AI in Europe's Schools

Curricula, Framework Guidelines and Educational Standards on Artificial Intelligence — A European Comparison

Analytical report based on 152 official primary documents from 49 countries and regions

As of: 6 September 2026 | Data basis: systematic research of ministerial sources (EU27, EFTA, UK, and EU, UNESCO, Council of Europe and OECD reference frameworks)

1. Introduction, Scope and Methodology

1.1 Background and European Framework

Artificial intelligence has arrived in Europe's schools — as a subject of instruction, as a tool, and as a regulatory challenge. Since generative AI systems became widely available in late 2022, education ministries, curriculum authorities and teacher-training institutions have faced a dual challenge: they must decide what students should learn about AI, while also regulating how teachers use AI responsibly and are trained to teach about it. Responses vary enormously across Europe — ranging from mandatory curricula, through national strategies, to non-binding recommendations.

The legal reference point for this development is the European AI Act (Regulation (EU) 2024/1689). Article 4 has obliged providers and operators of AI systems, since 2 February 2025, to ensure an adequate level of AI literacy among their staff. AI literacy is thus no longer merely an education-policy option but a binding obligation under Union law — one that directly affects public schools as operators of AI systems. Against this backdrop, the question of which European education systems have already anchored AI literacy bindingly in curricula, framework guidelines and educational standards — and which remain at the stage of non-binding orientation — becomes increasingly pressing.

1.2 Scope and Corpus

This report examines how European states anchor AI literacy in the documents that govern their school systems. It is based on a corpus of 152 official primary documents from 49 countries and regions (as of 6 September 2026). Only primary sources from state or officially mandated bodies were included: curricula and educational standards, legal instruments, national strategies, and ministerial guidelines and recommendations. The corpus comprises:

- the 27 EU member states,
- Switzerland, Norway and Iceland,
- the United Kingdom with its four autonomous education systems (England, Scotland, Wales, Northern Ireland),
- and European and international reference frameworks from the European Commission (including DigComp 2.2), UNESCO, the Council of Europe and the OECD.

Federally organised states were disaggregated at the level of actual educational authority: Germany at the Länder level (including the KMK's cross-Land resolutions as an overarching reference point), Belgium in Flanders and Wallonia, Spain with its autonomous communities, and Switzerland at the cantonal level. Of the 152 documents, 137 explicitly address artificial intelligence; 15 documents form the curricular context (for example, computer-science curricula with no explicit AI reference).

1.3 Methodology

Research was conducted through six parallel cluster investigations, each with clear geographic and thematic responsibility: DACH (Germany/Austria/Switzerland), Western Europe, the Nordics/Baltics, Southern Europe, Central & Eastern Europe, and the UK/Ireland combined with the international reference frameworks. Each cluster produced its own research report; all findings were consolidated into a central manifest recording, for every document, its source, country, year of publication and access status.

To make the heterogeneous national documents comparable, three dimensions were coded on a normalised basis:

- Bindingness — seven levels ranging from “mandatory curriculum / legal instrument” through “strategy / programme” and “recommendation / reference framework” to “draft / consultation”;
- Target groups — primary level, lower secondary, upper secondary, vocational education and training (VET), teachers, and system/governance level (multiple entries possible);
- Competency themes — nine categories ranging from “ML/technology/programming” to “ethics/responsibility/data protection” to “bias/disinformation”, coded separately for students and for teachers.

Source verification was documented throughout: 58 original PDFs were archived locally, 76 documents exist as HTML full texts; 18 documents were blocked by bot protection or access restrictions — their URLs are recorded in the manifest, and their content was reconstructed via secondary access or official-gazette references wherever possible.

The following table condenses the corpus's key figures:

Dimension	Distribution (n = 152)
Bindingness	69 recommendation/reference framework; 39 mandatory curriculum/legal instrument; 15 strategy/programme; 20 other; 6 elective subject; 2 draft; 1 pilot
Target groups (multiple)	Teachers 88; lower secondary 72; system/governance 54; primary 48; upper secondary 45; VET 10
Time distribution	2013–2021: 24 documents; 2022–2023: 35; 2024–2026: 84 (plus 1 announced for 2029; 8 documents with no datable year of publication)
Regional coverage	DACH 25; Western Europe 28; Nordics/Baltics 24; Southern Europe 22; Central & Eastern Europe 25; UK/Ireland 15; reference frameworks 13
AI relevance	137 explicit AI documents; 15 context documents

These figures already reveal the basic structure of the field: a marked upswing since 2024, a dominance of teachers as the target group, and a coexistence of legal formalisation and recommendation-based logic — distinctions that the following chapters will develop further.

1.4 Limitations of the Study

Four limitations should be noted. First, 18 documents could not be checked in full text owing to bot protection; their coding rests on documented metadata and substitute sources. Second, the corpus's linguistic diversity — documents in more than 25 languages, including Greek, Icelandic, Slovak and Catalan — required partial machine translation, leaving room for interpretation on fine legal or didactic distinctions. Third, the field is

highly dynamic: several reforms are announced for 2026/27 (including curriculum revisions in Romania, Slovenia and Czechia), so the findings as of September 2026 may in individual cases already be superseded. Fourth, the report makes no claim to assess implementation validity: it analyses governance documents, not actual classroom practice.

1.5 Purpose and Structure of the Report

The report aims to draw conclusions for education policy, school practice and teacher training from the comparative findings. The analysis proceeds from five perspectives: the country and regional comparison (Chapter 3), target groups (Chapter 4), competency priorities (Chapter 5), scope and depth of learning content (Chapter 6), and bindingness and governance (Chapter 7). It further addresses forms of implementation and didactic models (Chapter 8) and commonalities, gaps and tensions (Chapter 9), before Chapter 10 draws conclusions and sketches development paths to 2029. Chapter 2 opens the analysis with the quantitative overall landscape and its temporal dynamics. All chapters contain condensed, directly visualisable data tables; the underlying data file (analysis_data.json) is structured so that it can serve directly as the basis for a web-app visualisation and a presentation version.

2. Overall Landscape and Temporal Dynamics

2.1 Quantitative Overview

The dataset comprises 152 documents from 49 countries and regions across Europe, including the EU and Council of Europe levels as well as international reference frameworks (as of 6 September 2026). The selection does not claim to be exhaustive but captures the policy-relevant spectrum at high density: of the 152 documents, 58 exist as archived PDF full texts and 76 as HTML full texts; 18 sources were blocked from direct access and were documented via secondary evidence.

A striking feature is the strong territorial and federal differentiation. Germany alone is represented by the KMK level and several Länder (Baden-Württemberg, Bavaria, Berlin, Hesse, North Rhine-Westphalia); Belgium, Spain and the United Kingdom each appear through their respective education regions. The category “country/region” thus reflects actual curricular jurisdiction rather than state borders.

The distribution of bindingness levels shows a field in transition. By far the largest group consists of recommendations and reference frameworks (69 documents, roughly 45 percent), followed by mandatory curricula and legal instruments (39 documents, roughly 26 percent). Strategies and programmes account for 15 documents, elective subjects for 6, drafts for 2, and one pilot project for 1 document; 20 documents fall under “other” (status reports, research papers, international treaties, etc.).

Bindingness level	Number	Share (rounded)
Recommendation / reference framework	69	45%
Mandatory curriculum / legal instrument	39	26%
Strategy / programme	15	10%
Elective / voluntary offering	6	4%

Bindingness level	Number	Share (rounded)
Draft / consultation	2	1%
Pilot project	1	1%
Other	20	13%
Total	152	100%

That more than one in four data points already carries mandatory status is remarkable given how young the topic is. The 39 mandatory documents are spread across 29 countries and regions; Slovakia leads with three mandatory curriculum annexes, followed by several countries with two legal instruments each (Belgium/Flanders and Wallonia, Bavaria, North Rhine-Westphalia, Greece, Switzerland, Spain, Austria).

2.2 Temporal Dynamics: Three Waves of Policy Production

The distribution of publication years reveals a clearly staged development (see table below). A single outlier from the year 2029 stems from a strategic target horizon and is not counted here; likewise, 8 documents with no datable year of publication are excluded, so the year figures relate to 144 documents.

Year	Documents	Year	Documents
2013	1	2021	6
2014	1	2022	14
2016	2	2023	21
2017	2	2024	31
2018	3	2025	30
2019	6	2026	23
2020	3		

First wave (2013–2021): digital strategies and computer-science curricula. Early documents address AI only implicitly. They emerge in the context of digitalisation strategies and the establishment of computer science as a school subject: the English National Curriculum Computing (2013), the Swiss Lehrplan 21 with its “Media and Informatics” module (adopted 2014), the KMK strategy “Education in the Digital World” (2016, amended 2017), the Baden-Württemberg Bildungsplan 2016, the Irish Digital Learning Framework (2017), and the Portuguese Aprendizagens Essenciais (2018). AI appears here as a sub-aspect of computer science, media literacy or basic digital education. The dip in 2020 (3 documents) is plausibly explained by pandemic-related shifts in priority; from 2021/22 the numbers rise markedly again.

Second wave (2022–2024): the GenAI surge. With the public availability of ChatGPT in late 2022, output jumps from 14 documents (2022) to 21 (2023) and 31 (2024). This phase is characterised by quickly produced guidance and handbooks on generative AI, mostly without binding force: the Polish handbook “Chat GPT w szkole. Szanse i zagrożenia” (July 2023), the North Rhine-Westphalia guidance on text-generating AI systems (2023), the Hesse handbook “AI in School and Teaching” (2023), the Austrian handbook on engaging with AI in education (2023), the Swedish “Råd om AI, chattbottar och liknande verktyg” (2023), the English

Department for Education position paper “Generative AI in education” (2023), and, internationally, the UNESCO Guidance for generative AI in education and research (2023). These documents respond to acute practical uncertainty: they address exam formats, plagiarism, data protection and the role of teachers, without creating curricular obligations. The KMK recommendation on the use of AI (resolution of 10 October 2024) marks the typical conclusion of this phase: systematic, yet deliberately pitched at the level of a recommendation.

Third wave (2025/26): curriculum anchoring and legal formalisation. With 30 documents (2025) and already 23 documents in the current year 2026, output remains high but shifts qualitatively: guidance documents give way to statutory instruments, curriculum annexes and mandatory framework curricula. This third wave carries the report's central thesis (see Section 2.4).

2.3 Explicit AI Documents versus AI-Adjacent Context Documents

Of the 152 documents, 137 are explicit AI documents — that is, artificial intelligence is their subject matter or a named curricular content. The remaining 15 documents are AI-adjacent context documents: overarching digital strategies, general computer-science or media-literacy curricula and frameworks in which AI appears only implicitly but which are indispensable for interpretation. Examples include the KMK strategy “Education in the Digital World” (2016), the German-Swiss Lehrplan 21, the Portuguese Aprendizagens Essenciais (2018), or the Berlin framework curriculum for computer science in the upper secondary Gymnasium track. The 137-to-15 ratio shows that the field is now predominantly shaped by dedicated AI regulation — a marked contrast to the situation before 2022, when AI appeared almost exclusively as a subset of computer-science and digitalisation documents.

2.4 Central Thesis: From the Recommendation Phase to the Anchoring Phase

The findings support a clear temporal thesis: Europe is currently passing through the transition from a recommendation phase (2023/24) to an anchoring phase (2025/26). In the recommendation phase, non-binding guidance on generative AI predominated, offering schools orientation in dealing with a disruptive tool. In the anchoring phase, by contrast, AI is being fixed curricularly and legally — as a mandatory topic, a dedicated subject, or a binding competency framework. Six examples mark this transition:

- Poland: The Regulation of the Minister of Education of March 2026 (Dz.U. 2026, item 378) introduces a new core curriculum (podstawa programowa) and binds AI content into the subject Informatyka; in force from 1 September 2026.
- Slovakia: Amendment No. 17 to the national State Education Programme (ŠVP) introduces “AI literacy” (AI gramotnosť) as a mandatory cross-curricular theme — in force from 1 March 2026, taught from the 2026/27 school year — flanked by Amendment No. 4 (primary school) and Amendment No. 6 (Gymnasium, from 1 September 2026): currently the most coherent multi-stage anchoring model in Europe.
- Italy: The National Guidelines for the Curriculum (Ministerial Decree 221 of 9 December 2025, “Indicazioni 2025”) make AI and digital competencies compulsory from the 2026/27 school year; complemented by the guidelines on introducing AI in schools anchored via Law 132/2025.

- Sweden: The Gy25 upper-secondary reform introduces “Artificiell intelligens” as a new, graded upper-secondary subject from 1 July 2025 — one of the first standalone AI subjects at upper-secondary level in Europe.
- Greece: Ministerial Decision KYA 55909/Δ6/2026 of 12 May 2026 regulates, as a binding legal instrument, the use of AI systems in teaching — an example of formalising the terms of use themselves.
- France: Service Note No. 2026-019 of 23 January 2026 makes the Pix “Intelligence artificielle” pathway mandatory from the 2026/27 school year, linking a competency framework (Référentiel Pix IA, 2025) with mandatory certification.

These examples show three distinct anchoring paths: integration into existing subjects (Poland), a cross-curricular theme spanning all school levels (Slovakia), and a standalone subject or certified mandatory pathway (Sweden, France). The anchoring phase is thus not monolithic but path-dependent, reflecting national curricular traditions.

