Using EdTech Applications, Tools, and Platforms in Schools: a study of 6 countries

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FOREWORD

The rapid expansion of educational technology (EdTech) has transformed classrooms across Europe, introducing a new era of digital tools aimed at enhancing both teaching and learning experiences. The present survey explores the diverse use of EdTech applications, tools, and platforms in schools across six countries participating in the EdTech Talents project. By providing an in-depth analysis of EdTech integration in classrooms, this document offers valuable insights into the current state of educational innovation, revealing key trends, challenges, and opportunities.

Education across Europe is governed by decentralised systems, which presents both unique opportunities and obstacles for EdTech adoption. As highlighted in *The European EdTech Ecosystem Roadmap* (2024), Europe's decentralised education systems mean that procurement, curriculum standards, and implementation processes are handled at the national or even regional level. This fragmentation can complicate efforts for EdTech organisations to align their products with the different standards and frameworks present in each country. For instance, the distinct educational structures within Belgium's Dutch, French, and German-speaking communities or Germany's autonomous state-run systems illustrate the complexities faced by schools and EdTech providers alike (Roadmap, p. 28).

This survey analyses the use of EdTech through four critical lenses: national regulations and curriculum frameworks, national and regional EdTech programmes and initiatives, and the autonomy of local authorities, schools and teachers. Each perspective is crucial to understanding the dynamics of EdTech deployment and its impact on classroom learning.

National-level initiatives often drive significant investments in hardware as part of broader digitalisation efforts. However, as noted in the *European Teacher Survey 2024* (ETS), teachers do not view access to hardware as a top driver for improved learning outcomes. Instead, the focus has shifted towards digital tools that support pedagogical workflows, enhance student progress analytics, and facilitate personalised instruction (ETS, pp. 8, 11). Teachers consistently express a preference for blended learning materials, combining digital and printed resources, as a way to balance technology with traditional teaching methods (ETS, p. 13).

While digitalisation has improved efficiencies in planning, preparation, and administrative tasks, there is still significant work to be done in aligning these tools with the instructional needs of teachers and students. For instance, over 90% of teachers surveyed agree on the importance of personalised learning content tailored to individual student progress, emphasising the role of analytics in shaping more effective teaching strategies (ETS, p. 17). Yet, receptiveness to these tools varies across Europe, with notable differences such as Germany, where only 28% of teachers express openness to using student analytics (ETS, p. 18).

This study offers an in-depth look at how six European countries are navigating these challenges and opportunities in their integration of EdTech. By examining the regulatory frameworks, national and regional initiatives, and the practical experiences of school administrators and teachers, this document sheds light on the diverse paths taken by different countries and regions in their pursuit of educational innovation.

We hope this study provides educators, policymakers, and EdTech developers with a comprehensive understanding of the current state of EdTech adoption and sparks continued dialogue on how best to support the evolving needs of schools and teachers in the digital age.

This study was commissioned by the EdTech Talents project (edtechtalents.eu). The information and facts set out in this report are those of the authors. They do not necessarily reflect the opinion of the European Union or the European Commission, which are not responsible for the use which may be made of the information contained in this study by anyone.

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SERBIA: ADVANCING ALIGNMENT WITH THE EU DIGITAL EDUCATION ACTION PLAN 2021-2027

The European Commission Staff Working Document: Serbia 2024 Report which accompanies the 2024 Communication on EU Enlargement Policy, Chapter 26 highlights the following key points:

Ongoing Digital Transformation:

- Serbia is actively working on transforming its education system digitally. This includes efforts to improve digital infrastructure and to build teachers' digital competencies.

- Digital Skills in Curriculum: At the pre-university level, the curriculum now mandates subjects designed to foster digital skills and competencies, including computer science. This aims to ensure foundational digital literacy among students.

- Education Management Information System (EMIS): While Serbia has an EMIS in place, further consolidation is necessary to improve its effectiveness and support education administration.

EU Alignment:

Further efforts are needed to align digital education with the EU Digital Education Action Plan 2021- 2027.

According to the OECD (2024), Western Balkans Competitiveness Outlook 2024: Serbia, Competitiveness and Private Sector Development, OECD Publishing, Paris, https://doi.org/10.1787/3699c0d5-en there is a policy framework in place for the development of basic digital skills in the primary and secondary education system and legislation has been adopted and aligned to international standards. The education strategy aims to establish the foundations for the development of digital education at the pre- university level. The implementation of this framework is guided by the Action Plan 2023-26 for the Strategy for Education Development until 2030, with progress measured through monitoring outputs and assessing them against target benchmarks and indicators.

Digital skills development in Serbia benefits from robust monitoring (through domestic research studies and through participation in the International Computer and Information Literacy Study - ICILS).

Key Strategic Frameworks

Over the past decade, Serbia has pursued several strategic goals to modernize its education system and enhance digital literacy. Three key strategies underpin this effort:

1. **Strategy for the Development of Digital Skills in the Republic of Serbia (2020–2024)**:
   This strategy emphasizes the development of digital competencies among both students and teachers. It aims to reduce the digital divide by ensuring equal access to technology, especially in rural and underserved regions, and focuses on equipping educational institutions with the necessary digital infrastructure and training for teachers.
2. **Education Development Strategy of the Republic of Serbia 2030**:
   The 2030 strategy lays out a comprehensive plan to integrate information and communication technology (ICT) into teaching and learning. It emphasizes preparing students for a digital economy by embedding digital skills into the curriculum, with a goal of improving educational quality and ensuring equitable access to digital tools for all students.
3. **Strategy for the Development of Information Society in the Republic of Serbia (2021–2026)**:
   This broader strategy for digital transformation supports the creation of a digital ecosystem in education. It includes goals for robust infrastructure, cybersecurity, and the development of digital content aligned with educational standards.

