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Use cases analysis of AI in teaching

Comprehensive report

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More information about the Erasmus+ programme: www.oph.fi/erasmusplus

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How to Use This Report

This report is designed for a broad audience including educational leaders, teachers, policymakers, and researchers interested in the role of artificial intelligence in education. The report combines insights from two complementary surveys conducted among educational leaders and teachers across several European countries. By bringing together these two perspectives, the study provides a comprehensive overview of how artificial intelligence is currently being explored and implemented in educational institutions.

Readers may approach the report in different ways depending on their interests.

Educational leaders may focus on the sections related to institutional governance, leadership strategies, and policy recommendations, which provide insights into how AI can support institutional management and strategic decision-making.

Teachers and educators may find particular value in the sections discussing pedagogical practices, AI-supported teaching approaches, and professional development needs, which highlight practical ways of integrating AI into classroom practice.

Policymakers and researchers may benefit from the comparative analysis across countries, the discussion of governance frameworks, and the recommendations related to responsible and sustainable AI adoption in education.

The report also includes comparative insights that bring together the perspectives of teachers and educational leaders, highlighting both common trends and differences in how artificial intelligence is currently used in educational environments.

About the EducationalAI Project

This report was developed within the framework of the Erasmus+ project **Empowering Educational Leaders with AI Strategies** (Project Number: 2024-1-FI01-KA220-ADU-000255928).

The project aims to support educational institutions across Europe in understanding and responsibly integrating artificial intelligence technologies into educational leadership and teaching practices. Through research activities, training initiatives, and collaborative exchanges between partner institutions, the project seeks to strengthen digital leadership, promote AI literacy, and encourage innovative educational practices supported by emerging technologies.

The study presented in this report is based on two complementary surveys conducted among **educational leaders and teachers** from several European countries. The surveys explore how

artificial intelligence is currently used in educational institutions, what opportunities and challenges educators perceive, and what strategies may support responsible and sustainable AI adoption in education.

The findings contribute to a broader understanding of the evolving role of artificial intelligence in education and aim to support educational institutions, policymakers, and educators in navigating the ongoing digital transformation of educational systems.

The results of this study also support the broader objectives of European policy initiatives such as the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan (2021–2027)**, and the development of a **trustworthy AI ecosystem in Europe**.

Introduction and background

Artificial Intelligence (AI) is rapidly transforming education by creating new opportunities for personalized learning, pedagogical innovation, and institutional efficiency. Recent advances in machine learning, natural language processing, and generative AI have expanded the range of AI applications in education, enabling tools that support content creation, automated assessment, learning analytics, adaptive learning, and educational planning. As AI technologies become increasingly integrated into educational environments, understanding how educators and institutional leaders perceive, use, and manage these technologies has become essential.

This report presents the findings of a cross-national survey conducted among teachers and educational leaders across nine European countries: North Macedonia, Austria, Finland, Spain, Lithuania, Croatia, Norway, Latvia, and Romania. The study explores the current state of AI adoption in education, focusing on patterns of AI use, pedagogical practices, institutional readiness, policy and curriculum alignment, ethical and legal concerns, and the perceived benefits and challenges associated with AI integration.

To capture these perspectives, two separate questionnaires were developed: one targeting teachers and another targeting educational leaders, including rectors, deans, school principals, vice-principals, IT managers, coordinators, and administrative leaders. The questionnaires were designed to gather insights from professionals working across primary, secondary, post-secondary, higher education, and non-formal education sectors. They included structured questions related to AI literacy, teaching practices, use of AI tools, institutional support, and strategic planning, alongside open-ended questions exploring experiences, concerns, and future needs.

The analysis is based on responses from 287 participants and provides a comprehensive overview of how AI technologies are currently being explored and applied in educational settings. The report examines the purposes and frequency of AI use, examples of AI-supported pedagogical practices, the resources and tools used by educators, and the extent to which institutions support responsible AI adoption. It also investigates how teachers and educational leaders perceive the opportunities and risks associated with AI, including issues related to ethics, governance, academic integrity, and data protection.

The findings suggest that AI is increasingly used to support instructional preparation, assessment, content creation, and administrative efficiency. At the same time, the study highlights important challenges related to AI literacy, professional development, infrastructure, and institutional governance. While many educators recognize the potential of AI to support more adaptive and inclusive learning environments, respondents also emphasize the importance of maintaining human-centred pedagogical approaches and ensuring that AI integration aligns with ethical and educational principles.

The report is informed by current research in Artificial Intelligence in Education (AIED), which highlights both the transformative potential of AI technologies and the need for responsible implementation (Holmes et al., 2019; OECD, 2021; UNESCO, 2023). By combining the perspectives of teachers and educational leaders, the study provides a broader understanding of emerging practices, institutional challenges, and strategic opportunities related to AI adoption in education. The findings aim to support evidence-informed policy development, professional training initiatives, and institutional decision-making concerning the responsible integration of artificial intelligence in education.

Executive summary

Artificial intelligence (AI) is increasingly influencing teaching practices across European educational systems. This report presents the results of a cross-national survey conducted among educators and institutional leaders in nine European countries: North Macedonia, Austria, Finland, Spain, Lithuania, Croatia, Norway, Latvia, and Romania. The study explores current patterns of AI use in education, focusing on teaching practices, pedagogical approaches, institutional readiness, perceived benefits, and emerging challenges.

The findings indicate that AI tools are already being used by many educators, although the level of integration varies significantly between countries and institutions. Teachers most frequently use AI for content generation, lesson planning, assessment preparation, and administrative tasks. However, deeper pedagogical integration of AI in classroom practices remains limited.

The results show that the dominant approach is **"teaching with AI"**, where educators use AI tools to support instruction and streamline teaching processes. In contrast, **"teaching about AI"** and **"teaching for AI"**, which focus on developing students' understanding of AI systems and their responsible use, are less common. This suggests a need to strengthen AI literacy among both educators and students.

Respondents identified several key benefits of AI adoption in education. Teachers report improved efficiency, time savings, enhanced creativity in lesson design, and greater opportunities for personalized learning. At the same time, educators' express concerns about **ethical risks, data privacy, academic integrity, and the reliability of AI-generated content**.

Institutional readiness for AI integration varies widely. While some institutions are experimenting with AI tools and pilot initiatives, many lack clear policies, strategic frameworks, and professional development programs to support responsible and sustainable AI implementation.

Across all participating countries, the survey reveals a **strong demand for professional development**. Educators express interest in training focused on AI literacy, pedagogical integration, ethical risk assessment, and effective use of generative AI tools.

Overall, the findings highlight both the significant potential of AI to support innovative teaching practices and the need for coordinated efforts to strengthen governance frameworks, teacher competencies, and institutional strategies for responsible AI adoption in education.

Methodology

Purpose

The purpose of this survey was to explore the current landscape of artificial intelligence (AI) integration in education across nine participating countries: North Macedonia, Austria, Finland, Spain, Lithuania, Croatia, Norway, Latvia, and Romania.

The study aimed to examine educators' and institutional leaders' experiences, perceptions, and readiness regarding the use of AI tools in teaching, learning, and institutional practices.

In particular, the survey investigated AI literacy, patterns of AI use in educational settings, pedagogical approaches, perceived benefits and challenges, and institutional readiness for responsible AI adoption.

Research design

The study employed a **mixed-methods research design**, combining quantitative and qualitative data collected through a structured online questionnaire. The survey included both closed-ended questions and open-ended responses, allowing participants to report their experiences with AI tools while also providing reflections on challenges, opportunities, and future needs.

Research questions

This study explores the current use and perception of artificial intelligence in educational institutions from the perspectives of teachers and educational leaders. The analysis is guided by the following research questions:

1. How are artificial intelligence tools currently used by teachers in educational practice?
2. How do educational leaders perceive the role of artificial intelligence in institutional management and governance?
3. What similarities and differences exist between teachers' and educational leaders' perspectives on AI adoption?
4. What challenges and opportunities emerge in the integration of AI technologies in educational institutions?
5. To what extent are educational leaders currently using artificial intelligence technologies in their professional activities?
6. What types of institutional policies and governance frameworks exist to guide the use of AI in educational institutions?
7. What benefits do educational leaders perceive from the use of AI technologies in education?
8. What challenges and barriers do educational institutions face when adopting AI technologies?
9. What ethical and legal concerns are associated with the use of AI in educational environments?
10. What strategies and institutional actions are being implemented to support the responsible adoption of AI technologies?

Structure of the Questionnaire

The questionnaire was organized into several thematic sections covering key aspects of AI use in education:

Demographics – country, institutional role, level of education, and field of expertise.
AI literacy and training – familiarity with AI tools and professional development needs.
AI usage – frequency of use, types of tools used, and educational resources.
Pedagogical practices – approaches to integrating AI in teaching and learning.
Perceived benefits and challenges – educational impact, ethical concerns, and barriers to adoption.
Institutional readiness and policy frameworks – institutional support, strategies, and governance structures related to AI use.

Distribution

The survey was distributed online through educational networks, institutional mailing lists, professional communities, and social media channels. Participation was voluntary and anonymous, and informed consent was obtained at the beginning of the questionnaire.

Sample

A total of 287 respondents participated in the survey. Participants represented a diverse range of educational roles and institutional contexts, including teachers, university professors, and educational leaders such as school principals, deans, vice-principals, IT managers, and institutional administrators. Respondents came from nine European countries: North Macedonia, Austria, Finland, Spain, Lithuania, Croatia, Norway, Latvia, and Romania. Participants represented institutions from primary education, secondary education, post-secondary education, higher education, and non-formal education sectors.

Data collection

Data collection took place from April to September, 2025. Responses were collected through an online survey platform and later exported for analysis. The survey was designed to ensure clarity and accessibility for respondents from different national contexts. Participation in the study was anonymous, and respondents were informed that the collected data would be used exclusively for research and analytical purposes. The online survey format enabled efficient data collection across geographically distributed educational institutions and facilitated the compilation of responses for comparative analysis.

Data analysis

The collected survey data were analyzed using descriptive statistical methods in order to identify trends and patterns in the responses of educational leaders. Data analysis was conducted using SQL and Microsoft Excel.

The analysis included:

• calculation of frequencies and percentages for categorical responses;

• aggregation of responses across participating countries;

• interpretation of patterns related to AI adoption, governance frameworks, and perceived challenges.

In addition to descriptive analysis, the study also applied comparative interpretation of responses across countries in order to identify similarities and differences in how educational teachers and leaders approach the adoption of artificial intelligence technologies. The findings were organized into thematic categories corresponding to the main dimensions of the survey, allowing for a structured presentation of results in the subsequent sections of the report in order to identify common patterns and insights related to AI use in education. The results were visualized through tables and charts to highlight key trends across countries, institutional roles, and educational contexts.

Limitations of the study

While the study provides valuable insights into the emerging use of artificial intelligence in educational contexts, several limitations should be acknowledged. The findings are based on self-reported survey data, which may reflect participants' perceptions rather than actual institutional practices. In addition, the distribution of respondents across participating countries was uneven, which may influence the comparative interpretation of results. Despite these limitations, the study provides meaningful insights into the emerging role of artificial intelligence among teachers and educational leaders and offers a valuable basis for further research and policy development.

Demographics

The survey collected responses from 287 participants across nine European countries: North Macedonia, Austria, Finland, Spain, Lithuania, Croatia, Norway, Latvia, and Romania. Respondents represent a wide range of educational institutions and professional roles, providing a diverse perspective on the current use of artificial intelligence in education.

Country Distribution

The largest number of responses was recorded in North Macedonia, with 84 participants, indicating strong engagement from this country. Participants from other countries also contributed valuable insights, enabling cross-national comparisons of AI adoption in educational contexts.

Figure 1 illustrates the distribution of participants across participating countries.

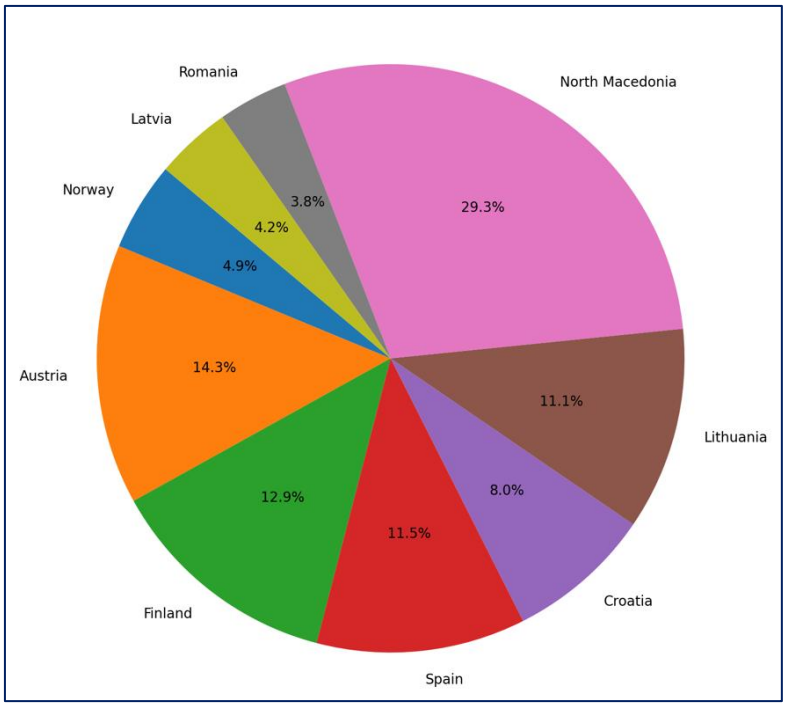

Figure 1. Rate of participant per country

Institutional Roles

Respondents hold a variety of roles within educational institutions. The majority of participants, 236 respondents, identified themselves as teachers, teaching assistants, lecturers, or instructors. This strong representation of frontline educators provides valuable insights into how AI tools are used directly in classroom practice.

In addition, the survey includes 51 educational leaders, such as school principals, deans, vice-principals, IT managers, and institutional administrators. Their participation offers a complementary perspective on institutional strategies, leadership involvement, and policy considerations related to AI adoption.

Figure 2 presents the distribution of respondents according to their institutional roles.

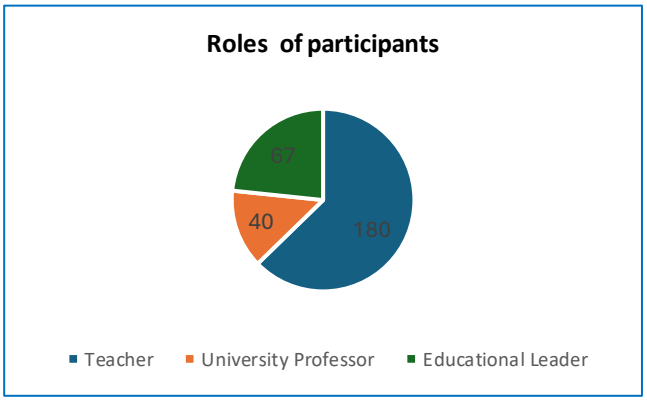

Figure 2. Roles of participants

Institutional Context

Participants work across different educational sectors. The largest group of respondents comes from primary education institutions, with 100 participants. This suggests that AI tools are increasingly being explored even in early stages of formal education.

Secondary education is the second most represented sector, with 62 participants, reflecting strong interest in AI integration among educators working with adolescents. Post-secondary and higher education institutions together account for 50 respondents, indicating that AI is also being incorporated into more advanced educational settings.

Some respondents reported working across multiple educational contexts, such as primary and secondary education or secondary and post-secondary education. These mixed roles highlight the flexibility of AI tools across educational levels and the interdisciplinary nature of many teaching responsibilities.

Figure 3 illustrates the distribution of respondents by institutional type.

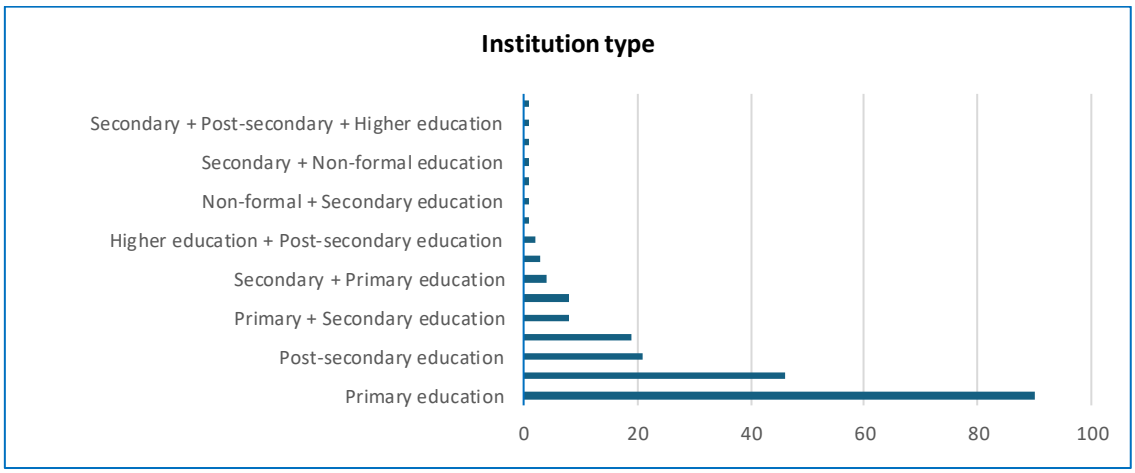

Figure 3. Institution type where teachers work

Leadership representation

Educational leaders participating in the survey represent a range of institutional contexts. Among the 51 leaders, the highest number work in secondary education (16 respondents), suggesting that AI-related decision-making and strategic planning are particularly active in middle and high school environments.

Higher education institutions follow with 11 leaders, reflecting the growing importance of AI strategies within universities. Primary education institutions account for 10 leaders, demonstrating that leadership involvement in AI adoption is also emerging in early education settings.

A smaller number of leaders represent non-formal education and post-secondary institutions, as well as institutions operating across multiple educational sectors. This diversity highlights the broad relevance of AI for educational management across different learning environments.

Figure 4 shows the distribution of leaders according to institutional type.

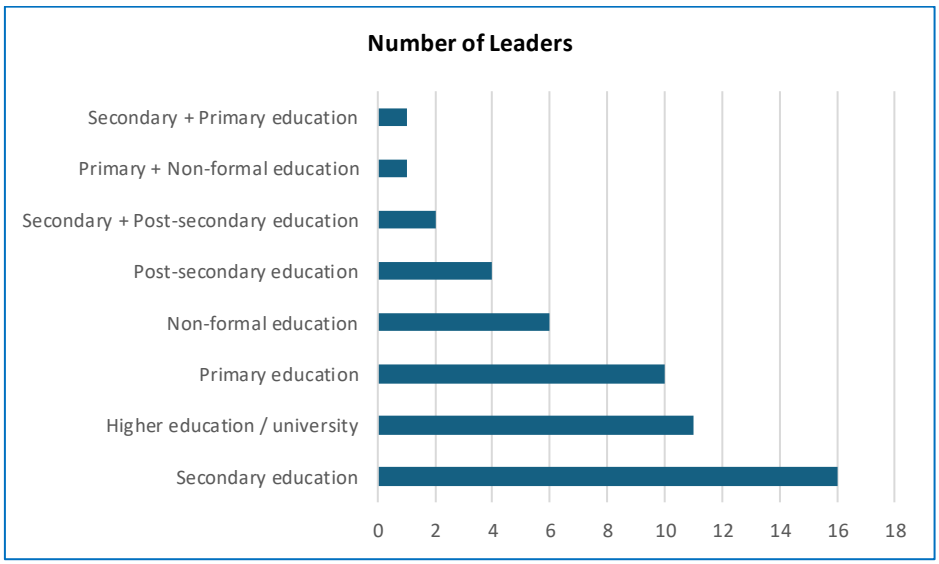

Figure 4. Institution type where leaders work

Fields of Expertise

Participants represent a broad range of academic disciplines. The largest proportion of respondents comes from humanities and social sciences, followed by educators working in formal sciences, and those specializing in natural and applied sciences.

Several respondents reported interdisciplinary expertise, combining fields such as humanities and formal sciences or natural sciences and applied sciences. This interdisciplinary representation reflects the increasingly cross-disciplinary nature of AI integration in education.

Educators with technical or scientific backgrounds may play an important role in driving experimentation and innovation in the use of AI tools, while educators from humanities and social sciences contribute valuable perspectives on ethical, pedagogical, and societal aspects of AI use in education.

Figure 5 presents the distribution of respondents according to their fields of expertise.

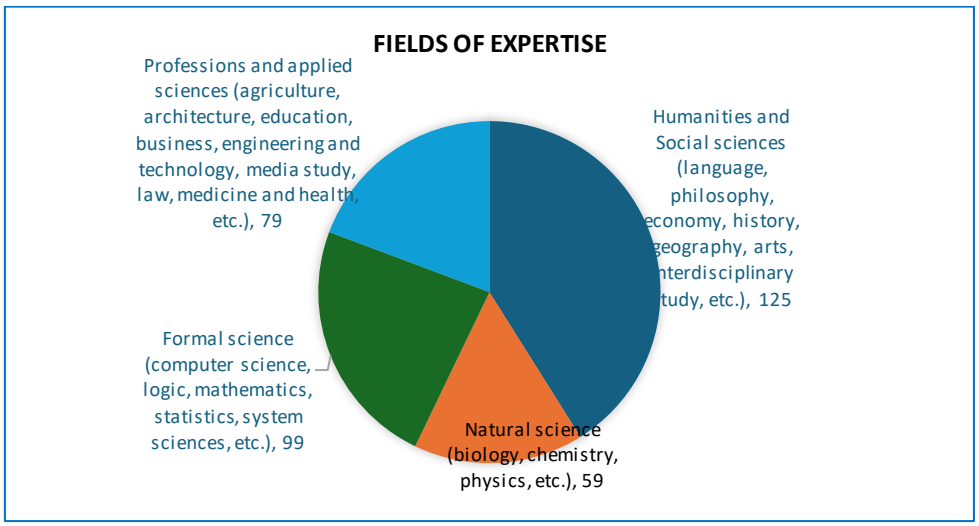

Figure 5. Fields of expertise

Familiarity with Artificial Intelligence

The survey explored the level of familiarity with artificial intelligence among both teachers and educational leaders. Understanding the degree of AI literacy among education professionals is essential for assessing institutional readiness and identifying areas where further professional development may be required.

Familiarity among Teachers

The results indicate that most teachers demonstrate **moderate familiarity with AI technologies**. A total of 90 teachers reported that they use AI tools occasionally, suggesting that many educators are currently experimenting with AI in their professional practice.

In addition, 73 teachers indicated that they have a good understanding of AI and use AI tools regularly, reflecting a growing group of educators who have begun integrating AI more consistently into their teaching activities.

A smaller group of 15 teachers reported having in-depth knowledge of AI, suggesting that advanced AI expertise is still relatively limited within the teaching community. At the same time, six teachers reported having no familiarity with AI tools, which may reflect barriers related to access, training opportunities, or institutional support.

Overall, the findings suggest that while basic awareness and occasional use of AI tools are widespread among teachers, more advanced AI literacy and pedagogical integration remain areas for further development.

Figure 6 presents the distribution of teachers according to their level of familiarity with AI technologies.

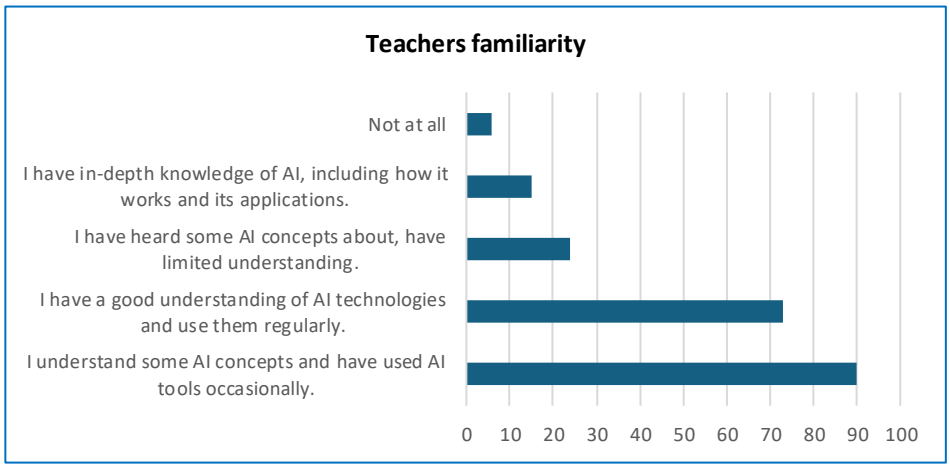

Figure 6. Teachers familiarity with AI

Familiarity among Educational Leaders

Educational leaders demonstrate a similar pattern of familiarity with AI technologies. Among leaders, 26 respondents reported occasional use of AI tools, indicating that many leaders are beginning to explore AI in their professional responsibilities.

In addition, 14 leaders reported having a good understanding of AI and using AI tools regularly, suggesting increasing engagement with AI technologies at the leadership level.

A smaller number of five leaders reported in-depth knowledge of AI, reflecting a limited but emerging group of leaders with advanced AI competencies. Notably, no leaders reported having no familiarity with AI technologies, which may reflect the strategic role leaders play in digital transformation processes and their exposure to institutional discussions on AI adoption.

Figure 7 illustrates the level of familiarity with AI among educational leaders.

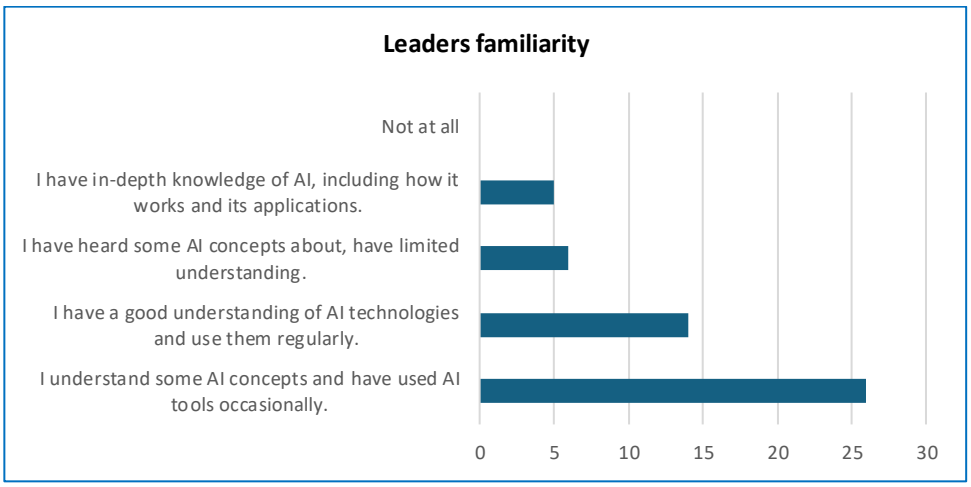

Figure 7. Leaders' familiarity with AI

Comparative Insight

A comparison between teachers and educational leaders reveals several interesting patterns. Both groups demonstrate a strong foundation of basic AI awareness, with many respondents reporting occasional use of AI tools.

However, teachers appear slightly more likely to report regular use of AI tools in their daily work, reflecting their direct involvement in classroom activities and instructional preparation. Educational leaders, on the other hand, tend to engage with AI more strategically, focusing on institutional planning, governance, and oversight of technological adoption.

These findings suggest that while AI familiarity is growing across the education sector, further professional development initiatives may be needed to strengthen both practical AI competencies among teachers and strategic AI leadership among institutional decision-makers.

Examination of AI usage - teachers

The survey explored how frequently teachers use artificial intelligence tools in their professional activities and how these technologies are integrated into teaching practices. The results indicate that AI is moderately integrated into teachers' everyday work. The majority of teachers reported using AI tools between one and three hours per week, suggesting that AI is increasingly used as a supportive tool for lesson preparation, resource development, and administrative tasks.

At the same time, 66 teachers reported that they do not currently use AI tools, indicating that a significant proportion of educators have not yet integrated AI into their teaching practices. This may reflect barriers such as limited access to training, uncertainty about appropriate use, or lack of institutional guidance. A smaller group of teachers reported more intensive use of AI technologies, dedicating four to seven hours or more per week to AI-supported tasks. These educators are likely to have higher levels of digital competence or work in environments where AI experimentation is actively encouraged. A meaningful minority, 18% of surveyed teachers report zero hours of AI use in their teaching practice, indicating that despite growing interest in AI, a substantial proportion of educators remain outside AI-supported pedagogical practices. This non-use reflects structural and institutional barriers rather than resistance at the individual level.

Overall, the results suggest that **AI is primarily used as a support tool for instructional preparation and administrative efficiency**, rather than as a core component of classroom teaching. The result aligns with other findings showing lower adoption of **Teaching WITH / FOR / ABOUT AI** in some countries, weaker alignment with **DigComp3 Areas 3, 4, and 5**, and stronger reporting of **structural challenges** (training, guidance, infrastructure). Figure 8 illustrates the frequency of AI usage among teachers.

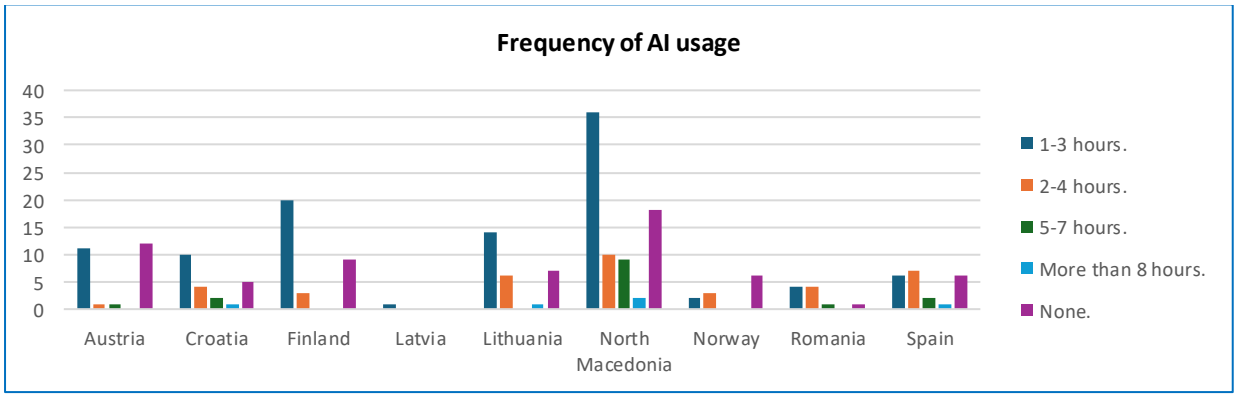

Figure 8. Frequency of AI usage

Purpose of AI usage by teachers

Across countries, the purpose of AI use by teachers ranges from basic content preparation and workload reduction to advanced pedagogical applications such as personalized learning, feedback, and learning analytics. Countries with higher AI readiness show broader and more instructional uses of AI, while lower-readiness contexts rely on limited, task-oriented applications or report no AI use at all.

Finland: Teachers in Finland use AI primarily for pedagogical enhancement, not just efficiency. The dominant purposes are content creation, feedback, personalized learning, and learning analytics. AI is frequently embedded in lesson planning, assessment design, and differentiation. Administrative uses are present but secondary. This pattern reflects a mature integration, where AI supports instructional quality and learner outcomes rather than isolated tasks. The breadth of purposes aligns with Finland's high DigComp3 alignment and very low proportion of zero-hours users.