2.5 Typology of Document Types

For further analysis, the 152 documents can be assigned to five basic types that serve different functions within the governance system:

- Curriculum / legal instrument: Binding curricular requirements (e.g., Poland's podstawa programowa, Slovakia's ŠVP amendments, Sweden's Gy25, Flanders' Minimumdoelen). These define what students are required to learn.
- Guidance / handbook: Non-binding orientation for schools and teachers, typical of the 2023/24 GenAI wave (e.g., the 2024 KMK recommendation, the DfE position paper, the 2025 Irish Guidance on AI in Schools).
- Competency framework: Systematic description of AI competencies for students or teachers (e.g., Référentiel Pix IA, Spain's MRCDD, the EU-wide DigComp reference in the Flemish Minimumdoelen).
- Strategy / programme: Overarching governance and investment documents (e.g., Hungary's AI strategy 2025–2030, Romania's AI strategy 2024–2027, Estonia's TI-Hüpe/AI Leap programme, Italy's Piano Scuola 4.0).
- Training material: Concrete professional-development resources for teachers (e.g., the EU project AI4T with its textbook, the Czech NPI materials, the Spanish Orientaciones for teacher training 2025).

These types increasingly interlock: strategies generate training programmes, competency frameworks become binding via legal instruments, and guidance documents feed into curriculum annexes. Precisely this chaining — visible, for example, in France (Strategy 2023–2027 → Référentiel 2025 → mandatory pathway 2026) and Slovakia (Implementation Plan 2025–2027 → Amendment 17) — is the characteristic signature pattern of the anchoring phase and forms the starting point for the country comparisons in the following chapters.

3. Country and Regional Comparison

The corpus of 152 documents from 49 countries and regions (as of 6 September 2026) can be organised into six geo-political clusters, plus 13 documents from supranational reference frameworks (EU, UNESCO, Council of Europe, OECD), which are reported separately. The comparison reveals a basic pattern: most education systems initially responded at the recommendation level between 2023 and 2026 — only 39 of the 152 documents (26 percent) hold the status of a mandatory curriculum or legal instrument. However, the rate of mandatory status and the target-group focus differ considerably: while the Nordics and Baltics steer in a markedly teacher-centred way, Central & Eastern Europe and the DACH region are dominated by student-facing curricular anchoring.

Cluster	Docs	Mandatory curr./legal instr.	Mandatory rate	Target focus (teachers/students)	Dominant governance mode
DACH (DE, AT, CH)	25	10	40%	15 / 18	Curriculum anchoring via computer-science/digital subjects, flanked by Länder/cantonal guidance
Western Europe (FR, BE, NL, LU)	28	7	25%	15 / 16	Central-state digital frameworks with AI modules, reference frameworks and certification
Nordics/Baltics (SE, FI, DK, NO, IS, EE, LV, LT)	24	2	8%	22 / 13	Guidance- and training-based governance, municipal school autonomy
Southern Europe (ES, PT, IT, GR, MT, CY)	22	7	32%	12 / 15	Legislative minimum standards plus ministerial guidance
Central & Eastern Europe (PL, CZ, SK, HU, RO, BG, HR, SI)	25	8	32%	12 / 12	Most recent curriculum reform wave with explicit AI literacy
UK/Ireland (ENG, SCT, WLS, NIR, IE)	15	4	27%	6 / 8	Guidance regime of the devolved education nations
Reference frameworks (EU, UNESCO, CoE, OECD)	13	1	8%	6 / 2	Normative framing without school-level authority

From this matrix a three-part typology can be derived, distinguishing systems by their primary anchoring mode:

Type	Characteristics	Countries/systems
(a) Curriculum anchors	AI as an explicit mandatory content in curricula, state education programmes or legal instruments; student competency goals at the centre	PL, SK, IT, SE, FR, GR, HR, ES
(b) Guidance	Ministerial recommendations, legal guidance and	DK, FI, AT, IE, NL

Type	Characteristics	Countries/systems
strategists	training programmes as the main instrument; no or only indirect curriculum change	
(c) Federal patchworks	Authority devolved to state/regional level; heterogeneous mix of mandatory subjects, minimum goals and guidance	DE, CH, BE, UK, ES

The classification is not clear-cut: Austria appears as a guidance strategist but has a mandatory subject with "Basic Digital Education" (Federal Law Gazette II No. 267/2022); Spain is simultaneously a curriculum anchor (Royal Decree 217/2022) and a federal patchwork (autonomous communities); the Netherlands sits at the threshold of Type (a) with its statutory core objectives (kerndoelen). The typology therefore describes emphases, not exclusive categories.

3.1 DACH: Curriculum Anchoring within Federalism

The DACH cluster, with 25 documents and ten mandatory curricula, shows the highest mandatory rate (40 percent) of all clusters — a finding attributable less to central-state steering than to the cumulative effect of three federal systems. In Germany, the KMK recommendation of 10 October 2024 forms the cross-Land orientation framework; it deliberately remains non-binding and addresses didactics, examination culture, teacher training and legal questions. Actual bindingness arises at the Land level: Bavaria anchors AI in the LehrplanPLUS (learning area "Artificial Intelligence" in Gymnasium Year 11; a new mandatory subject "Artificial Intelligence, Computer Science and Technology" at the Fachoberschule from 2024/25), North Rhine-Westphalia in the content area "Automata and Artificial Intelligence" within mandatory computer-science teaching in Years 5/6 (2021 core curriculum), and Berlin in the AI specialisation area of the framework curriculum for computer science in the upper Gymnasium track. Almost all Länder supplement this with guidance documents (Bavaria 2023/2026, North Rhine-Westphalia 2023, Hesse 2023, Berlin 2024) covering data protection, assessment and task design, without themselves having curriculum status.

Austria combines both levels: the 2023 BMBWF handbook and the school package "Artificial Intelligence — an Opportunity for Austria's Schools" (including an AI MOOC) operate at the recommendation level, while the mandatory subject "Basic Digital Education" (since 2022/23) already covers AI and automation bindingly, and the new AHS upper-secondary subject "Computer Science and Artificial Intelligence" (resolved 2026, introduced from 2026/27) extends the anchoring into upper secondary. Switzerland has binding foundations through the Lehrplan 21 module "Media and Informatics" (21 cantons) and the EDK framework curriculum for Matura schools (2024), while the cantons of Zurich (five guiding principles), St. Gallen and Solothurn (guidance with a criteria catalogue) deliberately favour flexible, non-binding governance. Typical of the cluster is thus the coexistence of binding computer-science education — into which AI is embedded — and recommendation-based guidance for everyday generative AI use.

3.2 Western Europe: Central-State Frameworks and a Certification Logic

Western Europe (FR, BE, NL, LU) is the largest cluster by volume, with 28 documents and seven mandatory curricula (25 percent). France stands as the reference case of central-state governance: beyond the mandatory subject "Sciences numériques et technologie" (SNT, seconde, since 2019) with its explicit "Intelligence artificielle" topic and the specialised NSI subject (première/terminale), the Pix "Intelligence artificielle"

pathway becomes mandatory from 2026/27 for all students in Years 4e, 2de and 1re CAP (Service Note No. 2026-019), based on the Référentiel Pix IA (2025) with its three domains of Understanding, Using and Analysing Impact. This is embedded in the Cadre de référence des compétences numériques (CRCN, 2019) and the Digital Strategy for Education 2023–2027. France thus uniquely combines a mandatory curriculum, certification (Pix) and a teacher framework (CRCN-Édu) into a closed regime.

Belgium exemplifies the federal patchwork in its purest form: Flanders sets legally binding minimum objectives ("Minimumdoelen") — "Computer science" (3rd stage, from 2025/26) and "Digital competencies and media literacy" (1st stage, since 2021) — including an explicit AI component, complemented by the non-binding vision text "Responsible AI in Flemish Education" (2024). The Fédération Wallonie-Bruxelles anchors AI via the AI annex to the FMTTN reference framework (2026) and the mandatory course "formation numérique" in the 1re secondaire from 2026/27. The Netherlands stand on the threshold of statutory anchoring: the finalised core objectives for digital literacy (2025) contain an explicit AI core objective for primary and lower-secondary levels, due to take effect in 2026/27, flanked by the government-wide vision on generative AI (2024) and the NOLAI research lab. Luxembourg has profiled itself with the "AI Compass" (MENJE/SCRIPT, finalised January 2026): a three-stage model — "Learning without AI — about AI — with AI" — that links the mandatory subject "Digital sciences" (7e–5e, with an explicit AI strand) to more than 80 IFEN training modules. The cluster overall is characterised by combining a digital-competency framework with subsequent AI-specific detailing.

3.3 Northern Europe and the Baltics: Guidance-Based Governance amid High School Autonomy

The Nordic/Baltic cluster (24 documents) shows the lowest mandatory rate of all clusters: only two of 24 documents (8 percent) are mandatory curricula — and both are notable trailblazers. Sweden introduced the new upper-secondary subject "Artificiell intelligens" (Gy25, two levels of 100 points each, from autumn 2024, with subject grades from 1 July 2025), one of Europe's first standalone AI school subjects, flanked by state-funded teacher training (7.5 higher-education credits) and Skolverket's continuously updated guidance on AI chatbots. Iceland anchored AI competency goals — the ethically responsible use of AI and other information-gathering tools from Grade 7 — as a legal instrument in the 2024 national curriculum (Adalnamskra grunnskola; Official Gazette B No. 1188/2024, in force from 2025/26), complementing this with the country's first national AI action plan (2025–2027) and a teacher pilot project with Anthropic and Google (around 600 teachers).

All other systems in the cluster rely on guidance. Denmark published separate recommendations for Folkeskole (June 2025), upper-secondary and vocational schools (November 2024), explicitly emphasising their non-binding status (local school boards approve teaching materials under section 44 of the Folkeskole Act) while regulating the examination side strictly: generative AI is banned in Folkeskole leaving examinations by executive order (detailed in 7.3) — the strictest single examination rule in Europe. Finland combines statutory obligations from the EU AI Act with national recommendations in its "Tekoälysuositukset" (OPH/OKM, March 2025), without amending the curriculum (POPS 2014). Norway remains the cluster's special case: the Directorate for Education confines itself to a guidance hub with recommendations, a learning-goal orientation tied to the existing LK20 curriculum, and a voluntary competency package — no binding curriculum decision exists. In the Baltics, programmes and guidance dominate: Estonia's TI-Hüpe (AI Leap) equips all 10th and 11th graders with AI learning applications from 2025/26 and builds a nationwide trainer network; Latvia (VIAA guidelines, 2025) and Lithuania (AI guidelines, ministerial decree of 16 January 2026, with explicit bans

on emotion recognition and social scoring) have recently issued detailed guidance. The cluster is thus the most teacher- and training-focused (22 of 24 documents address teachers) and relies on municipal and school-level governance capacity.

3.4 Southern Europe: Legislative Minimum Standards and New Legal Instruments

Southern Europe (22 documents, seven mandatory, 32 percent) combines older legislative digital anchoring with a recent wave of AI-specific legal instruments. Spain anchored AI as early as Royal Decree 217/2022 (LOMLOE) in the subjects “Tecnología y Digitalización” and “Digitalización” of the ESO — including the conceptual distinction between AI, machine learning and deep learning, and the topic of bias — as well as Royal Decree 279/2021, creating a vocational specialisation course “Inteligencia Artificial y Big Data”; the autonomous communities implement the minimum requirements independently (for example, Decree 65/2022 of the Community of Madrid). INTEF provides the recommendation level with its Guide on the Use of AI (2024), and the MRCDD (2022) provides the teacher reference framework.

Italy followed in 2025/26 with a two-pronged strategy: the guidelines (Ministerial Decree 166/2025) mandate governance of AI adoption across all schools (risk management, EU AI Act compliance), and the National Guidelines 2025 (Ministerial Decree 221/2025) introduce, for the first time from 2026/27, binding computer-science learning objectives including a “first approach to Artificial Intelligence” starting in primary school. Greece has created the cluster's strictest legal instrument with Ministerial Decision ΚΥΑ 55909/Δ6/2026 (Government Gazette 2639/B, 12 May 2026) — a binding catalogue of prohibitions for AI use in teaching (detailed in 7.3); at the same time, the IEP computer-science curriculum for Gymnasio (2022) already contains dedicated AI units. Malta (Digital Education Strategy 2024–2030; ICT-C3 specialisation “Robotics and Artificial Intelligence” in Year 11) and Cyprus (2025 policy document of the Ministry; horizontal curriculum integration rather than a dedicated subject) round out the cluster. Portugal is a notable special case: as of September 2026 the country has no binding AI school curriculum; Recommendation No. 4/2026 of the National Education Council (21 May 2026) remains a recommendation, while a government working group (Order 10945/2025) and the action plan of the national digital strategy (Council of Ministers Resolution 214/2025, Action 19) are still preparing binding proposals.

3.5 Central & Eastern Europe: The Most Recent Curriculum Reform Wave

Central & Eastern Europe (25 documents, eight mandatory, 32 percent) is the most dynamic cluster: it produced Europe's most recent explicit AI curricula in 2025/26. Slovakia stands as the pioneer: based on the “Plan for the Responsible Use of AI in Education 2025–2027,” AI literacy (AI gramotnosť) was made a mandatory cross-curricular theme (4.2.9) for primary and lower-secondary levels via Amendment No. 17 to the State Education Programme (in force from 1 March 2026, taught from the 2026/27 school year) — including critical evaluation of AI outputs, bias, and digital wellbeing. Amendment No. 4 (2026) defines AI literacy as its own literacy with a progression, and Amendment No. 6 (from 1 September 2026) extends this to the Gymnasium; a “Framework of AI competencies for teachers” (March 2026) frames teacher training. Poland follows with the “Compass for Tomorrow” reform: the Regulation of 11 March 2026 (Dz.U. 2026 item 378) brings explicit AI content into the mandatory subject Informatyka for the first time from 1 September 2026 (AI-based tools, training simple models, hallucinations and disinformation). Romania is a borderline case between reform and preparation: the Liceu curricula taking effect from 2026/27 (Order 6,930/2025) anchor AI content across subjects — from analysing AI-generated answers in ICT to the mandatory, critically validated

use of an AI assistant in the Mate-Info mathematics track — while the national AI guide for schools ("GHID AI pentru educație") had, as of June 2026, not yet been formally adopted and circulates only as a draft.