The Strategy for the Development of Education in the Republic of Serbia by 2030 includes a dedicated segment on digital education, highlighting the following key pillars:

1. Further development of an Education Management Information System. Enhances centralized data management and education governance.

2. Improvement of ICT Infrastructure. Investments to upgrade school infrastructure and enable digital learning environments.

3. Promotion of BYOD policy.

4. Strengthening School Capacity for Developmental Planning with a focus on Digital Transformation. Schools are encouraged and supported to integrate digital goals within their School development plans based on the results of the SELFIE self-assessment.

5. Increasing the Percentage of Schools Meeting Necessary Conditions for Blended and Online Learning.

Blended Learning development as one of the priorities of Serbia's digital education strategy. It is in line with the Council Recommendation on blended learning approaches for high-quality and inclusive primary and secondary education.

Unlike emergency remote education, this approach integrates online support into daily teaching, offering a more flexible, engaging, and personalized learning experience. LMS Moodle is advised and promoted for use in schools by the Ministry of Education. Proposed amendments to the "Law on Foundations of

Education System" are set to incorporate blended teaching models and enhance practical training opportunities. These changes are expected to facilitate advancements in digital education, strengthen student rights and responsibilities, and increase parental accountability within educational processes. The amendments should also be further regulated at the school level to ensure effective implementation.

6. Enhancing Students' Digital Competencies through dedicated Curricula.

In Serbia, digital skills development is integrated into the school curriculum at multiple levels. Since the 2021/22 school year, Digital World has been a mandatory subject for Grades 1 to 4, focusing on digital competencies such as safe device usage, communication, cooperation, and algorithmic thinking. The curriculum covers digital society, safe device use, and computational thinking, with 36 school hours per year.

Computer Science has been mandatory for Grades 5 to 8 since the 2017/18 school year, with 1 hour per week. It focuses on managing information, safe digital communication, content creation, and ICT skills, with programming skills introduced starting in Grade 5 using visual programming languages, and moving to textual languages like Python in Grade 6. Computer Science is also mandatory in secondary education, with varying hours depending on the type of school.

7. Improving Teachers' Digital and Pedagogical Competencies

Digital Competence Framework - Teacher for the Digital Age 2023 and self-assessment tool, as well as intermediate and advanced training programs to foster digital skills in teaching staff are available.

The development of the digital competences of all teachers in the Republic of Serbia is addressed as a transversal key competence. Empowering teachers to become confident and skilled in using digital technology to support learning in an online environment is ongoing activity.

There is a rich offer of available training, both from the Catalog of accredited programs by the Institute for Education Improvements and the List of Trainings of Public Interest. Additionally, an Analysis of the available training programs for developing digital competencies has been completed.

Regional and Municipal Authorities

Although regional and municipal authorities have less direct influence over the selection of EdTech tools, they often play a supporting role in implementing national initiatives. Municipalities may provide additional funding for digital infrastructure, such as computers and internet access, and organize teacher training sessions to facilitate the integration of technology in schools. In some instances, they also provide financial support for schools to enhance their technological capacity.

Key EdTech Initiatives and Projects

Several national initiatives have been pivotal in promoting the integration of EdTech in Serbian schools. These initiatives have contributed significantly to addressing the challenges of digital inclusion and improving the educational landscape:

1. **Connected Schools Project**:
   Supported by the European Investment Bank (EIB), this project aims to enhance digital infrastructure by connecting over 3,800 schools to high-speed internet. It has distributed more than 30,000 digital devices, provided comprehensive teacher training, and contributed to bridging the digital divide, especially during the COVID-19 pandemic.
2. **Bridging the Digital Divide in Serbia for the Most Vulnerable Children**:
   In partnership with UNICEF, this project addresses the digital exclusion faced by vulnerable children, including Roma and disabled students. By distributing digital devices and providing subsidized internet access, the initiative ensures that these students can participate fully in digital learning.
3. **Digital Classroom Initiative**:
   The "Digital Classroom" project promotes the use of digital educational materials and electronic textbooks. In its pilot phase, it has trained over 2,000 teachers and equipped classrooms with digital tools. The initiative is designed to modernize teaching practices and improve student outcomes by combining digital and traditional learning resources.
4. **School Modernisation Programme (2010–2014)**:
   This earlier initiative aimed to improve Serbia's education infrastructure, including the integration of ICT. It contributed to the strategic development of the education system, increased enrollment in secondary education, and helped produce graduates with skills aligned with the needs of the modern labor market.

School Principals and Teachers

While school principals and teachers have discretion in choosing additional digital tools, their options are often constrained by budget limitations, infrastructure, and the availability of professional development opportunities. Some schools, particularly those involved in pilot projects or supported by municipalities, have more flexibility in adopting and testing new technologies. Despite these constraints, many educators demonstrate creativity and innovation in incorporating digital tools to enhance their teaching practices.

Challenges and Opportunities

The challenges for digital education development in Serbia persist. Although information about digital education is shared publicly across various platforms, it lacks a structured and easily accessible format. Also, there is insufficient alignment of school EdTech practices with national policies and regulation on data protection.

Emerging topics artificial intelligence, digital wellbeing, and open educational resources are often discussed but not sufficiently addressed at the policy level nor in the school practices. While teachers have some competencies and support to implement the digital skills curriculum, there are notable gaps in capacity. Despite some progress in integrating digital tools into education, the sector still lacks a fully mature infrastructure to support widespread and consistent implementation.