Lithuania: In Lithuania, teachers' AI use is strongly instructional, with a clear emphasis on generating learning materials, assessment preparation, and supporting student understanding. AI is also used for data-informed decision-making (e.g. identifying learning gaps), though less systematically than in Finland. The purpose profile suggests confident classroom adoption, even if advanced analytics and institutional-level uses are less common. This confirms Lithuania's position among the high-readiness countries.

Croatia: Croatian teachers display a balanced purpose profile. AI is widely used for content creation, assessment tasks, student engagement activities, and feedback, with a noticeable share also using AI for administrative support. Compared to Finland and Lithuania, Croatian teachers rely slightly more on AI for efficiency and workload reduction, but still maintain strong pedagogical use. This hybrid pattern explains Croatia's high adoption of Teaching WITH, FOR, and ABOUT AI.

Austria: In Austria, AI use by teachers is selective and task-focused. The most common purposes are lesson preparation, content generation, and occasional assessment support. Uses related to personalization, student analytics, or innovative pedagogies are less frequent. This indicates an early-to-intermediate integration stage, where teachers experiment with AI mainly to support existing practices rather than redesign instruction.

Norway: Norwegian teachers primarily use AI for supportive and exploratory purposes, such as idea generation, content drafting, and limited feedback tasks. More advanced instructional purposes—like adaptive learning or systematic analytics—are relatively rare. This suggests that AI is perceived more as a supplementary tool than as a core pedagogical component, consistent with Norway's medium adoption and DigComp3 alignment.

Latvia: In Latvia, AI use is narrowly concentrated on basic instructional support, especially content creation and occasional student engagement activities. Uses related to assessment, feedback automation, or learning analytics are comparatively limited. The purpose profile reflects experimental use, often driven by individual teacher initiative rather than institutional strategy.

Romania: Romanian teachers who use AI tend to focus on practical classroom support, especially lesson preparation, material generation, and time-saving tasks. There is relatively little evidence of AI being used for data-driven personalization or student performance analysis. This suggests that AI is primarily adopted to reduce workload, not yet to transform pedagogy.

North Macedonia: In North Macedonia, AI use among teachers is highly polarized. A substantial group reports no AI use at all (23% zero hours), while those who do use AI rely on it mainly for basic purposes such as content preparation, idea generation, and occasional classroom activities. Advanced purposes—assessment automation, personalized learning, analytics, or systematic feedback—are rare. This reflects an early adoption stage, where AI use depends on individual motivation rather than structured curricular or institutional support.

Key interpretation of survey results

Across countries, teachers primarily use AI to support everyday teaching tasks, especially lesson preparation, content creation, and assessment-related activities, with some systems also using AI for student engagement and feedback. Overall, the purpose of AI use reflects a practical and supportive role in teaching, with more advanced instructional and data-driven applications appearing only in a smaller number of countries.

Teachers expressed that student engagement with AI in learning across countries, distinguishing between teacher-guided classroom use, independent student use, and limited or no exposure. It highlights cross-country differences in how structured, consistent, and embedded student AI use is within everyday learning activities. The results show that In Finland, Lithuania, and Croatia, students' use of AI is largely embedded in structured learning activities led by teachers, indicating that AI is primarily introduced within planned classroom contexts rather than through autonomous exploration. In Austria, Norway, Latvia, and Romania, student engagement with AI follows a more mixed pattern, combining teacher-guided activities with instances of independent or occasional use. By contrast, in North Macedonia, student AI use is more uneven, with many teachers reporting limited or no student engagement and teacher-guided use occurring within a smaller subset of classrooms.

Figure 9 presents the AI usage by students.

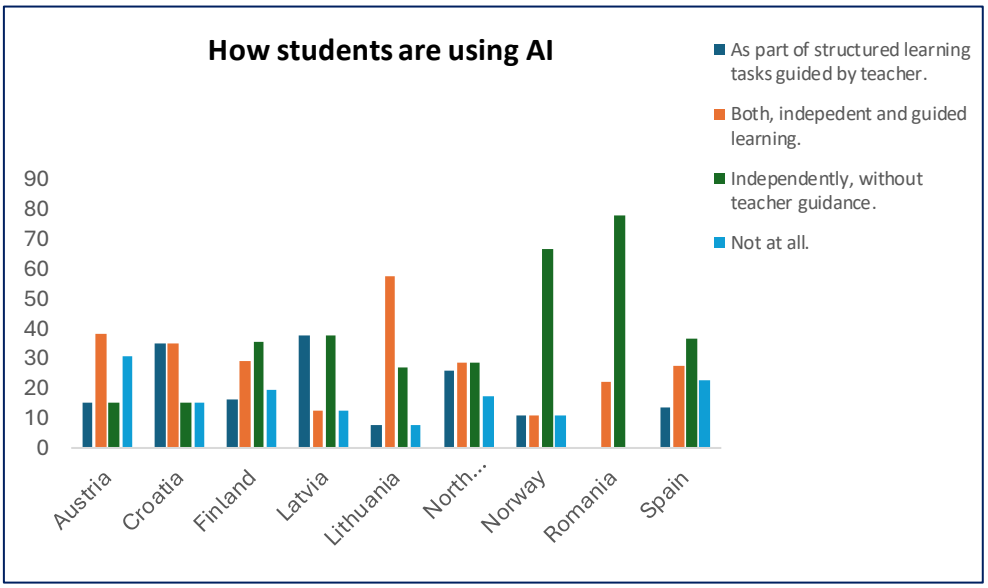

Figure 9. Use of AI by students

Identification of examples and scenarios

Teaching Approaches to AI

Identification of examples and scenarios was measured in relation to the teaching approach **with AI, for AI** and **about AI**, and types of tools they use. **Teaching *with* AI** approach involves using AI tools to support and enhance teaching practices. This includes activities such as lesson planning, content generation, assessment preparation, and feedback generation. **Teaching *for* AI** focuses on preparing students to use AI tools confidently, critically, and ethically. This approach includes developing competencies such as prompt engineering, evaluating AI-generated content, understanding algorithmic bias, and promoting academic integrity. **Teaching *about* AI** approach involves teaching students the fundamentals of AI, including its technical, ethical, and societal dimensions. These approaches reflect different ways in which AI technologies can be integrated into teaching and learning processes as it is defined in the EU report for AI in education[1].

[1] European Commission: European Education and Culture Executive Agency. (2023). AI report: by the European Digital Education Hub's Squad on artificial intelligence in education. https://data.europa.eu/doi/10.2797/828281

The results show that **teaching with AI** is the most common approach among teachers. More than 41% of respondents reported using AI tools to support their teaching practices, particularly for lesson preparation, content development, and administrative support.
In contrast, **teaching for AI** is less frequently implemented, with approximately 8% of respondents integrating this approach into their practice. This suggests that many educators are still developing the competencies needed to guide students in responsible and critical use of AI technologies.
Teaching about AI is the least common approach, with around 10% of teachers reporting that they teach AI-related topics as part of their curriculum. This approach is more common in secondary and higher education contexts where AI concepts are more directly linked to subject-specific learning. Figure 10 presents the distribution of pedagogical approaches used by teachers.

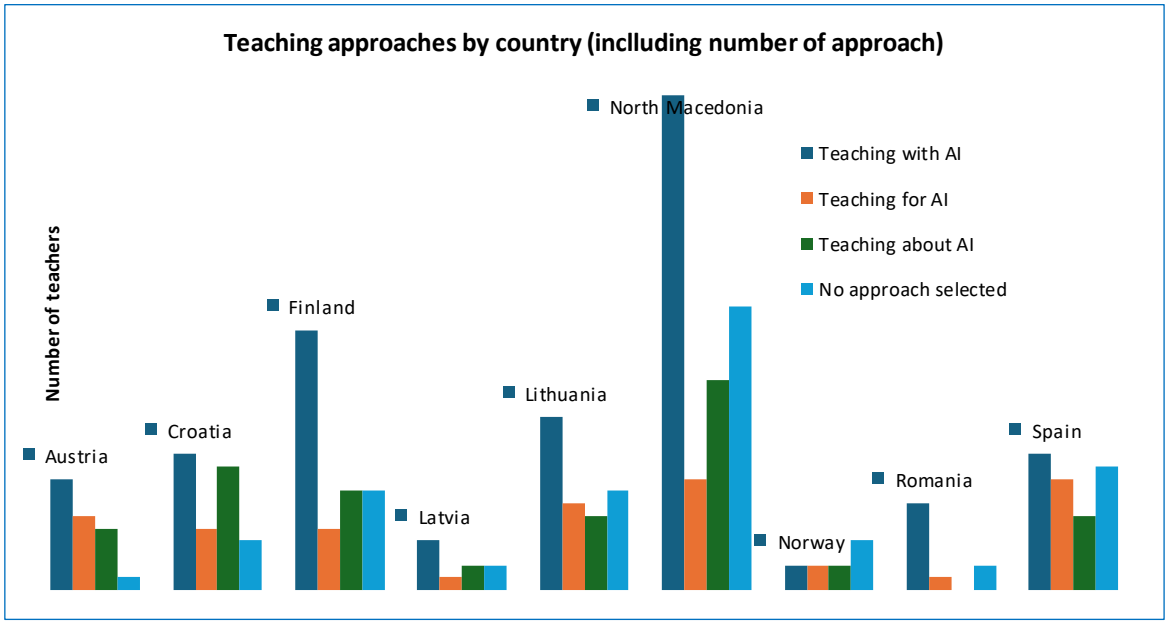

Figure 10. Teaching approach

Pedagogical practices supported by AI

The analysis also explored how AI tools support specific teaching activities. Across participating countries, the most common use cases include pre-class preparation, such as generating teaching materials, designing lesson plans, and preparing instructional resources. Teachers also reported using AI tools to support in-class learning activities, including designing interactive exercises, generating discussion prompts, and creating differentiated

learning materials. In several countries, AI tools are also used to support assessment practices, including automated quiz generation, formative assessment, and feedback on student work. The results indicate that AI is currently most frequently used for content generation and instructional planning, while more advanced uses such as adaptive learning, personalized instruction, and learning analytics remain less widespread. Figure 11 illustrates the main pedagogical practices supported by AI tools across participating countries.

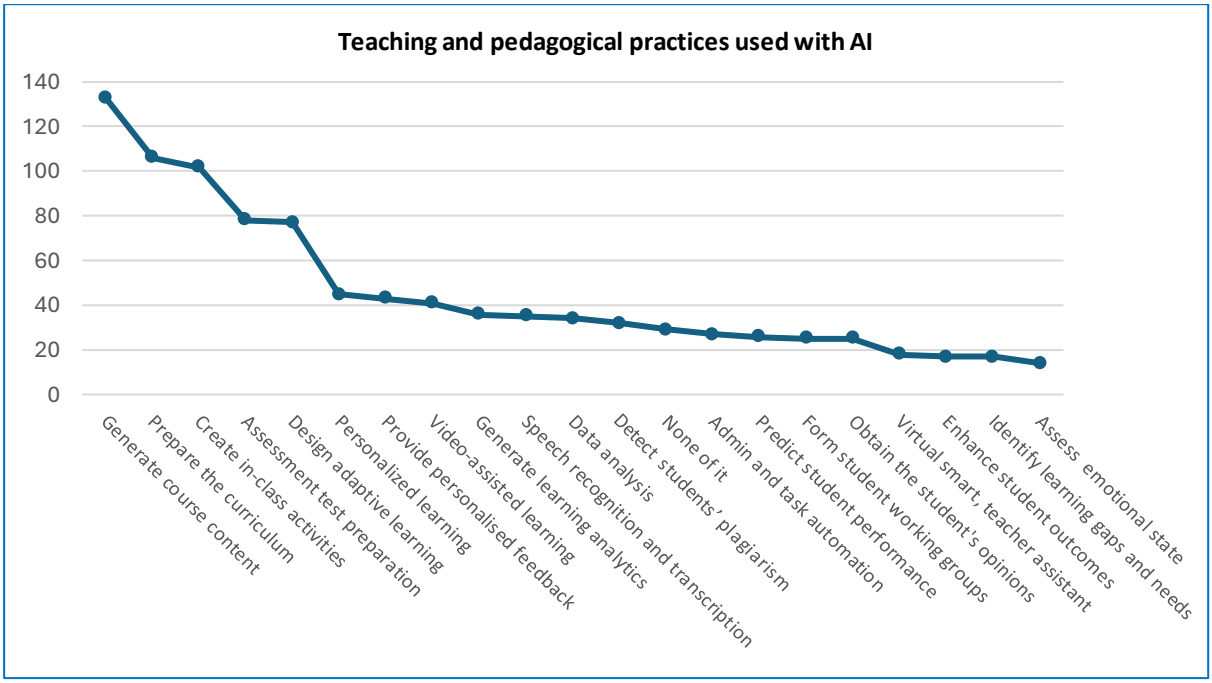

*Figure 11. Teaching and pedagogical practices used **with AI***

The result show how teachers in each country apply different AI-supported scenarios when they engage in **Teaching for AI**—that is, when they aim to help students understand how AI works, evaluate AI outputs, and develop digital-critical skills. Each bar represents a country, and each color in the legend represents a specific AI scenario. Overall, the results show that **teaching for AI** is strongest in countries where teachers rely heavily on chatbots, educational AI games, and AI-powered quizzes, demonstrating a hands-on, exploratory method of introducing AI concepts to students. Countries such as Croatia, Finland, and Lithuania display the highest weighted scenario use, indicating that teachers in these systems actively expose students to multiple AI tools as learning objects not just as assistants. In these countries, AI is used to demonstrate reasoning processes, compare AI versus human decision-making, and motivate discussion around ethics, accuracy, and algorithmic patterns. Countries such as Austria, Latvia, Norway, and Romania show moderate involvement, with visible but lower weighted bars. Their teachers tend to use fewer AI scenarios overall, relying mainly on

chatbots and simple AI-powered tools. This suggests that teaching **for AI** here is more introductory, focusing on basic awareness rather than deeper conceptual development. North Macedonia shows the lowest scenario usage, reflecting early-stage adoption. Teachers demonstrate interest in teaching **for AI** but may require stronger institutional support, training, or access to AI tools to expand the range of learning scenarios offered. Across all countries, **chatbots consistently dominate**, signifying their central role in classroom AI literacy. Their ease of use allows teachers to demonstrate how AI generates responses, where it fails, and how students can critically evaluate AI output—skills crucial in any Teaching for AI model.

The analysis of teaching **about AI** across countries shows that the integration of AI as curriculum content is still **uneven and in an early stage**. A few countries—particularly Finland, Lithuania, and Croatia demonstrate higher engagement, reflected in stronger combined scenario use. Teachers in these systems are exposing students more actively to AI concepts, tools, and exploratory learning activities. Other countries, including Austria, Norway, Latvia, and Romania, show moderate involvement, indicating that Teaching about AI is present but not a dominant instructional approach. Their scenario use suggests introductory exposure rather than deeper conceptual instruction. North Macedonia stands out with the lowest scenario usage, suggesting minimal integration of AI as a learning topic and pointing to a need for more structured support, training, and curricular alignment. Overall, the analysis shows that while teachers across Europe increasingly use AI as a tool, only a smaller group of countries is beginning to teach AI as essential knowledge, preparing students for deeper digital and algorithmic understanding.

Examination of resources used by teachers

The survey also explored the types of artificial intelligence tools and digital resources used by teachers in their professional activities. The results show that educators rely on a wide range of AI-powered tools to support teaching preparation, classroom activities, and assessment processes.

Among the most frequently mentioned tools are generative AI platforms, including ChatGPT, Microsoft Copilot, Gemini, and Bard. These tools are commonly used for generating teaching materials, developing lesson plans, preparing explanations of complex concepts, and supporting content creation.

Teachers also reported using learning management and analytics tools, such as Moodle Analytics and Power BI, which enable educators to monitor student progress, analyze learning patterns, and support data-informed teaching decisions.

In addition, several interactive learning platforms are widely used to increase student engagement. These include tools such as Kahoot, Quizizz, Edpuzzle, and Labster, which allow teachers to create interactive quizzes, multimedia learning activities, and virtual laboratory simulations.

The use of AI-supported assessment tools was also identified in the survey. For example, Turnitin is used for originality checking and plagiarism detection, while AI-based quiz generators support the development of formative assessments.

Across participating countries, these tools are most often used to improve teaching efficiency, content generation, and student engagement. Teachers frequently integrate AI tools into lesson preparation, classroom activities, and assessment processes to streamline routine tasks and enhance learning experiences.

Several country-specific examples illustrate how AI tools are being used in educational practice:

- In **North Macedonia and Finland**, teachers reported using AI-supported lesson planning tools and content creation platforms, such as Copilot and Canva for Education, to quickly develop interactive teaching materials.
- In **Spain**, educators reported using adaptive learning platforms to support differentiated instruction in mixed-ability classrooms.
- In **Austria and Croatia**, teachers highlighted the use of AI-powered quiz generators and interactive assessment tools to support formative assessment and student feedback.

Overall, the findings suggest that teachers primarily use AI tools to support instructional preparation, content creation, and student engagement, while more advanced uses such as learning analytics and adaptive learning systems remain less widespread.

Figure 12 illustrates the main AI tools and resources used by teachers across participating countries.

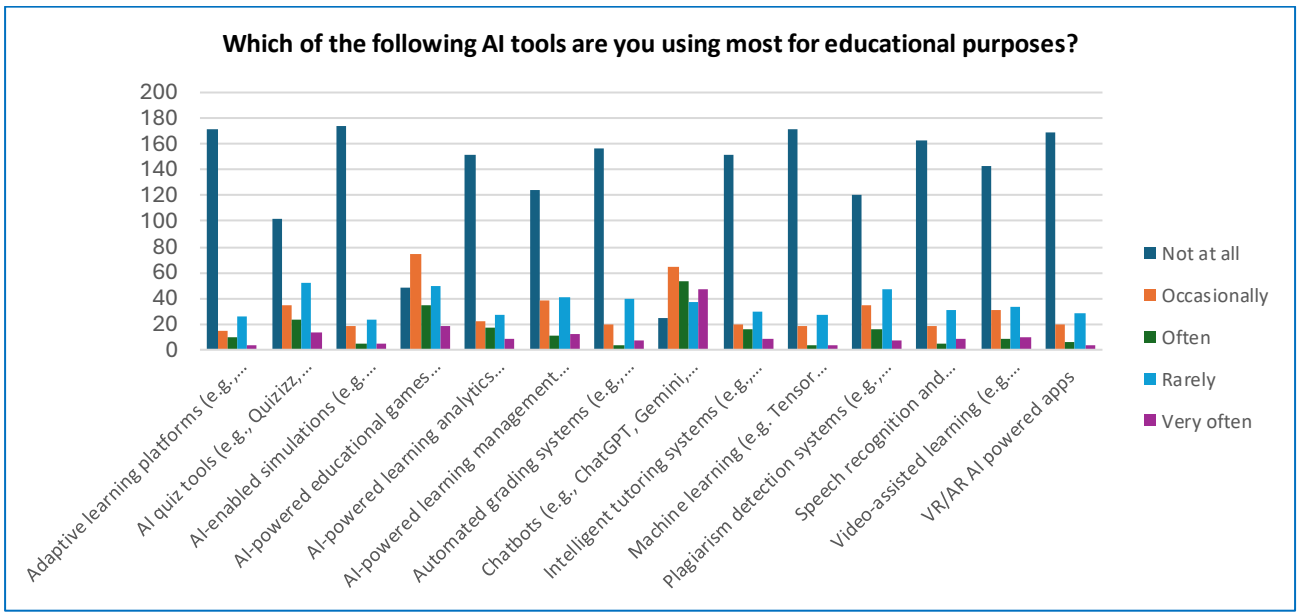

Figure 12. Resources used by teachers

In terms of **trainings** majority of participants didn't have any training for AI or they are self taught. According to approaches teachers had express that most of them are using Teaching with AI, that is for using AI tools to support and enhance teaching practices and it is in compliance with the quantity of training they had.

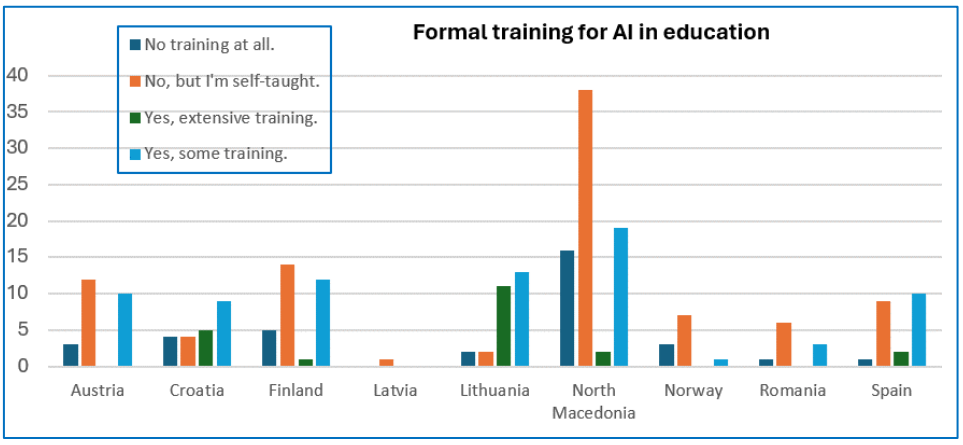

Figure 13. Training of teachers

Considering the results of the pedagogical approach and the amount of training, it would be very usefull for countries like Spain and Finland with higher content adoption to focus on training for deepen use in feedback, analytics, and personalization. Lower content adoption (e.g., North Macedonia) to start with ready-to-use prompt packs for lesson design and assessment blueprints. In countries where "None of it" is higher, hands-on demos, use-case

galleries, and clear data-use guidelines need to be prioritized. Also, teachers should be encouraged for short plan–do–study–act cycles tracking time saved, student engagement, and assessment quality per country cluster.

Assessment of pedagogical approaches and competencies

The survey further explored teachers' perspectives on the integration of AI into pedagogical practice and examined which competencies are most prominently developed across different educational contexts. Pedagogical approaches and associated competencies were analyzed through correlations between reported teaching approaches and the Digicomp3[2] framework, encompassing all five key competency domains. These domains represent distinct dimensions of AI-supported teaching and learning.

Spain: Spain demonstrates strong performance in content creation and solid results in problem solving, indicating that teachers actively use AI for instructional design and assessment. However, the lower score in Information and data literacy – AI literacy and moderate performance in collaboration suggest limited depth in critically evaluating AI outputs and engaging in collective professional practices. In area 4 - safety reflects awareness of ethical and privacy issues, but not consistent integration into classroom decision-making. It shows that teachers have advanced operational use of AI, but still developing critical, collaborative, and systematically applied ethical competence.

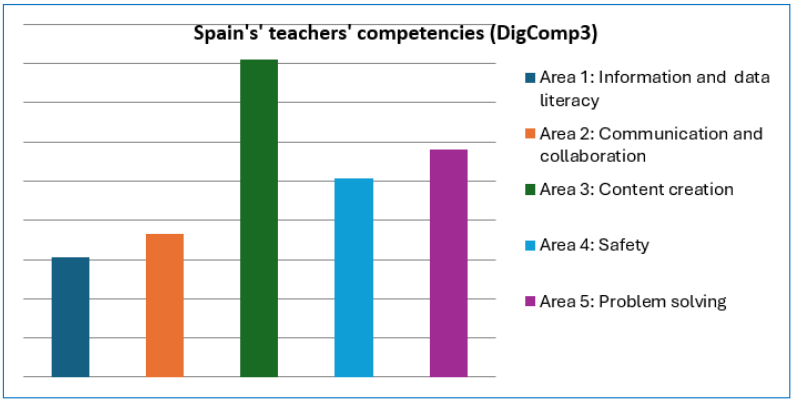

Figure 14. Spain's teachers' competencies across Digicomp3

Finland: Finland demonstrates a coherent and system-level alignment across DigComp3 areas, particularly strong in content creation and solid in collaboration and problem solving than most countries. Unlike other countries, Finland shows less fragmentation between practice

[2] https://joint-research-centre.ec.europa.eu/projects-and-activities/education-and-training/digital-transformation-education/digital-competence-framework-digcomp/digcomp-30-resources_en

and system support. However, AI literacy area remains at a moderate level, indicating that critical understanding of AI systems is still developing. Area 4 – safety, reflects awareness rather than fully embedded ethical practice. It indicates highly structured and policy-aligned system, ready for sustainable and safe AI scaling.

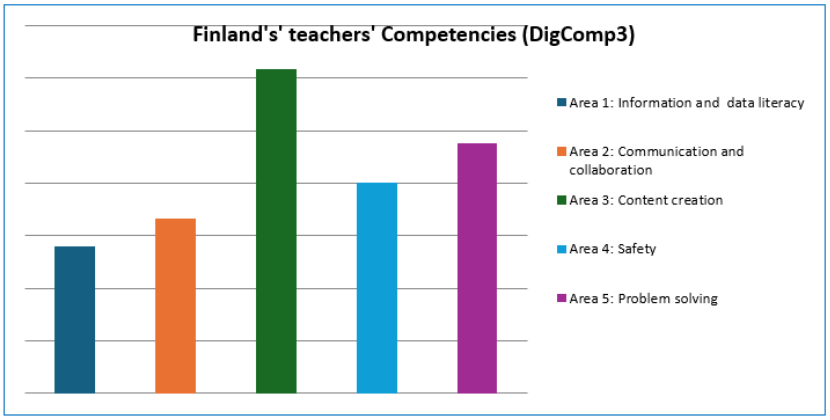

Figure 15. Finland's' teachers' competencies across Digicomp3

Lithuania: Lithuania stands out with very strong performance in problem solving and content creation, especially in assessment-related practices, and solid results in collaboration. However, weaker performance in AI literacy and safety reveals a gap between application and understanding, while safety remains moderate. This result shows strong competencies in using AI, but needs to strengthen critical and ethical foundations.

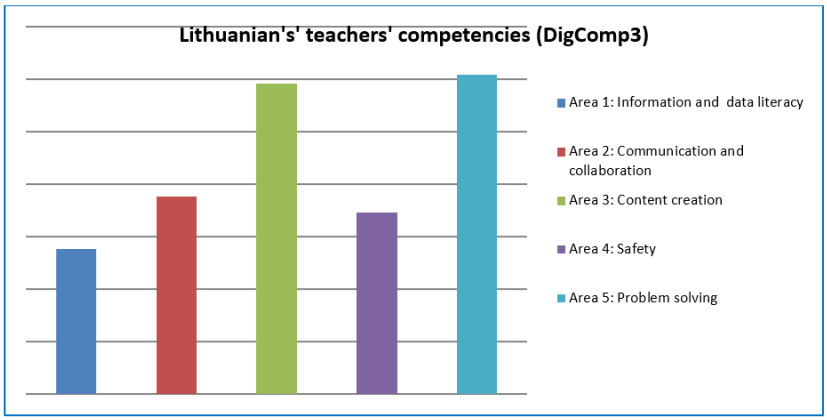

Figure 16. Lithuania's' teachers' competencies across Digicomp3

North Macedonia: North Macedonia shows moderate competence in problem solving and content creation, indicating active experimentation with AI in classrooms. However, consistently lower scores in AI literacy, collaboration, and safety suggest limited systemic support and uneven teacher preparedness. It indicates emerging practice-driven adoption

with significant gaps in foundational critical and systemic (collaborative, ethical) competencies as well lacking strong foundational and policy support.

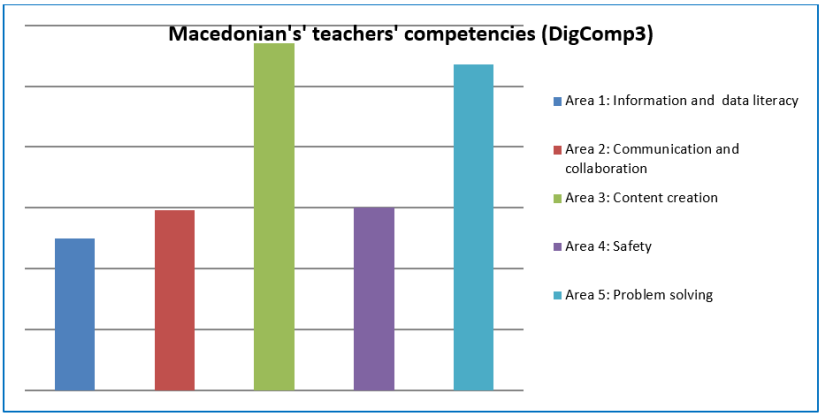

Figure 17. Macedonia's teachers' competencies across Digicomp3

Croatia: Croatia performs strongly in Problem solving and well in content creation, indicating active classroom use and experimentation. In the area of collaboration is relatively stronger than in many countries, suggesting peer learning dynamics. However, AI literacy and safety remain moderate, pointing to limited critical depth and partial ethical integration. This mean that teachers are innovation-driven and collaborative, but lacking sufficient critical and ethical grounding.

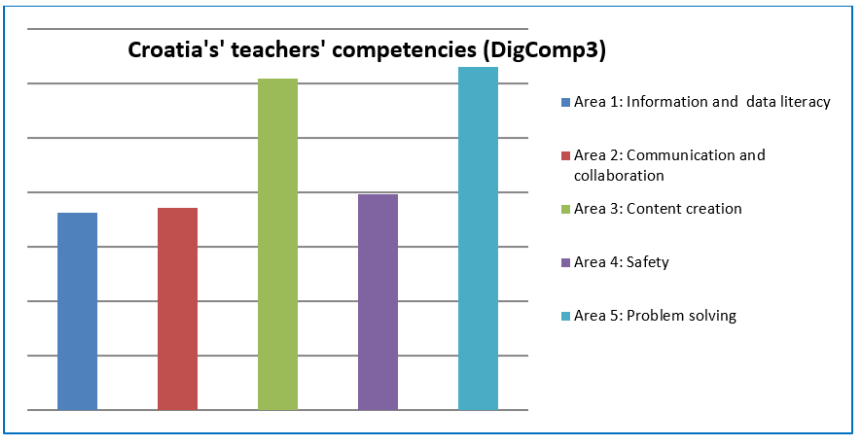

Figure 18. Croatia's' teachers' competencies across Digicomp3

Austria: Austria shows its strongest performance in area 4 - safety, indicating a clear emphasis on ethics, privacy, and responsible AI awareness. However, lower results in content creation and problem solving suggest slower adoption in classroom practice. Information and data literacy and communication areas remain moderate to low, indicating limited critical AI literacy and collaboration. Strong ethical awareness, but cautious and less developed in

practical application and critical engagement. Overall, ethically robust but pedagogically cautious, teachers need support to translate principles into practice.