Croatia has chosen its own path: the EU-funded BrAIn project (CARNET, commissioned by the Ministry of Science and Education) produced the curricula "Artificial Intelligence: from Concept to Application" (2024/2025) — the cluster's most extensive dedicated student AI curriculum — offered as a voluntary extracurricular activity (Grades 5–8) and as an elective at upper-secondary level, supplemented in 2026 by guidelines for responsible AI use. Czechia (NPI recommendations 2023/2025; AI anchoring via the revised RVP computer-science framework), Bulgaria (Guidelines 2024; Vision 2026 in consultation) and Slovenia (ZRSS guidelines 2026; linked to the ongoing KUP curriculum reform via DigComp-based cross-curricular goals) are moving between recommendation and imminent anchoring. Hungary is the report's second special case: the national AI strategy 2025–2030 contains an education chapter (critical thinking, methodological renewal, 579,000 notebooks as infrastructure), yet no curriculum change or ministerial AI-didactics guide exists; AI runs only indirectly through the mandatory subject "Digital Culture" (NAT 2020).

3.6 United Kingdom and Ireland: A Guidance Regime across the Devolved Nations

The UK/Ireland cluster (15 documents, four mandatory, 27 percent) is shaped by the separate education authorities of the UK's four nations and is thus a further federal patchwork. England relies on a guidance triad from the Department for Education: the policy paper "Generative AI in education" (2023, last updated 2025), the "Generative AI: Product Safety Expectations" (2025, expanded in 2026 to 13 standards including safeguarding and mental health), and modular training materials. No explicit mandatory AI curriculum exists; AI is covered only implicitly through the 2013 Computing curriculum, whose reform is being discussed as part of the Curriculum and Assessment Review (2025/26). Scotland issued the "Scottish Guidelines and Guardrails" in March 2026 — deliberately using the term "Learning with and about AI" rather than "AI literacy," with a strong focus on children's rights. Wales integrates AI via the mandatory cross-curricular Digital Competence Framework (DCF) and the 2025 Hwb recommendations. Northern Ireland shows the weakest coverage: besides EA guidance on AI images (2026) and a RaISe analysis (2025), a statutory AI curriculum is lacking; corresponding proposals are only now emerging within the TransformED reform. Ireland occupies a special position in the cluster: it combines the national "Guidance on Artificial Intelligence in Schools" (October 2025, with a 4P roadmap) with the formally strongest anchoring — the Leaving Certificate Computer Science (nationwide since 2020, with AI content; redevelopment in consultation since October 2025) — and embeds both within the Digital Strategy for Schools to 2027.

3.7 Supranational Reference Frameworks as a Common Denominator

The 13 reference-framework documents (only one a binding legal instrument) form the normative substrate to which almost all national documents refer. At EU level, four building blocks are in effect: DigComp 2.2 (2022) with its annex "Citizens interacting with AI systems"; the Commission's Ethical Guidelines for teachers (2022); the AI Act (Regulation (EU) 2024/1689), whose Article 4 has required AI-literacy measures from providers and operators since February 2025 and classifies education as a high-risk domain; and the joint AILit Framework of the Commission and OECD (finalised 17 June 2026) with four domains and 23 competencies, feeding directly into the PISA 2029 "Media & AI Literacy" assessment. UNESCO (AI Competency Frameworks for students and teachers, 2024; Guidance for Generative AI, 2023), the Council of Europe (Framework Convention CETS No. 225, 2024) and the OECD (Digital Education Outlook 2026) provide the global reference

layer. National documents cite these frameworks systematically — Skolverket refers explicitly to AILit and UNESCO, Cyprus to DigComp 2.2 and the AI Act, Latvia and Slovenia to DigComp 3.0 and PISA 2029 respectively.

3.8 Interim Finding: Convergence of Content, Divergence of Instruments

The country comparison yields a two-part picture. Substantively, the systems converge remarkably: basic AI understanding, critical evaluation of outputs (hallucinations, bias, disinformation), ethics and data protection, and the didactically reflective use of generative AI form the core everywhere — usually along the triad of "learning about / with / without AI" (explicit in Denmark, Luxembourg, Spain and Cyprus). Instrumentally, however, the systems diverge considerably: curriculum anchors such as Slovakia, Poland, Sweden and France create binding student competency goals; guidance strategists such as Denmark, Finland and Norway rely on recommendations and training; federal systems (Germany, Switzerland, Belgium, UK, Spain) produce patchworks in which mandatory subjects in individual states or regions sit alongside a purely recommendation-based level elsewhere. The outliers mark the edges of the spectrum: Portugal (only the CNE's recommendation level), Hungary (strategy without curriculum change), Norway (only the Udir hub) and Romania (reform adopted, guide still in draft) show that, in Europe in 2026, curricular anchoring of AI is unquestionably the goal but by no means yet the norm.

4. Target Group Analysis

4.1 Starting Point: Who Do the Documents Address?

The 152 documents analysed from 49 countries and regions address different target groups, and multiple designations are the rule: a typical governance document — such as the Standing Conference of Ministers of Education's (KMK) 2024 recommendation or Finland's Tekoälysuositukset (Finnish National Agency for Education/Ministry of Education and Culture, 2025) — simultaneously addresses teachers, school leaders and one or more school levels. Overall, the coding yields the following distribution: teachers are explicitly addressed in 88 documents, lower secondary in 72, the system/governance level in 54, primary in 48, upper secondary in 45, and vocational education and training (VET) in only 10 documents.

Target group	Number of documents	Example documents
Teachers	88	SK: Framework of AI competencies for teachers (2026); ES: INTEF Orientaciones (2025); IE: Guidance on AI in Schools (2025); FI: Tekoälysuositukset (2025)
Lower secondary	72	PL: New core curriculum / Informatyka (2026); GR: Gymnasio computer-science curriculum (2022); ES: Royal Decree 217/2022 (ESO); DE-NRW: Core curriculum Computer Science Yr 5/6 (2021)
System / Governance	54	IT: Guidelines M.D. 166/2025; UK-ENG: Product Safety Expectations (2025/26); CY: Policy document addressing parents (2025); NL: Government-wide vision on generative AI (2024)
Primary	48	SK: Graduated AI-literacy progression (2026); HR: Curriculum Grades 5/6 (2025); NL: Core objectives for digital literacy (2025); LU: Coding course (since 2022/23)
Upper secondary	45	SE: Subject "Artificiell intelligens" (Gy25); FR: NSI specialisation; IE: Leaving

Target group	Number of documents	Example documents
		Certificate Computer Science; HR: AI elective subject
VET	10	ES: Royal Decree 279/2021 (AI & Big Data); DK: Recommendations for vocational education (2024); HU: Digital Culture curriculum; RO: 2026 school programmes (partly)

Three findings structure this chapter: first, teachers are by far the most strongly addressed target group, though almost exclusively via continuing professional development; second, vocational education is the largest gap in the European corpus; third, primary level has grown markedly since 2025/26, but remains comparatively thin in substance.

4.2 Students by Education Level

Primary level (48 documents). At primary level, the pattern is a playful, phenomenon-based introduction to AI, usually embedded in broader digital basic education. Croatia has created one of the few standalone AI offerings for primary pupils with the CARNET curriculum “Artificial Intelligence: from Concept to Application” for Grades 5 and 6 (2025, revised 2026) — though as a voluntary extracurricular activity within the EU-funded BrAIn project. Slovakia goes further with Amendment No. 4 to the State Education Programme (in force from March 2026): the “graduated AI-literacy progression” it defines treats AI competency as a standalone literacy with gradual progression across primary cycles — a remarkably early case of mandatory anchoring. Comparable approaches are found in the Dutch core objectives for digital literacy (finalised 2025), Luxembourg's coding course in the enseignement fondamental, and Greece's Skills Labs, which place AI topics in age-appropriate mandatory formats. Often, however, primary level remains merely a co-addressee of general guidance for teachers, without its own curricular anchoring.

Lower secondary (72 documents). Lower secondary is the most broadly covered student level and the focus of current mandatory reforms. Poland's March 2026 regulation (Dz.U. 2026 item 378) introduces, from the 2026/27 school year, a new core curriculum with the mandatory subject Informatyka that systematically incorporates AI content. Greece already has a dedicated AI unit within the Gymnasio computer-science curriculum (IEP, 2nd edition 2022), in which 9th-grade students understand neural networks and build small AI applications themselves using App Inventor, Personal Image Classifier and Machine Learning for Kids; Grade 8 focuses on generative AI and its everyday opportunities and risks. Spain's minimum curriculum for the ESO (Royal Decree 217/2022), exemplified in Madrid's Decree 65/2022, requires the subject “Tecnología y Digitalización” to cover the conceptual distinction between AI, machine learning and deep learning, recognition of everyday AI applications with critical evaluation, and ethics topics such as bias and technological sovereignty. In Germany, responsibility lies with the Länder: North Rhine-Westphalia anchors AI as a mandatory module in computer science (core curriculum for Years 5–6, 2021; elective computer-science curriculum for Years 8–10, 2023, extended to include machine learning, data dependency and societal evaluation), while Baden-Württemberg (2016 education plan with an orientation framework for the “Digital World”) and Bavaria (2023 orientation framework on AI and school) cover the level through computer-science curricula and cross-curricular frameworks. Austria (mandatory subject “Basic Digital Education,” Federal Law Gazette II No. 267/2022), Czechia (RVP ZV, 2021 revision), and Iceland (2024 national curriculum, AI explicit

from Grade 7) complete the picture. Notably, many lower-secondary offerings treat AI as part of computer science or basic digital education rather than as a standalone subject.

Upper secondary (45 documents). At upper-secondary level, the pattern of dedicated subjects or specialisations is increasingly established. Sweden goes furthest: with Gy25 (from autumn 2024, subject grades from 1 July 2025), the new upper-secondary subject “Artificiell intelligens” is Europe's clearest case so far of a dedicated AI school subject (see 3.3 and 6.1 for detail). France relies on the specialised subject “Numérique et sciences informatiques” (NSI, since 2019/20) as a baccalauréat-relevant specialisation covering AI-related applications through data representation, algorithms, programming and databases; Ireland relies on the Leaving Certificate Computer Science (NCCA, 2018 specification), which combines three strands with four Applied Learning Tasks, including Analytics and Modelling & Simulation, in which ML-related content is worked on practically; AI impacts are reflected upon in the “Computers and Society” strand. Croatia complements its primary offering with the recognised elective “Artificial Intelligence: from Concept to Application” for Years 2–3 of upper-secondary school (from 2024/25). Further examples include the Dutch Examenprogramma informatica havo/vwo, the Flemish minimum objectives for computer science (2023), Austria's new AHS upper-secondary subjects “Computer Science and Artificial Intelligence” (introduction 2026), and Bavaria's LehrplanPLUS offerings for Gymnasium (Year 11) and the Fachoberschule. Upper secondary is thus the level with the highest disciplinary differentiation — though often as an elective or specialised subject, meaning actual reach depends on enrolment rates.

Vocational education and training / VET (10 documents). The most conspicuous coverage gap appears in vocational education: only 10 of the 152 documents explicitly address VET. The most prominent example is Spain's Royal Decree 279/2021, which establishes a state-regulated specialisation course “Inteligencia Artificial y Big Data” following an advanced vocational qualification — a mandatory curriculum covering machine learning, big-data models and applied AI in production sectors. Denmark has issued its own parallel version of its upper-secondary recommendations tailored to vocational schools through the STUK recommendations “Generative artificial intelligence in vocational education” (November 2024). Hungary integrates VET via the “Digital Culture” framework curriculum under the National Core Curriculum 2020, and Romania touches vocational education partly through the new 2026 school programmes (Order No. 6,930/2025). France addresses the level selectively (1re CAP within Service Note 2026-019; Pix Référentiel IA 2025), and Finland's Tekoälysuositukset and Estonia's programmes (TI-Hüpe from 2026/27) at least include VET institutions among their addressees. Given the importance of AI for the world of work — a competency theme that itself appears 14 times in student-facing documents — the small number of dedicated VET documents is the corpus's largest structural gap.

4.3 Teachers by Training Phase

With 88 documents, teachers are the dominant target group — yet analysis by training phase reveals a marked imbalance. Almost exclusively, in-service continuing professional development is addressed. Notable examples include Slovakia's Framework of AI Competencies for Teachers (March 2026), a dedicated competency framework for the systematic training of teaching staff; Spain's INTEF Orientaciones for integrating artificial intelligence into teacher training (2025), with three strategic lines for administration, competency programmes and protocols; Ireland's Guidance on Artificial Intelligence in Schools (2025); and Finland's Tekoälysuositukset (2025), which places the responsibility for ensuring staff AI literacy on education providers. Numerous training formats add to this: the French MOOC “Intelligence artificielle… avec

intelligence!" (AI4T), Austria's school package "AI — an Opportunity for Austria's Schools," the Swedish contract-based course "Teaching Artificial Intelligence at Upper-Secondary Level" (7.5 higher-education credits), Estonia's Harno digital training courses, Luxembourg's IFEN offering with more than 80 modules from October 2025, and the Bavarian and Hessian handbook offerings.

