments With Learners to Explore the Impact of GenAI on Competency Acquisition**

The experimental component of the research assessed the impact of GenAI on the acquisition of competencies and group dynamics in practical tasks. Two teams participated in the comparative group tasks: Team A used GenAI tools, while Team B will work without AI. It is ensured that each group is composed of participants of both genders. Each team will work on the same two-hour task: “Assessing the potential deployment of photovoltaic systems on suitable rooftops in Vienna”. The task for all groups will be uniform across institutions. The main objective will not be to complete the task within a specific timeframe, but to observe whether the work process is affected by using GenAI. This uniformity will ensure comparability of results across groups and institutions.

The objective is to observe the direct effects of GenAI integration on competence acquisition. This will be achieved by utilizing self- and peer-assessment sheets for the evaluation, observation and tracking of learning progress and time. Three observers will utilize a 1-to-5 Likert scale to evaluate participants on a range of competencies, including problem-solving, social, leadership, and communication skills. Additionally, they will assess the quality and time management of the task. Participants provide self-assessments using the same metrics, enabling comparisons between internal and external assessments of performance. Qualitatively, observers monitor group cooperation, communication, and division of labor, while post-task feedback from participants sheds light on their teamwork satisfaction and task engagement.

### **DEVELOP INTEGRATION STRATEGIES AND AI INFO HUB**

A blend of qualitative and quantitative analyses, coupled with targeted mitigation of gender bias and the application of a rigorous evaluation framework, is expected to generate reliable and actionable insights into the role of Generative AI in education. These insights will serve as the foundation for designing and implementing comprehensive strategies to integrate GenAI into educational programs, thereby enhancing teaching effectiveness and fostering skill acquisition. At the core of this effort is the establishment of an AI Info Hub, a centralised resource platform for educators and learners. This hub will provide up-to-date information, best practices and workshops organised by WKW institutions to support the effective integration of GenAI into teaching and learning processes. Furthermore, by fostering competencies for human-AI collaboration, the initiative aims to enhance the quality of education and prepare learners for AI-driven workplaces, positioning WKW institutions as leaders in future-oriented education.

## CONCLUSION AND FUTURE RESEARCH

This paper provides an overview of the challenges and research questions related to the implementation of Generative Artificial Intelligence (GenAI) in Vienna's educational institutions under the Vienna Chamber of Commerce and Industry (WKW). An initial external analysis has been conducted up to the end of 2024, yielding preliminary results that have been presented. This analysis identified key competency areas—technical knowledge, soft skills, information literacy, ethics and law, and application expertise—that are crucial for effective GenAI integration. These findings provide a foundational understanding of market and societal demands, guiding the educational sector in addressing these requirements.

The external analysis will continue annually as a longitudinal study, allowing for ongoing assessment of trends and evolving needs. This approach ensures that educational strategies remain aligned with current and future competencies required in the market.

Focus groups have been completed by the end of 2024, providing qualitative insights from educators on the use and integration of GenAI in teaching. Experiments are planned for early 2025 to observe the direct effects of GenAI integration on competency acquisition. After these experiments, the data will be analyzed and prepared, with results expected by mid-2025, offering valuable insights to inform subsequent steps.

Surveys are scheduled to run in the institutes from October to December 2024, gathering data from educators and learners regarding their familiarity with AI tools, existing practices, and challenges in integrating AI into the classroom. The analysis of these survey results will follow, contributing to a comprehensive understanding of the current state of AI utilization in education. Building on the findings, the next phases of the project include:

- **Establishment of the AI Info Hub:** Creating a centralized resource platform to offer up-to-date information, best practices, and tailored support for integrating AI into teaching and learning processes across WKW institutions.
- **Integration of AI Strategies in Education:** Developing and implementing practical strategies to incorporate GenAI into educational programs, focusing on enhancing teaching effectiveness and competency acquisition.
- **Workshops With Learners and Educators:** Organizing workshops to provide hands-on experience with GenAI tools, fostering skill development and promoting a culture of innovation and adaptability within the educational community.

By advancing these initiatives, the project aims to empower WKW institutions to effectively navigate the challenges and opportunities presented by GenAI. Continuous assessment through longitudinal studies will ensure that integration efforts remain relevant and impactful, ultimately preparing learners for success in an increasingly AI-driven world.



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## REFERENCES

- Akinwalere, Susan N., and Ventsislav Ivanov. 2022. "Artificial Intelligence in Higher Education: Challenges and Opportunities." *Border Crossing* 12 (1): 1–15. doi: 10.33182/bc.v12i1.2015.
- BMBWF. 2024. "Künstliche Intelligenz – Chance für Österreichs Schulen." <https://www.bmbwf.gv.at/Themen/schule/zrp/ki.html>.
- eEducation Austria. 2024. "KI Initiative des Bundesministeriums." <https://education.at/community/ki-initiative-des-bm>.
- Holmes, Wayne, Maya Bialik, and Charles Fadel. 2023. "Artificial intelligence in education." In *Data ethics: building trust: how digital technologies can serve humanity*, edited by Christoph Stückelberger and Pavan Duggal, 621–53: Globethics Publications.
- OECD. 2023. *OECD Skills Outlook*. [https://www.oecd.org/en/publications/oecd-skills-outlook-2023\\_27452f29-en.html](https://www.oecd.org/en/publications/oecd-skills-outlook-2023_27452f29-en.html).
- OpenAI. 2023. "Introducing GPTs." Accessed January 11, 2024. <https://openai.com/blog/introducing-gpts>.
- OpenAI. 2024. "OpenAI." <https://openai.com>.
- OpenAI, [Nachname nicht vorhanden], Josh Achiam, Steven Adler, Sandhini Agarwal, Lama Ahmad, Ilge Akkaya et al., 2023. "GPT-4 Technical Report." <https://arxiv.org/pdf/2303.08774v4>.
- Pedró, Francesc, Miguel Subosa, Axel Rivas, and Paula Valverde. 2019. *Artificial intelligence in education : Challenges and opportunities for sustainable development*. UNCESO. <https://api.semanticscholar.org/CorpusID:150157229>.
- World Economic Forum. 2023. "Future of Jobs Report 2023: World Economic Forum." <https://www.weforum.org/reports/the-future-of->.
- Zawacki-Richter, Olaf, Victoria I. Marín, Melissa Bond, and Franziska Gouverneur. 2019. "Systematic review of research on artificial intelligence applications in higher education – where are the educators?" *Int J Educ Technol High Educ* 16 (1). doi:10.1186/s41239-019-0171-0.