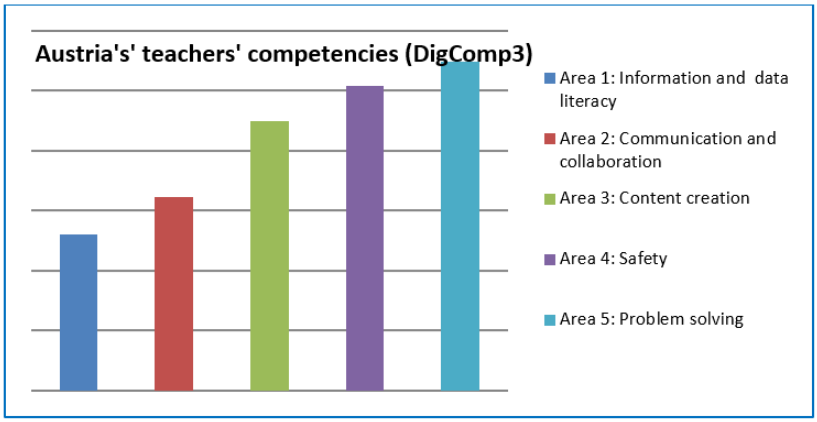

Figure 19. Austria's' teachers' competencies across Digicomp3

Norway: Norway presents a relatively weak and uneven profile, with only moderate performance in Problem solving and Safety. Low scores in areas of content creation, collaboration, and AI literacy indicate limited integration, weak collaboration, and insufficient critical understanding. Results shows fragmented and limited AI integration, with significant gaps across both application and foundational competencies.

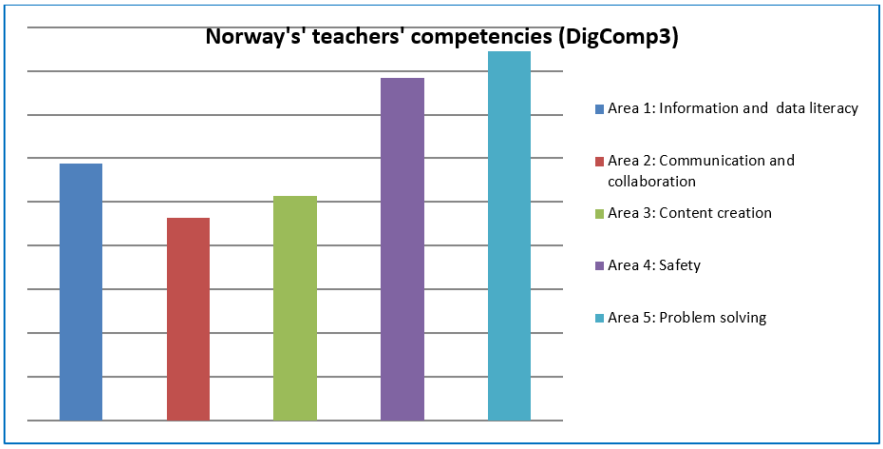

Figure 20. Norway's' teachers' competencies across Digicomp3

Romania: Romania stands out for very strong performance in content creation, indicating high engagement with AI for developing learning materials. However, this strength is not matched in problem solving or collaboration, while AI literacy and safety remain moderate. This indicate that teachers are technically strong in content creation, but unbalanced due to

weaker development of competencies for collaboration, critical use of AI and ethical principals.

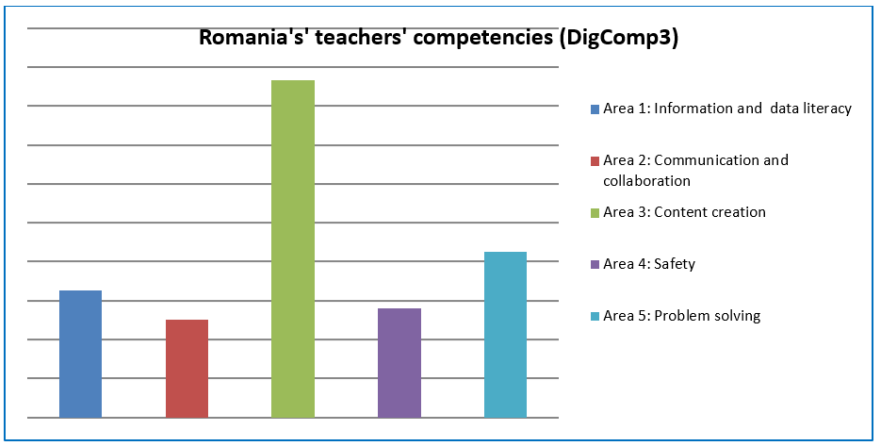

Figure 21. Romania's' teachers' competencies across Digicomp3

Latvia: Latvia's' teachers show strong performance in problem solving and relatively good results in safety, indicating active use of AI alongside ethical awareness. However, weaker performance in AI literacy and collaboration suggests limited depth in critical un derstanding and professional exchange. Results shows that teachers are operationally effective and ethically aware, but lacking deeper critical and collaborative capacity.

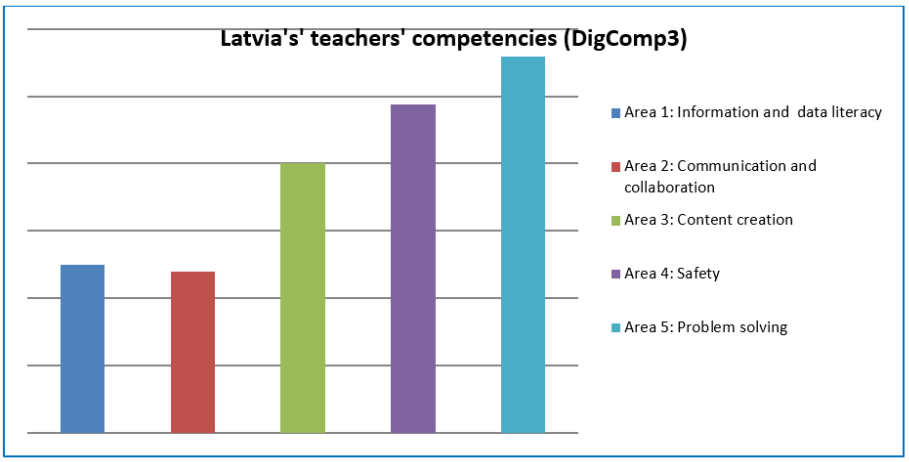

Figure 22. Latvia's teachers' competencies across Digicomp3

Key takeaways from scenarios and examples

Across countries, policy priorities reflect different stages of alignment with the DigComp3 framework:

Spain and Finland are well positioned to scale and consolidate their progress, combining strong performance in content creation and problem solving with growing attention to ethics and AI literacy. Policy in these contexts should focus on embedding comprehensive, system-wide models of AI pedagogy and sharing best practices.

Lithuania and Croatia demonstrate strong practical application, particularly in assessment and classroom innovation but require reinforcement of critical AI literacy and ethical integration to ensure responsible and sustainable use.

North Macedonia, while showing promising classroom-level experimentation, would benefit from clearer national guidelines and structured professional development to strengthen foundational competencies and system coherence.

Austria, by contrast, exhibits strong ethical awareness but slower pedagogical uptake, indicating the need to translate principles into practical classroom application through targeted support and incentives.

Norway faces more pronounced gaps, particularly in collaboration and AI literacy, and should prioritize foundational capacity-building and professional learning structures.

Romania's strength in digital content creation highlights strong technical engagement, but policy should focus on balancing this with inclusion, collaboration, and ethical safeguards.

Similarly, **Latvia** combines solid practical and ethical grounding with weaker critical and collaborative dimensions, suggesting a need to deepen AI literacy and strengthen professional exchange.

- **Overall, effective policy across contexts should aim to balance application, critical understanding, collaboration, and ethics, ensuring that AI integration in education is not only widespread, but also safe, equitable, and pedagogically sound.**
- **Across all countries, the same structural imbalance persists: teachers are more advanced in applying AI, areas 3 and 5, while critical understanding of information and data, area 1 and collaborative capacity Area 2, lag behind, as well ethical awareness, area 4, remains present but not fully embedded in practice.**

Interpretation of pedagogical approaches and competency domains

The relationship between pedagogical approaches to artificial intelligence and competency domains can be more effectively understood when interpreted through a digital competence lens. The three approaches—teaching with AI, teaching for AI, and teaching about AI—reflect different emphases across the key areas of digital competence, shaping how teachers and learners develop knowledge, skills, and attitudes for engaging with AI.

Teachers who adopt a teaching with AI approach demonstrate strong competences in the areas of digital content creation and teaching and learning practices, particularly in designing, orchestrating, and assessing learning processes. AI is primarily used as a functional tool to enhance instruction, support assessment, and optimise feedback. However, this approach shows a more limited engagement with competences related to critical understanding, ethical awareness, and reflective use of AI, which are essential for responsible digital practice.

In contrast, the teaching for AI approach aligns closely with competences related to information and data literacy, communication and collaboration, and safety. By guiding students to use AI tools critically and responsibly, teachers foster awareness of how AI systems function, including issues such as data use, bias, and transparency. This approach also promotes inclusive participation, collaboration, and reflective practices, supporting the development of transversal competences necessary for active and responsible engagement in AI-mediated environments.

The teaching about AI approach reflects a more balanced competence profile across all areas. It contributes to problem solving and conceptual understanding, enabling learners to grasp how AI systems are designed, trained, and applied, while also considering their societal and ethical implications. In this sense, AI is positioned not only as a tool but as a subject of inquiry, supporting deeper cognitive engagement and informed decision-making.

Teachers who do not adopt any AI-related pedagogical approach demonstrate lower levels of competence across all areas, particularly in assessment and feedback, collaboration, and critical engagement with digital technologies. This highlights a gap not only in practical skills but also in confidence and awareness. Addressing this gap requires targeted professional development that supports teachers in building competences across all DigComp3 areas, ensuring a balanced integration of technical, pedagogical, and ethical dimensions of AI use.

Evaluation of policies and curricula

The evaluation of curricula and policies is based on teachers' self-reported perceptions and experiences, analysed qualitatively and interpreted through the DigComp3 framework. Unlike competency scores, these findings do not represent calculated indices but rather thematic patterns derived from survey data.

Policy and curriculum alignment were not measured as quantitative indicators but inferred from teachers' responses regarding institutional support, guidance, and integration of AI-related practices. These responses were thematically analysed and mapped onto DigComp3 areas to identify cross-country patterns of strength and gaps.

The evaluation of curricula and policies across countries reveals a clear misalignment between emerging classroom practices and the system-level structures intended to guide them, when viewed through the lens of the DigComp3 framework. Overall, the findings suggest that while elements of AI integration are present in curricula and policy discourse, they remain fragmented, unevenly implemented, and insufficiently aligned with the full spectrum of competencies required for effective and responsible AI use in education.

From a curricular perspective, stronger alignment is observed in areas related to DigComp3 Area 3 - content creation and Area 5 - problem solving. In several countries, teachers report that curricula increasingly support the use of AI for instructional design, content development, and assessment practices. This reflects a growing emphasis on the practical application of AI, consistent with the higher competency levels identified in these areas. However, this integration is often instrumental rather than conceptual, focusing on how to use AI tools rather than developing a deeper understanding of their implications.

In contrast, weaker alignment is evident in DigComp3 Area 1 - information and data literacy. Curricula appear to place less emphasis on developing critical AI literacy, including the ability to evaluate outputs, understand limitations, and identify bias. This gap is particularly significant, as it limits teachers' capacity to use AI in an informed and reflective manner, and reinforces the pattern observed in the competency data.

A similar issue emerges in DigComp3 Area 2 - communication and collaboration. Policies and curricula rarely provide structured support for teacher collaboration, peer learning, or reflective practice related to AI use. As a result, the development of collective expertise remains largely informal and dependent on individual initiative, rather than being systematically embedded in professional development frameworks.

With regard to DigComp3 Area 4 - safety, the evaluation indicates that ethical considerations—such as privacy, data protection, and academic integrity—are increasingly acknowledged at policy level. However, this awareness is not always translated into clear

operational guidelines or classroom-level practices. In many cases, policies signal expectations without providing concrete implementation pathways, resulting in partial and inconsistent integration.

Across countries, a recurring challenge is the lack of coherence between policy, curriculum, and practice. In some contexts, strong classroom innovation exists without corresponding policy support, while in others, policy frameworks emphasize ethics and compliance but are not matched by pedagogical integration. This disconnect contributes to the observed imbalance in competencies, where teachers are more advanced in applying AI than in critically, collaboratively, and ethically shaping its use.

Overall, the evaluation shows that current curricula and policies tend to prioritise the practical use of AI - Area 3 and Area 5, while insufficiently addressing critical literacy - Area 1, collaboration - Area 2, and the systematic implementation of ethical frameworks - Area 4. As a result, AI integration in education is progressing faster at the level of classroom practice than at the level of coherent curricular and policy design, limiting its potential to align with the full competency vision of the DigComp3 framework.

Cross country analysis: Curriculum and Policy Alignment

Across the participating countries, the evaluation of curricula and policies reveals a shared structural imbalance in how AI is integrated into education systems. While there is clear evidence of progress, particularly in enabling practical classroom use, alignment with the full scope of DigComp3 competencies remains uneven and incomplete.

A consistent pattern across countries is the stronger curricular and policy emphasis on DigComp3 Area 3 - content creation and Area 5 - problem solving. In most contexts, teachers report that AI is increasingly supported for lesson design, instructional delivery, and assessment practices. This suggests that education systems are prioritising the instrumental use of AI, enabling teachers to adopt tools that enhance efficiency and classroom innovation. Countries such as Spain, Finland, and Croatia illustrate this trend, where practice-oriented integration is relatively well supported.

However, this focus on application is not matched by equivalent attention to DigComp3 Area 1 - information and data literacy. Across countries, there is limited evidence of systematic curricular integration of AI literacy, particularly in terms of critical evaluation, understanding of AI systems, and awareness of bias. This gap is visible in both high-performing and emerging systems, indicating that critical competence development is lagging behind technological adoption.

Similarly, DigComp3 Area 2 - communication and collaboration emerges as a weak point across nearly all countries. Policies rarely establish structured mechanisms for teacher collaboration, peer learning, or reflective practice related to AI. Even in contexts with strong classroom innovation, such as Lithuania and Croatia, collaboration remains largely informal. This limits the scalability and sustainability of effective practices, as knowledge exchange depends on individual initiative rather than system design.

With regard to DigComp3 Area 4 - safety, a more nuanced pattern emerges. Many countries—particularly Austria, Spain, and Finland—demonstrate clear policy-level awareness of ethics, privacy, and data protection, often aligned with broader regulatory frameworks. However, this awareness does not consistently translate into operational guidance for teachers, resulting in uneven implementation at classroom level. In other countries, such as North Macedonia and Croatia, ethical considerations are present but less formalised, reflecting a gap between aspiration and structured policy support.

Another key cross-country finding is the misalignment between policy maturity and classroom practice. Two contrasting patterns can be observed:

- In some countries (e.g. Austria), policy frameworks emphasize ethics and compliance, but classroom integration remains limited.
- In others (e.g. Croatia, North Macedonia), classroom innovation is more advanced, but policy frameworks are underdeveloped or fragmented.

Only a few systems, notably Finland and to some extent Spain, show signs of greater coherence between curriculum, policy, and practice, although even these are not fully aligned with all DigComp3 areas.

Overall, across countries, curricula and policies tend to support the practical application of AI - Areas 3 and Area 5, while providing insufficient structure for the development of critical AI literacy - Area 1, collaborative professional practice - Area 2, and the consistent operationalisation of ethical principles - Area 4. This cross-country pattern indicates that AI integration in education is currently driven more by tool adoption and pedagogical experimentation than by systematically designed competency frameworks, limiting alignment with the comprehensive vision of DigComp3.

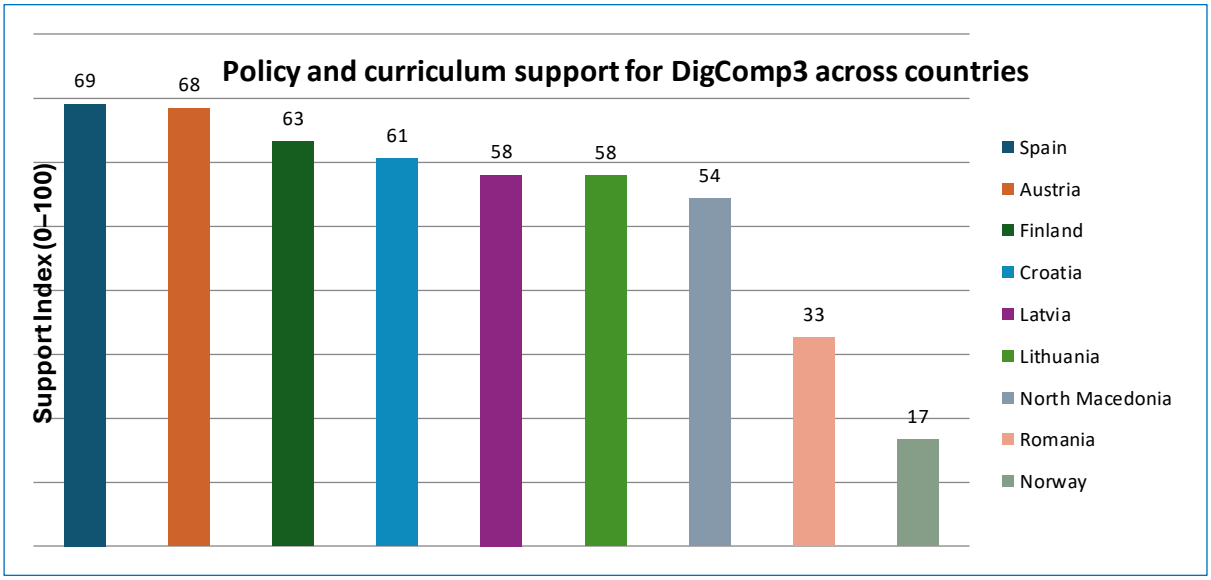

Figure 23. Policy and curriculum support for DigComp3 across countries

The graphic presents a comparative overview of countries based on two related dimensions: the extent to which AI related policies and curricula are implemented in practice, and the degree to which DigComp3 competencies are activated in teaching, using a composite index derived from teacher-reported practices. By displaying these indicators side by side for each country, the graphic illustrates how policy and curriculum intentions translate into observable competence development. Countries with higher index values, such as Spain and Austria, demonstrate more favourable implementation conditions, suggesting that policy intentions and curricular guidance are more effectively translated into classroom practice. Finland and Croatia also score relatively high, indicating stable support structures, although with slightly greater variability in adoption and perceived benefits. These countries show evidence of systemic conditions that enable teachers to integrate AI-related competences more consistently into teaching.

Latvia and Lithuania occupy an intermediate position, reflecting partial policy and curriculum alignment with DigComp3, where competencies are activated in some contexts but not uniformly across the system. In these cases, the graphic suggests that while curricular references or initiatives exist, limitations in implementation capacity or support hinder full realisation. North Macedonia appears below this group, indicating an early stage of policy and curricular development related to AI and digital competence frameworks. This position reflects weaker systemic support and systemic constraints rather than isolated shortcomings at the classroom level.

At the lower end of the index, Romania and Norway show comparatively limited policy and curriculum support for DigComp3 aligned teaching, despite some evidence of teacher engagement with AI. Overall, the graphic reveals a clear gradient across countries, demonstrating that stronger policy and curriculum readiness is closely associated with more supportive conditions for DigComp3 competency development.

Overall, the graphic demonstrates a **positive relationship between policy and curriculum readiness and DigComp3 competency activation** across countries. Where AI is more clearly embedded in curricular frameworks and supported by institutional conditions, teachers report broader activation of relevant competencies. Conversely, limited policy and curricular integration corresponds with weaker observable competence development, highlighting the importance of implementation conditions in bridging policy intentions and classroom realities.

Identification of benefits and challenges

The survey explored teachers' perceptions of the main benefits and challenges associated with the use of artificial intelligence in educational settings. The responses reveal both strong interest in the potential of AI to support teaching and learning, as well as concerns related to ethical, technical, and pedagogical implications. The findings indicate that teachers generally recognize the significant potential of artificial intelligence to improve efficiency and enhance teaching practices. Across all participating countries, educators highlight the value of AI tools in automating routine tasks such as content generation, assessment preparation, and administrative activities.

Another widely recognized benefit is the ability of AI tools to support immediate feedback and data-informed teaching decisions. In several countries, particularly Lithuania, Croatia, and North Macedonia, teachers report that AI-enabled analytics and feedback systems help identify student learning needs more quickly and support more personalized instructional strategies.

Teachers also emphasize the role of AI in supporting personalized and inclusive learning environments. In Finland and North Macedonia, for example, AI technologies are used to adapt learning materials to different student needs and support diverse learning styles.

At the same time, respondents express several important concerns related to the use of AI in education. Ethical considerations, including academic integrity, bias in AI-generated content, and transparency in AI decision-making, are among the most frequently mentioned challenges.

Technical barriers also remain significant in some contexts. Teachers in North Macedonia and Croatia report infrastructure limitations, including insufficient digital resources and connectivity, which may hinder wider adoption of AI tools in classrooms.

Another common concern relates to AI literacy and professional readiness, is that many educators indicate that they lack the training needed to critically evaluate AI outputs or integrate AI tools effectively into pedagogical practices.

Finally, teachers highlight the importance of maintaining human-centred teaching practices. Some respondents express concern that excessive reliance on AI technologies could reduce meaningful teacher–student interaction or weaken students' critical thinking skills.

According to DigComp3, the reported benefits and challenges of AI use in education reflect the same structural pattern observed in the DigComp3 aligned competency results. Overall, teachers tend to perceive the benefits of AI primarily in areas related to application and efficiency, while the challenges are concentrated in critical understanding, ethical use, and systemic support.

In terms of benefits, teachers most frequently highlight improvements in teaching and learning processes, particularly in relation to DigComp3 Area 5 - Problem solving and Area 3 - Content creation. AI is seen as a tool that enhances lesson planning, supports assessment practices, and enables the creation of engaging and adaptive learning materials. These perceived advantages align with the higher competency scores observed in these areas, confirming that teachers are already operationally confident in using AI to support instructional tasks. Additionally, benefits related to personalisation and inclusion suggest emerging potential within Area 2 - communication and collaboration, although this remains unevenly developed across contexts.

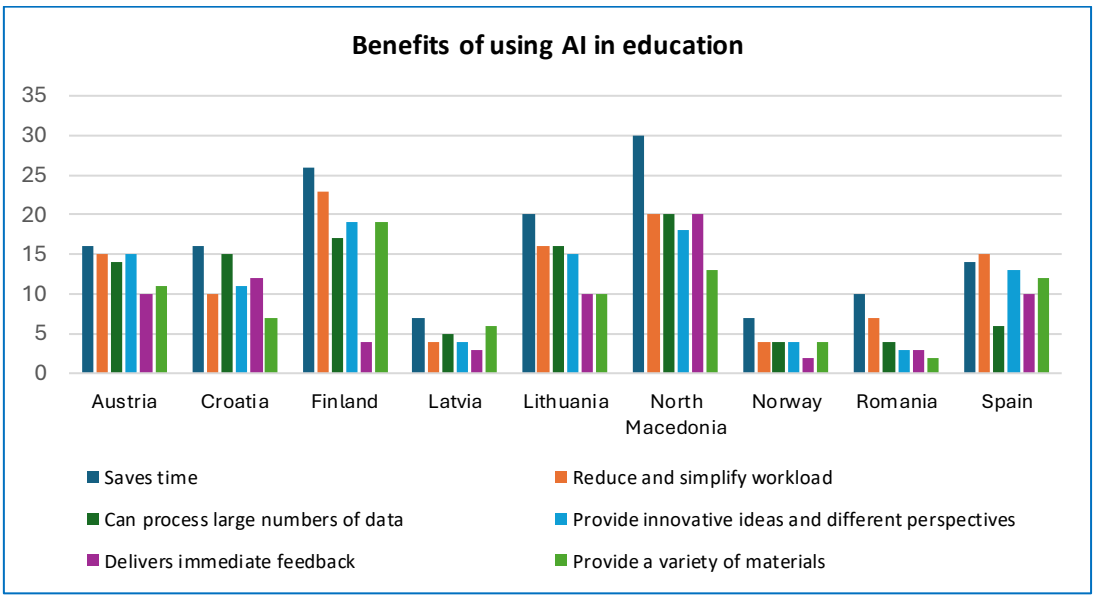

Figure 24. Six' most significant benefits of using AI in education

However, the challenges identified by teachers point to significant gaps in other DigComp3 areas. A key concern relates to limited AI literacy Area 1 - information and data literacy, particularly in evaluating the reliability, accuracy, and bias of AI-generated content. This indicates that while teachers use AI tools, they often lack the depth of understanding required for critical and informed decision-making. Closely related are concerns around ethics, privacy, and academic integrity, corresponding to Area 4 - safety. Although awareness of these issues is present, the findings suggest that teachers do not yet consistently integrate ethical considerations into everyday classroom practice.

Another major challenge concerns collaboration and professional learning - Area 2. Teachers report limited opportunities for structured exchange, peer learning, and shared reflection on AI use. This lack of collaborative infrastructure constrains the development of collective expertise and slows the diffusion of effective practices across schools and systems.

Finally, systemic challenges such as **lack of clear guidelines, insufficient training, and uneven institutional support** cut across all DigComp3 areas. These barriers reinforce the observed imbalance: teachers are able to experiment with AI at a practical level, but without sufficient support to develop **critical, ethical, and collaborative competencies**.

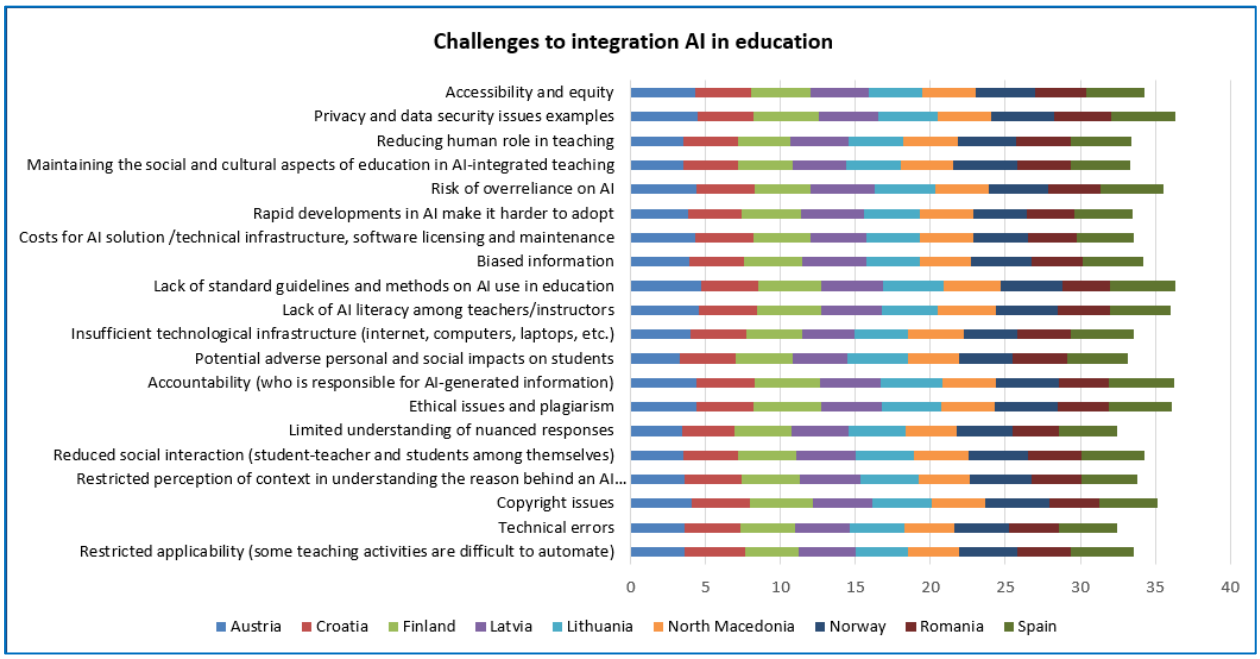

Figure 25. Challenges to integration of AI in education

Taken together, the findings show that, the perceived benefits of AI are closely aligned with areas where teachers already demonstrate higher competence, application and content creation, while the challenges reflect weaker areas related to critical understanding, ethical integration, and collaboration. This indicates that the current trajectory of AI adoption in education is driven more by practical utility than by a fully developed framework of critical, ethical, and collaborative competence, as envisioned in the DigComp3 framework.

Teacher perceptions show a strong and systematic alignment with the composite policy and curriculum readiness scores across countries. In countries with higher composite scores, teachers tend to report more benefits of AI use and fewer challenges, indicating that supportive policies and curricular conditions shape more positive perceptions and confidence in using AI. These favourable perceptions are reflected in higher adoption levels and more consistent integration of AI into teaching practice.

Conversely, in countries with lower composite scores, teachers report fewer perceived benefits and a higher number of challenges, suggesting that limited policy guidance, insufficient training, and infrastructural constraints negatively influence how AI is viewed and used. Countries in the intermediate range display mixed perceptions, where teachers recognise the potential value of AI but still experience notable barriers that constrain regular use. Overall, the alignment between teacher perceptions and composite scores indicates that

policy and curriculum readiness strongly condition how teachers perceive, value, and engage with AI, reinforcing the role of systemic support in shaping practice.

Cross-country patterns on teachers' AI integration perceptions

The analysis also reveals several country-specific patterns in how teachers perceive the benefits and challenges of AI integration.

Spain and Finland demonstrate a balanced perspective, where teachers recognize the benefits of AI while also emphasizing the importance of ethical safeguards and data protection.

Lithuania and Croatia appear to be strongly innovation-oriented, with teachers actively experimenting with AI tools, but also reporting challenges related to infrastructure and training.

Austria presents an ethics-oriented profile, where teachers emphasize responsible AI use, academic integrity, and regulatory compliance.

North Macedonia shows strong enthusiasm for AI-supported personalization and adaptive learning, although respondents highlight the need for stronger institutional support and professional development opportunities.

In **Norway**, teachers demonstrate awareness of responsible AI principles but report relatively lower levels of classroom-level AI use, suggesting the need for more practical training and pedagogical models.

Teachers in **Latvia** appear cautious in adopting AI technologies, indicating uncertainty about reliability and practical classroom implementation. Meanwhile, teachers in **Romania** show strong interest in AI tools but report limited experience and a need for clearer guidance and professional development.

Overall, the findings highlight a growing interest in AI-supported teaching practices across Europe, while also emphasizing the importance of **strengthening teacher training, institutional policies, and ethical governance frameworks** for responsible AI integration.

Overview of key findings - teachers

The analysis of survey responses from teachers and educational leaders across participating countries reveals several important trends regarding the current use of artificial intelligence in education. Table 1 summarizes the main findings emerging from the study.

Key findings	Description	Implication in education
Widespread but uneven AI adoption	AI tools are being used across all participating countries, but levels of integration vary significantly between institutions and national contexts.	Policies and support structures are needed to ensure more balanced and sustainable AI integration.
Teaching with AI dominates	Most teachers use AI tools primarily to support lesson preparation, content generation, and administrative tasks.	Greater focus is needed on developing pedagogical approaches that integrate AI more deeply into learning processes.
Limited focus on AI literacy	Teaching about AI and teaching for AI remain fewer common practices in classrooms.	Teacher training should emphasize AI literacy, critical evaluation of AI outputs, and responsible use of AI technologies.
Strong perceived benefits	Teachers report increased efficiency, improved lesson preparation, and enhanced opportunities for personalized learning.	AI has significant potential to support innovation in teaching when supported by appropriate training and resources.
Ethical and legal concerns remain significant	Teachers frequently highlight concerns related to academic integrity, bias, and data privacy.	Clear institutional policies and ethical guidelines are necessary for responsible AI implementation.
Demand for professional development	Teachers across countries express strong interest in training related to AI tools, pedagogical integration, and ethical considerations.	Professional development programs should be prioritized to strengthen AI-related competencies among educators.