Initial teacher education (first phase) and induction/probationary training (second phase), by contrast, are barely addressed explicitly. One of the few exceptions is the Dutch Kennisbasis digitale geletterdheid (revised 2025/26), which defines binding knowledge bases for the Pabo and teacher-training colleges; France's CRCN-Édu (2021) likewise addresses the INSPÉ and thus institutional teacher training. Generally, the first and second phases are addressed only indirectly — via general competency frameworks such as the Spanish Marco de Referencia de la Competencia Digital Docente (MRCDD, 2022) with its explicit AI descriptors, or through references to the European DigCompEdu framework, as in the KMK recommendation "Teaching and Learning in the Digital World" (2021). The pattern is consistent across Europe: systems first respond to AI through continuing training of existing teachers, while structural anchoring in initial training — the lever with the longest-lasting effect — is still pending.

4.4 System and Governance Addressees

The third major addressee group (54 documents) concerns the system level. School leaders are increasingly made accountable as governance actors: Italy's guidelines (Ministerial Decree No. 166/2025, anchored in Law 132/2025) explicitly place responsibility for AI adoption on school leadership, including a risk-management plan and compliance with the EU AI Act; Finland's Tekoälysuositukset and the Danish recommendations address school providers and leaders as the legally responsible parties for procurement, data protection and transparency. Lithuania (guidelines of January 2026) requires every school to adopt its own AI usage rules. Administration and education authorities are recurring addressees, for example in the KMK recommendation for education administration (2024), the Dutch government-wide vision on generative artificial intelligence (2024), or Portugal's 2025 administrative acts (Order No. 10945/2025; Resolution No. 214/2025). Notably rare is the inclusion of parents: Cyprus's policy document on responsible and ethical AI use (October 2025) and Bulgaria's guidelines (2024) explicitly name parents as a target group. A further special role is taken by EdTech providers: England addresses them directly with the "Generative AI: Product Safety Expectations" (2025/26), formulating safety standards for products — a governance approach that extends responsibility beyond the school gate into the market. The system level is further flanked by EU law, namely Article 4 of Regulation (EU) 2024/1689 (AI Act), which has set AI-competency requirements for all member states since February 2025.

4.5 Key Findings

First: teachers are the most strongly addressed target group (88 documents), but the address is almost entirely concentrated on continuing professional development. Initial teacher education and induction training remain largely unaddressed — with exceptions such as the Dutch Kennisbasis and the French CRCN-Édu — and are at best captured indirectly via competency frameworks (MRCDD, DigCompEdu). Systems thus steer AI competency primarily through the third phase of teacher education.

Second: vocational education, with only 10 documents, is the largest gap. Where VET is addressed, it happens either through individual measures (ES: Royal Decree 279/2021), parallel versions of general recommendations (DK), or only implicitly through framework curricula (HU, RO). A Europe-wide comparable pattern of dedicated VET AI curricula does not yet exist.

Third: primary level is growing noticeably — the most recent mandatory anchoring measures and programmes (SK: graduated progression from 2026; IT: guidelines from the 2025/26 school year; HR: curriculum for Grades 5/6 from 2025) mostly date from 2025/26 — but remain thin in depth and bindingness. Most primary offerings are voluntary, extracurricular, or mediated only indirectly through teacher-facing documents. Overall, the target-group structure shows a system in transition: addressing is shifting from reactive teacher handbooks towards binding student curricula, but reaches neither vocational education nor initial teacher training with comparable density.

5. Competency Priorities: Students and Teachers Compared

While the preceding chapters examined the formal anchoring of AI in curricula and framework guidelines, this chapter turns to the content level: which competencies should students, on the one hand, and teachers, on the other, acquire in dealing with artificial intelligence? The basis is a keyword analysis across nine competency themes in the 84 student-facing and 88 teacher-facing documents of the corpus. Because multiple mentions per document were possible, the values reflect not proportions but the prevalence of a theme across the document set. The result is a clearly contoured complementary profile: students are meant to understand, apply and evaluate AI; teachers are meant to take responsibility for, shape, and safeguard its use.

5.1 Theme Matrix: Nine Competency Fields Compared

The following matrix shows in how many documents for each target group the nine coded competency themes are addressed at least once.

Competency theme	Students (84 docs)	Teachers (88 docs)	Priority profile
ML/Technology/Programming	37	6	Strongly student-side
Ethics/Responsibility/Data Protection	36	56	Both sides, teacher-dominant
Critical thinking/Evaluation	31	30	Balanced
Didactics/Pedagogy	21	46	Strongly teacher-side
AI basics/How it works	21	16	Slightly student-side
Prompting/Tool use	21	26	Slightly teacher-side
Wellbeing/Safety	18	38	Strongly teacher-side
Society/World of work	14	2	Student-side
Bias/Disinformation	14	6	Student-side

Three findings deserve emphasis. First, ethics, responsibility and data protection is by far the most broadly anchored theme overall: it appears in 36 of the 84 student documents and 56 of the 88 teacher documents. No other theme reaches comparable values for both target groups; ethics is thus the only consistent consensus in the European document corpus. Second, a sharp asymmetry appears in the technical themes: machine learning, technology and programming is addressed in 37 student documents but only six teacher documents; AI basics and how systems work likewise lead on the student side (21 to 16). Technical depth is thus effectively

a student domain, while teachers remain largely excluded from technical instruction. Third, the ratio reverses for design and protection themes: didactics and pedagogy (46 to 21) and wellbeing and safety (38 to 18) are markedly teacher-weighted. Critical thinking and evaluation, at 31 to 30, is the most balanced theme and forms the substantive bridge between both target groups.

In summary, the student profile can be described by the verbs “understand, apply, evaluate”: technology and ethics are nearly level at 37 and 36 mentions, complemented by critical evaluation as a third pillar. The teacher profile follows the verbs “take responsibility, shape, safeguard”: ethics and didactics dominate with 56 and 46 mentions, flanked by safety and wellbeing, while technical themes remain marginal at six mentions. Also notable is the near-total absence of the theme society and world of work on the teacher side (2 mentions versus 14 for students): engagement with AI's societal consequences appears to be conceived as learning content for students, not as a matter for teachers' own reflection.

5.2 Reference Frameworks: The Normative Architecture Behind National Documents

National competency descriptions do not emerge in a vacuum. Five European and international reference frameworks structure which competencies are formulated for which target group.

Framework	Year	Target group	Structure	AI relevance and function
DigComp 2.2 (EU Commission, JRC)	2022	Citizens generally	5 competency areas, 21 competencies, 8 levels	Annex 2 “Citizens interacting with AI systems” with >250 examples on understanding, critical evaluation and ethics of AI
UNESCO AI Competency Framework for Students (AI CFS)	2024	Students (K-12)	4 aspects (human-centred mindset, ethics of AI, AI techniques & applications, AI system design) × 3 levels (understand, apply, create), 12 competencies	Global reference framework for student-side AI competency
UNESCO AI Competency Framework for Teachers (AI CFT)	2024	Teachers	5 aspects (human-centred mindset, ethics of AI, AI foundations & applications, AI pedagogy, AI for professional development) × 3 levels (acquire, deepen, create), 15 competencies	Global reference framework for teacher-side AI competency
AILit Framework (EU Commission & OECD)	2026	Primary/secondary students	4 domains (engaging with AI, creating with AI, managing AI, shaping AI), 23 competencies including attitudes	Basis of the PISA 2029 “Media & AI Literacy” assessment
EU Ethical Guidelines on AI and Data in Teaching and Learning	2022	Primary/secondary teachers	Ethical requirements (human dignity, fairness, transparency, privacy) plus checklists and emergent competencies	Practical ethics guideline as part of the Digital Education Action Plan 2021–2027

The uptake of these frameworks into national documents varies in explicitness. Cyprus references them most systematically: its 2025 policy and guideline on responsible and ethical AI use explicitly names DigComp 2.2, both UNESCO competency frameworks (CFS and CFT) and the EU AI Act as reference points, structuring its three axes of AI literacy (learning for, with and about AI) accordingly. Spain links its 2025 guidance on AI integration to the national teacher framework MRCDD, which is based on DigCompEdu and already contains explicit AI descriptors, and additionally references the UNESCO AI CFT. Slovakia anchors its 2025–2027 plan for responsible AI use and its own 2026 teacher competency framework in the context of the AI Act and European frameworks. Slovenia, in turn, already references DigComp 3.0 and the PISA 2029 Media & AI Literacy (MAIL) assessment in its 2026 didactic recommendations on generative AI — evidence that the AILit Framework is exerting normative influence via its PISA linkage even before it becomes broadly visible in national curricula. Ireland explicitly incorporates the EU Ethical Guidelines into an annex of its 2025 Guidance on Artificial Intelligence in Schools. A divide is thus emerging: while the student side is increasingly normed via DigComp and the AILit Framework, the teacher side orients more strongly towards the EU Ethical Guidelines and the UNESCO AI CFT — mirroring, at the reference level, the complementary profile observed in Section 5.1.

5.3 Deep Dive I: Critical Evaluation of AI Outputs

Critical thinking and evaluation is the only theme coded at almost equal frequency for both target groups (31 to 30). It becomes concrete wherever documents make the evaluation of AI-generated content an explicit curricular subject. Slovakia goes furthest: Amendment No. 17 to the State Education Programme (in force from 1 March 2026, taught from the 2026/27 school year) anchors critical evaluation of AI outputs as part of the cross-curricular theme “AI literacy,” explicitly naming the probabilistic operating principle of generative models as the reason outputs must fundamentally be questioned; the Gymnasium amendment (No. 6, September 2026) adds disinformation and data bias as further subjects of scrutiny. Poland, with its new core curriculum (regulation of March 2026, in force from September 2026), has for the first time bindingly incorporated source criticism of AI-generated content and dealing with hallucinations into the curriculum. Romania operationalises the theme with particular subject-specific precision: the new 2026 lower-secondary programmes provide, in the ICT subject, for the analysis of AI-generated answers including fact-checking and veracity testing, and even the mathematics curriculum permits use of an AI assistant only with critical validation of results. These three examples trace a developmental line: the general call for “critical thinking” is increasingly turning into a concretely described capacity to scrutinise AI outputs.

5.4 Deep Dive II: Prompting as a New Basic Competency

The targeted steering of generative AI systems — prompting — appears in 21 student and 26 teacher documents, establishing itself as a new basic competency for both target groups. Croatia has anchored prompting earliest and most explicitly in its curricula: the 2024 curricula “Artificial Intelligence: from Concept to Application” for the elective subject and the extracurricular activity already include prompt creation as its own learning objective alongside data foundations and students' own AI projects; the revised primary-school version (2025/2026) introduces simple prompts in a game-based way even earlier. Czechia addresses prompting mainly on the teacher side: the National Pedagogical Institute's 2025 recommendations on using generative AI for lesson preparation and material creation make sovereign tool control a working competency for teachers. Finland frames the topic most broadly at the policy level: its background paper “AI and Changing Literacy” (2024–2025) treats AI competency as part of an expanded concept of literacy (multiliteracy), in

which the productive use of AI-generated content and its critical evaluation belong together. Notably, the framing differs: where Croatia treats prompting as a technical-practical skill in the curriculum, Finland treats it as an element of cultural literacy — yet both approaches mark the same shift from passive AI use to active AI steering.

5.5 Deep Dive III: Bias, Hallucinations and Disinformation

The theme of bias and disinformation shows the second-largest target-group asymmetry after technology: 14 student documents but only six teacher documents. The explanation is straightforward — bias and hallucinations are primarily described as phenomena students encounter when using AI, rather than as a subject of professional development in its own right. Poland makes hallucinations and disinformation a mandatory subject at lower-secondary level in its new core curriculum (2026), linking them with source criticism and cybersecurity. Slovakia's Amendments 17 and 6 (2026) explicitly name data bias and disinformation as content of AI literacy, each embedded in the critical review of AI outputs. Slovenia addresses hallucinations and bias in its 2026 didactic recommendations on generative AI, but does so on the teacher side — as risks to be anticipated when planning AI-supported teaching and formative assessment with AI. Slovenia is thus one of the few systems in which the bias theme crosses the target-group boundary; in the Scandinavian-Western European document landscape, it otherwise mostly remains a sub-point of general source criticism.

5.6 Deep Dive IV: Academic Integrity and Examinations

A fourth priority cuts across the competency themes: securing academic integrity. Denmark pursues the most restrictive, clearly regulated approach: through the examination notice, the use of digital aids — and hence generative AI — is fundamentally prohibited in Folkeskole examinations unless expressly permitted locally (detailed in 7.3); recommendations for the upper-secondary tracks (2024/2025) add rules for written work and critically reflective AI use in teaching — a deliberate separation of learning and examination situations. Ireland takes the declaratory route: the 2025 Guidance on Artificial Intelligence in Schools refers to the State Examinations Commission's rules on AI in coursework, and the Leaving Certificate Computer Science specification requires that AI use be referenced in the Applied Learning Tasks — AI is thus permitted but subject to a duty of disclosure. England addresses academic integrity centrally in the DfE policy paper on generative AI (2023, continuously updated), but leaves concrete regulation to schools and examination bodies. The three models — prohibition, declaration duty, and delegated self-regulation — mark the range of European responses to the same underlying question: how learning achievement remains distinguishable from machine output.