Bridging the Digital Divide

Despite considerable progress, significant challenges remain, particularly in bridging the digital divide between urban and rural areas. The digital divide encompasses not only access to technology but also disparities in digital literacy and the ability to use digital tools effectively. Rural areas often face greater challenges in terms of infrastructure and digital skills, both among students and educators.

Impact of the COVID-19 Pandemic

The COVID-19 pandemic accelerated the adoption of digital infrastructure in Serbian schools but also exposed gaps in digital inclusion. Vulnerable populations, including children from low-income families and marginalized communities, faced significant barriers to online learning. The Serbian government's response, particularly through initiatives like "Connected Schools" and efforts to bridge the digital divide, has been crucial in addressing these challenges. However, the pandemic also underscored the need for more comprehensive, long-term solutions to ensure all students can access high-quality digital education.

Conclusion: Progress, Challenges, and Lessons in Digital Education

Serbia's experience with EdTech integration highlights both the progress made and the challenges that remain. Through strategic national initiatives and a focus on digital literacy, the country is making strides toward modernizing its education system. However, the ongoing need to bridge the digital divide, particularly in rural and marginalized communities, remains a significant challenge. As Serbia continues to invest in digital education, the lessons learned from its initiatives offer valuable insights for other countries seeking to navigate the complexities of EdTech adoption in a centralized education system.

Hungary: Using EdTech Applications, Tools, And Platforms In Schools

In Hungary, the use of educational technology (EdTech) is largely governed by national policies and strategies aimed at enhancing digital literacy and modernizing the education system. The centralized nature of Hungary's education system, with substantial control exerted by national authorities, shapes the extent to which schools can independently adopt and integrate EdTech tools. The framework for EdTech integration is laid out in various national policy documents, which establish guidelines and regulations for the use of digital technologies in classrooms.

National Authorities

Hungary's education system operates under a highly centralized structure, with the **Ministry of Interior** and the **Klebelsberg Center** playing key roles in shaping education policy, including the use of digital technologies. These bodies set the national curriculum, approve teaching materials, and regulate the use of technology in schools. Digital tools and platforms used in public schools must comply with national guidelines and are often recommended or selected by government institutions.

Key national regulations that influence EdTech use include:

1. **National Public Education Act (2011)**:

   This act provides the legal framework for public education in Hungary. While not specifically focused on EdTech, it emphasizes preparing students for the digital age and lays the groundwork for the inclusion of digital tools in teaching.

2. **Digital Education Strategy of Hungary (Digitális Oktatási Stratégia, DOS)**:

   Launched in 2016, the DOS is a comprehensive strategy designed to improve digital literacy in education. It outlines key objectives such as developing digital competencies for students and teachers, modernizing educational content, and upgrading digital infrastructure in schools. The strategy is a primary guiding document for integrating EdTech into the national curriculum.

3. **National Core Curriculum (Nemzeti Alaptanterv, NAT)**:

   The NAT includes digital competencies as a core component, ensuring students are equipped with the necessary skills for the digital world. It outlines how digital tools should be used across various subjects and grade levels.

4. **Digital Child Protection Strategy (Digitális Gyermekvédelmi Stratégia)**:

This strategy focuses on ensuring the safe use of digital tools and the internet in schools. It provides guidelines to protect students from online risks while using educational technologies and promotes digital safety education.

5. **Classroom ICT-Supported Pedagogical Practices (Tantermi IKT Eszközökkel Támogatott Pedagógiai Gyakorlatok)**:

These guidelines offer best practices for integrating information and communication technology (ICT) into classroom teaching. They provide teachers with practical advice on using digital tools to enhance learning.

6. **Széchenyi 2020 Program**:

Supported by the European Union, this program includes substantial investments in digital infrastructure and education modernization. It aligns with the goals of the Digital Education Strategy by funding the development of EdTech tools, teacher training, and improvements in school infrastructure.

7. **Information Society Strategy (Információs Társadalom Stratégia, ITS)**:

Though broader in scope, this strategy outlines the role of education in building a digitally literate society, with provisions for integrating digital tools in the learning process.

8. **Teacher Training and Professional Development Programs**:

Continuous professional development for teachers is crucial for successful EdTech integration. Several national programs focus on improving teachers' digital competencies, ensuring they are prepared to utilize new technologies in the classroom.

National initiatives, such as the **Digital Education Strategy of Hungary**, set the framework for EdTech use in schools. These policies emphasize standardization, with a particular focus on ensuring equitable access to technology across the country.

As part of the **Recovery and Resilience Facility (RRF)**, the Hungarian government launched the project **"Ensuring Equal Access to Digital Education for Students and Teachers" (RRF-1.2.1-2021-2021-00001)**. This initiative aims to address digital disparities by providing portable IT devices to students and teachers. By December 2025, approximately 560,000 students and 55,000 teachers are expected to receive new laptops, enhancing access to digital education across the country.

Regional and Municipal Authorities

In Hungary, regional and municipal authorities have limited influence over EdTech selection. Their role is mainly administrative, focusing on implementing national policies and ensuring that schools have adequate infrastructure, such as internet connectivity and digital devices. Although they may organize professional development workshops or provide additional funding for schools, decisions about which EdTech tools to use are generally made at the national level.

School Principals and Teachers

School principals and teachers in Hungary have limited autonomy regarding the introduction of new EdTech tools. While they can supplement the curriculum with additional resources, these must adhere to national guidelines. The formal adoption of new technologies requires approval from central authorities, and schools often rely on nationally approved tools for major educational technology implementations.

Teachers do have some flexibility in using free online resources to enhance their lessons, but these tools are typically considered supplementary rather than a core part of the curriculum. Moreover, the ability to adopt new technologies often depends on the availability of resources and professional development opportunities.