Table 1. Source, authors' analysis based on survey responses (N = 287)

The findings suggest that artificial intelligence is gradually becoming part of everyday teaching practice, although its integration remains uneven across educational systems. Most educators

currently use AI tools primarily to support **instructional preparation and administrative efficiency**, rather than as core components of classroom pedagogy. This indicates that AI adoption is still in an **early-to-intermediate stage**, where experimentation is common but systematic integration remains limited.

At the same time, teachers demonstrate a growing awareness of both the **opportunities and risks associated with AI technologies**. While educators recognize the potential of AI to enhance creativity, personalization, and efficiency in teaching, they also emphasize the importance of ethical safeguards, data protection, and responsible use of AI-generated content.

A consistent finding across all participating countries is the **strong demand for professional development**. Teachers indicate that they require further training not only in the technical use of AI tools but also in pedagogical strategies, ethical risk assessment, and critical evaluation of AI outputs.

These findings highlight the importance of **coordinated efforts at institutional and policy levels** to support teachers in developing the competencies required for responsible and effective AI integration in education.

Conclusion and recommendations- teachers

The survey findings demonstrate that artificial intelligence is becoming an increasingly visible element of educational practice. Teachers in participating countries are experimenting with AI mainly to support lesson planning, generate teaching materials, and assist with assessment tasks. However, the level of AI integration varies widely and is still largely driven by individual educators rather than coordinated institutional strategies.

Although many teachers acknowledge AI's capacity to enhance efficiency, creativity, and personalization in teaching, several barriers continue to limit its effective use. These include insufficient AI related knowledge, ethical and legal uncertainties, uneven technological infrastructure, and the lack of formal policies and guidance within institutions.

Overall, the results indicate that sustainable and responsible AI integration in education requires aligned action across institutional, national, and European level. Priority areas include strengthening teachers' competencies, establishing clear governance frameworks, and ensuring fair access to AI-supported learning opportunities.

The survey also shows that teachers are increasingly conscious of both the opportunities and the systemic challenges associated with digital technologies and AI. Despite growing adoption, AI use remains predominantly operational rather than pedagogically transformative. This

supports international findings that technology alone does not improve learning outcomes. Educational impact depends primarily on intentional pedagogical design[3].

Reported benefits such as time efficiency, improved access to resources, and support for differentiation suggest that many teachers have reached an intermediate level of digital competence. Nevertheless, persistent challenges, particularly limited training, ethical concerns, student misuse, and weak alignment with curricula, highlight gaps in more advanced competencies, including critical use of technology, assessment design, and learner empowerment.

From an analytical standpoint, the education system appears to be in a transitional stage. Teachers are gradually moving away from purely instrumental uses of technology toward more transformative applications that support learning design, critical thinking, and student agency. However, this shift remains incomplete. Evidence continues to point to a disconnect between improved task performance and deeper learning when AI is used without structured pedagogical guidance[4].

In competence DigComp3 framework terms, the system shows clear strengths in access to digital resources, professional engagement, and initial AI adoption, while notable weaknesses persist in assessment innovation, learner empowerment, and the development of digital and AI literacy.

Importantly, the findings suggest that teachers are not opposed to innovation. Instead, they require coherent, long-term, competency-based support to move beyond basic adoption toward meaningful and pedagogically sound integration of AI.

[3] https://digital-skills-jobs.europa.eu/en/latest/news/oecd-digital-education-outlook-2026-how-generative-ai-can-support-learning-when-used

[4] https://www.oecd.org/en/publications/oecd-digital-education-outlook-2026_062a7394-en.html

RECOMMENDATIONS FOR TEACHERS

Building on the survey evidence and aligned with international competence frameworks, the following recommendations emphasize pedagogical transformation rather than simple tool adoption:

1. **Move from technical use to pedagogical design**. Educators should go beyond using AI for efficiency and instead design learning activities in which technology actively supports critical thinking, creativity, collaboration, and reflective learning.

2. **Apply AI as support, not a substitute**. AI should be used to assist with planning, feedback, and differentiation, while pedagogical decisions and instructional authority remain firmly with teachers. Overdependence on AI should be avoided, as it risks reducing student engagement and deeper learning.

3. **Explicitly develop student AI and digital literacy**. Students should be taught how to critically assess AI generated content, understand limitations and bias, and use AI responsibly and ethically . Instruction should promote active co creation rather than passive consumption and address ethical considerations and academic integrity.

4. **Rethink assessment** in AI supported contexts. Assessment practices should be redesigned to emphasize reasoning, originality, and learning processes. Greater use of oral, in class, and project based assessments can help address concerns about authenticity and misuse of AI.

5. **Ensure ongoing professional development**. AI related competence should be supported through continuous professional development rather than one off training. Teachers should engage in collaborative learning communities, reflective experimentation, and shared practice across schools and systems.

6. **Involve teachers** in tool selection and design. Educators should be actively involved in choosing, adapting, and evaluating digital tools to ensure alignment with curricular goals and classroom realities. Their feedback is essential to improve usability and pedagogical relevance.

7. Preserve a **human centred** approach to education. AI implementation should reinforce, not weaken the relational aspects of teaching. Effective use of technology must continue to prioritize interaction, feedback, emotional support, and meaningful teacher–student relationships.

Examination of AI usage – leaders

Institutional purposes of AI adoption in education

The rapid advancement of artificial intelligence (AI) technologies is transforming societies across the globe, reshaping economic systems, communication practices, and institutional structures. Education is among the sectors experiencing significant impact from these developments. In recent years, AI technologies have increasingly been explored as tools for supporting teaching and learning processes, improving administrative efficiency, and enhancing institutional decision-making.

Artificial intelligence in education (AIED) encompasses a wide range of applications, including adaptive learning platforms, intelligent tutoring systems, automated assessment tools, learning analytics, and generative AI technologies. These tools have the potential to personalize learning experiences, provide real-time feedback to students, and assist educators in designing more effective instructional strategies.

At the same time, AI technologies can support institutional management by automating administrative processes, analyzing large volumes of educational data, and facilitating evidence-based decision-making. As educational institutions become more digitally connected and data-driven, AI systems are increasingly viewed as potential tools for improving institutional performance and supporting strategic planning.

However, the integration of AI technologies into educational systems also raises important questions regarding governance, ethics, data protection, and the role of human decision-making. Ensuring that AI technologies are implemented responsibly and transparently has therefore become a central concern for policymakers, educational institutions, and researchers.

Key interpretation of survey results

The rapid development of artificial intelligence (AI) technologies is transforming multiple sectors of society, including education. Educational institutions are increasingly exploring the potential of AI tools to enhance teaching and learning processes, improve administrative efficiency, and support data-driven decision-making. Within this transformation, educational leaders play a critical role in shaping how AI technologies are introduced, governed, and integrated into institutional practices.

This report presents the results of a survey conducted among educational leaders and decision-makers from several European countries. The study explores their experiences,

perceptions, and expectations regarding the use of artificial intelligence in educational leadership and institutional management.

The findings indicate that AI technologies are gradually becoming part of the professional practices of educational leaders. A majority of respondents reported using AI tools in their everyday work, although the intensity of use remains moderate. In most cases, AI technologies are primarily used to support administrative tasks, such as information retrieval, document preparation, communication management, and organizational planning.

At the same time, educational leaders demonstrate strong awareness of the potential benefits of AI technologies in education. Respondents emphasized the ability of AI tools to improve administrative efficiency, support data analysis, enhance teaching and learning processes, and facilitate more informed decision-making within educational institutions.

Despite these positive perceptions, the results also reveal several challenges that may hinder the effective adoption of AI technologies. These challenges include limited technological infrastructure, insufficient technical expertise among staff, financial constraints related to implementation, and concerns regarding ethical governance, data protection, and regulatory compliance.

The survey findings further suggest that many educational institutions are still in the early stages of developing formal governance frameworks for AI use. While some institutions have already introduced or are planning to introduce institutional AI policies, others continue to rely primarily on individual experimentation with AI tools rather than systematic institutional strategies.

Another important finding relates to the role of institutional leadership in managing the transition toward AI-supported educational environments. Educational leaders recognize the importance of professional development, stakeholder engagement, and clear strategic planning as essential components of successful AI adoption.

Overall, the results suggest that educational institutions are currently in a **transitional phase of AI adoption**, characterized by growing awareness, initial experimentation, and gradual development of governance frameworks.

Based on these findings, the report proposes several recommendations for supporting responsible and effective AI adoption in educational systems. These include strengthening AI literacy and professional development for educational leaders and educators, developing institutional governance frameworks for ethical AI use, promoting collaborative policy development, and supporting pilot initiatives that allow institutions to experiment with AI technologies in real educational contexts.

By addressing these priorities, educational institutions and policymakers can ensure that AI technologies contribute to more innovative, inclusive, and effective educational systems while maintaining strong ethical and governance standards.

The role of educational leadership in AI adoption

Educational leaders play a crucial role in shaping how emerging technologies are adopted and implemented within educational institutions. School leaders, institutional managers, and other decision-makers are responsible for developing strategic directions, establishing governance frameworks, and ensuring that technological innovations align with institutional values and educational goals.

The adoption of AI technologies is not merely a technical process. It represents a broader organizational transformation that requires effective leadership, institutional readiness, and stakeholder engagement. Educational leaders must balance the potential benefits of AI technologies with concerns related to ethics, privacy, and accountability. In addition, they must ensure that educators and students are adequately prepared to use AI tools in responsible and meaningful ways. Leadership also plays a central role in fostering a culture of innovation within educational institutions. Leaders who support experimentation, professional development, and collaborative decision-making can create environments that encourage responsible technological adoption while minimizing potential risks.

As AI technologies become more widely available, educational leaders increasingly face the challenge of determining how these tools should be integrated into institutional processes, teaching practices, and governance structures.

Opportunities and challenges of AI in educational institutions

The integration of artificial intelligence into educational environments presents both significant opportunities and complex challenges. On the one hand, AI technologies offer the potential to enhance administrative efficiency, reduce routine workloads, and support data-driven decision-making. Educational leaders can use AI tools to analyze patterns in student performance, identify areas for improvement in institutional processes, and optimize resource allocation.

AI technologies can also contribute to improving teaching and learning experiences. Personalized learning systems can adapt educational content to the needs of individual students, while learning analytics tools can provide valuable insights into student engagement and academic progress.

On the other hand, the adoption of AI technologies raises several important concerns. Issues related to data privacy, algorithmic bias, transparency, and accountability are frequently highlighted in discussions about AI governance. Educational institutions must ensure that AI systems operate in ways that respect ethical standards, protect student data, and maintain human oversight in critical decision-making processes.

Furthermore, many educational institutions face practical challenges when attempting to integrate AI technologies. These challenges include limited technological infrastructure, insufficient digital competencies among staff, financial constraints, and the absence of clear institutional guidelines for AI use.

Understanding how educational leaders perceive these opportunities and challenges is therefore essential for developing effective strategies for responsible AI adoption in education.

The second purpose of this study is to explore how educational leaders perceive and use artificial intelligence technologies within the context of educational leadership and institutional management. By analyzing the experiences and perspectives of educational leaders from several European countries, the study aims to provide insights into the current stage of AI adoption in educational institutions.

More specifically, the study seeks to:

- examine the extent to which educational leaders currently use AI technologies in their professional activities;
- explore whether educational institutions have developed or are planning to develop policies and governance frameworks related to AI use;
- identify perceived benefits and challenges associated with AI adoption in educational leadership;
- investigate the ethical, legal, and organizational considerations associated with AI integration;
- analyse institutional strategies and initiatives aimed at supporting AI adoption.

Through this analysis, the study aims to contribute to a deeper understanding of how AI technologies are shaping the evolving role of educational leadership in contemporary educational systems.

Artificial Intelligence and educational leadership

The adoption of emerging technologies within educational institutions is strongly influenced by the role of educational leadership. School leaders, institutional managers, and other decision-makers play a central role in shaping the direction of technological innovation, allocating resources, and establishing policies that guide technology use.

Educational leadership in the digital age increasingly involves navigating complex technological ecosystems and managing processes of digital transformation. Leaders are expected not only to support the adoption of digital tools but also to ensure that technological innovation contributes to meaningful improvements in educational quality and institutional performance.

In the context of artificial intelligence, educational leaders face several important responsibilities. These include evaluating the potential benefits and risks of AI technologies, establishing governance frameworks for responsible AI use, and ensuring that educators and students possess the necessary competencies to engage with AI tools effectively.

Research suggests that successful technological innovation in educational institutions requires leadership that is both visionary and collaborative. Leaders who promote professional development, encourage experimentation with new technologies, and engage stakeholders in decision-making processes are more likely to foster environments where technological innovation can thrive.

At the same time, leadership must also address concerns related to transparency, accountability, and ethical governance. AI systems used in educational contexts must be implemented in ways that respect institutional values and protect the interests of students and educators.

Ethical and legal frameworks for artificial intelligence in education

The rapid expansion of artificial intelligence technologies has prompted increasing attention to the ethical and legal implications of AI use in education. Issues related to privacy, transparency, fairness, and accountability are central to discussions about responsible AI implementation.

One of the most widely discussed concerns relates to the protection of personal data. Educational institutions collect large amounts of information about students, including academic performance, behavioural patterns, and engagement data. When AI systems analyze such data, institutions must ensure compliance with data protection regulations and safeguard the privacy of students and staff.

Within the European context, the General Data Protection Regulation (GDPR) provides a comprehensive legal framework governing the processing of personal data. Educational institutions using AI technologies must ensure that data collection and analysis practices comply with GDPR requirements related to consent, transparency, and data minimization.
In addition to data protection, concerns have also been raised about algorithmic bias and fairness in AI systems. Machine learning algorithms are often trained on large datasets that may contain historical biases. If not properly addressed, these biases can lead to discriminatory outcomes or unequal treatment of certain groups of students.
International organizations have begun to develop ethical guidelines to address these issues. For example, UNESCO has published recommendations on the ethics of artificial intelligence, emphasizing the importance of human-centred AI, transparency, and accountability. Similarly, the European Union has proposed regulatory frameworks aimed at ensuring the development of trustworthy AI systems.
These frameworks highlight the importance of implementing AI technologies in ways that promote fairness, protect fundamental rights, and ensure responsible governance.

Artificial Intelligence and data-driven decision making in education

Another significant area of research concerns the role of AI technologies in supporting data-driven decision-making within educational institutions. Educational institutions increasingly rely on digital data to evaluate institutional performance, monitor student progress, and guide strategic planning.
AI-powered analytics tools can process large datasets and identify patterns that may not be immediately visible to human decision-makers. For example, learning analytics systems can analyze student engagement patterns and identify students who may be at risk of academic difficulties.
Similarly, predictive analytics tools can support educational leaders in planning resource allocation, improving curriculum design, and developing targeted interventions aimed at improving student outcomes.
Proponents of data-driven decision-making argue that AI technologies can enhance the effectiveness of institutional leadership by providing timely and evidence-based insights. However, researchers also emphasize the importance of maintaining human oversight in data-driven decision processes to ensure that algorithmic recommendations are interpreted responsibly and contextually.

Challenges and risks of AI adoption in education

Despite the growing interest in AI technologies, the adoption of AI in educational institutions faces several challenges.

One of the most frequently cited barriers is **the lack of technical expertise among educators and institutional leaders.** Many educational professionals report limited familiarity with AI technologies and may feel uncertain about how these tools should be integrated into educational practice.

Another important challenge relates to technological infrastructure. **Implementing AI systems often requires advanced digital infrastructure**, including reliable data systems, secure storage solutions, and specialized software platforms. Institutions with limited technological resources may struggle to adopt such technologies effectively.

Financial constraints also represent a significant barrier. The development, implementation, and maintenance of AI systems may require substantial investments in technology, training, and support services.

In addition to these practical challenges, researchers also emphasize the importance of addressing broader **ethical and societal concerns associated with AI technologies**. Issues related to academic integrity, the potential overreliance on automated systems, and the possible reduction of human interaction in educational environments are frequently highlighted in discussions about AI adoption.

These challenges suggest that successful AI integration in education requires not only technological innovation but also strong institutional leadership, effective governance frameworks, and sustained investment in professional development.

European Policy Frameworks for Artificial Intelligence in Education

The increasing integration of artificial intelligence in education is also reflected in broader European policy initiatives aimed at supporting digital transformation across sectors. The European Union has developed several strategic frameworks that emphasize the importance of responsible AI adoption and digital innovation within education systems.

One of the key strategic documents is the Digital Compass, The European way for the digital decade, published by the European Commission in 2021. This initiative outlines the European Union's vision for achieving digital transformation by 2030 and highlights the importance of developing digital skills, secure digital infrastructures, and digitally enabled public services. Within this framework, education systems are recognized as critical environments for fostering digital competence and preparing citizens for the digital economy.

Another important initiative is the Digital Education Action Plan (2021–2027), which provides a strategic roadmap for supporting the digital transformation of education across Europe. The Action Plan emphasizes the need to strengthen digital education ecosystems, enhance the digital competencies of educators and learners, and promote the responsible use of emerging technologies such as artificial intelligence and learning analytics.

In addition, the European Union has introduced a comprehensive European Strategy for Artificial Intelligence, which aims to promote the development of trustworthy AI systems aligned with European values and fundamental rights. A central component of this strategy is the development of the EU Artificial Intelligence Act, which establishes regulatory guidelines for the use of AI technologies, particularly in high-risk contexts such as education.

The AI Act emphasizes the importance of transparency, accountability, and human oversight in the use of AI systems. Educational institutions that adopt AI technologies must ensure that these systems operate in ways that protect fundamental rights, prevent discrimination, and maintain the integrity of educational processes.

Furthermore, the European Commission has developed frameworks aimed at strengthening digital competencies among educators and learners. One of the most widely used frameworks is DigComp3 (Digital competence framework for educators [5]), which outlines key competencies required for educators to effectively integrate digital technologies into teaching and learning processes.

Together, these European policy initiatives highlight the growing recognition that artificial intelligence and digital technologies will play a crucial role in shaping the future of education. They also underscore the importance of developing governance frameworks, professional development initiatives, and institutional strategies that support responsible and inclusive digital transformation.

Examination of management-level support

The questionnaire for leaders consisted of several thematic sections addressing different aspects of AI integration in educational institutions. These sections included:

- current use of AI technologies by educational leaders;
- time spent using AI tools in professional activities;
- institutional policies and governance frameworks related to AI;
- elements considered important for AI policy development;
- communication strategies related to AI adoption;

[5] https://joint-research-centre.ec.europa.eu/digcompedu_en

• involvement of educators and students in AI-related discussions;
• institutional initiatives supporting AI adoption;
• perceived advantages of AI technologies;
• perceived challenges and barriers to AI adoption;
• ethical and legal concerns related to AI use;
• observed institutional improvements resulting from AI use.

The questionnaire included both closed-ended questions and Likert-scale items that allowed respondents to express their level of agreement with various statements regarding the use and impact of AI technologies in educational contexts.

Sample and Participating Countries

The study involved educational leaders from multiple European countries representing different educational systems and institutional contexts. Respondents included school leaders, institutional managers, and other decision-makers responsible for strategic planning and institutional governance within educational institutions.

In total, 51 educational leaders participated in the survey. The respondents represented educational institutions from the following countries:

Country	Number of respondents
Austria	15
Spain	11
North Macedonia	9
Finland	5
Lithuania	4
Latvia	4
Romania	1
Norway	2

Table 2. Number of participants

Although the distribution of respondents across countries is not perfectly balanced, the sample provides valuable insights into the perceptions and experiences of educational leaders from diverse educational contexts across Europe.

Cross-country patterns on leaders' AI integration perceptions

Use of AI technologies in everyday professional activities of educational leaders

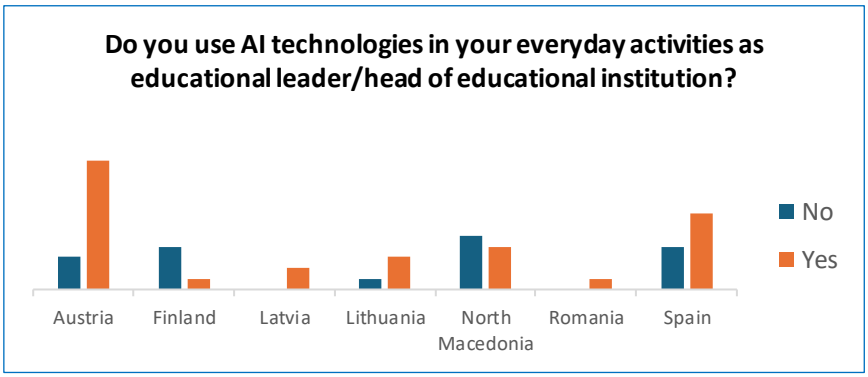

Figure 26: Usage of AI by leaders

The survey explored whether educational leaders and heads of educational institutions currently use artificial intelligence (AI) technologies in their everyday professional activities. The results indicate that AI technologies are already present in the professional practices of a majority of respondents, although adoption levels vary considerably across countries.

Overall, **63.8% of the surveyed educational leaders reported using AI technologies in their daily professional activities**, while **36.2% indicated that they do not currently use AI tools**. These findings suggest that AI is gradually becoming part of leadership practices in educational institutions, though its integration remains uneven.

A particularly high level of AI adoption is observed in **Austria**, where **80% of respondents (12 out of 15)** reported using AI technologies in their everyday professional activities. This suggests that educational leaders in Austria demonstrate a relatively advanced level of engagement with emerging digital tools and innovation in institutional management.

In **Spain**, a clear majority of respondents also reported using AI technologies. Specifically, **63.6% of Spanish respondents (7 out of 11)** indicated active AI use, while **36.4% reported not using AI tools**. This distribution reflects a moderate but growing level of AI integration among educational leaders.

In **Lithuania**, **75% of respondents (3 out of 4)** reported using AI technologies, indicating a relatively strong openness to technological innovation within leadership practices.

By contrast, **Finland presents the lowest level of AI use among the surveyed countries**. Only **20% of respondents (1 out of 5)** reported using AI technologies, while **80% indicated that**

they do not currently use them. This finding may reflect a more cautious or critical approach toward AI adoption within educational leadership.

In **North Macedonia**, responses are almost evenly distributed, with **44.4% of respondents reporting AI use and 55.6% indicating non-use**. This balanced distribution suggests that the system may currently be in a **transitional phase**, where awareness of AI technologies is increasing but systematic implementation within leadership practices is still developing.

In **Latvia and Romania**, all respondents reported using AI technologies. However, the number of responses from these countries is relatively small, which limits the possibility of drawing broader conclusions.

Cross-country patterns

The comparative analysis highlights substantial differences in AI adoption among educational leaders across countries. While Austria, Lithuania, and Spain demonstrate relatively high levels of AI engagement, other contexts—particularly Finland and North Macedonia—appear to be at earlier stages of adoption.

These variations may be associated with several contextual factors, including:

- the presence of **national digital education strategies and AI policies**,
- access to **professional development opportunities focused on digital leadership**,
- institutional support for technological innovation, and
- the overall **digital maturity of educational systems**.

The findings suggest that while AI technologies are increasingly accessible, **their integration into educational leadership practices remains inconsistent across national contexts**.

Key findings

The results indicate that **AI technologies are beginning to influence leadership practices in education**, with nearly two-thirds of surveyed educational leaders reporting some level of use. However, the uneven distribution of responses across countries points to persistent disparities in digital readiness and institutional support.

Implications for policy and leadership development

The findings highlight the need to strengthen the capacity of educational leaders to effectively integrate AI technologies into institutional management and decision-making processes.

In particular, policy initiatives and project interventions should focus on:

- strengthening **AI literacy and digital leadership competencies among school leaders**,
- developing **guidelines for responsible and ethical AI use in educational institutions**,
- supporting **cross-national exchange of good practices**, and

- promoting **systematic institutional strategies for AI-supported educational management**.

Strengthening these dimensions would enable educational leaders to more effectively leverage AI technologies as tools for innovation, improved decision-making, and enhanced institutional performance.

Implementation or planned implementation of AI policies in educational institutions

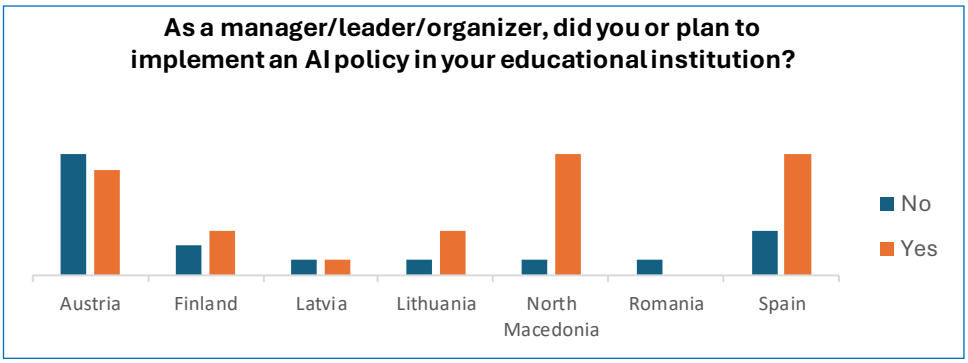

Figure 27: Implemented AI policy or planned

Implementation, or future planning to implement of an AI policy within their educational institutions was examine as crucial point of successful adoption of AI. The responses provide important insight into the extent to which AI adoption is being translated into **institutional strategies and governance frameworks**.

The results indicate that **63.8% of surveyed educational leaders reported that their institutions have implemented or are planning to implement an AI policy**, while **36.2% indicated that such policies are currently not in place nor planned**. These findings suggest that while AI is increasingly present in educational practice, the process of formalizing its use through institutional policy frameworks is still evolving.

Significant differences emerge across the participating countries.

In **North Macedonia**, the vast majority of respondents reported that their institutions have implemented or plan to implement an AI policy. Specifically, **88.9% of respondents (8 out of 9)** indicated a positive response, while only one respondent reported that such policy initiatives are not currently in place. This suggests a strong level of institutional awareness regarding the need to regulate and guide the use of AI technologies within educational environments.

A similarly positive trend is observed in **Spain**, where **72.7% of respondents (8 out of 11)** indicated that their institutions have implemented or plan to implement an AI policy. This

points to growing strategic engagement with AI governance in Spanish educational institutions.

In **Lithuania**, **75% of respondents (3 out of 4)** reported that their institutions have implemented or plan to implement AI-related policies, indicating a relatively strong orientation toward institutionalizing AI use.

In **Finland**, the responses also suggest a moderate level of policy development, with **60% of respondents (3 out of 5)** reporting the existence or planned implementation of AI policies, while **40% reported no such initiatives**.

A more balanced distribution of responses is observed in **Latvia**, where half of the respondents reported that their institutions plan to implement AI policies, while the other half indicated that no such initiatives currently exist.

In **Austria**, the responses are almost evenly divided, with **46.7% of respondents reporting the implementation or planned implementation of AI policies**, while **53.3% indicated that no such policies are currently in place**. This suggests that although AI technologies are already used by many educational leaders in Austria, institutional policy frameworks may still be under development.

Finally, in **Romania**, the single response available indicates that no AI policy has been implemented or planned within the respondent's institution. However, due to the very small number of responses, this result should be interpreted with caution.

Comparative insights

The comparative analysis suggests that **institutional AI governance is emerging across European educational systems but remains unevenly developed**. While several countries demonstrate strong engagement with the development of AI-related institutional policies, others appear to rely primarily on individual experimentation with AI tools rather than structured policy frameworks.

Importantly, the findings indicate that **AI adoption among educational leaders does not always correspond with the existence of institutional AI policies**. In some contexts, leaders actively use AI technologies despite the absence of formal governance structures, highlighting a potential gap between technological adoption and institutional regulation.

Key findings

The results reveal that **the institutionalization of AI through formal policy frameworks is still at an early stage across many educational systems**, even in contexts where AI technologies are already being used by educational leaders.

Implications for educational policy and governance

The findings highlight the importance of strengthening **institutional governance frameworks for AI in education**. As AI technologies become more widely used in educational settings, the absence of clear policies may create risks related to ethical use, data protection, transparency, and responsible implementation.

Therefore, educational institutions and policymakers should consider:

- developing **clear institutional AI policies and governance frameworks**;
- establishing **guidelines for responsible and ethical AI use in educational leadership and administration**;
- supporting educational leaders through **targeted training in AI governance and digital strategy development**;
- promoting **alignment between national digital education strategies and institutional practices**.

Strengthening these dimensions would help ensure that AI technologies are integrated into educational institutions in a **strategic, responsible, and sustainable manner**.

Key elements included in institutional AI policies

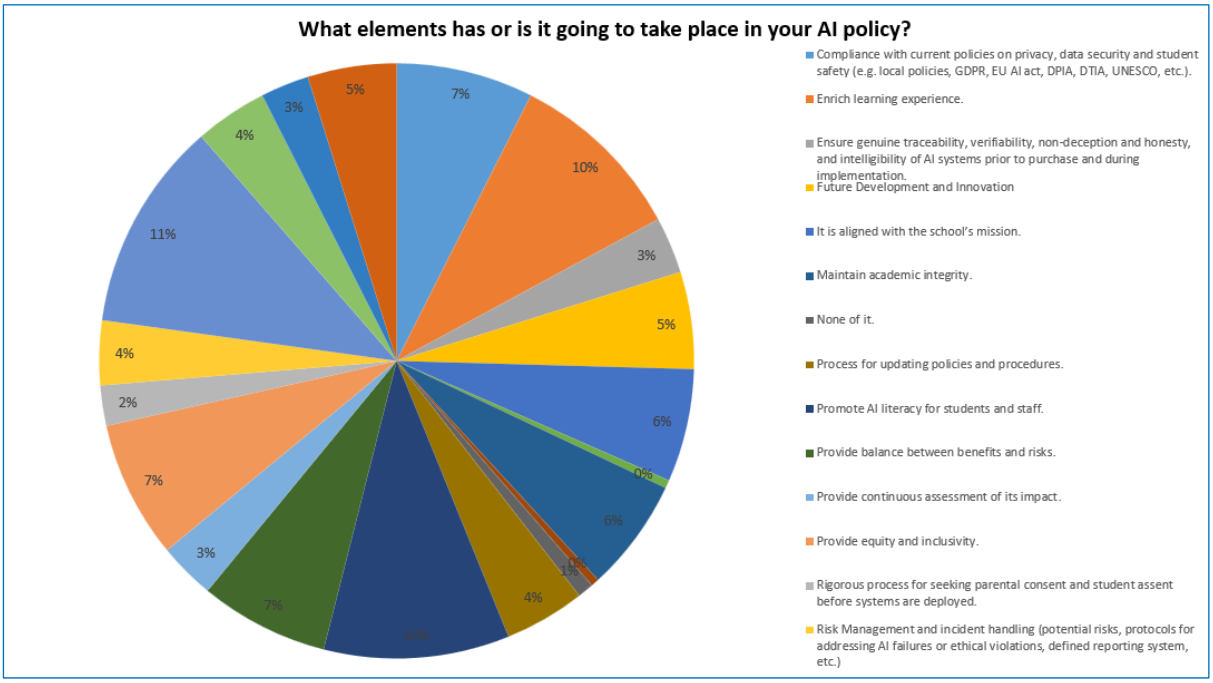

Figure 28: Elements of AI policy

Which elements educational leaders consider important when developing or implementing artificial intelligence (AI) policies within their institutions were examine within research. Respondents identified a diverse range of components, reflecting different priorities related to governance, pedagogical innovation, ethical considerations, and institutional development. The results reveal that educational leaders perceive AI policy as a **multidimensional framework** that combines regulatory compliance, pedagogical enhancement, institutional governance, and capacity building.