5.7 Finding: One Consensus, Two Profiles, One Gap

The overview confirms the initial finding on three counts. First, ethics is the only consistent consensus: with 36 mentions for students and 56 for teachers, ethics, responsibility and data protection is the only theme reaching peak values for both target groups — underpinned by the 2022 EU Ethical Guidelines, which serve as a reference in numerous national documents from Ireland to Cyprus. Second, two clearly separated competency profiles exist: students are meant to understand, apply and evaluate AI — with technology and ethics almost level (37 to 36) and critical thinking as the connecting link; teachers are meant to take responsibility for, shape and safeguard AI use — with ethics and didactics as the dominant pillars (56 and 46)

and safety as a third. Third, technical depth remains a student domain: machine learning and programming are addressed in 37 student documents — predominantly within computer-science and technology subjects such as the Spanish “Tecnología y Digitalización,” the Irish Leaving Certificate Computer Science, or the Croatian AI curricula — while teachers receive almost no technical depth, with only six mentions. This gap is systemically significant: those expected to take responsibility for and shape AI use in the classroom, without a deeper grasp of the underlying technical principles, remain reliant on ethical guardrails and didactic heuristics. The reference frameworks — particularly the UNESCO AI CFT with its “AI foundations & applications” aspect and the AILit Framework as the PISA 2029 basis — address exactly this gap; whether national training systems follow this lead will be a test of the coming years.

6. Scope and Depth of Learning Content by Target Group

The curricula, framework guidelines and handbooks examined differ not only in their legal bindingness but above all in the scope and cognitive depth of the intended learning content. Across all countries, a remarkably consistent progression emerges: the higher the education level, the more technical, abstract and production-oriented the content becomes; the more binding the curricular anchoring, the greater the guaranteed instructional time. This chapter organises the findings by target group: primary, lower secondary, upper secondary, vocational education (VET), and teachers.

6.1 Stage Progression as a Common Thread

Primary: playful encounter rather than technology. At primary level, a relieving, phenomenon-based approach dominates: children should recognise AI as part of their everyday world, not understand its mathematical foundations. Croatia's curriculum for the extracurricular activity “Artificial Intelligence: from Concept to Application” (CARNET/BrAIn, Grades 5–6, 2025) works explicitly through play — escape rooms, quizzes and simulations on algorithms, machine learning, pattern recognition and the Turing test — and introduces first simple prompts and basic training examples. Slovakia's Amendment No. 17 to the State Education Programme (ŠVP), in force from 1 March 2026 (taught from the 2026/27 school year), anchors the cross-curricular theme “AI literacy” already in the first primary cycle: basic principles of AI and machine learning, formulating simple prompts, digital wellbeing and initial ethical reflection — always under teacher guidance. Italy's National Guidelines 2025 (Ministerial Decree 221/2025) provide, for the first educational cycle, specific computer-science learning objectives for the first time, and a “first approach to Artificial Intelligence,” embedded in critical and conscious technology use. Luxembourg's Medienkompass (SCRIPT 2020/2022) supplies the framework here: understanding of algorithmic systems and data literacy as a foundation, on which the mandatory coding course at primary level and, later, the Digital Sciences subject build.

Lower secondary: concepts, everyday relevance and first own models. At lower secondary, the emphasis shifts from encounter to concept: basic AI terminology, the distinction between AI, machine learning and deep learning, everyday examples, hallucinations and disinformation, and — increasingly — the practical training of simple models using low-threshold tools. Poland's new core curriculum (regulation of 11 March 2026, in force from 1 September 2026) for the first time makes explicit AI content mandatory in the subject Informatyka: use of AI-based tools, training simple AI models, AI hallucinations, critical source evaluation and cybersecurity. Greece's Gymnasio computer-science curriculum (IEP 2022) contains a dedicated AI unit, “Artificial Intelligence,” in which Grade 9 students understand neural networks and build small AI applications

themselves using App Inventor, Personal Image Classifier and Machine Learning for Kids; Grade 8 focuses on generative AI and its everyday opportunities and risks. Spain's minimum curriculum for the ESO (Royal Decree 217/2022), exemplified in Madrid's Decree 65/2022, requires the subject “Tecnología y Digitalización” to cover the conceptual distinction between AI, machine learning and deep learning, recognition of everyday AI applications with critical evaluation, and ethics topics including bias and technological sovereignty. In Germany, North Rhine-Westphalia anchors AI as a mandatory module in computer science: the core curriculum for computer science in Years 5 and 6 (2021) contains the content area “Automata and Artificial Intelligence,” extended in the elective computer-science curriculum for Years 8–10 (2023) to include machine learning, data dependency, and societal evaluation.

Upper secondary: dedicated subjects and specialisations. At upper-secondary level, AI steps out of computer science's shadow to become its own subject with programming and data-science components. Sweden goes furthest: with Gy25, the standalone upper-secondary subject “Artificiell intelligens” has existed since autumn 2024 (subject grades from 1 July 2025) in two levels of 100 points each — Level 1 covers AI from a societal perspective, problem-solving with AI, and ML basics and data management; Level 2 covers neural networks, deep learning, intelligent agents, and training and validating one's own models. France's specialised subject NSI (Numérique et sciences informatiques) in première/terminale covers AI-related applications through data representation, algorithms, programming and databases, and is relevant to the baccalauréat. Ireland's Leaving Certificate Computer Science (NCCA, national since 2020) combines three strands with four Applied Learning Tasks, including Analytics and Modelling & Simulation, in which ML-related content is worked on practically; AI impacts are reflected upon in the “Computers and Society” strand. Croatia offers a recognised but voluntary deepening with its elective curriculum (Years 2–3 of upper-secondary school, 35 hours/year) including students' own AI projects, prompt creation and bias topics. Switzerland, finally, anchors AI in the EDK framework curriculum for Matura schools (2024) on two levels: explicitly within cross-disciplinary methodological competencies (critical handling of AI-generated content) and implicitly via basic digital education and the computer-science subject.

Vocational education (VET): applied specialisation. In vocational education, content depth reaches its maximum because AI is taught directly in relation to employment. Spain's Royal Decree 279/2021 establishes the state-regulated specialisation course “Inteligencia Artificial y Big Data” following an advanced vocational qualification: machine learning and big-data models, programming of AI systems, data management, and applied AI in production sectors. Denmark addresses vocational education through a dedicated set of STUK recommendations (November 2024), which in parallel structure to the upper-secondary recommendations tailors critical, reflective AI use, writing skills and examination relevance specifically to vocational training — less deep on model technology, but more focused on work processes and examinations.

Level	Typical content	Examples (document, country, year)
Primary	Playful encounter, pattern recognition, Turing test, simple prompts, basic algorithmic ideas	Grade 5–6 curriculum (HR, 2025); AI literacy Cycle 1/Amendment 17 (SK, from 1.3.2026/2026/27); “Indicazioni 2025” first approach to AI (IT); Medienkompass (LU, 2020/2022)
Lower secondary	AI basic concepts, AI vs. ML vs. deep learning, everyday examples, first own models, hallucinations, cybersecurity, ethics/bias	Core curriculum Informatyka (PL, 2026); Gymnasio computer science with App Inventor/Machine Learning for Kids (GR, 2022); RD 217/2022 and Decree 65/2022 Madrid (ES); Core curricula computer

Level	Typical content	Examples (document, country, year)
		science Yr 5/6 and 8–10 (DE-NW, 2021/2023)
Upper secondary	Dedicated subjects/specialisations: programming, data science, neural networks, own model training, societal reflection	Subject “Artificiell intelligens” Gy25 (SE, 2024/25); NSI (FR, since 2019/20); Leaving Cert Computer Science (IE, since 2020); Elective AI subject (HR, 2024); EDK framework curriculum for Matura schools (CH, 2024)
VET	Applied specialisation: ML/big-data models, data management, occupation-specific AI application, examination relevance	RD 279/2021 Specialisation course AI and Big Data (ES, 2021); STUK recommendations for vocational education (DK, 2024)

6.2 Anchoring Forms and Their Effect on Scope

The extent to which AI content actually reaches classrooms depends less on how learning objectives are phrased than on how they are curricularly anchored. Four basic forms can be distinguished.

First, the cross-curricular theme: Slovakia anchors AI literacy as a cross-curricular theme across all subjects and levels (Amendment No. 17 for primary schools, Amendment No. 6 for Gymnasium from 1.9.2026). This ensures maximum breadth — every student encounters AI — but generates no dedicated instructional depth: responsibility is diffuse, and actual time spent depends on the subject and the teacher. Switzerland's 2024 framework curriculum works similarly with cross-disciplinary methodological competencies.

Second, the module within the computer-science subject: Poland (core curriculum 2026) and the German Länder (e.g., the NRW core curricula) attach AI to an existing mandatory or elective subject. This secures a calculable minimum scope, but depth remains limited by the host subject's teaching hours; NRW's elective status in Years 8–10 illustrates the reach trap — not all students receive the offering.

Third, the standalone subject: Sweden's new upper-secondary subject “Artificiell intelligens” and France's NSI represent the greatest depth within general education — a graded, staged AI subject and a baccalauréat-relevant specialisation with programming and databases respectively. The price: these are elective or specialisation subjects reaching only part of the cohort.

Fourth, extracurricular or elective anchoring: Croatia's BrAIn curricula (35 hours/year, voluntary but ministerially recognised) achieve considerable substantive depth — from playful primary content to students' own AI projects at upper-secondary level — without, however, creating universal bindingness; coverage depends on school choice and enrolment.

Anchoring form	Examples	Scope/depth	Reach
Cross-curricular theme (all subjects)	SK: AI literacy (Amendments 17/6, 2026); CH: cross-disciplinary competencies (EDK 2024)	Low instructional depth per subject, diffuse responsibility	Universal (all students)
Module in computer-science subject	PL: core curriculum 2026; DE-NW: core curricula Yr 5/6 and	Medium, calculable minimum scope	High (mandatory) to limited (elective)

Anchoring form	Examples	Scope/depth	Reach
	8–10		
Standalone/specialised subject	SE: “Artificiell intelligens” (Gy25); FR: NSI	Greatest depth (programming, own models, data science)	Selective (elective/specialisation subject)
Extracurricular / elective	HR: BrAIn curricula (35 hrs/yr, 2024/2025)	Broad substantive coverage without bindingness	Voluntary, school-dependent

6.3 Teachers as a Target Group: From Practice Guide to Competency Framework

Scope also varies considerably in offerings for teachers. At the lower end are compact practice guides of roughly 20 to 40 pages: Bulgaria's guidelines (MON, 41 pages, 2024) and Poland's “Chat GPT w szkole. Szanse i zagrożenia” (MEiN, 2023) provide rules, example scenarios and assessment guidance for immediate classroom use, without systematic competency building. An intermediate tier consists of structured training frameworks: Spain's INTEF Orientaciones for integrating AI into teacher training (2025) define three strategic lines — AI in administration and management, AI competency programmes, and protocols for tutors and designers — linking to the MRCDD, the EU AI Act and the UNESCO AI CFT; Finland's Tekoälysuositukset (OPH/OKM, 2025) combine statutory obligations (including from the EU AI Act) with national recommendations and a ten-part background material package including a five-part AI-literacy concept. At the top end are progressive competency frameworks: Slovakia's Framework of AI Competencies for Teachers (March 2026) sets out staged competencies as a reference framework for systematic teacher training; the UNESCO AI Competency Framework for Teachers (2024) structures 15 competencies across five dimensions over the three stages Acquire, Deepen and Create; the Erasmus+ project AI4T combines a MOOC and an open textbook (“AI for Teachers,” 2nd edition 2024) into a curricularly structured, evaluated training format (1,005 teachers, 302 schools across five countries). Sweden supplements this spectrum with university-based 7.5-ECTS courses that, combined to 15 ECTS, qualify teachers to teach the new AI subject — a notable coupling mechanism between the scope of teacher training and the student curriculum.

6.4 Finding: Scope and Depth Increase with Level and Bindingness

Two regularities condense the individual findings. First, content depth follows the education level: playful pattern recognition and simple prompts at primary level, conceptual differentiation and first own models at lower secondary, programming, neural networks and own model training at upper secondary, employment-related specialisation in vocational education. This progression is stable across countries and matches the three-stage logic of the UNESCO frameworks (Understand–Apply–Create for students, Acquire–Deepen–Create for teachers). Second, guaranteed scope correlates with the bindingness of the anchoring: dedicated subjects and mandatory modules guarantee instructional time and examination relevance but reach selective groups; cross-curricular models such as Slovakia's AI literacy reach all students but buy this breadth at the cost of lower guaranteed depth and diffuse responsibility. The policy response to this breadth–depth dilemma is discernible: countries such as Slovakia, Poland and, increasingly, France (Pix AI pathway from 2026/27) combine binding cross-curricular or certification elements for breadth with subject-based deepening for depth — flanked in both cases by staged teacher frameworks, without which even the most ambitious student curricula would remain ineffective.

7. Bindingness and Governance

The question of how bindingly AI education is anchored in Europe's schools cannot be answered with a simple yes or no. The 152 documents analysed from 49 countries and regions are distributed across a broad spectrum of legal natures — from directly applicable EU law, through national legal instruments and mandatory curricula, to voluntary programmes, non-binding guidance and mere drafts. This chapter organises the spectrum as a "bindingness staircase," identifies countries with mandatory instruments, examines governance instruments beyond the curriculum, and compares central-state with federal governance modes. The central finding: bindingness correlates with curricular integration, not with the density of published guidance.