The centralized nature of Hungary's education system limits innovation at the local level, with significant decision-making power resting with national authorities. This centralized structure, however, ensures a standardized approach to digital education across the country.

Challenges and Opportunities

Digital Access and Infrastructure

One of the key challenges in Hungary's education system is ensuring equitable access to digital tools and infrastructure. The **COVID-19 pandemic** underscored the digital divide in the country, particularly in rural areas, where schools often lack the necessary resources to fully integrate EdTech into the classroom. The government's **Recovery and Resilience Facility** project is a direct response to these challenges, aiming to bridge this digital gap by providing essential devices and improving connectivity for students and teachers across the country.

Digital Literacy and Professional Development

The integration of EdTech tools also hinges on the digital literacy of teachers and students. Continuous professional development is essential to ensure that educators can effectively use technology in their classrooms. Hungary's national strategies emphasize teacher training, but the rapid pace of technological change

presents an ongoing challenge in keeping the workforce up to date with the latest tools and best practices.

Digital Safety

Hungary has also taken steps to ensure that the use of digital tools in education is safe for students. The **Digital Child Protection Strategy** provides a framework for schools to adopt practices that protect students from online risks, emphasizing the importance of educating both students and teachers about safe digital practices.

Conclusion

Hungary's approach to integrating EdTech in schools is shaped by a strong national framework that emphasizes standardization, digital literacy, and safe use of technology. While the centralized nature of the system limits the autonomy of individual schools, it ensures a cohesive strategy for modernizing education across the country. However, challenges remain in bridging the digital divide and ensuring that all teachers are adequately trained to utilize new technologies effectively.

GERMANY: DECENTRALIZATION AND VARIABILITY IN EDTECH USAGE

Germany's decentralized education system means that policies governing the selection and use of EdTech tools can vary significantly across its 16 federal states (Bundesländer). Each state has considerable autonomy over its educational policies, including the use of technology in schools, although these policies generally align with federal-level guidelines and initiatives. Teachers and school principals operate within both state and national frameworks, allowing for some autonomy in decision-making but also imposing certain limitations based on regulatory and resource constraints.

Powers of the Federal Government in EdTech Policy

Although education is primarily the responsibility of the Bundesländer, the federal government plays a role in shaping broader frameworks for digital education across the country. Here are the key powers exercised by federal educational authorities:

1. **Setting National Education Standards and Frameworks**

The federal government, in collaboration with the Standing Conference of the Ministers of Education and Cultural Affairs (Kultusministerkonferenz, KMK), sets national educational standards that can influence the use of EdTech tools. The KMK's *"Strategy on Education in the Digital World"* is a key framework that outlines digital competencies and guides states in integrating EdTech into their curricula.

2. **Coordination Through the KMK**

The KMK facilitates collaboration between federal and state governments, harmonizing educational policies across Germany. While the KMK doesn't mandate specific EdTech tools, its coordination helps ensure a level of consistency in how digital tools are integrated into education nationwide.

3. **Funding and National Programs**

Programs such as the *DigitalPakt Schule* provide federal funding to improve digital infrastructure in schools. While individual states and schools decide on the actual tools used, these funding priorities from the federal level can influence which technologies are adopted.

4. Research and Development Support

The federal government funds research on educational technology and digital learning methods, contributing to the development of new tools and practices that may be adopted by schools.

5. National Digital Literacy Initiatives

Federal initiatives to promote digital literacy often include recommended resources and tools for schools. Although not mandatory, these resources encourage specific approaches to digital education.

6. Regulatory Oversight on Data Protection

Data protection regulations, such as the General Data Protection Regulation (GDPR), are overseen at the federal level and can restrict the use of certain EdTech tools that don't comply with privacy standards, influencing the tools that schools are permitted to use.

National Strategies and Initiatives

Several national strategies and initiatives are aimed at fostering the integration of EdTech within Germany's educational system:

1. KMK Strategy on Education in the Digital World

This KMK strategy, first launched in 2016, provides guidelines for integrating digital competencies into school curricula, emphasizing the need for digital literacy among students and teachers.

2. DigitalPakt Schule

A federal initiative launched in 2019, the *DigitalPakt Schule* allocates funding for improving digital infrastructure in schools, including devices, connectivity, and software. Schools are required to develop digital strategies to qualify for this funding.

3. Federal Data Protection Act and GDPR

Data protection laws, particularly the Federal Data Protection Act (BDSG) and GDPR, shape the selection of EdTech tools by ensuring strict compliance with privacy regulations.

4. EdTech Next and Eduvation Initiatives

These programs, such as *EdTech Next*, foster innovation by supporting early-stage EdTech startups with mentorship and funding, particularly in regions like North Rhine-Westphalia.

Role of State-Level Educational Authorities

At the state level, each Bundesland plays a significant role in guiding the use of EdTech tools in schools. Key responsibilities include:

1. **State-Level Digital Strategies**

Each Bundesland develops its own digital education strategy, often building upon federal frameworks but tailoring them to local needs. These strategies guide the integration of EdTech tools into classrooms.

2. **Approved Lists of Digital Tools**

Some states maintain approved lists of digital tools that schools are encouraged or required to use, ensuring compliance with data protection laws and curriculum standards.

3. **Curriculum Guidelines**

State educational authorities set curriculum standards, which indirectly shape the selection of EdTech tools by ensuring alignment with educational goals.

4. **Data Protection Regulations**

Each state has its own guidelines on data protection, ensuring that EdTech tools used in schools comply with GDPR and local privacy laws.

5. **Teacher Training Programs**

States provide training programs to equip teachers with the skills to effectively use EdTech tools, ensuring that they align with the state's digital education strategy.