One of the most prominent elements highlighted by respondents is **the promotion of AI literacy for both students and staff**, representing approximately **11% of the responses**. This suggests that many educational leaders view AI policy not only as a regulatory instrument but also as a mechanism for strengthening digital competencies and preparing educational communities for the responsible use of emerging technologies.

Another frequently identified element is **enriching the learning experience through AI-supported tools**, which accounts for approximately **10% of responses**. This indicates that educational leaders recognize the potential of AI technologies to support innovative teaching practices, personalize learning experiences, and enhance student engagement.

Similarly, **aligning AI use with the institutional mission and educational goals** represents another key component (approximately **10% of responses**). This highlights the importance of ensuring that AI integration supports the broader strategic objectives of educational institutions rather than functioning as an isolated technological initiative.

Regulatory and governance-related aspects also appear prominently. Approximately **7% of responses** emphasize the importance of **compliance with existing policies on privacy, data security, and student protection**, including frameworks such as the **GDPR and the EU AI Act**. This indicates a growing awareness among educational leaders of the ethical and legal responsibilities associated with the adoption of AI technologies.

Additional policy elements include **ensuring transparency, traceability, and verifiability of AI systems**, which account for roughly **3% of responses**. These concerns reflect broader European debates regarding trustworthy AI and the need to ensure that AI systems used in education remain transparent and accountable.

Several responses also emphasize **maintaining academic integrity** (around **6%**) as an important component of AI policy. These highlights growing concerns regarding the potential misuse of generative AI technologies in academic contexts and the need to establish clear institutional guidelines.

Furthermore, a number of respondents identified the need to **establish procedures for regularly updating policies and institutional guidelines** (approximately **4%**), indicating

recognition that AI governance requires continuous adaptation in response to rapid technological developments.

Some respondents also highlighted the importance of **balancing the benefits and risks of AI technologies** (around **7%**), suggesting that educational leaders are increasingly aware of both the opportunities and the challenges associated with AI adoption in education.

Finally, a small proportion of responses indicate that some institutions **have not yet dedicated sufficient time to systematically address AI governance**, reflecting the fact that AI policy development remains at an early stage in certain contexts.

Thematic insights

The analysis of responses suggests that educational leaders conceptualize AI policy around **four main thematic dimensions**:

1. Governance and regulatory compliance

Including privacy protection, data security, and alignment with European regulatory frameworks such as GDPR and the EU AI Act.

2. Pedagogical innovation

Focusing on improving teaching and learning processes through AI-supported tools and enriching learning experiences.

3. Institutional strategy and alignment

Ensuring that AI adoption is aligned with the mission, values, and long-term strategic priorities of educational institutions.

4. Capacity building and AI literacy

Strengthening digital competencies among both educators and students to ensure responsible and informed use of AI technologies.

Key findings

The results indicate that educational leaders increasingly view AI policy as a **strategic governance instrument** that must balance innovation, ethical responsibility, and institutional development.

Implications for policy development

The findings highlight the need for educational institutions to develop **comprehensive AI governance frameworks** that integrate regulatory compliance, pedagogical innovation, and institutional capacity building.

In particular, AI policies in education should:

- promote **AI literacy and digital competence among educators and students**;
- ensure **alignment with ethical standards and European regulatory frameworks**;

- support **innovation in teaching and learning while safeguarding academic integrity**;
- establish **clear procedures for monitoring, evaluating, and updating AI-related policies**.

Such an integrated approach would help ensure that AI technologies are adopted in ways that support **both educational innovation and responsible governance**.

Key aspects of AI adoption that should be communicated to staff and students

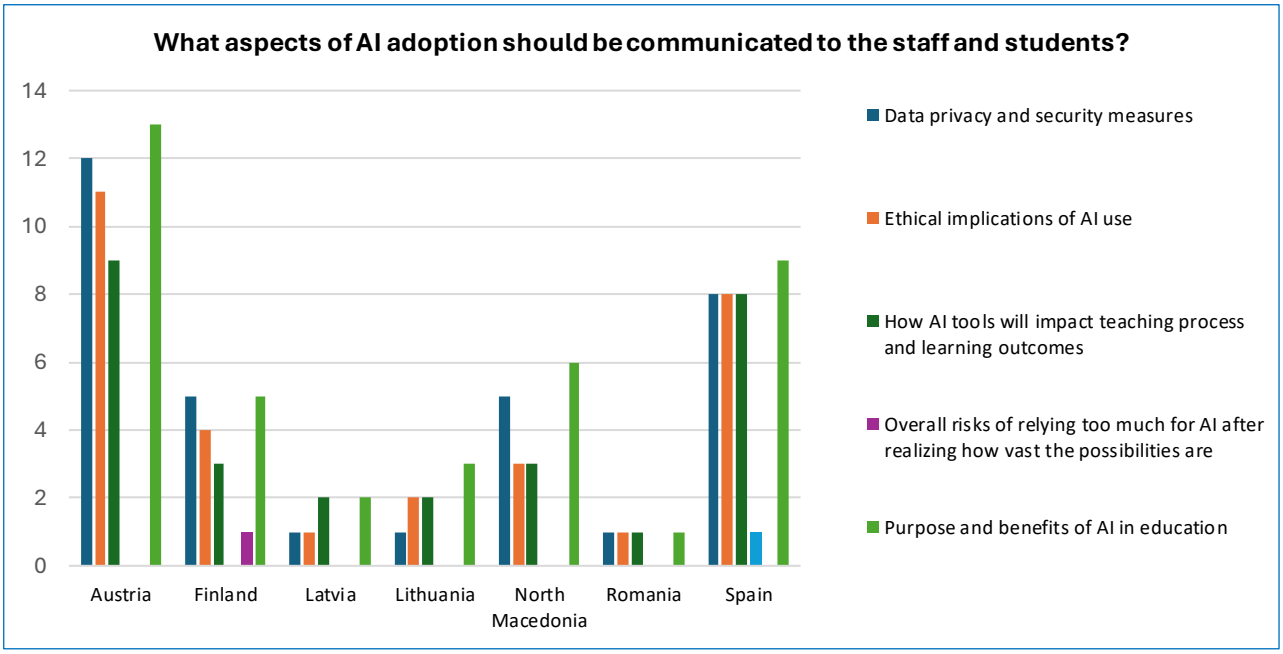

Figure 29: Key aspect of AI communicated with staff and students

This question explored which aspects of artificial intelligence adoption educational leaders believe should be communicated to staff and students within educational institutions. The results provide insight into the priorities that leaders associate with responsible AI implementation and institutional transparency.

Overall, the findings indicate that educational leaders place the greatest emphasis on communicating the **purpose and benefits of AI in education**, which represents **29.1% of all responses (39 mentions)**. This suggests that leaders recognize the importance of ensuring that both staff and students understand how AI technologies can support teaching, learning, and institutional innovation.

The second most frequently identified aspect relates to **data privacy and security measures**, accounting for **24.6% of responses (33 mentions)**. This highlights the strong awareness among educational leaders of the need to ensure responsible data management and compliance with regulatory frameworks such as the **General Data Protection Regulation (GDPR)** when introducing AI technologies in educational contexts.

Closely following this dimension are the **ethical implications of AI use**, representing **21.6% of responses (29 mentions)**. This finding suggests that educational leaders consider ethical awareness to be an essential component of AI adoption, particularly in relation to issues such as fairness, transparency, and responsible use of emerging technologies.

Another significant aspect concerns **how AI tools may influence teaching processes and learning outcomes**, which accounts for **20.9% of responses (28 mentions)**. This indicates that educational leaders recognize the importance of helping educators and students understand how AI technologies may transform pedagogical practices and assessment approaches.

A smaller proportion of responses (**3.0%, 4 mentions**) highlights the need to communicate **the risks of excessive reliance on AI technologies**, suggesting that some leaders are concerned about the potential overdependence on automated systems.

Finally, only **0.7% of responses (1 mention)** refer to issues related to **creative AI applications and copyright considerations**, indicating that this dimension is currently less prominent in leaders' perceptions of AI-related communication priorities.

Key findings

The distribution of responses suggests that educational leaders prioritize **three central communication pillars** when introducing AI technologies in education:

1. Educational purpose and benefits of AI (29.1%)
2. Data protection and security considerations (24.6%)
3. Ethical implications of AI use (21.6%)

Together, these three dimensions account for **over 75% of all responses**, indicating that leaders view responsible AI adoption primarily through the lenses of **educational value, ethical responsibility, and data protection**.

Implications for institutional communication strategies

The results suggest that successful AI implementation in educational institutions requires not only technological integration but also **structured communication strategies that inform and engage institutional stakeholders**.

Educational institutions should therefore prioritize communication efforts that:

- clearly explain **the educational value and benefits of AI technologies**;

- ensure transparency regarding **data privacy and security measures**;
- address **ethical considerations and responsible AI use**;
- clarify **how AI tools may influence teaching practices and learning outcomes**.

Such an approach would support a more **transparent, responsible, and well-informed integration of AI technologies in education**.

Involvement of educators and students in AI-related discussions within educational institutions

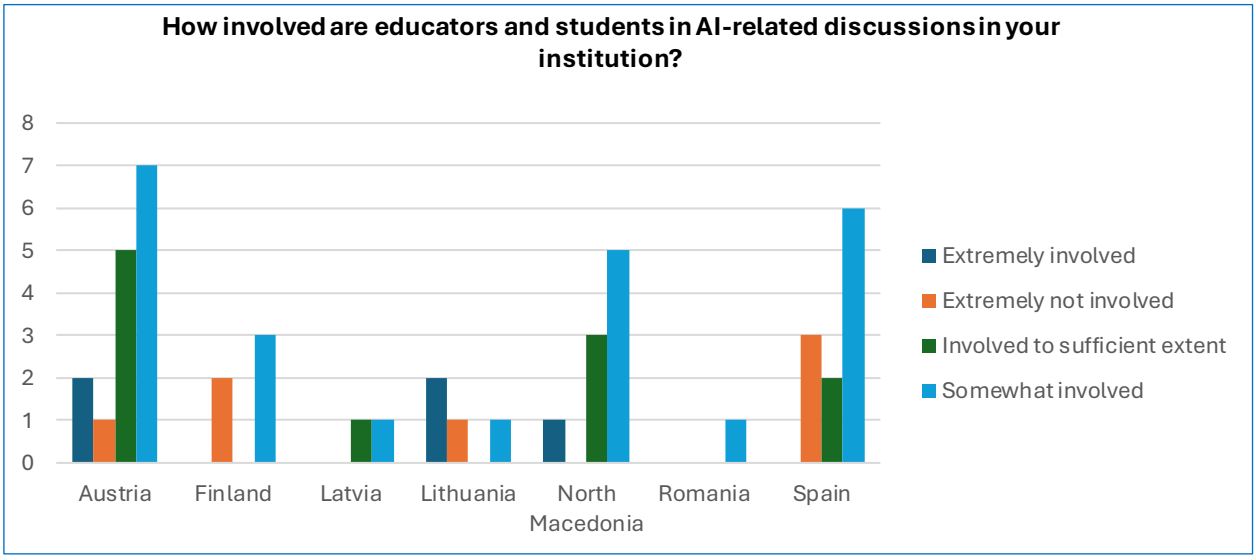

Figure 30: Teachers' and students' involvement in AI discussion

This question explored the extent to which educators and students are involved in discussions related to artificial intelligence (AI) within their educational institutions. The responses provide insight into the level of stakeholder participation in institutional conversations surrounding AI adoption and governance.

The results suggest that while discussions about AI are taking place in many institutions, the level of participation among educators and students varies considerably.

The largest proportion of responses indicates that educators and students are **somewhat involved in AI-related discussions**, representing **49.0% of responses (24 mentions)**. This suggests that in many institutions AI-related conversations have begun to emerge, but stakeholder engagement may still remain informal or limited in scope.

A further **24.5% of responses (12 mentions)** indicate that educators and students are **involved to a sufficient extent**. This suggests that in a number of institutions AI-related

discussions have already reached a more structured level of engagement, where stakeholders actively participate in conversations about AI adoption and its implications for education.
However, the findings also reveal that **16.3% of responses (8 mentions)** indicate that educators and students are **extremely not involved** in AI-related discussions. This suggests that in some institutions AI-related decision-making may still be concentrated at the leadership or administrative level without broader stakeholder participation.
Finally, only **10.2% of responses (5 mentions)** indicate that educators and students are **extremely involved** in institutional discussions about AI. This relatively low proportion suggests that highly participatory approaches to AI governance are still relatively rare across the surveyed institutions.

Comparative insights

The country-level distribution reveals certain differences in stakeholder engagement.
For example, **Austria and Spain** show relatively higher levels of moderate engagement, with several responses indicating that educators and students are **somewhat involved** in AI-related discussions. Similarly, **North Macedonia** demonstrates a pattern where most responses fall within the categories of **somewhat involved** and **sufficiently involved**, indicating a moderate level of institutional dialogue.
By contrast, **Finland** and **Spain** also show several responses indicating limited or no involvement of educators and students in AI-related discussions, suggesting that stakeholder participation may vary significantly even within digitally advanced education systems.
Countries with smaller response samples, such as **Latvia and Romania**, provide limited data but still reflect the emerging nature of AI-related discussions in educational institutions.

Key findings

The findings suggest that *AI-related discussions are increasingly present in educational institutions, but stakeholder participation remains mostly moderate rather than highly institutionalized.*
In most cases, educators and students appear to be **partially engaged in AI-related discussions**, while fully participatory models of AI governance remain relatively uncommon.

Implications for institutional governance

The results highlight the importance of strengthening **participatory approaches to AI governance in educational institutions**.
Successful and responsible AI adoption requires not only leadership-level decision-making but also **active engagement of educators and students**, who are directly affected by the use of AI technologies in teaching and learning.

Educational institutions should therefore consider:

- encouraging open institutional dialogue about AI adoption and its implications;
- involving teachers and students in policy development and decision-making processes;
- creating forums, workshops, or working groups dedicated to AI governance;
- promoting collaborative development of institutional AI guidelines.

Such participatory approaches can strengthen **institutional transparency, trust, and responsible AI implementation**.

Time spent using AI technologies per week

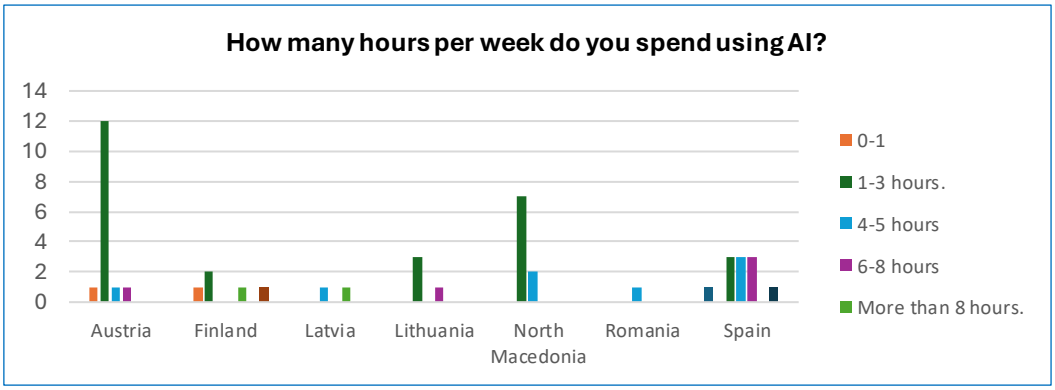

Figure 31: Time spent using AI technologies per week

The survey examined how much time educational leaders spend using artificial intelligence (AI) technologies on a weekly basis. The responses provide insight into the **intensity of AI usage among educational leaders and decision-makers within educational institutions**.

The results indicate that AI use among educational leaders is already integrated into professional practice, although the intensity of use varies.

The largest proportion of respondents reported using AI technologies **between one and three hours per week**, representing **55.1% of responses (27 respondents)**. This suggests that for most educational leaders AI tools are used as **supportive instruments for specific tasks**, rather than as central tools used continuously throughout the working week.

A further **16.3% of respondents (8 responses)** reported using AI **between four and five hours per week**, indicating a more regular integration of AI technologies in professional workflows. Similarly, **10.2% of respondents (5 responses)** indicated that they use AI technologies **between six and eight hours per week**, suggesting a higher level of engagement with AI-supported tools in institutional management, communication, or administrative tasks.

Another **10.2% of respondents (5 responses)** reported using AI technologies **for less than one hour per week**, indicating occasional or exploratory use.
Only **6.1% of respondents (3 responses)** indicated that they use AI technologies **more than eight hours per week**, representing the most intensive users of AI within the surveyed group.
Finally, **2.0% of respondents (1 response)** reported **not using AI technologies at all**, suggesting that complete non-use among educational leaders is relatively rare within the surveyed sample.

Comparative insights

Across countries, the results indicate that **moderate AI usage is the dominant pattern**. In several countries—particularly **Austria, North Macedonia, and Spain**—most respondents reported using AI technologies within the **1–3 hours per week range**, suggesting that AI tools are increasingly becoming part of routine professional tasks.
Higher levels of usage (4–8 hours weekly) appear particularly visible in **Spain and North Macedonia**, indicating that in some contexts AI tools may already be more systematically integrated into leadership practices.
Countries with smaller samples show more varied patterns, which should be interpreted cautiously.

Key findings

The findings suggest that **AI technologies are widely used among educational leaders, but typically as complementary tools rather than core operational technologies**. Most leaders appear to use AI for targeted tasks such as information retrieval, document drafting, planning, or communication support.

Implications for institutional AI adoption

The moderate level of weekly AI use suggests that educational leaders are still in the **early-to-intermediate phase of AI integration**. While awareness and experimentation appear widespread, the transition toward deeper integration of AI into institutional processes is still developing.
To support more effective and responsible AI adoption, educational institutions should:

- provide training for educational leaders on advanced uses of AI tools;
- encourage integration of AI technologies into administrative and strategic decision-making processes;
- develop institutional frameworks that guide efficient and responsible AI use.

Strengthening these dimensions could help move AI use *from occasional experimentation toward more structured and strategic integration within educational leadership practices*.

Anticipated challenges in AI adoption

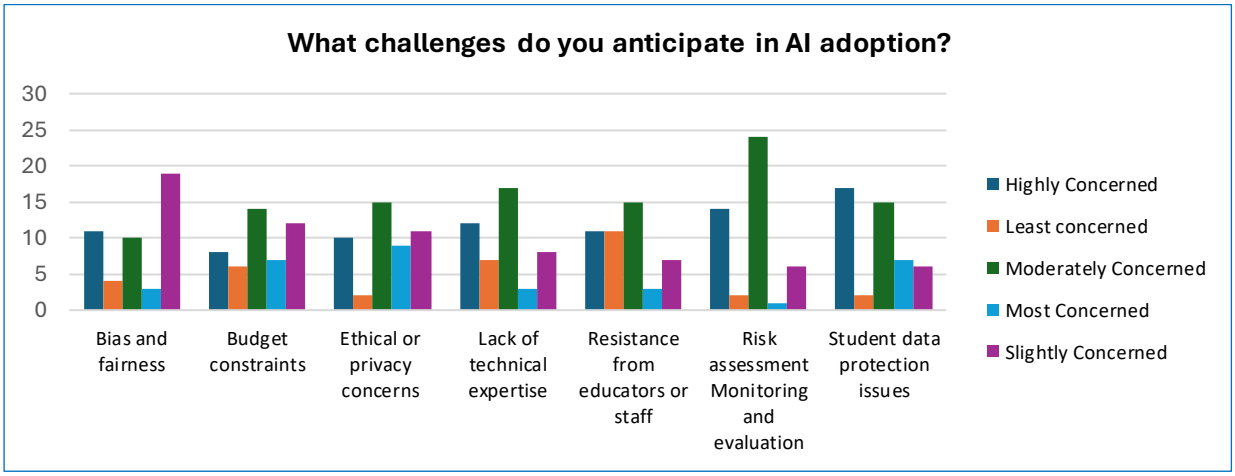

Figure 32: Anticipation of challenges in AI adoption

This question examined the level of concern educational leaders express regarding potential challenges associated with the adoption of artificial intelligence (AI) in educational institutions. The responses provide insight into how leaders perceive the risks and uncertainties accompanying the integration of AI technologies into educational environments.

Overall, the findings indicate that educational leaders demonstrate a **moderate but noticeable level of concern regarding AI adoption**.

The largest proportion of responses falls within the category **"moderately concerned," representing 32.4% of all responses (107 mentions)**. This suggests that while many leaders acknowledge the existence of potential challenges, they do not perceive them as overwhelming obstacles to AI implementation.

A further **25.2% of responses (83 mentions)** indicate that respondents are **highly concerned** about the challenges associated with AI adoption. This relatively large proportion suggests that a significant number of educational leaders remain cautious about the implications of integrating AI technologies into educational institutions.

Similarly, **20.9% of responses (69 mentions)** fall within the category **"slightly concerned,"** indicating that a substantial group of respondents recognizes potential challenges but does not consider them particularly significant.

Smaller proportions of respondents fall into the categories **"most concerned" (10.9%, 36 mentions)** and **"least concerned" (10.6%, 35 mentions)**. These findings suggest that extreme positions—either very high or very low concern—are relatively less common among educational leaders.

Comparative insights

Across countries, the data indicate a broadly similar pattern in which **moderate concern dominates perceptions of AI adoption challenges**. Countries with larger response groups, such as **Austria, North Macedonia, and Spain**, show higher absolute numbers across several concern levels, reflecting both greater participation and a wider diversity of perceptions.

In these countries, a considerable number of respondents fall within the **moderately concerned and highly concerned categories**, suggesting that educational leaders recognize both the opportunities and potential risks associated with AI technologies.

Countries with smaller samples, such as **Latvia and Romania**, show more limited variation but generally follow the same pattern of moderate concern.

Key findings

The results indicate that educational leaders generally approach AI adoption with **cautious optimism**. While many recognize the potential challenges associated with AI implementation, relatively few respondents express either extreme concern or complete absence of concern.

Implications for AI adoption in education

The presence of moderate and high levels of concern highlights the importance of addressing potential barriers to AI adoption through **institutional support and capacity-building initiatives**.

Educational institutions and policymakers should therefore focus on:

- providing training and professional development for educational leaders and educators on AI technologies;
- developing clear institutional guidelines and governance frameworks for AI use;
- supporting ethical and responsible AI implementation practices;
- strengthening institutional readiness for technological innovation.

By addressing these concerns through structured policies and professional support, educational systems can facilitate a more **confident and responsible adoption of AI technologies**.

Key institutional steps taken or planned for AI adoption

According to the concrete measures educational institutions have implemented or intend to

implement to support the adoption of artificial intelligence (AI), the responses highlight the practical approaches institutions are using to facilitate the integration of AI technologies into educational settings, offering insight into current efforts and future plans aimed at embedding AI in institutional practice

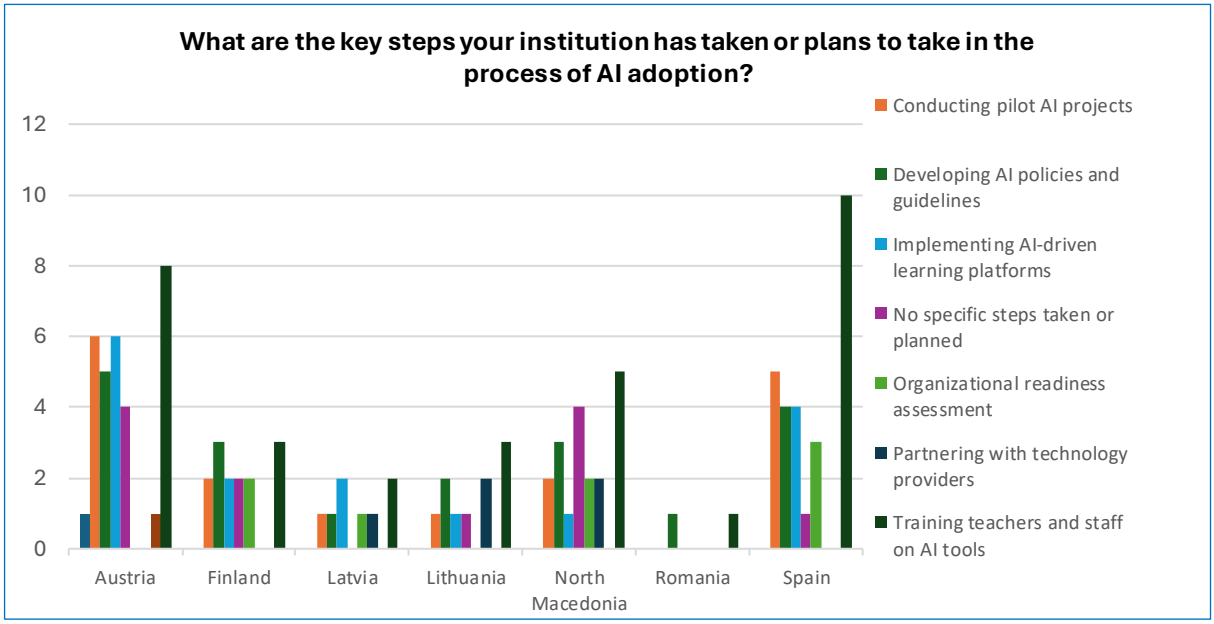

Figure 33: Key institutional steps for AI adoption

The results indicate that the most common institutional step involves **training teachers and staff on AI tools**, which represents **28.3% of all responses (32 mentions)**. This finding suggests that many educational institutions recognize the importance of strengthening digital and AI-related competencies among educators as a foundational step toward responsible AI integration.

The second most frequently mentioned action is **developing institutional AI policies and guidelines**, accounting for **18.6% of responses (21 mentions)**. This indicates a growing awareness of the need to establish governance frameworks that guide the ethical and strategic use of AI technologies in educational settings.

Another common strategy involves **conducting pilot AI projects**, which represents **15.0% of responses (17 mentions)**. Pilot initiatives allow institutions to experiment with AI tools and evaluate their potential benefits before implementing them on a broader scale.

Similarly, **implementing AI-driven learning platforms** accounts for **12.4% of responses (14 mentions)**. This suggests that some institutions are already moving beyond experimentation toward integrating AI-supported digital learning environments.

A smaller proportion of responses highlight actions such as **organizational readiness assessments (7.1%)**, **partnerships with technology providers (7.1%)**, and **cases where no specific steps have yet been taken (7.1%)**. These responses indicate varying levels of institutional preparedness and strategic planning for AI adoption.

Other less frequently mentioned actions include **offering AI-related educational modules or courses (3.5%)** and **participation in Erasmus+ AI-related projects (0.9%)**, suggesting that while such initiatives exist, they are not yet widespread across the surveyed institutions.

Comparative insights

The country-level data reveal some interesting patterns. Countries such as **Austria and Spain** demonstrate relatively high levels of activity across several categories, including training initiatives, pilot projects, and policy development. This suggests a more comprehensive institutional approach toward AI adoption.

Similarly, **North Macedonia** shows notable engagement in several areas, particularly in policy development and pilot initiatives. By contrast, countries with smaller response samples demonstrate fewer reported initiatives, which may reflect either limited activity or smaller institutional representation.

Overall, the results suggest that while institutions are beginning to implement concrete steps toward AI adoption, these efforts remain uneven across countries and institutions.

Key findings

The findings indicate that **capacity-building and policy development represent the two central pillars of institutional AI adoption strategies**. Most institutions appear to prioritize developing human competencies and governance frameworks before moving toward more extensive technological implementation.

Implications for institutional AI strategies

The results highlight the importance of adopting a **multi-dimensional approach to AI integration in education**, combining capacity building, policy development, and technological experimentation.

Educational institutions should therefore consider:

- prioritizing professional development for educators and institutional leaders on AI technologies;
- developing clear institutional policies and ethical guidelines for AI use;

- implementing pilot projects to test AI tools in real educational contexts;
- strengthening collaboration with technology providers and research institutions.

Such strategies can support a more systematic and sustainable integration of AI technologies in educational institutions.

Specific challenges anticipated in AI adoption

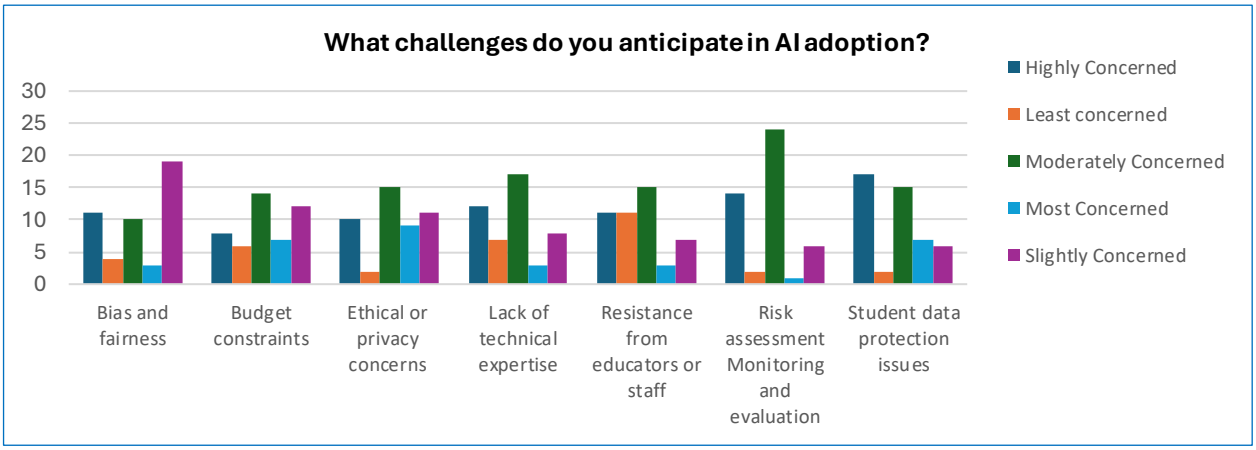

Figure 34: Challenges within AI adoption

This question explored the specific challenges educational leaders anticipate when adopting artificial intelligence (AI) technologies in educational institutions. Respondents evaluated several potential barriers, including ethical concerns, resource limitations, and institutional readiness.

Overall, the results indicate that educational leaders perceive AI adoption challenges with a **moderate level of concern**, with **33.4% of responses falling into the "moderately concerned" category**. This suggests that while leaders acknowledge potential barriers to AI implementation, these challenges are generally viewed as manageable rather than prohibitive.

A further **25.2% of responses indicate a high level of concern**, highlighting that a significant proportion of educational leaders remain cautious about the implications of integrating AI technologies into educational environments.