7.1 The Bindingness Staircase: Seven Levels of Governance

The corpus's documents can be placed on seven descending levels of bindingness. What matters is not the normative aspiration expressed in the text but the actual legal form and its enforceability in everyday school life.

Level	Legal nature	Examples from the corpus	Corpus share
1	Supranational and international law	Regulation (EU) 2024/1689 (AI Act), Art. 4 AI literacy — applicable since 02.02.2025, reformulated by Regulation (EU) 2026/1744 from an outcome obligation to a measures obligation; Council of Europe Framework Convention on AI, Human Rights, Democracy and the Rule of Law (CETS No. 225, opened 05.09.2024)	2 instruments, horizontal effect
2	National legal instruments (regulations, official-gazette publications)	Greece: KYA 55909/D6/2026 (Government Gazette 2639/B/12.05.2026); Iceland: Adalnamskra grunnskola 2024 (Official Gazette B No. 1188/2024); Poland: Regulation of March 2026 (Dz.U. 2026 item 378); Spain: Royal Decrees 217/2022 and 279/2021; Slovakia: Amendments 17, 4 and 6 to the ŠVP (2026); Romania: Order No. 6,930/2025	Core of the "mandatory curriculum/legal instrument" group (39 documents)
3	Mandatory curricula without statutory form (ministerial decrees, curriculum resolutions)	France: SNT programme (since 2019/20), Service Note No. 2026-019 (Pix pathway); Austria: mandatory subject "Basic Digital Education" (Federal Law Gazette II No. 267/2022); Belgium-Flanders: Minimumdoelen (2023); Luxembourg: mandatory subject "Digital sciences"; Switzerland: Lehrplan 21, "Media and Informatics" module; Germany: Länder curricula (Bavaria, Baden-Württemberg, North Rhine-Westphalia, Berlin)	Bulk of the 39 mandatory documents
4	Elective and voluntary but officially recognised offerings	Croatia: elective/extracurricular curricula "Artificial Intelligence: from Concept to Application" (CARNET, BrAIn project, from 2024/25); Malta: ICT-C3 curriculum with "Robotics and Artificial Intelligence" specialisation (Year 11); Ireland: Leaving Certificate Computer Science; Sweden: new upper-secondary subject "Artificiell intelligens" (Gy25)	6 documents
5	Strategies and programmes	Hungary: National AI Strategy (2025–2030); Portugal: Council of Ministers Resolution No. 214/2025 (Action #19 "Digital and AI in Education"); Malta: Digital Education Strategy 2024–2030 (14 measures, 79 actions); Ireland: Digital Strategy for Schools to 2027; Italy: Piano Scuola 4.0 (PNRR)	15 documents
6	Recommendations and guidance	Largest group of the corpus: 69 documents, including the KMK recommendation (2024), the Danish recommendations (2024/2025), the Finnish Tekoälysuositus (2025), the Estonian AI guidance (2024), and the 2022 EU Ethical Guidelines and 2024	69 documents

Level	Legal nature	Examples from the corpus	Corpus share
		UNESCO competency frameworks	
7	Drafts and consultations	Romania: AI guide for education (working status 03/2026); Bulgaria: Vision for introducing and using artificial intelligence in Bulgarian school education (consultation status 01/2026)	2 documents

Three observations structure this staircase. First, the top level is new: with the AI Act, directly applicable law has existed since 2 February 2025, obliging providers and operators of AI systems — explicitly including educational institutions as operators — to take AI-literacy measures; the definition of AI competency in Art. 3(56) (skills and knowledge for informed decisions about AI systems, their opportunities, risks and potential harms) simultaneously provides a normative anchor for school curricula. The Council of Europe Convention CETS No. 225 adds a human-rights framing directly relevant to AI use in public education systems; the Council of Europe DG II preliminary study on an education-specific legal instrument (DGII/EDU/AIED(2024)01) points to further legal formalisation at this level.

Second, the national-legal-instrument level shows a striking temporal concentration: five of the seven cited instruments (Greece, Iceland, Poland, Slovakia, Romania) date from 2024 to 2026. The wave of bindingness is thus a current phenomenon, not the result of long-standing curricular tradition.

Third, the recommendation level dominates by volume: with 69 of 152 documents (45 percent), the “soft” governance mode remains the statistical norm — a finding central to interpreting the following sections.

7.2 Mandatory Instruments in Country Comparison

At least one mandatory instrument — understood as a mandatory curriculum, legal instrument or binding framework requirement — is found in 28 of the 49 countries and regions examined: Belgium (Flanders and Wallonia), Germany (Baden-Württemberg, Bavaria, Berlin, North Rhine-Westphalia), France, Greece, Ireland, Iceland, Italy, Luxembourg, the Netherlands, Austria, Poland, Portugal, Romania, Sweden, Switzerland, Slovakia, Slovenia, Spain (national level and the Community of Madrid), Czechia, Hungary, and the United Kingdom (England, Scotland, Wales); the EU level itself is added via the AI Act.

The list requires three qualifications. First, “mandatory” does not equal “AI-mandatory”: in several cases — for example, the Spanish Royal Decrees, Hungary's National Core Curriculum 2020, or England's 2013 Computing curriculum — these are binding curricula in computer science or basic digital education in which AI appears as a sub-topic, without a dedicated AI curriculum existing. This also applies to Portugal, whose mandatory instrument has no explicit AI reference (AI at most implicit), and to Slovenia and Czechia, whose AI anchoring is each part of a reform still being implemented (the KUP curriculum reform and the RVP revision respectively; see Sections 3.4 and 3.5). Explicitly AI-named mandatory anchoring, by contrast, is found in Slovakia (the cross-curricular theme “AI literacy” across three amendment stages), Iceland (ethically responsible AI use from Grade 7), Greece (dedicated AI unit in the 2022 computer-science curriculum, and the Skills Labs), and Poland's new core curriculum from 1 September 2026.

Second, several mandatory instruments, as of the analysis date, are already adopted but have not yet reached the classroom: the Dutch core objectives for digital literacy are due to take effect in 2026/27, Italy's National Guidelines 2025 become mandatory from 2026/27, Romania's school programmes (Order No. 6,930/2025)

apply from 2026/27, and Slovakia's amendments take effect in stages from March and September 2026 respectively. Europe is thus in a transitional phase in which formal bindingness runs ahead of actual classroom practice.

Third, some of the systems richest in guidance are conspicuously absent from the list: Denmark, Finland, Norway, Estonia, Latvia and Lithuania appear not at all, or only via indirect instruments. This is not an omission but — as Section 7.5 shows — deliberate policy.

7.3 Governance Beyond the Curriculum

Bindingness does not arise only through curricula. A second, increasingly differentiated regulatory field concerns the handling of AI systems within the school itself. Five instrument types can be distinguished.

First, usage rules for generative AI with explicit prohibition catalogues. The reference example is the Greek KYA 55909/D6/2026, which as a binding legal instrument (Government Gazette 2639/B/12.05.2026) stipulates that AI tools in teaching may serve only to support learning, and prohibits deepfakes, profiling, processing of sensitive data, and fully automated assessment of student performance; at the same time, IEP-approved teacher training becomes mandatory infrastructure. Comparable, though not legally binding, prohibition lists appear in several Scandinavian and DACH guidance documents — for example, a Swiss cantonal handbook banning emotion recognition, biometric tracking and social scoring.

Second, examination rules. Denmark bindingly regulates, via the Folkeskole examination order (sections 43 and 56), that generative AI is prohibited in written and oral Folkeskole examinations, and recommends that AI also not be permitted in examination-related products — a precise case in which classroom practice remains at the recommendation level while examination integrity is legally secured.

Third, data protection of minors and age limits. UNESCO's Guidance for Generative AI in Education and Research (2023), as the world's first normative reference document, flagged age limits, consent arrangements and age-appropriateness as core governance questions; nearly all more recent national guidance documents — from Finland's Tekoälysuositus to France's Cadre d'usage — take this up and link it to the GDPR and the AI Act's high-risk classifications (Annex III, point 3, which qualifies educational applications such as automated assessment as high-risk AI).

Fourth, product requirements for providers. England's Department for Education has, with its “Generative AI: Product Safety Expectations” (first version 22.01.2025, expanded on 19.01.2026 to 13 standards), set a non-statutory but Safeguarding-linked requirement catalogue for EdTech products (anchored via the mandatory Keeping Children Safe in Education 2025, section 143) — including filtering of harmful content, activity logs, jailbreak protection, a “schools mode” without complete-solution generation, and distress detection with safeguarding escalation. This is Europe's most elaborate attempt so far to organise governance not through the school but through the product.

Fifth, academic integrity. Ireland (via the SEC/NCCA rules on AI in coursework and the AAC guidelines) and Poland (in the “Compass for Tomorrow” reform package for the new core curriculum) treat labelling and assessment of AI-assisted student work as a distinct regulatory problem; rules on the integrity of examination and coursework thus form a third pillar alongside curriculum and usage prohibitions.

7.4 Governance Modes: Central-State versus Federal

The bindingness staircase becomes a multi-dimensional staircase in federal systems: bindingness at one level guarantees no bindingness at another.

Centrally governed are France, Greece, Poland and Slovakia. France combines statute (Article L312-9 of the Education Code, the SREN law, with mandatory attestation from 2025/26), ministerial decree (Service Note No. 2026-019 on the Pix pathway) and certification-based enforcement via the Pix platform — the corpus's most coherent, closed governance model. Greece relies on a single, comprehensive legal instrument (the KYA); Poland and Slovakia rely on regulations and curriculum amendments respectively, each with a clear entry-into-force logic.

Federally organised, by contrast, are Germany, Switzerland, Belgium, the United Kingdom and — in attenuated form — Spain. In Germany, the KMK recommendation of 10.10.2024 deliberately remains at the recommendation level; bindingness arises only at the level of the 16 Länder, and there highly heterogeneously: Bavaria has the most far-reaching dedicated anchoring with the mandatory subject “Artificial Intelligence, Computer Science and Technology” at the Fachoberschule (from 2024/25), while other Länder rely on guidance documents (North Rhine-Westphalia 2023, Berlin 2024). Switzerland reproduces this pattern: the EDK framework (Lehrplan 21, framework curriculum for Matura schools 2024) creates bindingness only for member cantons, while cantonal guidance (St. Gallen, Solothurn) remains at the recommendation level. Belgium shows two parallel, community-specific mandatory regimes with the Flemish Minimumdoelen and the Walloon FMTTN common core. The United Kingdom governs across four nations with four logics: England through non-statutory guidance plus product standards, Wales through the cross-curricular mandatory Digital Competence Framework, Scotland through the Curriculum for Excellence framework. Spain, finally, combines national minimum requirements (Royal Decree 217/2022) with regional implementation (e.g., the Community of Madrid's Decree 65/2022) — a model of shared bindingness in which the regional level determines the actual school pathway.

7.5 Finding: Bindingness Correlates with Integration, Not with Guidance Density

The chapter's most important overarching finding is counterintuitive: the degree of bindingness correlates with the form of curricular integration, not with the volume of published guidance. Systems with a dedicated mandatory subject or module — France (SNT), Luxembourg (Digital sciences), Slovakia (AI literacy as a cross-curricular theme with a graduated progression), Bavaria (Fachoberschule mandatory subject), Iceland (2024 national curriculum) — are also the systems with the highest legal bindingness. Conversely, the countries with the highest density of guidance deliberately remain at the recommendation level: Denmark has published five parallel, substantively highly differentiated instruments (three sets of recommendations, one legal guidance document, the examination rulebook) without creating a single mandatory AI curriculum; Finland bundles statutory obligations and national recommendations in its Tekoälysuositus (31.03.2025) but leaves curricular implementation to municipalities. This choice is not a regulatory gap but a discernible governance philosophy: trust in local school autonomy and teachers' professional judgement instead of central mandate-setting.

For policy assessment, this yields a two-part picture. The bindingness staircase is filling from the top: EU law (the AI Act, CETS No. 225) and the 2024–2026 wave of legal instruments in Southern and Central & Eastern Europe create a hard core, further reinforced by the high-risk classification of education-related AI from 2027. At the same time, the largest part of Europe's regulatory stock remains soft — 69 recommendation documents

against 39 mandatory documents. Whether this constellation develops into a European minimum bindingness for AI competency depends less on further guidance than on whether the impending entries into force in 2026/27 (Netherlands, Italy, Romania, Slovakia, Poland) exert the expected pull effect on neighbouring systems — and whether the drafts in Romania (AI Guide) and Bulgaria (Vision 2026) manage the jump from level 7 to level 2 or 3.

8. Implementation Forms and Didactic Models

While the preceding chapters compare the normative content of European AI curricula and framework guidelines, this chapter turns to how AI education is organisationally anchored and didactically framed. The comparison of documented cases shows that European states choose among three clearly distinguishable integration forms, while increasingly drawing on the same didactic grammar.