6. **Pilot Programs and Collaboration**

State authorities often launch pilot programs to test new EdTech tools, collaborating with educational institutions and tech companies to evaluate their effectiveness before recommending wider adoption.

Freedom of Teachers in Selecting EdTech Tools

While teachers in Germany enjoy a high degree of autonomy in selecting classroom tools, their choices are influenced by several factors:

1. **Autonomy in Decision-Making**

Teachers are generally free to select digital tools that align with the curriculum and enhance learning outcomes. However, these tools must comply with state guidelines and data protection laws.

2. **Curriculum Alignment**

Teachers must ensure that the EdTech tools they choose help students achieve state-mandated educational goals.

3. **Resource Availability**

The availability of digital devices, internet connectivity, and funding can limit teachers' ability to implement certain tools, especially in under-resourced schools.

4. **Data Protection**

Teachers must ensure that the tools they use comply with strict data protection laws, which can restrict the use of certain platforms that do not meet GDPR standards.

Role of School Principals in EdTech Decision-Making

School principals play a pivotal role in shaping the use of EdTech tools within their schools:

1. **Support and Guidance**

Principals can influence the adoption of EdTech tools by providing support to teachers, offering training, and setting school-wide strategies for digital education.

2. **Resource Allocation**

Principals often control the school's budget, determining which tools can be purchased and used.

3. **Coordination with State Authorities**

While principals have some flexibility, they must ensure that their choices comply with state and federal regulations and are aligned with the school's overall digital strategy.

Limitations in EdTech Adoption

Several factors limit the flexibility of schools and teachers in adopting EdTech tools:

1. **State Regulations**

State-level guidelines and approved lists of digital tools can restrict teachers' and principals' ability to freely choose EdTech solutions.

2. **Infrastructure and Funding Constraints**

Limited digital infrastructure and funding can impede the adoption of advanced EdTech tools, especially in less well-resourced schools.

3. **Collective Decision-Making**

In some schools, decisions about EdTech use are made collectively, which can reduce individual teachers' freedom to experiment with new tools.

Conclusion

Germany's decentralized education system results in significant variation in EdTech policies across its 16 federal states. While each state holds autonomy over educational technology use, federal initiatives like the "Strategy on Education in the Digital World" and the "DigitalPakt Schule" establish national guidelines, promote digital literacy, and provide funding to enhance digital infrastructure. Data protection laws such as the GDPR further influence EdTech selection to ensure privacy standards are met.

States also develop their own digital education strategies, sometimes maintaining lists of approved digital tools, providing teacher training, and setting curriculum standards. Teachers have a high degree of autonomy but must comply with state and federal regulations, especially concerning data protection. School principals support EdTech adoption through budgeting and resource allocation. Despite these frameworks, adoption varies due to differences in funding, infrastructure, and collective decision-making processes within schools, which can limit flexibility in tool selection.

ESTONIA: USING EDTECH APPLICATIONS, TOOLS, AND PLATFORMS IN SCHOOLS

In Estonia, the use of EdTech applications in schools is primarily regulated by a combination of national legislation, guidelines from the Ministry of Education and Research, and specific programs designed to promote digital education.

1. Key Legal Acts

Estonia's legal framework for the use of EdTech tools is rooted in several legislative acts, even though no single law specifically governs educational technology. Schools and educational institutions must comply with broader laws that address digital resources, data protection, and educational standards.

- **Basic Schools and Upper Secondary Schools Act (Põhikooli- ja gümnaasiumiseadus):** This act outlines the general framework for education in Estonia, including the use of digital tools and resources. It emphasizes the importance of digital competence as part of the curriculum.
- **Education Act (Haridusseadus):** This act serves as an overarching law for all levels of education in Estonia and includes provisions related to the integration of technology in education.
- **Information Society Services Act (Infoühiskonna teenuse seadus):** Although not specific to education, this act covers the provision of digital services, which would include EdTech applications, ensuring they comply with national standards for digital security and data protection.
- **Personal Data Protection Act (Isikuandmete kaitse seadus):** This act regulates the processing of personal data, which is crucial for EdTech applications that collect and manage student data.

In general, there are no specific regulations directly governing the use of educational technologies in Estonia. However, all educational resources must comply with existing legislation. Particular attention should be given to the **General Data Protection Regulation (GDPR)** and the **Copyright Act**.

Some provisions of the **Regulation on Educational Materials** (e.g., §3, clauses 6 and 7) can be applied to digital educational materials, although not to all educational resources. [Õppekirjandusele esitatavad nõuded, õppekirjanduseretsenseerimisele ja retsensentidele esitatavad miinimumnõuded ning riigi poolt tagatava minimaalse õppekirjanduse liigid klassiti ja õppeaineti–Riigi Teataja](#)

Curricula direct the use of modern technologies, as indicated in the National Curriculum for Basic Schools (PRÕK): "5) age-appropriate and individually adaptable educational resources are used, including contemporary information and communication technology-based learning materials and tools."

For **special education, speech therapy, and other medical support services**, legally mandated and recommended requirements are available on the **TalTech** website. https://taltech.ee/en/healthapplications

2. National Programmes and Initiatives

Estonia has been a leader in digital education, and several programs and initiatives support the use of EdTech tools in schools:

- **ProgeTiiger (Programming Tiger):** Launched by the Tiger Leap Foundation, ProgeTiiger is an initiative aimed at improving digital skills among students, particularly in coding and programming. It includes training for teachers and provides resources for integrating digital tools into the classroom.
- **e-School (eKool):** eKool is a widely used digital platform that facilitates communication between teachers, students, and parents. It is an essential part of Estonia's digital education infrastructure.