Similarly, **21.0% of responses indicate slight concern**, suggesting that many leaders recognize potential challenges but do not perceive them as critical obstacles.

Smaller proportions of responses fall within the categories **"most concerned" (10.0%)** and **"least concerned" (10.3%)**, indicating that extreme positions—either very high or very low concern—are relatively uncommon.

Challenge-specific patterns

Although the overall distribution of concern levels is similar across challenges, several areas appear particularly prominent.

One key concern relates to **risk assessment, monitoring, and evaluation**, which received the highest number of **moderate concern responses (24)**. This suggests that educational leaders recognize the complexity of evaluating AI systems and ensuring their responsible use within educational institutions.

Another important challenge concerns **lack of technical expertise**, where many respondents reported moderate or high concern. This finding highlights the importance of strengthening digital and AI-related competencies among educational staff and leadership.

Ethical or privacy concerns and **student data protection issues** also appear as important areas of attention. These challenges reflect broader debates about the ethical governance of AI technologies and the need to ensure compliance with regulatory frameworks such as **GDPR and the EU AI Act**.

Resource-related constraints also emerge as relevant challenges. In particular, **budget constraints** represent a significant concern for some educational leaders, indicating that financial limitations may affect the ability of institutions to invest in AI-related infrastructure and training.

Finally, **bias and fairness in AI systems** appear as another important concern, highlighting awareness of potential algorithmic bias and the need to ensure equitable use of AI technologies in educational contexts.

Key findings

The findings suggest that educational leaders perceive AI adoption challenges primarily as **organizational, ethical, and capacity-related issues**, rather than purely technological barriers.

Implications for educational institutions

The results highlight the need for a comprehensive approach to AI adoption that addresses both technical and organizational dimensions.

Educational institutions should therefore prioritize:

- strengthening AI literacy and technical expertise among educators and institutional leaders;
- developing clear governance frameworks addressing ethical use, fairness, and data protection;
- establishing systems for monitoring and evaluating AI implementation;
- ensuring adequate financial and institutional support for AI-related initiatives.

Such measures would help mitigate potential challenges and support a more **responsible and sustainable integration of AI technologies in education**.

Strategies considered essential for managing change in AI adoption

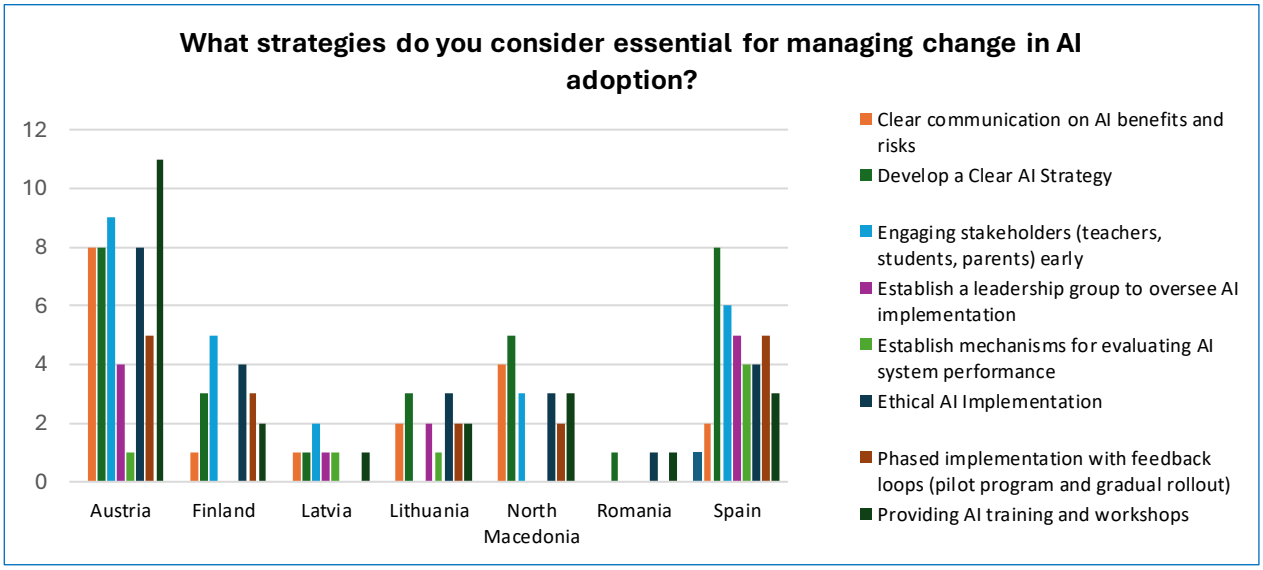

Figure 35: Most used strategies for managing AI adoption

The findings illustrate which strategies educational leaders consider essential for managing institutional change linked to the adoption of artificial intelligence (AI). The responses underscore the strategic approaches leaders regard as most important for achieving a successful, effective, and responsible integration of AI technologies within educational institutions.

The results indicate that **capacity-building and strategic planning are the two most prominent priorities in managing AI-related change**.

The most frequently identified strategy is **providing AI training and workshops for educators and staff**, representing **18.6% of all responses (29 mentions)**. This finding highlights the strong emphasis educational leaders place on strengthening digital competencies and preparing educational staff for the effective use of AI technologies.

Closely following this priority are **developing a clear institutional AI strategy** and **engaging stakeholders early in the adoption process**, each accounting for **17.9% of responses (28 mentions)**. These findings suggest that leaders recognize the importance of both strategic planning and inclusive decision-making when introducing AI technologies into educational environments.

Another commonly identified strategy is **clear communication about the benefits and risks of AI**, representing **11.5% of responses (18 mentions)**. This indicates that educational leaders consider transparency and awareness-building to be essential components of successful AI implementation.

Similarly, **ethical AI implementation** represents **10.9% of responses (17 mentions)**, reflecting growing awareness of the importance of responsible AI governance and compliance with ethical and regulatory standards.

Several respondents also highlighted the need to **establish leadership or governance groups responsible for overseeing AI implementation**, accounting for **9.6% of responses (15 mentions)**. This indicates recognition of the importance of institutional leadership structures in guiding AI adoption processes.

Other strategies include **phased implementation with feedback loops (7.7%)** and **establishing mechanisms for evaluating AI system performance (5.1%)**, both of which emphasize the need for gradual implementation and continuous monitoring.

Finally, only a very small proportion of responses referred explicitly to **general capacity-building measures (0.6%)**, likely because many respondents addressed this dimension through more specific actions such as training and professional development.

Comparative insights

The country-level data suggest that countries such as **Austria and Spain** demonstrate stronger emphasis across multiple strategic dimensions, particularly training initiatives, stakeholder engagement, and strategic planning. This indicates a more comprehensive approach to managing institutional change related to AI adoption.

Similarly, **North Macedonia** and **Lithuania** show moderate engagement with several strategic dimensions, particularly those related to training and governance structures.

Countries with smaller numbers of responses display fewer reported strategies, which may reflect smaller institutional representation rather than lower levels of engagement.

Key insight

The findings indicate that educational leaders view **AI adoption primarily as an organizational change process rather than purely a technological transition**. Successful implementation therefore depends not only on technological infrastructure but also on leadership, stakeholder engagement, and capacity development.

Implications for AI change management in education

The results highlight the importance of adopting a **structured change management approach to AI adoption in educational institutions**.

Educational institutions should therefore prioritize:

- strengthening AI-related competencies among educators and institutional leaders;
- developing clear institutional AI strategies and governance frameworks;
- engaging teachers, students, and other stakeholders early in the adoption process;
- promoting ethical and transparent AI implementation practices;
- implementing monitoring and evaluation mechanisms for AI systems.

Such strategies can support a more **sustainable, inclusive, and responsible integration of AI technologies in education**.

Purposes for which AI is used in managing and leading educational institutions

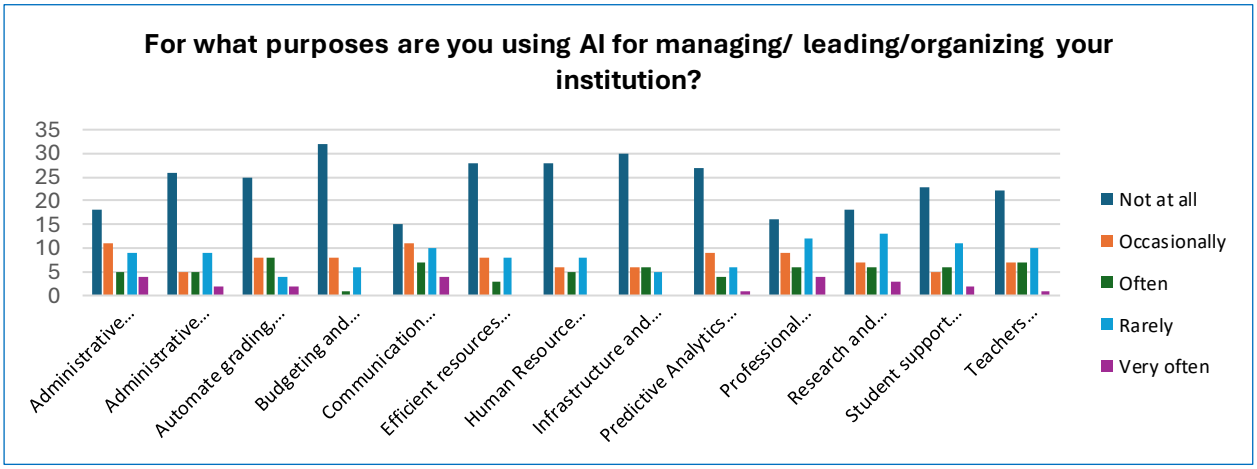

Figure 36: Purpose of use AI for managing/ leading/ organizing educational institution

This question explored the areas in which educational leaders use artificial intelligence (AI) to support the management and organization of their institutions. The responses provide insight into the operational domains where AI technologies are currently applied in educational leadership.

Overall, the results indicate that **AI use among educational leaders remains relatively limited across most managerial functions**, with a significant proportion of respondents reporting that they do not yet use AI tools for many institutional tasks.

Across nearly all categories, the largest proportion of responses falls within the **"not at all"** category, indicating that AI technologies are still in an early stage of integration into institutional management processes.

Areas with relatively higher AI use

Some areas show comparatively greater use of AI technologies.

For example, **communication and administration tasks** show a relatively higher level of AI use, with approximately **53% of respondents reporting occasional or frequent use** of AI tools. This suggests that leaders are beginning to rely on AI technologies for drafting communication materials, managing documentation, and supporting administrative workflows.

Similarly, **administrative workflow management** and **automated grading, scheduling, and reporting tasks** demonstrate moderate levels of AI adoption, reflecting the potential of AI tools to streamline routine organizational processes.

Another area with emerging AI use is **professional learning and development**, where approximately **53% of respondents report occasional or more frequent use**. This may reflect the use of AI tools for professional development planning, resource recommendations, or training design.

Areas with lower AI integration

By contrast, several strategic and operational areas demonstrate much lower levels of AI adoption.

These include:

- budgeting and financial management
- human resource and staff management
- infrastructure and security management
- predictive analytics for student performance

In these domains, the majority of respondents report **little or no AI use**, suggesting that educational institutions have not yet widely integrated AI tools into more complex management and decision-making processes.

Similarly, areas such as **student support services** and **teacher counselling and support** also show relatively low levels of AI usage.

Key findings

The findings suggest that AI use among educational leaders is currently concentrated in **administrative and operational tasks rather than strategic decision-making processes**.

This pattern reflects a broader trend in educational AI adoption, where AI technologies are first applied to **routine administrative functions** before being integrated into more complex institutional management activities.

Implications for AI integration in educational leadership

The results indicate that educational institutions are still in the **early stages of integrating AI into leadership and management practices**. While leaders are beginning to experiment with AI tools for administrative support, more advanced applications—such as predictive analytics, strategic planning, or resource management—remain relatively underdeveloped.

To support deeper integration of AI technologies, educational institutions should consider:

- strengthening AI literacy among educational leaders and administrative staff;
- exploring AI-supported decision-making tools for institutional management;
- developing institutional policies and governance frameworks for AI use in leadership processes;
- encouraging pilot projects that test AI applications in strategic management areas.

Such initiatives could support the gradual transition from **administrative AI use toward more strategic and data-informed educational leadership**.

Perceived advantages of using artificial intelligence in education

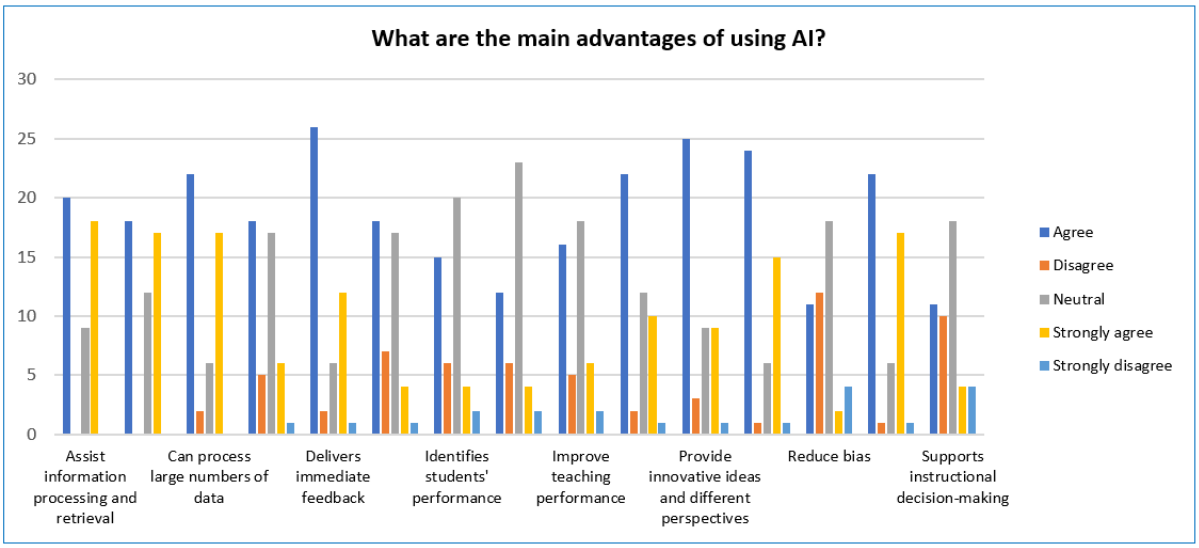

Figure 37: Advantages of using AI in educational institution

This question examined how educational leaders perceive the potential advantages of using artificial intelligence (AI) in educational institutions. Respondents evaluated a range of possible benefits related to administrative efficiency, teaching improvement, and decision-making support.

Overall, the findings indicate that educational leaders demonstrate **strongly positive perceptions regarding the potential benefits of AI technologies in education**. For most of the examined practices, the majority of respondents either **agreed or strongly agreed** that AI provides meaningful advantages.

Administrative efficiency and operational support

Several of the highest-rated advantages relate to the ability of AI to support **administrative efficiency and information processing**.

For example, a large proportion of respondents agreed that AI can:

- assist in information processing and retrieval,
- automate repetitive or mechanical tasks, and
- process large volumes of data efficiently.

Across these categories, approximately **75–85% of respondents expressed positive agreement**, indicating that educational leaders perceive AI as a powerful tool for reducing administrative workload and improving operational efficiency.

Similarly, a strong majority of respondents agreed that AI can **reduce workload and simplify routine tasks**, further highlighting the perceived administrative benefits of AI technologies.

Teaching and learning improvements

Educational leaders also recognize several advantages related to **pedagogical processes**.

Many respondents agreed that AI technologies can:

- support personalized learning,
- deliver immediate feedback to learners,
- enhance student engagement and learning experiences, and
- identify patterns in student performance.

These findings suggest that educational leaders see AI not only as an administrative tool but also as a **potential catalyst for improving teaching and learning processes**.

Additionally, many respondents indicated that AI can help **provide diverse learning materials and innovative perspectives**, further supporting the integration of digital tools into pedagogical practice.

Decision-making and institutional support

Another important perceived advantage relates to the role of AI in **supporting decision-making processes** within educational institutions.

Many respondents agreed that AI can:

- support instructional decision-making,
- provide analytical insights into student performance, and

- help identify trends and patterns in educational data.

Although these advantages received slightly lower levels of strong agreement compared to administrative functions, the results still indicate generally positive perceptions of AI's potential role in **data-informed institutional leadership**.

Key findings

The findings suggest that educational leaders perceive AI primarily as a tool that can **increase efficiency, support teaching innovation, and improve data-driven decision-making** in educational institutions.

Implications for AI adoption

The strong positive perceptions of AI benefits indicate a **favourable environment for further AI adoption in educational leadership**. When leaders recognize the potential advantages of AI technologies, they are more likely to support initiatives aimed at integrating these tools into institutional practices.

However, as previous survey results indicate, **positive perceptions do not always translate into extensive practical use**, suggesting that additional support—such as training, governance frameworks, and institutional strategies—may be necessary to fully realize the potential benefits of AI in education.

AI tools used or planned for institutional management and leadership

The data reflect the types of artificial intelligence (AI) tools that educational leaders currently use or plan to use for institutional management and organizational purposes. The distribution of responses indicates that AI adoption in this area remains limited, suggesting that the integration of AI technologies into educational leadership practices is still in its early stages. For most categories, responses are predominantly clustered in the "not at all" option, pointing to the fact that many educational institutions have not yet implemented specialized AI tools for institutional management and decision-making.

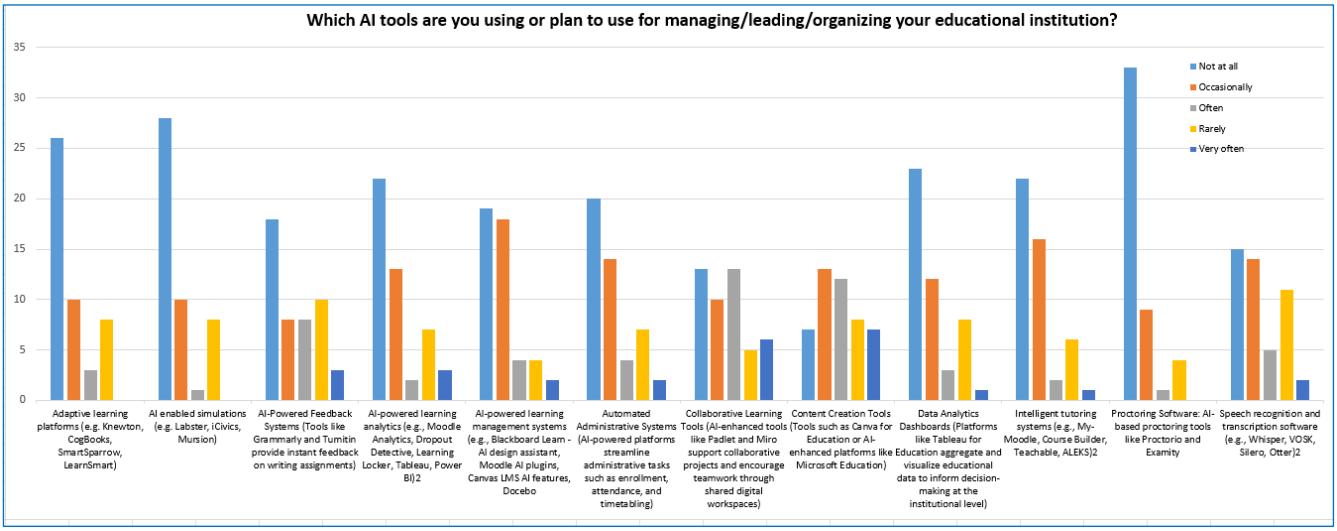

Figure 37: AI tools used or plan to use by leaders

Tools with relatively higher levels of use

Some AI tools demonstrate comparatively higher levels of adoption or planned use.

One such category includes **collaborative learning tools enhanced with AI features**, where approximately **62% of respondents report occasional or frequent use**. This suggests that collaborative platforms supporting digital teamwork are among the more widely integrated AI-supported technologies in educational environments.

Similarly, **content creation tools** such as AI-supported design platforms also demonstrate moderate levels of use, reflecting the increasing role of generative AI tools in supporting educational communication and resource development.

Another emerging area is **AI-powered learning analytics tools**, which allow institutions to analyse student engagement and performance data. Although adoption remains moderate, these tools represent an important step toward **data-informed educational leadership**.

Tools with limited adoption

Several AI tools remain relatively underutilized across institutions.

For example, **adaptive learning platforms**, **AI-enabled simulations**, and **AI-powered tutoring systems** show relatively low levels of current use among educational leaders.

Similarly, **AI-based proctoring software** appears to have very limited adoption, with the majority of respondents reporting that such tools are not used in their institutions.

In addition, **speech recognition and transcription technologies** are still not widely integrated into institutional management processes.

Key findings

The findings suggest that **AI adoption among educational institutions is currently focused more on general-purpose digital tools rather than specialized AI systems designed specifically for educational management**.
Many leaders appear to rely on broadly accessible AI functionalities integrated into existing platforms rather than implementing advanced AI-driven systems.

Implications for technological readiness

The limited use of many AI tools suggests that educational institutions are still **in the early stages of exploring AI-supported technological ecosystems**.
While leaders demonstrate strong awareness of AI's potential benefits, the transition toward widespread implementation of specialized AI technologies appears to be gradual.
To support deeper technological integration, educational institutions may benefit from:

- increased training on available AI tools for educational management,
- stronger institutional support for technological experimentation,
- clearer strategic frameworks guiding the selection and implementation of AI technologies, and
- enhanced collaboration with technology providers and research institutions.

Such initiatives could facilitate the transition from **experimental AI use toward systematic technological integration in educational leadership**.

Perceived barriers to implementing AI in educational leadership and management

The findings shed light on the barriers educational leaders perceive when introducing artificial intelligence (AI) into the management and organization of educational institutions. Respondents identified a range of challenges spanning technological, ethical, organizational, and pedagogical dimensions. Overall, the results suggest that educational leaders are aware of multiple, interconnected obstacles, with particular emphasis on limitations in technical capacity, levels of institutional readiness, ethical concerns, and the complexities associated with organizational change.

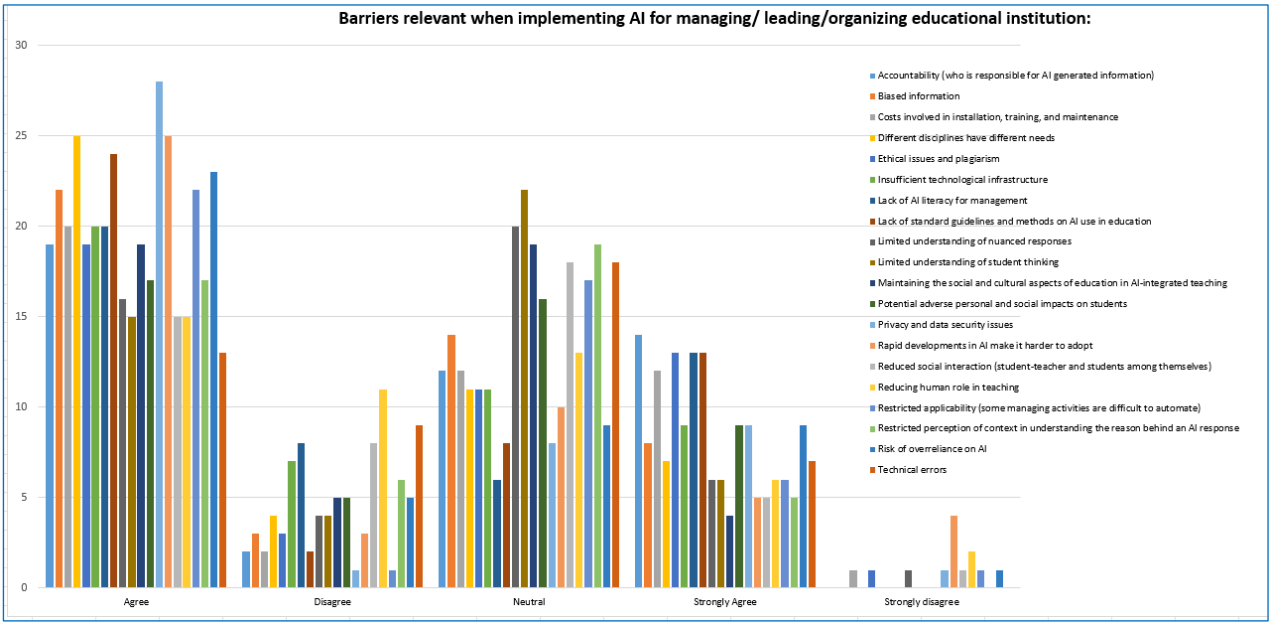

Figure 38: Barriers relevant when implementing AI for managing/leading/organizing educational institution

Technological and institutional barriers

Several barriers relate directly to **institutional readiness and technological capacity**.

A substantial proportion of respondents agreed that **insufficient technological infrastructure** represents a relevant challenge for AI implementation. Similarly, many respondents indicated that **costs related to installation, training, and maintenance of AI systems** may represent a significant barrier.

Another commonly recognized barrier concerns the **lack of standard guidelines and methods for AI use in education**, suggesting that many institutions lack clear frameworks that guide AI implementation and governance.

Furthermore, respondents also identified **limited understanding of AI technologies within educational contexts** as an important obstacle, highlighting the need for improved institutional knowledge and training.

Ethical and governance-related barriers

Ethical concerns also appear prominently among the identified barriers.

Many respondents expressed agreement that **ethical issues such as plagiarism, bias in AI-generated information, and accountability for AI-generated outputs** represent relevant challenges for educational institutions.

Similarly, **privacy and data protection issues** are perceived as important barriers. This reflects broader concerns regarding the protection of student data and compliance with regulatory frameworks such as **GDPR and the EU AI Act**.

Another related concern involves the **potential adverse social and cultural impacts of AI in education**, indicating awareness among educational leaders of the broader societal implications of AI technologies.

Organizational and pedagogical barriers

The results also highlight several barriers related to **organizational culture and pedagogical practice**.

For example, some respondents indicated that AI adoption could potentially **reduce social interaction between teachers and students**, raising concerns about the possible effects of technology on educational relationships.

Similarly, concerns were expressed regarding the **restricted applicability of AI in certain teaching contexts**, particularly where learning activities require complex human judgment or contextual understanding.

Another frequently mentioned barrier relates to the **rapid pace of technological development**, which may make it difficult for institutions to keep up with the continuous evolution of AI tools and systems.

Key findings

The findings suggest that barriers to AI adoption are **multidimensional**, combining technological, ethical, organizational, and pedagogical challenges rather than being limited to a single domain.

Implications for institutional AI adoption

The results highlight the need for educational institutions to adopt a **comprehensive and strategic approach to AI implementation**, addressing both technological readiness and governance frameworks.

In particular, institutions should consider:

- strengthening institutional digital infrastructure;
- providing training and professional development related to AI literacy;
- developing ethical guidelines and governance frameworks for AI use;
- ensuring robust data protection and privacy mechanisms;
- promoting responsible and balanced integration of AI into teaching and learning environments.

Addressing these barriers will be essential for ensuring a **sustainable and responsible adoption of AI technologies in educational leadership and institutional management**.

Observed improvements resulting from the use of AI in educational leadership

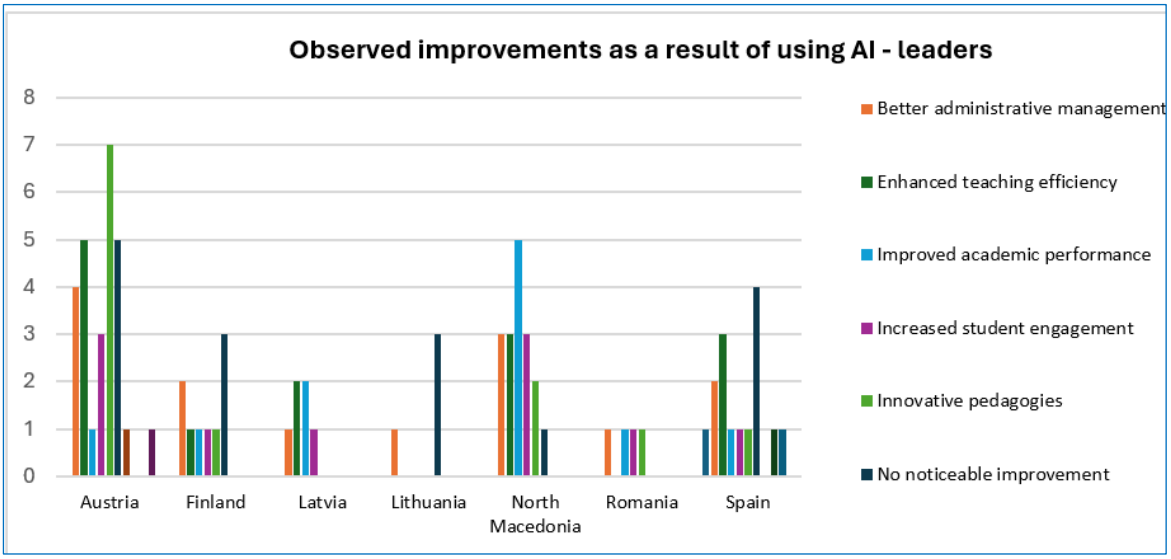

Figure 39: Improvements of using AI

This question explored whether educational leaders have already observed improvements in their work as a result of using artificial intelligence (AI). The responses provide insight into the perceived impact of AI technologies on institutional management, teaching practices, and student engagement.

Overall, the findings suggest that while a number of educational leaders report **positive outcomes associated with AI use**, a significant proportion indicate that it is **still too early to evaluate the full impact of these technologies**.

Reported improvements

Several respondents indicated that the use of AI has led to **observable improvements in different aspects of educational practice**.

One of the most frequently mentioned improvements relates to **better administrative management**. This finding aligns with earlier results indicating that AI tools are most commonly used for administrative and organizational tasks.

Another commonly reported improvement is **enhanced teaching efficiency**, suggesting that AI tools can support teachers in managing instructional processes more effectively.

Respondents also reported improvements in **academic performance and student engagement**, indicating that AI-supported learning environments may contribute to improved learning experiences.

Additionally, some leaders highlighted the emergence of **innovative pedagogical practices**, reflecting the potential of AI technologies to support new approaches to teaching and learning.

Early stage of evaluation

A number of respondents indicated that **it is still too early to evaluate the impact of AI**. This suggests that many institutions have only recently begun experimenting with AI tools, and the long-term outcomes of these initiatives have not yet been fully assessed.
This finding is consistent with earlier survey results showing that AI integration in educational leadership is still at an **emerging stage**.

Limited or no observed improvements

Some respondents reported **no noticeable improvements** or indicated that AI technologies are **not yet widely used in their institutions**.
These responses suggest that in certain contexts AI adoption remains limited, either due to institutional readiness challenges, lack of resources, or insufficient experience with AI tools.

Key findings

The results indicate that while **positive impacts of AI are already visible in certain areas—particularly administrative efficiency and teaching support—many institutions are still in an experimental phase**, where the long-term effects of AI adoption have yet to be fully realized.

Implications for educational institutions

The findings highlight the importance of supporting educational institutions as they move from **initial experimentation toward systematic evaluation of AI impacts**.
Institutions should consider:

- developing mechanisms for monitoring and evaluating AI-supported practices;
- documenting good practices and successful AI implementations;
- encouraging pilot projects that assess the educational impact of AI technologies;
- strengthening institutional capacity to analyse data related to AI-supported learning and management processes.