8.1 Three Integration Models Compared

Model 1: the standalone subject. The most ambitious but reach-limited form is the creation of a dedicated, graded subject. Sweden goes furthest with the new upper-secondary subject “Artificiell intelligens” under the Gy25 reform: teachable since autumn 2024 and graded from 1 July 2025, the subject ranges from ML basics and data management to neural networks and own model training (Skolverket, Gy25 subject syllabus; see 3.3 and 6.1 for detail). France anchors AI at upper-secondary level in the specialised subject “Numérique et sciences informatiques” (NSI) for première and terminale, complemented by the mandatory subject SNT in seconde with its explicit “Intelligence artificielle” topic (Ministry of Education, Official Bulletin 2019). Luxembourg has created a graded mandatory lower-secondary subject, “Digital sciences,” running nationwide since 2024/25, containing an explicit AI strand (“A machine smarter than me, does that exist?”) (MENJE/SCRIPT). Ireland, finally, offers the examination-relevant elective Leaving Certificate Computer Science (NCCA, 2018), with Applied Learning Tasks on data science and machine learning.

Model 2: the cross-curricular theme. The counter-model is horizontal integration into all subjects. Slovakia is the European pioneer here: through Amendment No. 17 to the State Education Programme (in force from 1 March 2026, taught from the 2026/27 school year), “AI literacy” is introduced as a mandatory cross-curricular theme (4.2.9) for primary and lower-secondary level; Amendment No. 6 extends this to the Gymnasium from September 2026 (Ministry of Education, Science, Research and Sport of the Slovak Republic). Cyprus has explicitly decided, by ministerial decision, against a dedicated AI subject and in favour of embedding AI competencies into the updated curricula of all subjects (Ministry of Education, official statement April 2026). Wales anchors digital competency via the Digital Competence Framework (DCF) as a cross-curricular duty for all teachers; Finland frames AI competency, in its document “AI and Changing Literacy” from the Finnish National Agency for Education, as part of an expanded concept of literacy that cuts across the subject canon.

Model 3: the module within the computer-science subject. The most widespread middle path is to anchor AI as a dedicated learning area within an existing computer-science or digital subject. Poland introduces explicit AI content into the subject Informatyka for the first time from September 2026 via its new core curriculum (regulation of March 2026, reform portal “Reforma26. Kompas Jutra”) — from training simple AI models to dealing with hallucinations and disinformation. In Germany this happens on a Land-by-Land basis: North Rhine-Westphalia designates the content area “Automata and Artificial Intelligence” in the core curriculum

for computer science in Years 5/6 and in the elective subject for Years 8–10; Bavaria anchors the learning area "Artificial Intelligence" in the LehrplanPLUS Gymnasium in Year 11 (ISB handbook) and even creates the mandatory subject "Artificial Intelligence, Computer Science and Technology" at the Fachoberschule from 2024/25; Baden-Württemberg addresses AI in the 2016 education plan via upper-secondary data analysis, and Berlin via the specialisation area "Artificial Intelligence" in the framework curriculum for the upper Gymnasium track. Hungary's mandatory subject "Digital Culture" (framework curriculum under NAT 2020) contains foundations of intelligent systems, Greece's IEP computer-science curriculum (2022) a dedicated AI unit with neural networks and App Inventor, and Czechia's RVP computer-science framework forms the substantive basis that the Ministry of Education/NPI is currently reinforcing explicitly with AI content.

Integration model	Countries and examples	Advantages	Disadvantages
Standalone subject	SE (Gy25 "Artificiell intelligens"), FR (NSI/SNT), LU (mandatory "Digital sciences," lower secondary), IE (Leaving Cert CS)	Greatest content depth (own model training, deep learning); clear responsibility; graded and examination-relevant; qualified specialist teachers	Limited reach (elective/specialisation subject, high barriers); teacher shortages; late introduction (usually only at upper secondary); risk of disconnecting from everyday AI competency
Cross-curricular theme	SK (Amendment 17 "AI literacy"), CY (horizontal integration), UK-WLS (DCF), FI (expanded literacy)	Maximum breadth: all students, all levels, from primary onward; AI in subject context; no competition for timetable slots	Depth is fragile: technical foundations remain shallow; implementation depends on each individual teacher; quality is hard to verify; enormous training need
Module in computer-science subject	PL (Informatyka from 2026), DE-NW/BY/BW/BE, HU (Digital Culture), GR (Computer Science), CZ (RVP Computer Science)	Sensible placement alongside data and algorithms; uses existing subject structures; legally simpler to implement	Reach limited to that of the computer-science subject itself; AI competes with other modules for time; non-technical perspectives (ethics, language, society) risk marginalisation

8.2 Didactic Models: Convergence of Three-Mode Schemes

It is notable that, regardless of the chosen integration form, national documents draw on almost identical basic didactic schemes. Cyprus's policy paper from the Ministry and the Pedagogical Institute (October/November 2025) structures AI literacy in three axes: learning for AI, learning with AI, learning about AI. Romania's draft guide "GHID AI pentru educație" (working status March 2026) adopts the same pattern as "Teaching FOR/WITH/ABOUT AI," coupling it with the AI4K12 progression for ages 5 to 18. Spain's INTEF guide (2024) formulates the triad as "teaching for AI / about AI / with AI" — teaching for AI (competencies AI does not replace), about AI (how it works, its limits, ethics), and with AI (as a classroom tool). Luxembourg's AI Compass (MENJE/SCRIPT, 2025/26) operationalises the scheme as a school-career-linked three-stage model: learning without AI (foundation in lower grades), learning about AI (including in the Digital Sciences subject), learning with AI (upper grades). Denmark's STUK recommendations for the upper-secondary tracks (2024) vary it as teaching "in, with and without" generative AI.

Alongside these three-mode schemes, complementary framings appear: Ireland's “Guidance on Artificial Intelligence in Schools” (Department of Education and Youth, 2025) links AI to the 4Cs (Critical Thinking, Creativity, Communication, Collaboration); Slovenia's didactic recommendations from ZRSS (2026) explicitly frame the use of generative AI via the TPACK and SAMR didactic models and link them to formative-assessment scenarios; the German Länder handbooks — for example, the Bavarian orientation framework and handbook (StMUK 2023/2026), the North Rhine-Westphalia handbook (MSB 2023), and the Berlin recommendations (SenBJF 2024) — order learning objectives along the progression Understand–Apply–Shape, linked to the KMK dichotomy of “learning about AI / learning with AI.” Poland's MEiN guide “Chat GPT w szkole” (2023) speaks of “4K competencies” and places critical review of AI-generated student work at its centre.

8.3 Examination and Integrity Rules as a Distinct Regulatory Field

Beyond the curricular and didactic level, a third, independent regulatory field has emerged: safeguarding examination and performance integrity. Denmark regulates this most strictly: generative AI is fundamentally prohibited in Folkeskole leaving examinations, and the 2025 STUK recommendations call for a clean separation between AI use permitted in class and its prohibition in examinations (detailed in 7.3). Greece's KYA 55909/D6/2026 prohibition catalogue (see 7.3) bans, among other things, fully automated assessment systems; AI tools may serve only as learning support, never as a substitute for producing one's own work. Ireland's 2025 Guidance devotes its own guidelines to academic integrity, ranging from a duty to label AI-generated content to redesigning task formats. Poland's 2023 MEiN handbook specifically addresses checking the originality of homework. The German documents — from the 2024 KMK recommendation through the Berlin recommendations to the Baden-Württemberg ministry's website — link this field to the concept of a declaration of independent work and calls for “AI-resistant” task design and a changed examination culture.

8.4 The Teacher's Role Across the Models

The description of the teacher's role visibly shifts across the documents. Early guidance — such as the Czech NPI recommendation (2023) with its training format “Generative AI as a teacher's assistant,” or the Polish MEiN guides — framed AI primarily as an assistant to the teacher for lesson preparation and material creation. More recent, more binding documents, by contrast, emphasise human oversight: the European Commission's Ethical Guidelines (2022) posit human control as a non-negotiable condition; the Greek KYA requires that AI use occur under supervision and that teacher training be approved by the state IEP; Luxembourg's AI Compass explicitly formulates the guiding principle “L'humain avant l'IA” (“the human before AI”). The teacher is thus reframed from a tool user into a guarantor of didactic and ethical responsibility — a role understanding empirically confirmed by Scandinavian status reports (Skolverket 2026): teachers use AI mainly for planning and assessment but remain responsible for final judgement.

8.5 Finding: Didactic Convergence, Curricular Path Dependency

In summary, a dual finding emerges. At the didactic level, European models converge remarkably quickly: whether framed as “for/with/about,” “para/sobre/con,” “sans/sur/avec,” or “Understand–Apply–Shape,” a three-mode scheme dominates everywhere, distinguishing between competency development relative to AI, knowledge about AI, and AI as a tool. At the level of curricular integration form, by contrast, national path dependency remains decisive: states with a strong computer-science subject (DE, PL, CZ, HU, GR) choose the module; federally or competency-oriented systems (SK, CY, WLS, FI) choose the cross-curricular theme; and

only a few systems with sufficient curricular manoeuvring room (SE, FR, LU, IE) venture the standalone subject. The integration form is thus less a result of didactic conviction than an expression of institutional path dependencies — with the consequence that the depth of AI education in Europe continues to depend on which country a child happens to attend school in.

9. Commonalities, Gaps and Tensions

The preceding chapters have measured Europe's AI education landscape along the dimensions of prevalence, target groups, competencies, bindingness and didactics. This chapter cross-condenses the individual findings: what nearly all systems share (9.1), where the corpus shows structural gaps (9.2), and at which points national responses contradict one another (9.3). The interim conclusion (9.4) situates the findings for further policy development.

9.1 Consensus Areas: A European Minimum Core Is Discernible

Despite all differences in bindingness and integration form, a remarkably stable substantive core consensus exists, expressible in five points.

First, ethics, responsibility and data protection form the universal core. With 56 of 88 teacher-facing and 36 of 84 student-facing documents, this is the only competency theme reaching peak values for both target groups. The normative template is supplied by the European Commission's Ethical Guidelines (2022), to which national documents from Ireland's 2025 Guidance on AI in Schools to Cyprus's 2025 policy document systematically refer.

Second, critical evaluation of AI outputs is the most evenly distributed competency of all (31 student and 30 teacher documents). From the early, diffuse call for “critical thinking,” a concretely described capacity to scrutinise has emerged: Slovakia's Amendments 17 and 6, as well as Poland's new core curriculum (see 3.5 and 6.1 for detail), make it a binding learning content.

Third, human oversight is treated as a non-negotiable guiding principle. The EU Ethical Guidelines posit human control as a condition of any school AI use; the Greek KYA 55909/D6/2026 permits AI only under supervision and as learning support; Luxembourg's AI Compass captures the principle in the formula “L'humain avant l'IA.” The teacher is thus reframed across Europe from a tool user into a guarantor.

Fourth, a three-mode didactic scheme has established itself as a shared grammar: learning for/about/with AI appears as “for/with/about AI” (Cyprus, Romania), “para/sobre/con la IA” (Spain, INTEF 2024), “sans/sur/avec l'IA” (Luxembourg), or “in, with and without” generative AI (Denmark). This convergence across language and system boundaries shows that the didactic framing is shared across Europe even where curricular implementation diverges.

Fifth, there is agreement on prohibiting fully automated assessment. The Greek KYA explicitly bans fully automated assessment systems; the EU AI Act classifies automated assessment in education as a high-risk application (Annex III); England's Product Safety Expectations (2025/26) require a “schools mode” without complete-solution generation. Machine-based final assessment of student performance is thus the clearest European normative consensus beyond the curriculum.

9.2 Gaps: Six Structural Blind Spots

The consensus on the core stands opposite six gaps that are not incidental but systemic — each concerns target groups or functions that remain absent from states' governance actions to date.

Gap	Finding in the corpus	Affected target group / region
Vocational education (VET)	Only 10 of 152 documents address VET; the only dedicated mandatory AI curriculum is the Spanish specialisation course (RD 279/2021); Denmark provides only a parallel version of general guidance (as shown in 4.5)	Apprentices and vocational students across Europe; especially serious as “society/world of work” itself appears in 14 student documents as learning content
Initial teacher education and induction	First and second phases of teacher training are barely addressed; exceptions are only the Dutch Kennisbasis digitale geletterdheid (mandatory for Pabo and teacher-training colleges) and, indirectly, the French CRCN-Édu; the 88 teacher documents concentrate on continuing professional development	Prospective teachers in all regions; the lever with the longest-lasting effect remains unused
Primary level in Southern Europe	Of 48 primary documents, binding anchoring mostly comes from other regions (SK, NL, LU, HR); in Southern Europe only Italy's “first approach to Artificial Intelligence” (National Guidelines 2025, Ministerial Decree 221/2025) exists as a mandatory anchor, flanked by the Greek Skills Labs	Primary students in PT, ES, MT, CY
Evaluation and impact obligations	No document in the corpus requires evaluation of the impact of AI curricula or guidance; the Erasmus+ project AI4T (1,005 teachers, 302 schools, evaluated) is the exception that proves the rule; monitoring remains a matter of individual status reports (e.g., Skolverket 2026)	System level: without evaluation obligations it remains unverified whether the anchoring phase generates learning effects
Technology gap among teachers	ML, technology and programming appear in only 6 of 88 teacher documents (student side: 37 of 84); teachers are meant to take responsibility for AI use without a deeper knowledge of the underlying technical principles	Teachers at all school levels; undermines the oversight principle from 9.1
Blocked and non-machine-readable sources	18 of 152 documents (roughly 12 percent) were blocked from direct access or not machine-readable and could only be documented via secondary evidence	Research, comparative monitoring and the public; a transparency problem precisely for a transparency topic

These gaps are interlinked: whoever only trains teachers rather than educating them reinforces the technology gap; whoever leaves out VET undermines the employment-world rationale of their own student curricula; and whoever does not evaluate cannot even reliably measure the remaining gaps.