- **Digipeegel:** This initiative offers schools tools and guidelines to assess and improve their digital maturity, helping them integrate technology effectively into teaching and learning.
- **Estonian Lifelong Learning Strategy 2020:** This strategy outlines the goals for the development of digital competence across all levels of education, supporting the integration of EdTech in schools.
- **Digital Turn (Digipööre):** A broader initiative aimed at enhancing the digital competence of students and teachers, promoting the use of digital textbooks, and integrating technology into teaching methodologies.

These legal frameworks and initiatives collectively support the widespread adoption and regulation of EdTech applications in Estonian schools, ensuring that technology is used effectively and securely to enhance education.

The Ministry of Education and Research (HTM) has also issued some regulations, guidelines, and recommendations regarding the use of educational technology tools in schools.

- On the topic of **artificial intelligence**: see the Ministry of Education and Research's page on **Artificial Intelligence in Learning and Teaching** | Ministry of Education and Research (hm.ee). Tehisaru õppimises ja õpetamises | Haridus- ja Teadusministeerium (hm.ee)
- **HARNO**, an agency under HTM, has issued various guidelines, recommendations, and training materials. For example, see the **Education Technology Compass** homepage (harno.ee). Avaleht - Hariduse tehnoloogiakompass (harno.ee)
- **Digital competence models** for both students and teachers are available at https://digipadevus.ee/.
- Descriptions of **learning processes** include recommendations for using digital technologies in teaching: https://projektid.edu.ee/site/okmv.

- Guidelines for developing **e-courses** can be found here: https://haka.ee/wp-content/uploads/E-kursuse-kvaliteedimargi-juhend-2023.pdf and https://oppevara.edu.ee/ekursus/.
- The HTM is in the process of developing **quality standards** for digital educational materials (including educational technology), which will include **guidelines for content developers** and **teachers**.

It is important to note that adherence to these recommendations and guidelines is not centrally regulated (i.e., it is not mandatory), and the HTM does not conduct ongoing monitoring. Each local government and school can exercise autonomy in applying the guidelines according to their needs and capabilities. As a result, the **implementation of these guidelines is likely to be inconsistent**.

In addition to all that, the Ministry of Education and Research has conducted public procurements or direct offers for acquiring educational technology applications for learning content in various subjects (e.g., mathematics, Estonian language, etc.).

The Ministry has procured content for the **digital learning repository** (interactive materials for upper secondary school) for **E-koolikott**, and these materials are publicly available for free. We so ensure free access to **special needs educational materials** via the Opiq platform. https://digiexpo.e-estonia.com/education-and-research/opiq-a-digital-learning-platform/

Other procurements include:

- **Mathematics digital lessons** have been procured in two rounds:
  - **Round I**: https://www.hm.ee/uudised/matemaatika-digitunnid-aitavad-keerulisemates-teemades-jarjele
  - **Round II**: https://sites.google.com/view/mat-digitund/2023-aastal-valminud-digitunnid-ja-%C3%BCldised-soovitused-koopia
- In previous procurements, HTM has provided access to **digital learning resources** for various school levels, for example:
  - https://riigihanked.riik.ee/rhr-web/#/procurement/727136/general-info
  - https://riigihanked.riik.ee/rhr-web/#/procurement/2434773/general-info
  - https://riigihanked.riik.ee/rhr-web/#/procurement/1595869/general-info
- Access to **digital learning resources** was ensured for students and teachers by HTM to support the initial use of these resources and during the COVID-19 pandemic. Since 2021, **Opiq** operates in the open market, and HTM has no plans to centrally procure paid digital learning resources

Role of Local Governments in Regulating EdTech

Local governments, which serve as the administrators of schools, hold significant authority in regulating the use of EdTech tools within their jurisdictions. They have the authority to establish general rules regarding the organization of school life, including directing the use of various digital solutions and technologies. Increasingly, school administrators are centrally procuring learning management systems or specific digital solutions (e.g., centralized use of **Microsoft** or **Google** services). For further information on this matter, it may be useful to consult the **Association of Estonian Cities and Municipalities**: https://www.elvl.ee/.

Teacher and School Administration Autonomy

Schools have the flexibility to specify, within their **curriculum** and **internal regulations**, the principles, objectives, and conditions for using educational technology tools and digital resources. Additionally, teachers can establish clear rules regarding attendance and the use of such tools in their own classrooms.

However, the adoption of EdTech must align with broader national laws and guidelines, particularly concerning data protection and copyright regulations.

There are **some surveys and analyses** about the use of Edtech applications in Estonian schools, see the homepage of Edtech Estonia: https://www.edtechestonia.org/resources

Conclusion

In Estonia, the integration of educational technology in schools is guided by a combination of national legislation, guidelines, and various initiatives. While no single law specifically governs EdTech, several key legal acts, such as the Education Act and the Personal Data Protection Act, ensure compliance with broader standards for digital resources and data privacy. The Ministry of Education and Research, along with agencies like HARNO, issues recommendations on using digital tools, though their implementation is not centrally monitored. National programs like ProgeTiiger and e-School support digital learning, and local governments play a crucial role in regulating EdTech usage. Despite flexible guidelines, schools must align with national laws, particularly in data protection and digital content standards.

Spain: A Decentralized But Collaborative Approach

In Spain, the regulation of EdTech applications in schools is influenced by a multi-level governance system where national, regional (autonomous communities), and local authorities all play distinct but interconnected roles. Education in Spain is highly decentralized, and the autonomous communities (regions) have significant authority over educational matters, including the use of technology in schools.