Such initiatives would support a more evidence-based understanding of how AI technologies contribute to **improving educational leadership and institutional effectiveness**.

Perceived legal and ethical concerns related to AI use in education

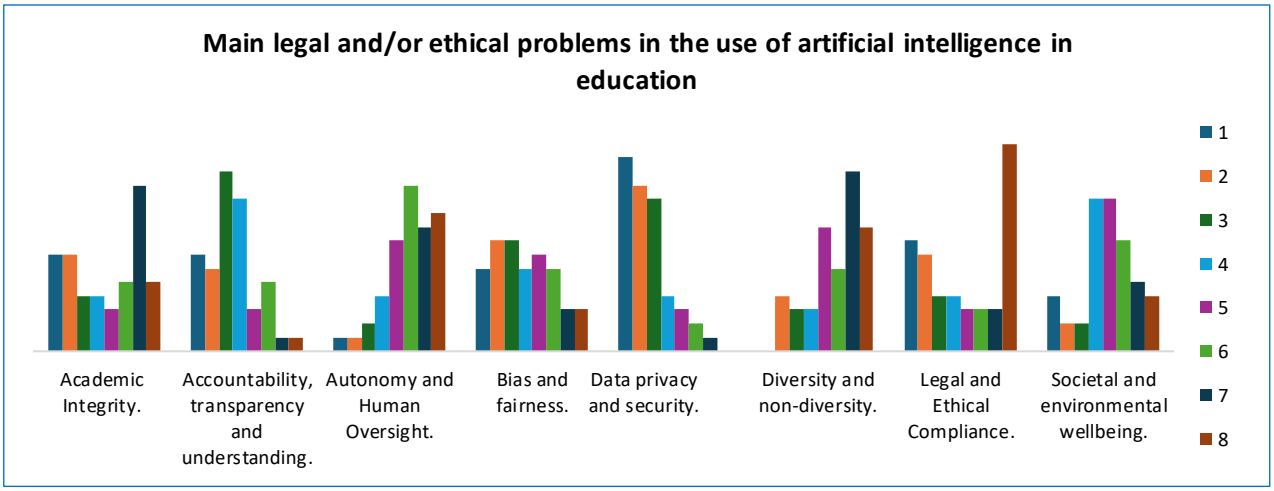

Figure 40: Legal and ethical problems of using AI

This question explored educational leaders' perceptions regarding the main legal and ethical challenges associated with the use of artificial intelligence (AI) in education. Respondents evaluated several areas of concern, including academic integrity, accountability, data protection, bias, and broader societal implications.

Overall, the findings indicate that educational leaders demonstrate **strong awareness of the ethical and regulatory implications of AI technologies in education**, with several issues receiving consistently high ratings across respondents.

Data protection and privacy concerns

One of the most prominent concerns relates to **data privacy and security**. A significant number of respondents assigned high ratings to this issue, indicating that leaders view the protection of student data and compliance with data protection regulations as critical aspects of responsible AI implementation.

This finding aligns with earlier survey results highlighting concerns regarding **GDPR compliance and institutional data governance**.

Accountability and transparency

Another major concern involves **accountability, transparency, and understanding of AI systems**. Educational leaders recognize the importance of ensuring that AI-generated outputs remain explainable and that institutional stakeholders understand how AI systems operate and make decisions.

This concern reflects broader discussions in the field of **explainable AI and algorithmic transparency**.

Autonomy and human oversight

Respondents also expressed strong concern regarding **autonomy and the need for human oversight in AI-driven decision-making**. Many educational leaders emphasized that AI systems should not replace human judgment in educational contexts, particularly in areas related to evaluation, decision-making, and student support.

This finding highlights the importance of maintaining **human-centred approaches to AI adoption in education**.

Bias, fairness, and diversity

Concerns related to **bias, fairness, and diversity** also received notable attention. Respondents recognized that AI systems may potentially reproduce or amplify existing biases present in training data, which could lead to inequitable outcomes in educational environments.

These concerns underscore the importance of implementing **ethical safeguards and monitoring mechanisms** when introducing AI technologies in educational systems.

Academic integrity and legal compliance

Issues related to **academic integrity** and **legal compliance** were also identified as relevant concerns. Educational leaders are increasingly aware that AI tools—particularly generative AI systems—may raise questions regarding plagiarism, authorship, and academic honesty.

Similarly, legal compliance with emerging AI regulations is perceived as an important institutional responsibility.

Societal and broader ethical implications

Finally, respondents also highlighted concerns regarding the **broader societal and environmental implications of AI technologies**. This indicates that educational leaders are considering not only institutional impacts but also the wider ethical context in which AI systems operate.

Key findings

The results indicate that educational leaders perceive AI adoption not only as a technological transformation but also as a **significant ethical and governance challenge** requiring careful regulation and institutional oversight.

Implications for responsible AI adoption

The findings highlight the importance of strengthening **ethical governance frameworks for AI in education**.

Educational institutions should therefore prioritize:

- establishing clear institutional policies for ethical AI use;

- ensuring compliance with data protection and privacy regulations;
- promoting transparency and explainability in AI systems;
- maintaining human oversight in AI-supported decision-making processes;
- addressing bias and fairness issues in AI applications.

These measures are essential for ensuring that AI technologies are integrated into education in a **responsible, transparent, and ethically sound manner**.

Overcoming legal and ethical uncertainty in the use of AI in education

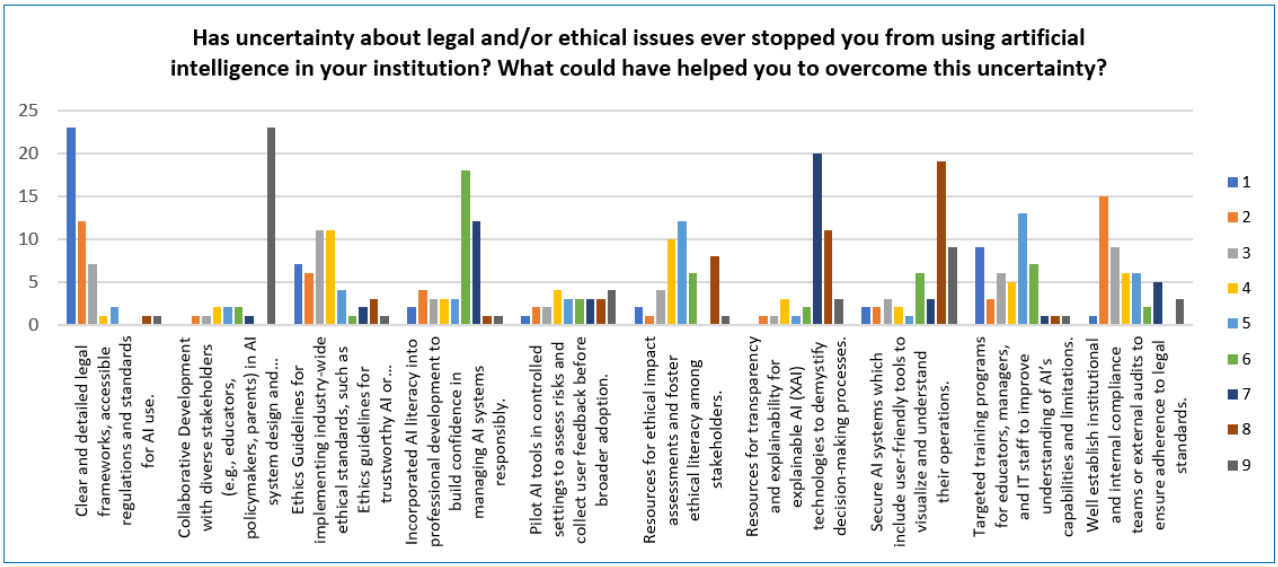

Figure 41: Perceived ways to overcome uncertainty

This question explored whether uncertainty related to legal and ethical issues has ever prevented educational leaders from using artificial intelligence (AI) in their institutions and what measures could help overcome this uncertainty. Respondents evaluated a range of possible actions related to regulation, governance, professional development, and institutional support.

Overall, the results indicate that educational leaders perceive **clear governance frameworks, professional development, and institutional support mechanisms** as the most important factors for overcoming uncertainty related to AI adoption.

Regulatory clarity and legal frameworks

One of the most frequently highlighted solutions involves the development of **clear and detailed legal frameworks and accessible regulations for AI use in education**. Respondents emphasized that transparent regulatory guidelines would provide educational institutions with greater confidence when implementing AI technologies.

Similarly, many respondents indicated that **establishing clear ethical guidelines and standards for AI use** would help reduce uncertainty. References to internationally recognized frameworks, such as **UNESCO's recommendations on the ethics of artificial intelligence**, were also noted as useful reference points for responsible implementation.

Professional development and AI literacy

Another major theme emerging from the responses is the importance of **professional development and AI literacy for educational leaders and staff**.

Respondents highlighted the need for **targeted training programs for educators, managers, and IT staff** to better understand AI technologies, their capabilities, and their limitations. Strengthening AI literacy across institutions is perceived as essential for enabling informed decision-making and responsible AI adoption.

In addition, many respondents emphasized the importance of **integrating AI literacy into professional development programs**, allowing educational leaders to build confidence in managing AI-supported systems.

Ethical governance and stakeholder engagement

Respondents also emphasized the importance of **collaborative governance structures** involving diverse stakeholders. This includes engaging educators, policymakers, students, and parents in the development of AI-related policies and practices.

Such collaborative approaches are seen as important for ensuring that AI adoption reflects the needs and values of the educational community.

Furthermore, several respondents highlighted the need for **ethical impact assessments and monitoring mechanisms** that evaluate the implications of AI technologies before and during implementation.

Transparency and explainability

Another important dimension concerns the need for **transparent and explainable AI systems**. Respondents indicated that tools that allow users to understand how AI systems generate outputs and make decisions would significantly reduce uncertainty and increase trust in AI technologies.

Similarly, the development of **secure and user-friendly AI systems** that clearly communicate how data are processed was identified as an important step toward responsible AI adoption.

Institutional governance and compliance mechanisms

Finally, respondents emphasized the role of **institutional governance structures**, including compliance teams, internal monitoring mechanisms, and external audits.

These structures can help ensure that AI technologies are implemented in accordance with legal requirements and ethical standards, thereby strengthening institutional accountability.

Key findings

The results indicate that uncertainty surrounding AI adoption is primarily related to **governance, regulation, and institutional capacity rather than technological limitations**.

Implications for AI policy and institutional leadership

The findings highlight several priority areas for supporting responsible AI adoption in education:

- developing clear regulatory frameworks and institutional AI policies;
- strengthening AI literacy and professional development for educational leaders and staff;
- promoting transparent and explainable AI systems;
- encouraging collaborative governance involving multiple stakeholders;
- establishing institutional monitoring and compliance mechanisms.

Addressing these dimensions would significantly reduce uncertainty and support a more **confident, responsible, and strategic integration of AI technologies in educational institutions**.

Overview of key findings - leaders

The analysis of survey responses from educational leaders across participating European countries provides important insights into the current stage of artificial intelligence adoption within educational institutions. The findings highlight several key trends related to the use of AI technologies, institutional governance frameworks, perceived benefits and challenges, and organizational readiness for AI integration.

Overall, the results suggest that educational institutions are currently in a **transitional phase of AI adoption**, characterized by increasing awareness of AI technologies, moderate levels of practical use, and the gradual development of institutional governance frameworks.

One of the most notable findings is that **a majority of educational leaders report using AI technologies in their everyday professional activities**, although the intensity of use remains relatively moderate. Most respondents indicated that they use AI tools only a few hours per week, primarily for administrative and organizational tasks such as information retrieval, document preparation, and communication management.

Another important finding relates to the development of institutional policies governing the use of AI technologies. While many respondents reported that their institutions have implemented or are planning to implement AI policies, a significant proportion of institutions still lack formal governance frameworks for AI use.

The analysis also reveals that educational leaders generally demonstrate **positive attitudes toward the potential benefits of AI technologies**. Respondents highlighted several advantages, including improved administrative efficiency, enhanced data analysis capabilities, and opportunities for supporting teaching and learning processes.

At the same time, the findings indicate that AI adoption in educational institutions is accompanied by several challenges. Educational leaders identified barriers related to technological infrastructure, limited technical expertise among staff, financial constraints, and the absence of clear guidelines for AI implementation.

Ethical and legal considerations also emerged as important concerns. Respondents emphasized issues related to data privacy, algorithmic transparency, accountability, and the need for human oversight in AI-supported decision-making processes.

Despite these challenges, many educational leaders reported that AI technologies have already contributed to improvements in certain aspects of institutional practice, particularly in administrative efficiency and organizational processes. However, a considerable number of respondents indicated that it is still too early to fully evaluate the long-term impact of AI adoption in educational institutions.

Taken together, these findings suggest that while artificial intelligence technologies are gradually becoming part of educational leadership practices, their integration remains at an **early to intermediate stage of institutional development**.

Dimension	Key Findings
Use of AI by educational leaders	A majority of educational leaders report using AI technologies in their everyday professional activities.
Intensity of AI use	Most leaders use AI tools between one and three hours per week, indicating moderate levels of engagement.
Institutional AI policies	Many institutions have implemented or are planning to implement AI policies, although formal governance frameworks remain uneven across institutions.
Elements of AI governance	AI literacy, ethical use of AI technologies, and alignment with institutional goals are considered key components of AI policies.
Communication about AI adoption	Educational leaders emphasize the importance of communicating AI benefits, data protection measures, and ethical implications to staff and students.
Stakeholder involvement	Educators and students are moderately involved in AI-related discussions, suggesting opportunities for stronger participatory governance.
Institutional initiatives	Many institutions have initiated training programs, pilot projects, and policy development activities related to AI adoption.
AI tools used in leadership	AI tools are most commonly used for administrative tasks rather than strategic decision-making processes.
Perceived advantages of AI	Educational leaders recognize benefits related to efficiency, data analysis, and support for teaching and learning processes.
Challenges and barriers	Major barriers include limited infrastructure, lack of expertise, financial constraints, and uncertainty regarding AI governance.
Ethical and legal concerns	Data privacy, algorithmic bias, and transparency of AI systems are major concerns among educational leaders.
Observed impact	Some leaders report improvements in administrative efficiency and teaching support, although long-term impacts remain uncertain.

Table 3. Key Findings from the Survey of Educational Leaders

AI technologies are beginning to influence leadership practices in education, with nearly two-thirds of surveyed educational leaders reporting some level of use. However, adoption levels remain uneven across countries.

AI Readiness Landscape Across Participating Countries

The comparative analysis of survey responses reveals that educational institutions across participating countries demonstrate different levels of readiness for adopting artificial intelligence technologies in educational leadership and institutional management.
These differences reflect variations in institutional strategies, levels of digital maturity, leadership engagement, and access to professional development opportunities related to emerging technologies.
Based on the survey findings, participating countries can be broadly characterized according to their current stage of AI adoption in educational leadership.

Austria – Advanced Adoption Stage

Austria demonstrates the highest level of AI use among educational leaders, with the majority of respondents reporting active use of AI technologies in their everyday professional activities. Educational leaders in Austria appear to be relatively comfortable experimenting with AI tools, particularly for administrative tasks, communication, and information management. At the same time, the development of institutional AI policies appears to be more uneven, suggesting that practical experimentation may currently be advancing faster than formal governance frameworks.

Spain – Institutional Engagement Stage

Spain demonstrates strong institutional engagement with AI adoption, with many respondents indicating both active use of AI tools and ongoing efforts to develop institutional policies related to AI governance.
Educational leaders in Spain appear to combine experimentation with increasing attention to strategic planning and governance frameworks for responsible AI use.

Lithuania – Emerging Innovation Stage

Although represented by a smaller number of respondents, Lithuania shows a strong openness to technological innovation, with most respondents reporting the use of AI tools in their professional activities.
This suggests that Lithuanian educational leaders may be actively exploring new technological possibilities, even if institutional governance frameworks are still evolving.

North Macedonia – Transitional Adoption Stage

North Macedonia demonstrates a transitional pattern of AI adoption.

Responses indicate a relatively balanced distribution between leaders who already use AI tools and those who do not. However, the majority of respondents reported that their institutions have implemented or plan to implement AI policies, suggesting increasing institutional awareness regarding the governance of AI technologies.

Finland – Early Exploration Stage

Finland shows more cautious adoption of AI technologies among educational leaders. Most respondents indicated that they do not yet use AI tools in their everyday professional activities. This pattern suggests that institutions may currently be in an exploratory phase, where educational leaders are evaluating the potential role of AI technologies before integrating them into institutional processes.

Latvia and Romania – Limited Evidence Stage

Due to the small number of responses from Latvia and Romania, the available data do not allow for definitive conclusions regarding AI adoption patterns in these contexts. However, the responses suggest that awareness of AI technologies is present even where systematic institutional adoption may still be limited.

Country	Stage of AI Adoption	Key Characteristics
Austria	Advanced adoption	High practical use of AI tools
Spain	Institutional engagement	AI policies and active experimentation
Lithuania	Emerging innovation	Strong openness to AI tools
North Macedonia	Transitional adoption	Mixed levels of AI use
Finland	Early exploration	Limited practical AI use
Latvia	Limited evidence	Small sample
Romania	Limited evidence	Small sample

Table 4. Visual Policy Snapshot

Conclusions and recommendations - leaders

The findings reveal different stages of AI adoption across the participating countries (see Figure). Austria demonstrates a high level of AI use, reflecting more advanced integration practices within educational contexts. Spain shows growing institutional engagement, with increasing attention to structured implementation and organisational support. Lithuania appears particularly open to innovation, with strong willingness to explore emerging AI possibilities. North Macedonia represents a more transitional adoption stage, where awareness and experimentation are developing but institutional structures remain less mature. Finland, in contrast, is currently situated in an early exploration phase, characterised by initial interest and emerging experimentation with AI technologies.

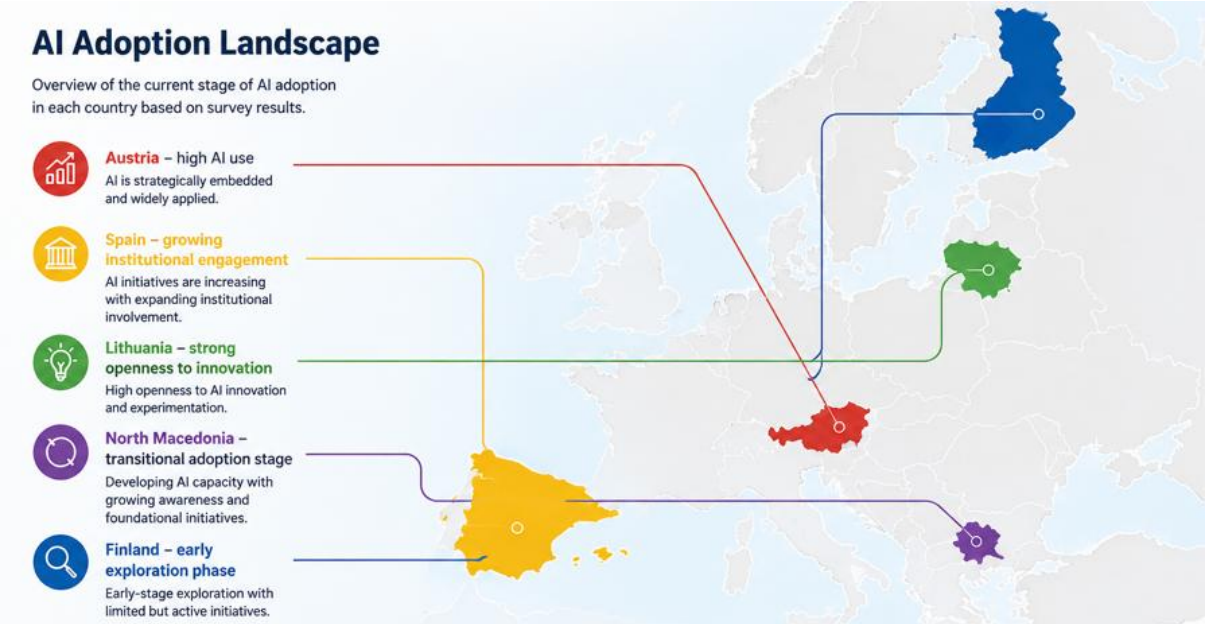

Figure 42: AI adoption landscape within EducationalAI project countries. Source: illustration of survey findings designed with ChatGPT

The survey results reveal several common trends as well as notable differences in how educational leaders across participating countries approach the use of artificial intelligence in educational management.

Overall, the findings suggest that **AI adoption in educational leadership is emerging across all participating countries**, but the level of engagement and institutional readiness varies significantly.

Austria demonstrates the **highest level of practical use of AI technologies among educational leaders**. Most respondents reported that they already use AI tools in their daily work. This

suggests that institutions in Austria may have relatively strong digital readiness and greater familiarity with emerging technologies.

Spain also shows **relatively high levels of engagement with AI tools**, particularly in terms of institutional discussions about AI use and the development of policies related to AI integration in educational settings.

Lithuania, although represented by a smaller number of respondents, shows **strong interest in AI adoption**, with most respondents indicating active use of AI technologies in their professional activities.

In contrast, Finland demonstrates **more cautious adoption of AI technologies among educational leaders**. A majority of respondents indicated that they do not yet use AI tools in their everyday work. This may reflect a more exploratory phase in which institutions are still evaluating the potential role of AI in educational leadership.

North Macedonia presents a **mixed pattern of adoption**. The responses are relatively balanced between leaders who use AI tools and those who do not. This suggests that many institutions may currently be in a transitional phase, where AI technologies are beginning to be explored but have not yet been widely integrated into institutional practices.

Due to the small number of respondents from Latvia and Romania, results from these countries should be interpreted cautiously. However, the available responses suggest that awareness of AI technologies is present even in contexts where practical use remains limited.

Across the participating countries, educational institutions appear to be at different stages of AI adoption. While some institutions are already experimenting with AI tools in leadership and management processes, others remain in earlier stages of exploration.

The rapid development of artificial intelligence technologies is increasingly shaping the digital transformation of education systems across Europe. As educational institutions navigate this transformation, educational leaders play a central role in determining how emerging technologies are adopted, governed, and integrated into institutional practices.

This study examined the perceptions, experiences, and practices of educational leaders regarding the use of artificial intelligence in educational leadership and institutional management. By analyzing survey responses from educational leaders across several European countries, the study provides insight into the current stage of AI adoption within educational institutions.

The findings indicate that artificial intelligence technologies are gradually becoming part of the professional practices of educational leaders. Many respondents reported using AI tools in their everyday work, particularly for administrative tasks such as information management, document preparation, and communication support. However, the overall intensity of AI use

remains moderate, suggesting that many educational institutions are still in the early stages of exploring the potential of these technologies.

Another important finding relates to the development of institutional governance frameworks for AI use. While some institutions have begun to develop or plan AI policies, many educational institutions still rely primarily on individual experimentation with AI tools rather than systematic institutional strategies. This highlights the need for stronger governance structures and clearer institutional guidelines to support responsible AI adoption.

The study also demonstrates that educational leaders generally recognize the potential benefits of artificial intelligence technologies. Respondents emphasized the ability of AI tools to improve administrative efficiency, support data analysis, and contribute to more informed decision-making processes. At the same time, educational leaders expressed concerns related to ethical governance, data protection, transparency of AI systems, and the potential risks associated with automated decision-making.

These findings reflect broader discussions within European policy frameworks regarding the responsible use of artificial intelligence. Initiatives such as the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan**, and the **European Strategy for Artificial Intelligence** emphasize the importance of developing trustworthy AI ecosystems that support innovation while safeguarding fundamental rights and ethical standards.

The results of this study suggest that educational institutions are currently in a **transitional phase of AI adoption**, characterized by increasing awareness of AI technologies, moderate levels of practical use, and the gradual development of institutional governance frameworks.

Moving forward, the successful integration of artificial intelligence in education will depend on several key factors. These include strengthening AI literacy among educational leaders and educators, developing institutional governance frameworks for responsible AI use, investing in digital infrastructure, and promoting collaborative initiatives that support innovation and knowledge sharing across educational systems.

Ultimately, artificial intelligence should be understood not as a replacement for human expertise but as a tool that can support educational leaders in making more informed decisions, improving institutional efficiency, and enhancing educational experiences for learners.

By aligning institutional practices with broader European strategies for digital transformation, educational institutions can ensure that artificial intelligence technologies contribute to more **innovative, inclusive, and resilient education systems in the digital age**.

PRACTICAL TAKEAWAYS FOR EDUCATIONAL LEADERS

The findings of this study provide several practical insights that may support educational leaders and teachers in navigating the growing use of artificial intelligence in educational institutions.

- **Start with small and practical applications of AI:** Educational leaders can begin by using AI tools to support everyday administrative tasks such as document preparation, communication, information retrieval, and planning. Small-scale experimentation allows institutions to explore the potential of AI without significant risks.
- **Promote AI literacy among staff:** Successful AI adoption requires that teachers and institutional leaders understand both the capabilities and the limitations of AI technologies. Providing training sessions and professional development opportunities focused on AI literacy can support responsible and informed use of AI tools.
- **Develop clear institutional guidelines**: Even when AI tools are used informally, it is important to establish clear institutional guidelines that address issues such as academic integrity, data protection, and responsible AI use.
- **Encourage open dialogue about AI:** Educational institutions should involve teachers and students in discussions about AI technologies. Open dialogue can help address concerns, build trust, and promote responsible innovation.
- **Use AI as a support tool, not a replacement for human judgment:** AI technologies should be used to assist educational leaders and educators in decision-making processes rather than replacing human expertise and professional judgment.

Discussion

The findings of this study provide valuable insights into the current stage of artificial intelligence adoption in educational leadership across several European educational contexts. By examining the perceptions and practices of educational leaders, the study contributes to a broader understanding of how AI technologies are beginning to influence institutional management, governance structures, and strategic decision-making in education.

Overall, the results suggest that educational institutions are currently in an **early-to-intermediate stage of AI adoption**, characterized by growing awareness of AI technologies, moderate levels of practical use, and the gradual emergence of governance frameworks guiding their implementation.

AI Adoption in educational leadership

One of the most significant findings of the study is that a majority of educational leader's report using AI technologies in their everyday professional activities. This indicates that AI tools are gradually becoming part of the digital ecosystem within educational institutions. However, the relatively moderate intensity of AI use suggests that these technologies are currently employed primarily as **support tools for specific administrative tasks**, rather than as core instruments for institutional management and strategic decision-making.

This pattern reflects broader trends identified in research on digital transformation in education. Educational institutions often begin integrating new technologies through small-scale experimentation and operational applications before gradually incorporating them into more complex institutional processes.

The findings of this study therefore support the view that educational institutions are still in a **transitional phase of AI adoption**, where experimentation and exploratory use of AI technologies are more common than fully institutionalized AI strategies.

Institutional governance and policy development

Another important dimension emerging from the findings relates to the development of institutional governance frameworks for AI use.

While many educational leaders reported that their institutions have implemented or are planning to implement AI policies, a considerable proportion of institutions still lack formal governance frameworks guiding the use of artificial intelligence technologies.

This finding highlights an important gap between **technological adoption and institutional governance**. Educational leaders may begin using AI tools individually, but institutional structures often develop more slowly.

The need for stronger governance frameworks is also reflected in broader European policy initiatives. The **European Union's Digital Compass for the Digital Decade** emphasizes the importance of developing digital infrastructures, digital skills, and secure digital ecosystems that support responsible technological innovation.

Similarly, the **Digital Education Action Plan (2021–2027)** highlights the importance of strengthening digital education ecosystems and supporting the responsible integration of emerging technologies such as artificial intelligence in educational institutions.

The findings of this study suggest that educational institutions may need additional support in developing governance frameworks that align with these broader European policy priorities.

Ethical governance and responsible AI

Ethical considerations emerged as a central theme in the perceptions of educational leaders regarding AI adoption.

Respondents frequently highlighted concerns related to data privacy, transparency of AI systems, algorithmic bias, and accountability for AI-generated outputs. These concerns reflect growing awareness that AI technologies must be implemented in ways that protect fundamental rights and ensure fairness in educational environments.

These findings are consistent with the principles outlined in the **European Union's strategy for trustworthy artificial intelligence**, which emphasizes transparency, accountability, human oversight, and respect for fundamental rights.

In the context of education, maintaining human oversight is particularly important. Educational decisions often involve complex ethical and pedagogical considerations that cannot be fully automated. AI technologies should therefore be viewed as tools that support human decision-making rather than replacing it.

Educational institutions must therefore develop governance frameworks that ensure the responsible use of AI technologies while maintaining the central role of educators and institutional leaders in decision-making processes.

Capacity building and digital competence

Another key finding of the study relates to the importance of capacity building and professional development for educational leaders and educators.

Many respondents identified limited technical expertise and insufficient familiarity with AI technologies as significant barriers to effective AI adoption. This finding highlights the need for targeted professional development initiatives aimed at strengthening AI literacy among educational professionals.

European policy frameworks already recognize the importance of digital competence development. For example, the **Digital Competence Framework for Educators (DigComp3)** outlines key competencies required for educators to effectively integrate digital technologies into teaching and learning processes.

However, the findings of this study suggest that additional attention should be given to **AI-specific competencies**, including understanding how AI systems function, evaluating the reliability of AI-generated outputs, and addressing ethical considerations associated with AI use.

Strengthening AI literacy among educational leaders is particularly important, as leadership plays a critical role in shaping institutional strategies for technological innovation.

Institutional readiness for AI integration

Taken together, the findings of the study suggest that educational institutions demonstrate varying levels of readiness for AI adoption.

Some institutions appear to be actively experimenting with AI technologies, conducting pilot projects, and developing governance frameworks for responsible AI use. Other institutions, however, remain in earlier stages of exploration, where AI tools are used only occasionally or not at all.

This variation in institutional readiness may reflect differences in digital infrastructure, access to technological resources, national policy environments, and institutional leadership priorities.

These findings support the development of an **AI readiness framework for educational institutions**, which categorizes institutions according to different stages of AI adoption, ranging from initial awareness and experimentation to more advanced stages of institutional integration and strategic AI leadership.

Such frameworks can help policymakers and educational institutions better understand the current state of AI adoption and identify areas where additional support or investment may be needed.

Policy Recommendations

Policy implications regarding teachers

The survey confirms a key systemic insight: the primary challenge is no longer access to digital tools, but the ability to use them pedagogically and responsibly. While efficiency gains are already evident, achieving lasting improvements in learning outcomes requires new competencies, supportive leadership, and structured governance.

To support this transition, educational institutions should invest in comprehensive teacher training, establish clear institutional policies for AI use, promote inclusive access to AI-enabled learning, and implement mechanisms for monitoring and evaluating educational impact.

Only through intentional, critical, and human-centred integration of AI can digital innovation translate into sustainable improvements in teaching quality and student learning.

The findings of this study highlight several opportunities for strengthening the responsible and effective adoption of artificial intelligence technologies in educational institutions. Based on the analysis of survey responses from educational leaders, this section proposes a set of recommendations aimed at supporting the development of institutional strategies, strengthening governance frameworks, and promoting responsible AI integration in education.