9.3 Tensions: Five Contradictions in European Governance

Between the consensus areas and the gaps lie five tensions where national strategies visibly grate against one another.

First: regulation versus innovation. Denmark, with its ban on generative AI in Folkeskole leaving examinations (by executive order, see 7.3), has created Europe's strictest single examination rule. Estonia sets the opposite model with TI-Hüpe (AI Leap): from 2025/26, all 10th and 11th graders are equipped nationwide with AI

learning applications, supported by a nationwide trainer network. Both systems belong to the same guidance-focused Nordic/Baltic cluster, yet embody opposite basic stances: protection through limitation here, competency building through broad exposure there.

Second: basic-skills education versus AI delegation. Portugal's National Education Council explicitly warns in its Recommendation No. 4/2026 of “cognitive atrophy” if AI systems take over cognitive work before foundational competencies are secured. Opposing this are systems that actively expand personalised, AI-supported learning: Malta's Digital Education Strategy 2024–2030 relies on adaptive learning offerings, and Romania's new curriculum for the Mate-Info mathematics track even makes use of an AI assistant obligatory — albeit coupled with critical validation. The contradiction is fundamental: is AI in the classroom a risk to basic-skills education, or its modern tool? The answer currently depends on the country, not on the evidence.

Third: central versus federal governance. France and Slovakia show what closed central governance can achieve: France combines statute, ministerial decree (Service Note No. 2026-019) and mandatory certification via Pix into a coherent regime; Slovakia staggers three amendment stages across all school types. Germany, Switzerland and the United Kingdom, by contrast, produce patchworks: the KMK recommendation (2024) deliberately remains non-binding, while Bavaria introduces a Fachoberschule mandatory subject and other Länder remain at the level of guidance; in Switzerland, the EDK framework binds only member cantons. Federalism generates experimental diversity but not equal distribution: in these systems, where a child lives determines whether they learn about AI bindingly.

Fourth: breadth versus depth. The cross-curricular model (Slovakia, Cyprus, Wales) reaches all students but buys this breadth at the cost of diffuse responsibility and low guaranteed instructional depth. The standalone subject (Sweden with Gy25, France with NSI) guarantees depth up to own model training but reaches only selective groups and requires qualified specialist teachers, who are in short supply. No system has solved this dilemma; the discernible policy response — cross-curricular for breadth, subject or certificate for depth — is so far more addition than integration.

Fifth: the field's speed versus the rules' bindingness. The guidance documents of the 2023/24 GenAI wave (e.g., Poland's “Chat GPT w szkole” or the North Rhine-Westphalia guidance) were tailored to a tool that has since changed repeatedly; they become outdated faster than legal instruments can be amended. Conversely, legal instruments such as Slovakia's amendments fix learning objectives for years, while the AILit Framework (2026) and the PISA 2029 “Media & AI Literacy” assessment are already shifting the targets further; even the AI Act itself had to be readjusted within two years (Regulation (EU) 2026/1744). Systems face a choice between rapidly ageing flexibility and sluggish bindingness — a governance problem for which, so far, only Sweden's continuously updated Skolverket guidance and England's versioned Product Safety Expectations have found a pragmatic answer.

9.4 Interim Conclusion

European AI education policy in 2026 is marked by a characteristic asymmetry: at the substantive-didactic level, broad convergence prevails — ethics and data protection, critical output evaluation, human oversight, the three-mode scheme, and the prohibition of fully automated assessment form a shared minimum core running from the EU Ethical Guidelines to the Greek KYA. At the structural level, by contrast, the gaps remain considerable: vocational education, initial teacher education, primary level in Southern Europe, binding evaluation, and the technical qualification of teachers are the blind spots of the anchoring phase. And at the

strategic level, the five tensions show that Europe is not pursuing a single unified model but is deliberately diverging in a controlled way: regulation and innovation, delegation and basic-skills education, central and federal governance, breadth and depth, and speed and bindingness are each calibrated differently according to national curricular tradition. The decisive test of the coming years will therefore be less the invention of new instruments than the closing of the structural gaps — and the question of whether the entries into force scheduled for 2026/27 exert the expected pull effect on the still-undecided systems.

10. Conclusions and Recommendations

The preceding chapters have described a field that has, in barely three years, evolved from reactive chatbot guidance into binding legal instruments. The report's central thesis — the transition from the recommendation phase (2023/24) to the anchoring phase (2025/26) — is thus well supported empirically: 39 of the 152 documents (26 percent) carry mandatory status, five of the seven prominent national legal instruments date from 2024 to 2026, and output of binding instruments continues at a record level with 30 documents (2025) and already 23 documents (2026 to date). From the findings of Chapters 2 through 8, five recommendations can be drawn for education policy, school practice, teacher training, vocational education, and the European level, followed by a sketch of development paths to 2029 and a note on using the report's follow-on products.

10.1 Five Recommendations

Recommendation 1 — Education policy: actively use the anchoring phase and choose a combination model. None of the three pure integration forms resolves the breadth–depth dilemma diagnosed in Chapters 6 and 8: the standalone subject (Sweden, France/NSI) delivers the greatest depth with selective reach; the cross-curricular theme (Slovakia, Cyprus, Wales) reaches all students but buys this breadth at the cost of diffuse responsibility and low guaranteed instructional depth; the module within the computer-science subject (Poland, North Rhine-Westphalia, Greece) secures a calculable minimum scope but remains bound to the reach of its host subject. The most robust model is therefore the combination of a mandatory module for depth with a cross-curricular element for breadth — exactly the pattern already being realised by Poland (mandatory Informatyka plus the “Compass for Tomorrow” reform framework), Slovakia (Amendment 17 as a cross-curricular theme plus staged subject-based amendments), and France (SNT/NSI plus a mandatory Pix pathway from 2026/27). Since bindingness, per the Chapter 7 finding, correlates with curricular integration rather than guidance density, systems now deciding their approach should use the current 2026/27 reform wave rather than producing yet another round of non-binding handbooks.

Recommendation 2 — School practice: clarify usage and examination rules before tool rollout. Chapters 7 and 8 show that the most effective governance instruments lie beyond the curriculum: Greece regulates via the prohibition catalogue of KYA 55909/D6/2026 (see 7.3) as a legal instrument that AI may be used only as learning support under supervision; Denmark legally secures examination integrity via the examination notice (see 7.3) while classroom teaching remains at the recommendation level; Ireland chooses the declaratory route of a disclosure duty via its 2025 Guidance on AI in Schools. The common thread: these systems clarified the rules of use before or during tool introduction — not afterwards. At the same time, Italy's guidelines (Ministerial Decree 166/2025, anchored in Law 132/2025) show that governance is a school-leadership task: a risk-management plan, AI Act compliance, and procurement responsibility are explicitly assigned to the

school level. For practice, the conclusion follows: usage and examination rules first, then tool rollout — and responsibility for this lies with school leadership, not with the individual teacher.

Recommendation 3 — Teacher training: address all three training phases and close the technology gap. With 88 documents, teachers are the most strongly addressed target group, yet the address concentrates almost entirely on continuing training of existing staff; initial teacher education and induction remain — with exceptions such as the Dutch Kennisbasis digitale geletterdheid and the French CRCN-Édu — unaddressed (Chapter 4). At the same time, the technology gap in the competency matrix (Chapter 5) is systemically significant: machine learning and programming are addressed in 37 student documents but only six teacher documents. Those expected to take responsibility for and shape AI use without knowing its technical principles lack the foundation for proper oversight — leaving only ethical guardrails and didactic rules of thumb. Reference models already exist: Slovakia's Framework of AI Competencies for Teachers (2026) with its staged progression, and the UNESCO AI Competency Framework for Teachers (2024) with its Acquire–Deepen–Create stages, including the "AI foundations & applications" aspect. The conclusion: extend competency frameworks with progression stages to cover initial education, induction and continuing training alike, and anchor technical foundations as a mandatory component of teacher education — Sweden's coupling of a 15-ECTS qualification with the licence to teach the new AI subject shows what such a mechanism can look like.

Recommendation 4 — Vocational education: close the largest gap through applied specialisations. With only 10 of 152 documents, VET is the most thinly covered target group, even though AI's relevance to the world of work is prominent in the student-facing documents themselves (Chapter 4). A workable counter-model already exists, as shown in Section 4.5: the Spanish specialisation course under RD 279/2021 as a mandatory curriculum, and the Danish STUK recommendations for vocational education as an examination- and work-process-oriented parallel version. The conclusion is to scale this pattern: occupation-specific AI specialisations modelled on RD 279/2021, complemented by VET-specific usage recommendations of the Danish type — otherwise a cohort emerges that knows AI as a general literacy but not as a vocational working competency.

Recommendation 5 — European level: leverage the convergence pressure and mirror national frameworks against AILit. Three supranational drivers are generating binding adaptation pressure for the first time: Article 4 of the AI Act (Regulation (EU) 2024/1689, applicable since February 2025) obliges providers and operators — explicitly including educational institutions — to take AI-competency measures; the AILit Framework of the Commission and OECD (finalised 17 June 2026) defines the shared reference core with four domains and 23 competencies; and PISA 2029 makes "Media & AI Literacy" an internationally comparable metric. Slovenia and Latvia already reference DigComp 3.0 and PISA 2029 respectively, and Skolverket references AILit and UNESCO. The conclusion: national competency frameworks and curriculum revisions should mirror their domain structure against AILit to ensure compatibility with the assessment and with EU law, rather than investing in national conceptual architectures that will need to be re-translated by 2029.

Recommendation	Core finding (chapter)	Reference example
1. Combination model: mandatory module + cross-curricular theme	Breadth–depth dilemma of the three integration forms (Ch. 6, 8)	PL: mandatory Informatyka from 2026; SK: Amendment 17; FR: Pix pathway
2. Rules before tool rollout; governance by school leadership	Examination/usage rules as a distinct regulatory field (Ch. 7, 8)	GR: KYA 55909/D6/2026; DK: Folkeskole examination ban (both 7.3); IT: Guidelines M.D. 166/2025

Recommendation	Core finding (chapter)	Reference example
3. Teacher training across three phases plus technical foundations	88 teacher documents almost all training-focused; technology 6 vs. 37 (Ch. 4, 5)	SK: Framework of AI Competencies for Teachers; UNESCO AI CFT; SE: 15-ECTS coupling
4. Scale VET specialisations	Only 10 of 152 documents address VET (Ch. 4)	ES: Royal Decree 279/2021; DK: STUK vocational-education recommendations
5. Mirror national frameworks against AILit	AI Act Art. 4, AILit 2026, PISA 2029 MAIL as convergence drivers (Ch. 3, 7)	EU/OECD: AILit Framework (2026); SI/LV: reference to PISA 2029

10.2 Development Paths to 2029

Four development lines will shape the field through the end of the decade. First, the measurement horizon: with PISA 2029, Media & AI Literacy will be measured comparably at international level for the first time; the AILit Framework, as its conceptual basis, will thereby become the de facto norm against which national curricula are measured — a pull effect already visible in the most recent Slovenian and Latvian documents. Second, legal development: the AI Act unfolds its full effect in stages; the high-risk classification of education-related AI applications (Annex III) will make educational institutions, as operators, subject to concrete compliance obligations from 2027, and the Council of Europe DG II preliminary study on an education-specific legal instrument points to further legal formalisation at the supranational level. Third, the national reform agenda: with the 2026/27 entries into force (Poland from 1 September 2026, Italy, the Netherlands, Romania from the 2026/27 school year, the Slovak Gymnasium amendments), an implementation phase begins in which it must be shown whether formal bindingness translates into classroom practice; the next revisions are already announced — Romania's Liceu programmes from 2026/27, Slovenia's KUP curriculum reform with a 2029 target horizon, the Czech RVP revision with strengthened AI anchoring, and the rollout of Poland's Reforma26 across subsequent cohorts. Fourth, a second wave of legal formalisation is to be expected: the drafts in Romania (AI Guide) and Bulgaria (Vision 2026) stand at the threshold between consultation and legal-instrument status, and the pull effect of neighbouring systems is likely to place guidance strategists such as the Netherlands (core objectives 2026/27) and, over the medium term, the Scandinavian systems as well, under pressure to justify their approach. The likely norm of 2029 is thus what, in 2026, is still the exception: binding, staged AI anchoring with clarified usage rules.

10.3 Using the Report for Visualisation and Presentation

The report is structured so that its chapters can be adopted one-to-one as modules of a web-dashboard application and as sections of a presentation: Chapter 2 provides the opening slide with overall figures and the time series, Chapter 3 the interactive country and cluster map, Chapter 4 the target-group view, Chapter 5 the competency matrix, Chapter 6 the stage progression, Chapter 7 the bindingness staircase, Chapter 8 the model comparisons, and this chapter the action level. The quantitative basis for all visualisations is available in machine-readable form in the file /mnt/agents/output/research/analysis_data.json: the cluster matrix (documents, mandatory-status rates, target-group focus by region), the 2013–2026 time series of publication years, the theme matrix of the nine competency fields for students and teachers, and the distribution of bindingness levels underlying the bindingness staircase. The underlying data catalogue is the file

Übersicht_KI_Lehrplaene_Europa.xlsx, from which document-level filters (country, year, type, target group, bindingness) can be derived for the dashboard. For presentation purposes, it is recommended to support each of the five recommendations with exactly one reference example and one figure — for example, “VET: 10 of 152” or “Technology among teachers: 6 of 88” — since these pairings convey the report's analytical edge most concisely.