In Spain, the use of EdTech in schools is guided by several key policy documents issued by the national government and regional authorities. These documents set the guidelines for integrating digital technologies into education, aiming to modernize the educational system and enhance digital literacy among students. Here are the most important education policy documents that influence the use of EdTech in Spanish schools:

1. Ley Orgánica de Educación (LOE) - Organic Law on Education

- The LOE, first passed in 2006 and later amended by subsequent laws, provides the overall framework for education in Spain. It establishes the legal basis for integrating digital competencies into the curriculum and emphasizes the importance of incorporating technology into teaching and learning processes.

*In the context of Spanish laws, **"Ley Orgánica"** refers to a type of law that holds a special status and significance within the Spanish legal system. The term "orgánica" indicates that the law in question is an "organic law," which is a law that is fundamental to the functioning of the state and its institutions. It may be understood in English as „fundamental law".*

Key Characteristics of a "Ley Orgánica":

1. ***Constitutional Importance***

Organic laws are used to regulate matters that are of constitutional importance. These include fundamental rights and freedoms, the structure and functioning of autonomy for Spain's autonomous communities.

2. ***Higher Hierarchical Status**:*

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Key Characteristics of a "Ley Orgánica":

3. ***Constitutional Importance***

Organic laws are used to regulate matters that are of constitutional importance. These include fundamental rights and freedoms, the structure and functioning of autonomy for Spain's autonomous communities.

4. ***Higher Hierarchical Status:***

Organic laws have a higher hierarchical status than ordinary laws. While they are below the Constitution in the legal hierarchy, they have greater authority than regular laws (known as "Leyes Ordinarias").

5. ***Special Legislative Procedure:***

The process for passing an organic law is more stringent than that for ordinary laws. An organic law requires an absolute majority in the Spanish Congress of Deputies (Cámara de los Diputados), meaning it must be approved by more than half of the total number of members of the Congress.

6. ***Areas Covered by Organic Laws:***

According to the Spanish Constitution, organic laws must be used to regulate certain areas, including:

The development of fundamental rights and public liberties (e.g., laws affecting freedom of speech, privacy, etc.).

The approval of statutes of autonomy for Spain's autonomous communities.

The electoral system.

Other matters explicitly reserved for organic laws by the Constitution.

2. Ley Orgánica para la Mejora de la Calidad Educativa (LOMCE) - Organic Law for the Improvement of Educational Quality

The LOMCE, enacted in 2013 as a reform of the LOE, further emphasizes the importance of digital literacy and the use of ICT (Information and Communication Technology) in education. It mandates the inclusion of digital competencies in the curriculum and encourages the use of digital tools to improve educational quality.

3. Ley Orgánica de Modificación de la LOE (LOMLOE) - Organic Law Modifying the LOE

The LOMLOE, also known as the "Celaá Law," was passed in 2020 as a reform to the LOE and LOMCE. It continues to prioritize digital competencies and the integration of EdTech in schools, aligning educational practices with the demands of the digital age. The LOMLOE emphasizes equity in access to digital resources and the importance of fostering students' digital skills.

Spain has several EdTech-related programs, initiatives, and projects aimed at integrating digital technologies into education, improving digital literacy, and modernizing the educational system. These initiatives are led by the Spanish government, regional authorities, and private organizations. Here are some notable examples:

1. Plan de Educación Digital (Digital Education Plan)

- **Overview**: The Plan de Educación Digital is part of Spain's broader digital transformation strategy, aligned with the European Union's Digital Education Action Plan. It focuses on enhancing digital skills among students and teachers, promoting the use of digital tools in the classroom, and improving digital infrastructure in schools.
- **Key Components**:

Training programs for teachers to improve their digital competencies.

Development and distribution of digital educational content.

Investments in digital infrastructure, such as high-speed internet and digital devices for schools.

2. Programa Escuela 2.0

- **Overview**: Launched in 2009, Programa Escuela 2.0 was a pioneering initiative aimed at integrating ICT into primary and secondary education. The program provided students and teachers with laptops and other digital devices, introduced interactive whiteboards in classrooms, and promoted the use of digital content in education.

- **Impact**: Although it was one of the earlier programs and has since been succeeded by other initiatives, Escuela 2.0 laid the groundwork for digital education in Spain, influencing subsequent programs.

3. Programa ProFuturo

- **Overview**: ProFuturo is an international digital education program, jointly led by the Telefónica Foundation and "la Caixa" Foundation. It aims to provide quality digital education to children in underserved communities, both in Spain and globally.
- **Key Features**: Delivery of digital educational content and devices to schools. Teacher training programs focused on digital pedagogy. Initiatives to bridge the digital divide and promote digital inclusion.

4. Plan Nacional de Competencias Digitales (Digital Competence National Plan)

- **Overview**: This national plan outlines Spain's strategy for enhancing digital competencies across all sectors, including education. The plan sets specific objectives for improving digital literacy among students, teachers, and the broader population.

- **Educational Focus**:

Integrating digital competencies into the curriculum at all educational levels.

Developing digital content and resources for educators.

Supporting lifelong learning and continuous professional development in digital skills.

5. Programa TIC 2020

- **Overview**: The Programa TIC 2020 is a regional initiative by various autonomous communities in Spain to promote the use of ICT in education. Each region adapts the program to its specific needs, focusing on improving digital infrastructure, teacher training, and the integration of EdTech tools in schools.
- **Key Components**:

Digital training programs for teachers.

Implementation of digital classrooms with interactive whiteboards and tablets.

Development of regional digital platforms for educational resources.