The recommendations are organized across three levels: institutional, national, and European policy levels.

Recommendations for educational institutions

Educational institutions play a central role in shaping how artificial intelligence technologies are integrated into educational environments. Institutional leadership is therefore essential for ensuring that AI adoption aligns with educational values, pedagogical goals, and ethical standards.

One of the most important priorities is the development of **institutional AI strategies**. Educational institutions should establish clear strategic frameworks that define the objectives, scope, and governance mechanisms for the use of AI technologies within institutional processes. Such strategies should ensure that AI tools are used in ways that support educational quality and institutional effectiveness.

Another key recommendation concerns **professional development and AI literacy**. Educational leaders and educators require targeted training programs that enable them to understand the capabilities, limitations, and ethical implications of AI technologies.

Strengthening AI literacy among educational professionals will help institutions make informed decisions regarding the adoption and use of AI tools.

Institutions should also promote **participatory governance processes** involving educators, students, and other stakeholders in discussions related to AI adoption. Engaging the broader educational community in decision-making processes can help ensure that AI technologies are implemented in ways that reflect institutional values and address the needs of different stakeholders.

Furthermore, educational institutions should develop **ethical guidelines and governance frameworks** for AI use. These frameworks should address issues such as transparency, accountability, data protection, and human oversight in AI-supported decision-making processes.

Finally, institutions should encourage **pilot projects and innovation initiatives** that allow educators and administrators to experiment with AI technologies in controlled environments. Such initiatives can help institutions evaluate the potential benefits and risks of AI tools before implementing them on a larger scale.

Recommendations for national education systems

National education authorities also play an important role in supporting the responsible adoption of artificial intelligence in educational institutions.

One important priority is the development of **national strategies for AI in education**. Governments should establish policy frameworks that provide guidance on the ethical, legal, and pedagogical dimensions of AI integration within educational systems.

National authorities should also invest in **digital infrastructure and technological capacity** in order to ensure that educational institutions have access to the technological resources required for AI adoption. Investments in secure data systems, digital platforms, and technological support services can help institutions effectively integrate AI tools into their operations.

Another important recommendation concerns the development of **professional development programs for educators and educational leaders**. National training initiatives should focus on strengthening digital and AI-related competencies among educational professionals.

Additionally, national education systems should promote **research and innovation initiatives** related to artificial intelligence in education. Supporting collaborative research projects and partnerships between educational institutions, technology providers, and research

organizations can help generate new knowledge and innovative solutions for educational challenges.

Recommendations for European education policy

At the European level, policy initiatives play a crucial role in shaping the broader ecosystem for digital transformation in education.

European policy frameworks such as the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan (2021–2027)**, and the **European Strategy for Artificial Intelligence** already emphasize the importance of responsible technological innovation in education.

Building on these initiatives, European policymakers should continue to support the development of **trustworthy AI ecosystems in education**. This includes promoting the principles of transparency, accountability, human oversight, and protection of fundamental rights in the design and implementation of AI systems.

Another important priority is the strengthening of **European digital education ecosystems**. Supporting collaboration among educational institutions, research organizations, and technology providers across Europe can facilitate the exchange of knowledge, good practices, and innovative solutions.

The European Union should also continue supporting **cross-national research initiatives** focused on artificial intelligence in education. Such initiatives can help generate comparative evidence on how AI technologies are adopted across different educational systems and identify effective strategies for responsible AI integration.

Finally, European policies should emphasize the importance of **inclusive digital transformation in education**, ensuring that the benefits of AI technologies are accessible to all learners and institutions regardless of geographic or socioeconomic context.

Implementation, sustainability and dissemination

The findings of this study not only provide insight into the current state of artificial intelligence adoption in educational leadership but also highlight several directions for future implementation, sustainability, and dissemination of AI-related practices within educational institutions.

Given the rapidly evolving nature of artificial intelligence technologies, it is essential that educational initiatives move beyond pilot experimentation and focus on the long-term integration and sustainability of AI-supported practices in educational environments.

Implementation of AI-supported practices in educational institutions

The survey findings indicate that many educational institutions are currently experimenting with AI tools in administrative and pedagogical contexts. However, these initiatives often remain limited to individual experimentation rather than systematic institutional implementation.

To support effective implementation, educational institutions should develop **structured implementation frameworks** that guide the integration of AI technologies into institutional processes. Such frameworks should clearly define institutional objectives, responsibilities, and procedures for adopting AI tools in ways that align with educational goals and ethical standards.

Implementation strategies should also prioritize **capacity building among educational leaders and educators**. Providing targeted training opportunities can help institutional stakeholders develop the competencies required to evaluate, adopt, and manage AI technologies responsibly.

Furthermore, institutions should consider establishing **internal coordination mechanisms**, such as AI working groups or digital innovation teams, that support the implementation of AI-related initiatives and facilitate collaboration between educators, administrators, and technology specialists.

Sustainability of AI Innovation in Education

Ensuring the long-term sustainability of AI initiatives represents another important challenge for educational institutions. Many digital innovation initiatives fail to achieve lasting impact due to insufficient institutional support, lack of resources, or limited integration into existing governance structures.

Sustainable AI adoption requires the development of **institutional governance frameworks** that support continuous monitoring, evaluation, and adaptation of AI-supported practices. Institutions should establish mechanisms for assessing the effectiveness of AI tools and identifying areas where improvements may be needed.

Another key factor for sustainability is the integration of AI-related competencies into **professional development programs for educators and educational leaders**. By embedding AI literacy within continuous professional development systems, educational institutions can ensure that staff members remain prepared to engage with evolving technological environments.

Additionally, sustainable AI adoption requires ongoing investment in **digital infrastructure and data management systems** that enable institutions to safely and effectively utilize AI technologies.

Dissemination and Knowledge Sharing

The dissemination of knowledge and good practices related to AI adoption is essential for supporting broader digital transformation across educational systems.

European collaborative initiatives provide valuable opportunities for sharing experiences, resources, and innovative practices among educational institutions from different countries. Dissemination activities may include conferences, workshops, training sessions, and online platforms that facilitate the exchange of knowledge regarding AI integration in education.

Educational institutions involved in AI innovation projects should actively document and share their experiences, including both successful practices and challenges encountered during implementation. Such knowledge sharing can help other institutions learn from existing initiatives and adopt effective strategies for AI integration.

Furthermore, dissemination efforts should aim to reach multiple stakeholder groups, including educators, institutional leaders, policymakers, and technology developers. Broad dissemination can contribute to the development of a more informed and collaborative ecosystem for responsible AI adoption in education.

Future Outlook: AI in educational leadership (2025–2030)

Looking ahead, artificial intelligence is expected to play an increasingly important role in shaping the future of educational leadership and institutional management. As digital transformation continues across European education systems, AI technologies are likely to become more deeply integrated into both administrative and pedagogical processes.

Over the next five years, educational institutions are expected to move beyond the initial phase of experimentation with AI tools toward more structured and strategic integration. AI technologies may increasingly support institutional planning, learning analytics, resource allocation, and personalized learning environments.

At the same time, the successful adoption of AI in education will depend on the development of strong governance frameworks that ensure responsible, transparent, and ethical use of these technologies. Educational leaders will play a crucial role in balancing technological innovation with the protection of fundamental values such as academic integrity, data privacy, and human oversight in decision-making.

Another important development will likely involve the strengthening of AI-related competencies among educators and institutional leaders. Professional development initiatives focused on AI literacy, digital leadership, and responsible technology use will become increasingly important as AI tools become more widely available.

European policy initiatives, including the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan**, and the implementation of the **EU Artificial Intelligence Act**, will continue to provide important strategic direction for the responsible integration of AI technologies within educational systems.

In this evolving context, educational leaders will play a key role not only as technology adopters but also as strategic innovators capable of guiding their institutions through the complex process of digital transformation.

Ultimately, the future of AI in education will depend on the ability of educational institutions to combine technological innovation with strong leadership, ethical governance, and inclusive educational practices.

Policy Highlights: Artificial Intelligence in educational leadership

The findings of this study highlight several important messages for educational institutions, policymakers, and educational leaders regarding the integration of artificial intelligence in education.

AI adoption is emerging but uneven.

Artificial intelligence technologies are increasingly present in the daily work of educational leaders, but adoption levels vary significantly across countries and institutions.

AI is primarily used for administrative support.

Educational leaders most commonly use AI tools for information retrieval, document preparation, communication, and administrative tasks rather than strategic decision-making.

Institutional governance frameworks are still developing.

While many institutions are beginning to develop AI policies and guidelines, formal governance frameworks for responsible AI use remain unevenly implemented.

Capacity building is essential for successful AI adoption.

Educational leaders and educators require targeted professional development opportunities to strengthen AI literacy and digital leadership competencies.

Ethical governance and transparency are critical.

Ensuring responsible AI use requires clear guidelines addressing data protection, algorithmic transparency, accountability, and human oversight.

Integrated Insights from teachers and educational leaders

The findings from the two complementary surveys—one focusing on **educational leaders** and the other on **teachers**—provide a comprehensive perspective on how artificial intelligence is currently being adopted across educational institutions.

While the survey of educational leaders explored institutional governance, strategic planning, and organizational readiness for AI adoption, the teacher survey focused on classroom practices, pedagogical approaches, and competencies related to AI-supported teaching.

Taken together, the results reveal several important patterns regarding the integration of artificial intelligence in education.

Converging perspectives

Both teachers and educational leaders recognize the growing importance of artificial intelligence technologies in educational environments. In both surveys, respondents reported **increasing experimentation with AI tools**, although the level of integration remains moderate.

Another shared finding concerns the perception of **AI as a supportive rather than transformative technology** at the current stage. Educational leaders most commonly use AI tools for administrative and communication tasks, while teachers primarily use AI for lesson preparation, content generation, and assessment support.

Both groups also identify **professional development and AI literacy** as key priorities. Teachers highlight the need for training in pedagogical AI integration, while educational leaders emphasize the importance of strengthening digital leadership competencies and institutional capacity for managing AI adoption.

Finally, both surveys reveal strong awareness of **ethical and governance concerns**, including data protection, transparency of AI systems, academic integrity, and the need for human oversight in AI-supported processes.

Differences in perspectives

Despite these common trends, the two surveys also reveal important differences in how AI adoption is perceived at different levels of the educational system.

Educational leaders primarily focus on **institutional governance, policy development, and organizational readiness**, emphasizing the importance of strategic frameworks, infrastructure development, and institutional leadership.

Teachers, on the other hand, focus more strongly on **pedagogical practices and classroom implementation**, highlighting issues such as instructional design, personalized learning, assessment practices, and collaboration among educators.

These differences reflect the complementary roles that teachers and educational leaders play in the digital transformation of education.

Joint implications for AI integration in education

The combined findings of the two surveys suggest that successful AI adoption in education requires coordinated development across both **institutional leadership and classroom practice**.

Educational leaders are responsible for establishing governance frameworks, institutional strategies, and supportive infrastructures for AI adoption. At the same time, teachers play a central role in translating technological innovation into meaningful learning experiences for students.

Effective AI integration therefore depends on alignment between **institutional policies, professional development initiatives, and pedagogical innovation**.

Future directions for AI in education

Looking ahead, the results of both surveys suggest that educational systems across Europe are entering a new phase of digital transformation in which artificial intelligence will play an increasingly important role.

Future efforts should focus on:

- strengthening AI literacy among educators and educational leaders
- developing institutional governance frameworks for responsible AI use
- supporting pedagogical innovation through AI-supported teaching practices
- ensuring ethical and transparent AI implementation in educational environments
- promoting cross-national collaboration and exchange of good practices.

By addressing these priorities, educational institutions can ensure that artificial intelligence technologies contribute to more innovative, inclusive, and effective educational systems.

Dimension	Teachers' Perspective	Educational Leaders' Perspective	Key Insight
Level of AI use	Teachers increasingly experiment with AI tools for lesson planning, content generation, assessment preparation, and classroom support.	Educational leaders use AI mainly for administrative tasks such as information retrieval, document preparation, communication, and planning.	AI is currently used primarily as a **support tool** rather than a core educational technology.
Intensity of use	Teachers report occasional but growing use of AI tools in teaching practice.	Most leaders report using AI **1–3 hours per week**, indicating moderate use.	AI adoption is present but still at an **early-to-intermediate stage**.

Main purpose of AI	Supporting teaching practices, lesson design, assessment, and differentiated learning.	Supporting administrative management, institutional communication, and organizational planning.	Teachers focus on **pedagogical applications**, leaders on **organizational functions**.
Institutional policies	Teachers often operate without clear institutional AI guidelines.	Many leaders report that institutions are **developing or planning AI policies**, although governance frameworks remain uneven.	Institutional governance is **still evolving** across educational systems.
AI competencies	Teachers highlight the need for training in AI literacy, critical use of AI, and pedagogical integration.	Leaders emphasize the need for **digital leadership skills**, AI governance knowledge, and institutional strategy development.	Professional development is a **shared priority** for both groups.
Perceived benefits	AI can enhance creativity, efficiency in lesson preparation, and opportunities for personalized learning.	AI can improve administrative efficiency, data analysis, and decision-making support.	Both groups recognize **significant potential benefits of AI**.
Key concerns	Ethical use of AI, academic integrity, reliability of AI-generated content, and responsible use by students.	Data privacy, algorithmic transparency, accountability, and governance of AI systems.	Ethical and governance concerns are **central across both groups**.
Implementation challenges	Limited training opportunities and uncertainty about effective pedagogical use of AI.	Infrastructure limitations, lack of technical expertise, financial constraints, and absence of institutional frameworks.	Successful adoption requires **both institutional support and teacher training**.
Overall stage of adoption	Teachers are experimenting with AI at the classroom level.	Leaders are gradually developing institutional strategies for AI use.	Education systems are in a **transitional phase of AI adoption**.

Source: Authors' analysis based on teacher and educational leader survey data.

AI Adoption Ecosystem in Education

The integration of artificial intelligence in education can be understood as a multi-level ecosystem in which different actors and institutional layers interact to support technological

adoption. Successful AI implementation requires coordination between policy frameworks, institutional leadership, teaching practices, and student learning processes. Each level plays a distinct role in shaping how AI technologies are introduced, managed, and used within educational environments.

Table X illustrates this ecosystem perspective by outlining the main roles, activities, and expected outcomes associated with different levels of the educational system involved in AI adoption.

Level of the Educational System	Role in AI Adoption	Key Activities	Expected Outcomes
European and national policy frameworks	Provide regulatory and strategic direction for AI integration in education.	Development of digital education strategies, AI regulatory frameworks (EU AI Act), and support programs for digital transformation.	Responsible, ethical, and coordinated AI adoption across education systems.
Educational leadership and institutional governance	Guide institutional strategy and ensure responsible implementation of AI technologies.	Development of institutional AI policies, governance frameworks, training programs, and infrastructure support.	Strategic and sustainable integration of AI technologies in educational institutions.
Teachers and pedagogical practice	Translate AI technologies into classroom practice and learning activities.	Use of AI tools for lesson design, assessment support, differentiated instruction, and personalized learning.	More innovative teaching practices and improved learning experiences.
Students and learning processes	Engage with AI-supported learning environments and develop AI literacy.	Use of AI tools for learning support, problem solving, creativity, and digital competence development.	Improved engagement, personalized learning pathways, and future-ready skills.

Table 5. Teachers – Leadership – Institutional Governance Model

Interpretation of the AI Adoption Ecosystem

The integration of artificial intelligence in education can be understood as a multi-level ecosystem in which different actors play complementary roles.

At the policy level, European and national frameworks provide strategic direction and regulatory guidance for the responsible adoption of AI technologies in education. Initiatives such as the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan**, and the **EU Artificial Intelligence Act** establish the broader policy environment for digital transformation.

At the institutional level, educational leaders play a key role in translating these policy priorities into institutional strategies and governance frameworks. Leadership decisions influence how AI technologies are introduced, regulated, and supported within educational institutions.

Teachers operate at the pedagogical level, where AI technologies directly influence teaching practices and learning processes. Their ability to integrate AI tools into instructional design, assessment practices, and personalized learning approaches is critical for realizing the educational potential of AI.

Finally, students represent the ultimate beneficiaries of AI-supported educational innovation. Through AI-enhanced learning environments, students can engage with personalized learning pathways and develop digital and AI-related competencies that are increasingly important in contemporary societies.

Taken together, this ecosystem perspective highlights that **successful AI integration in education requires alignment between policy frameworks, institutional leadership, pedagogical practice, and student learning processes**.

Stage	Characteristics	Role of Educational Leaders	Role of Teachers
Stage 1 – Awareness	Institutions are aware of AI technologies but have limited practical experience. AI is mostly discussed rather than actively used.	Leaders explore potential applications of AI and monitor technological developments.	Teachers show curiosity about AI tools but rarely integrate them into teaching practice.
Stage 2 – Exploration	Institutions begin experimenting with AI tools for specific tasks such as information search, lesson	Leaders encourage experimentation and initiate discussions about AI adoption.	Teachers begin using AI tools for lesson planning, content generation, and simple classroom activities.

	preparation, or communication.		
Stage 3 – Institutional Integration	AI tools become more regularly used and institutions begin developing governance frameworks and training initiatives.	Leaders develop institutional policies, provide training opportunities, and support pilot projects.	Teachers integrate AI tools into teaching practices, assessment design, and differentiated instruction.
Stage 4 – Strategic AI Leadership	AI becomes embedded in institutional strategy and supports decision-making, innovation, and data-driven educational management.	Leaders integrate AI into strategic planning, institutional management, and digital transformation initiatives.	Teachers use AI systematically to support personalized learning, learning analytics, and innovative pedagogical approaches.

Table 6. Stages of Artificial Intelligence Adoption in Education

Interpretation of AI Adoption Stages

The findings of the present study suggest that most participating educational institutions currently operate between **Stage 2 (Exploration)** and **Stage 3 (Institutional Integration)**. Educational leaders increasingly experiment with AI technologies for administrative and organizational purposes, while teachers explore AI tools for lesson preparation and instructional support. However, fully strategic and system-wide integration of AI technologies remains relatively limited.

Moving toward **Stage 4 – Strategic AI Leadership** will require coordinated efforts to strengthen institutional governance frameworks, professional development programs, and technological infrastructure.

In particular, educational systems must focus on strengthening AI literacy among educators and educational leaders, developing clear institutional policies for responsible AI use, and promoting collaboration between policymakers, educational institutions, and technology providers.

AI Use Case Scenarios in Education

Building on the comparative analysis of teachers' and educational leaders' experiences with artificial intelligence, the following use case scenarios illustrate how AI technologies are currently applied in educational contexts.

Artificial intelligence technologies are increasingly being explored in educational institutions through a variety of practical applications. While the level of institutional integration varies across countries and institutions, both teachers and educational leaders report experimenting with AI tools in several key areas of educational practice.

Based on the findings of the surveys conducted among teachers and educational leaders, several typical AI use case scenarios can be identified. These scenarios illustrate how AI technologies are currently being used to support teaching, learning, and institutional management.

Use Case 1 – AI for Lesson Planning and Content Development

Teachers increasingly use generative AI tools to support lesson planning and the preparation of teaching materials. AI applications such as language models and content generation tools allow educators to quickly generate explanations of complex concepts, create examples, and design structured lesson outlines.

This use case supports teachers in saving time during lesson preparation while also providing opportunities for generating diverse instructional materials adapted to different learning needs.

Use Case 2 – AI for Assessment and Feedback

Another emerging application of AI in education involves the use of AI tools for preparing assessments and supporting feedback processes. Teachers report using AI systems to generate quizzes, design formative assessments, and draft feedback comments on student work.

Although AI-generated feedback still requires careful human review, these tools can support teachers in streamlining evaluation processes and identifying areas where students may need additional support.

Use Case 3 – AI for Administrative and Organizational Support

Educational leaders increasingly experiment with AI tools to support administrative and organizational tasks. These include drafting reports, summarizing documents, preparing institutional communications, and organizing information relevant to institutional management.

AI tools can therefore support leaders in improving efficiency in administrative processes and freeing time for strategic planning and leadership activities.

Use Case 4 – AI for Personalized Learning and Student Support

AI technologies also have potential applications in supporting personalized learning experiences. Teachers report experimenting with AI tools that help adapt learning materials to different student needs, provide additional explanations, or generate practice exercises at different levels of difficulty.

Such tools can contribute to more inclusive learning environments by supporting differentiated instruction and enabling students to learn at their own pace.

Use Case 5 – AI for Learning Analytics and Data-Informed Decision Making

In some educational contexts, AI tools are also used to analyse student learning data and support data-informed decision-making. Learning analytics systems can help teachers and institutional leaders identify patterns in student performance, monitor learning progress, and detect potential learning difficulties.

Although these applications are still developing in many institutions, they illustrate the potential of AI technologies to support more informed educational decision-making.

AI Use Case	Main Users	Description	Educational Value
Lesson planning and content development	Teachers	Use of generative AI tools to create lesson plans, teaching materials, explanations, and examples for classroom instruction.	Saves preparation time and supports diverse instructional materials.
Assessment preparation and feedback	Teachers	AI tools assist in generating quizzes, formative assessments, and draft feedback for student work.	Supports faster assessment preparation and helps teachers identify learning gaps.
Administrative and communication support	Educational leaders	AI tools are used to draft documents, summarize reports, and support institutional communication and planning.	Improves administrative efficiency and allows leaders to focus on strategic tasks.
Personalized learning support	Teachers	AI tools generate exercises, explanations, and learning resources adapted to different student needs and learning levels.	Supports differentiated instruction and inclusive learning environments.
Learning analytics and data-informed decision making	Teachers and educational leaders	AI-based tools analyze student progress and learning data to support monitoring and educational decision-making.	Enables data-informed teaching and early identification of learning challenges.

Table 7. Summary of AI Use Cases Identified in the Study. Source: Authors' analysis based on teacher and educational leader survey responses.

The use cases summarized in Table 7 illustrate how artificial intelligence technologies are currently being explored across different levels of educational practice. While many of these applications remain at an exploratory stage, they demonstrate the growing role of AI as a support tool for both teaching and institutional management. The findings suggest that the further development of AI-supported practices will depend on strengthening professional competencies, institutional strategies, and governance frameworks that enable responsible and sustainable AI integration in education.

Overall, these use case scenarios demonstrate that artificial intelligence is currently used primarily as a **support tool for teaching, learning, and institutional management**. While many of these practices remain at an exploratory stage, they illustrate the growing potential of AI technologies to support innovation in educational environments.

Practical guidance for integrating artificial intelligence in educational institutions

The findings of this study highlight several practical insights that can support educational leaders and teachers in navigating the growing use of artificial intelligence in education.

1. Start with practical AI applications

Educational institutions do not need to implement complex AI systems immediately. Leaders and teachers can begin with simple applications such as:

- document preparation and communication support
- lesson planning and teaching material generation
- information search and administrative support.

Small-scale experimentation allows institutions to explore the potential of AI while minimizing risks.

2. Invest in AI literacy and professional development

One of the most important conditions for successful AI adoption is strengthening **AI literacy among educators and educational leaders**.

Training programs should help teachers and institutional leaders:

- understand how AI technologies work
- critically evaluate AI-generated content
- integrate AI tools responsibly into teaching and management practices.

Professional development should therefore become a central component of institutional AI strategies.

3. Develop clear institutional guidelines for AI use

Even when AI tools are used informally, institutions should establish clear guidelines addressing:

- responsible use of AI technologies
- academic integrity and authorship
- data protection and privacy considerations
- transparency in AI-supported decision-making.

Clear institutional policies can help ensure that AI technologies are used responsibly and consistently across educational institutions.

4. Encourage open dialogue about AI in education

Successful AI adoption requires the active participation of the entire educational community. Educational leaders should encourage:

- open discussions about AI technologies

- involvement of teachers and students in AI-related decision-making
- collaborative exploration of new teaching approaches supported by AI.

Such dialogue can strengthen trust, transparency, and responsible innovation.

5. Use AI as a support tool, not a replacement for human judgment

Artificial intelligence should support educational leaders and teachers rather than replace professional expertise.

Human judgment, pedagogical experience, and ethical responsibility remain essential elements of educational decision-making.

AI technologies can therefore be most effective when used as **tools that assist educators and leaders in improving educational processes**, rather than replacing human interaction in teaching and leadership.

KEY MESSAGES

- **The analysis presented in this section highlights the interconnected roles of teachers, educational leaders, and institutional frameworks in shaping the adoption of artificial intelligence in education. While teachers primarily engage with AI through pedagogical experimentation and classroom practices, educational leaders focus on governance, institutional strategy, and responsible implementation.**
- **The ecosystem model, adoption stages, and identified use case scenarios together suggest that educational institutions across participating countries are currently transitioning from exploratory experimentation toward more structured and strategic integration of AI technologies.**
- **This transition will require continued investment in professional development, the development of clear institutional policies, and stronger alignment between classroom innovation and institutional governance. By strengthening collaboration between teachers, educational leaders, and policymakers, educational systems can support responsible and sustainable AI integration that enhances both**

Conclusion

The findings of this study provide a comprehensive overview of how artificial intelligence is currently being explored and integrated across educational institutions from two complementary perspectives: educational leadership and classroom practice.

The combined analysis of responses from educational leaders and teachers indicates that artificial intelligence is gradually becoming part of the educational landscape across participating European countries. Both groups demonstrate increasing awareness of the potential of AI technologies to support teaching, learning, and institutional management. However, the level of adoption remains uneven and largely characterized by experimentation and early-stage integration.

The findings of this study reveal a notable gap between the rapid experimentation with artificial intelligence at the classroom level and the slower development of institutional governance frameworks. While teachers increasingly explore AI tools for lesson planning, assessment, and personalized learning, many educational institutions have not yet established clear policies or strategic frameworks guiding the responsible use of AI technologies. Addressing this gap will require stronger alignment between classroom innovation, institutional leadership, and policy development.

Educational leaders primarily approach artificial intelligence from a strategic and organizational perspective. Their responses highlight the importance of institutional governance, policy development, infrastructure readiness, and responsible implementation of AI technologies. Leaders emphasize the need to develop clear institutional frameworks that guide AI adoption while ensuring compliance with ethical standards, data protection regulations, and emerging European policy frameworks.

Teachers, on the other hand, engage with artificial intelligence primarily through pedagogical practice. The results show that AI tools are increasingly used to support lesson planning, content generation, assessment preparation, and differentiated instruction. At the same time, teachers identify significant needs related to professional development, AI literacy, and pedagogical guidance for integrating AI effectively into teaching and learning processes.

Taken together, the findings suggest that the successful integration of artificial intelligence in education requires alignment between **institutional leadership and classroom practice**. Educational leaders play a crucial role in creating the conditions that enable responsible AI adoption through strategic planning, governance frameworks, and institutional support mechanisms. Teachers, meanwhile, play a central role in translating technological innovation into meaningful learning experiences for students.

The study also highlights several cross-cutting challenges that must be addressed in order to support sustainable AI integration in education. These include strengthening digital infrastructure, developing institutional policies and ethical guidelines, enhancing AI literacy among educators and leaders, and ensuring transparency, accountability, and human oversight in AI-supported processes.

At the same time, the findings point to significant opportunities. Artificial intelligence technologies have the potential to improve administrative efficiency, support data-informed decision-making, enhance personalized learning environments, and foster innovation in teaching and institutional management.

Within the broader European context, these developments align with strategic initiatives such as the **Digital Compass for the Digital Decade**, the **Digital Education Action Plan (2021–2027)**, and the evolving **EU regulatory framework for artificial intelligence**. These policy frameworks emphasize the importance of responsible, human-centred, and inclusive digital transformation in education.

The results of this study suggest that educational institutions across Europe are currently in a **transitional phase of AI adoption**, moving from initial awareness and experimentation toward more structured institutional integration.

Supporting this transition will require coordinated efforts across multiple levels of the educational ecosystem. Educational institutions, policymakers, and European initiatives must work together to strengthen professional competencies, establish governance frameworks, and promote collaborative learning environments that support responsible innovation.

Ultimately, artificial intelligence should not be viewed as a replacement for educators or educational leadership, but rather as a tool that can support more informed decision-making, enhance teaching practices, and contribute to more adaptive and resilient educational systems.

By combining technological innovation with strong leadership, ethical governance, and pedagogical expertise, educational institutions can ensure that artificial intelligence contributes positively to the future of education.

Within the broader European context, the findings of this study contribute to ongoing discussions on the responsible integration of artificial intelligence in education. As educational systems continue to adapt to rapid technological change, the alignment between pedagogical innovation, institutional leadership, and policy frameworks will become increasingly important. Strengthening this alignment will help ensure that artificial intelligence technologies support inclusive, ethical, and sustainable digital transformation in education.

Key Findings on AI in educational leadership and teaching

Artificial Intelligence in Educational Leadership and Teaching: Artificial intelligence (AI) technologies are increasingly influencing educational systems across Europe. This study examines how AI is currently used in educational leadership and classroom practice by analysing survey responses from teachers and educational leaders across several European countries. The findings provide a comprehensive overview of the current stage of AI adoption in education, highlighting both emerging opportunities and important challenges related to governance, professional development, and institutional readiness.

AI adoption in education is growing but remains uneven: Both teachers and educational leaders report increasing experimentation with AI tools, although the intensity of use remains moderate and varies across countries and institutions.

AI is primarily used as a support tool: Educational leaders most commonly use AI technologies for administrative tasks such as document preparation, communication management, and information retrieval. Teachers primarily use AI tools for lesson planning, content generation, and assessment preparation.

Institutional governance frameworks are still developing: While many educational institutions are beginning to develop policies and guidelines for AI use, formal governance frameworks remain uneven and are often still under development.

Professional development and AI literacy are critical priorities: Both teachers and educational leaders emphasize the need for targeted training programs that strengthen AI literacy, pedagogical competencies, and digital leadership skills.

Ethical and regulatory considerations play a central role: Respondents highlight concerns related to data protection, transparency of AI systems, academic integrity, and the importance of maintaining human oversight in AI-supported decision-making processes.

Policy Implications: The findings suggest that successful AI integration in education requires coordinated efforts across multiple levels of the educational ecosystem. Educational institutions should prioritize the development of institutional AI strategies, strengthen professional development programs, and establish clear governance frameworks that ensure responsible and transparent use of AI technologies. At the same time, national and European policy initiatives should continue supporting digital transformation in education through investments in digital infrastructure, cross-national collaboration, and the development of ethical and regulatory frameworks for trustworthy AI.

By aligning institutional practices with broader European digital transformation strategies, educational systems can ensure that artificial intelligence technologies contribute to more innovative, inclusive, and resilient education systems.

EDUCATIONALAI REPORT MAIN TAKEAWAYS

- **Artificial intelligence is gradually becoming part of educational practice across participating countries, although its adoption remains uneven and largely experimental.**
- **Teachers primarily use AI tools to support lesson planning, content development, and assessment preparation, while educational leaders tend to apply AI for administrative and organizational tasks.**
- **Both groups (teachers and educational managers) highlight the importance of strengthening AI literacy, professional development, and institutional guidance for responsible AI use in education.**
- **Ethical considerations, including data privacy, academic integrity, and transparency of AI systems, remain central concerns in the adoption of AI technologies in educational institutions.**
- **The findings suggest that successful AI integration requires stronger alignment between classroom innovation, institutional leadership, and policy frameworks supporting digital transformation in education.**

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