6. Red.es Initiatives

- **Overview**: Red.es is a public entity responsible for promoting the digital transformation in Spain, including in the education sector. It has launched various projects to support digital education.
- **Notable Projects**:

Digital School Program (Escuelas Conectadas): Focused on improving internet connectivity in schools, particularly in rural and underserved areas.

Educa en Digital: A collaborative project with regional governments to provide digital devices and resources to students and teachers, especially in response to the challenges posed by the COVID-19 pandemic.

7. Aula del Futuro (Classroom of the Future)

- **Overview**: The Aula del Futuro project is an initiative of the Spanish Ministry of Education, in collaboration with the National Institute of Educational Technologies and Teacher Training (INTEF). It promotes innovative teaching practices by creating flexible and technology-rich learning environments.
- **Key Features**:

Design and implementation of flexible classroom spaces equipped with advanced digital tools.

Teacher training programs to foster innovative pedagogy using digital technologies.

Pilot projects in schools across Spain to test and refine new educational methodologies.

8. Escuelas Conectadas (Connected Schools)

- **Overview**: This initiative aims to ensure that all schools in Spain have access to high-speed internet, enabling the effective use of EdTech tools in classrooms. The program is part of the broader Digital Agenda for Spain and focuses on reducing the digital divide between urban and rural schools.
- **Impact**: By improving connectivity, the program supports the integration of digital resources and platforms in teaching and learning, especially in remote areas.

Marco Común de Competencia Digital Docente (Common Digital Competence Framework for Teachers)

- Developed by the Spanish Ministry of Education and Vocational Training, this framework provides guidelines for the digital competencies that teachers should possess. It outlines the skills needed to effectively integrate

EdTech tools into teaching and learning and serves as a reference for teacher training and professional development programs.

9. Data Protection Laws (Ley Orgánica de Protección de Datos - LOPD)

Spain's data protection laws, in conjunction with the EU's General Data Protection Regulation (GDPR), regulate the use of digital tools in schools, ensuring the protection of students' personal data. Compliance with these laws is crucial when selecting and implementing EdTech tools.

National Level: Ministry of Education and Vocational Training

The national government, through the Ministry of Education and Vocational Training (Ministerio de Educación y Formación Profesional), sets general guidelines and policies for the entire educational system, including digital transformation strategies. Key responsibilities at the national level include setting National Curriculum Standards. The ministry establishes a national curriculum framework that includes digital literacy and technology competencies for students across Spain.

Strategic Plans: The national government develops broad initiatives and strategic plans to promote the use of technology in education, such as the Digital Education Plan (Plan de Educación Digital 2021-2027). These plans aim to ensure equitable access to digital tools and resources.

Coordination with Autonomous Communities: The national government works with regional authorities to support the development of EdTech initiatives, providing funding and resources where necessary.

However, it is the regional governments that have the most direct role in implementing and regulating the use of EdTech in schools.

Regional Level: Autonomous Communities

Spain is divided into 17 autonomous communities, each with its own government, and the regional ministries or departments of education (Consejerías de Educación) have substantial autonomy over educational matters. Their role in regulating EdTech includes:

Curriculum Adaptation: Regional governments have the authority to adapt the national curriculum to their local context, including the integration of digital education competencies and the use of EdTech tools in schools.

Development of Digital Education Plans: Many autonomous communities have their own digital education strategies or plans for the digital transformation of education, which outline the use of technology in schools. For example, regions like Catalonia (Pla d'educació digital de Catalunya) and Andalusia (Plan de Acción

en Transformación Digital Educativa) have developed specific programs to promote the use of EdTech.

Procurement of EdTech Tools: Regional governments often handle the procurement of digital tools, platforms, and resources for schools within their territories. They may negotiate contracts with EdTech providers or develop proprietary platforms.

Teacher Training: Regional authorities are responsible for organizing professional development programs to train teachers in the effective use of EdTech tools.

Digital Competence Frameworks: Some regions have developed their own digital competence frameworks for both teachers and students, which may include guidelines for selecting and using digital applications in classrooms.

Local Level: Municipalities and School Boards

At the local level, municipalities and individual schools also have a role in regulating and managing the use of EdTech applications, although their influence is more operational than regulatory.

Municipal Support for Infrastructure: Local governments (ayuntamientos) are often responsible for maintaining the physical infrastructure of schools, which includes providing internet access and ensuring that schools have the necessary technological infrastructure to support digital learning.

School Autonomy in EdTech Adoption: Schools in Spain enjoy a significant degree of autonomy in choosing which digital tools and platforms to adopt, as long as they comply with regional and national guidelines. School boards (consejos escolares) and school management teams have the authority to decide on the implementation of specific EdTech applications based on their educational needs.

Collaboration with Local Governments: Some municipalities offer additional support or initiatives for digital education in local schools, particularly in areas related to digital inclusion and ensuring access to technology for students from disadvantaged backgrounds.

Collaborative Programs and Public-Private Partnerships

In many regions, local and regional authorities collaborate with private companies and educational technology providers to facilitate the implementation of digital tools in schools. Public-private partnerships (PPPs) are common in the procurement and development of EdTech solutions. These partnerships often include:

Pilot Programs for EdTech Applications: Regional governments may collaborate with EdTech companies to test new applications or digital learning platforms in a subset of schools before broader adoption.

Resource Sharing: Many regions provide digital repositories and platforms that house learning materials and resources accessible to teachers and students across the region. For example, Aula Virtual in Andalusia and Atenea in Catalonia are platforms that offer digital content and EdTech resources.

Conclusion: In Spain, the role of regulating the use of EdTech applications in schools is shared across national, regional, and local authorities, with the autonomous communities holding the primary regulatory power. The national government sets overarching strategies and competencies, while regional authorities manage the implementation, procurement, and adaptation of EdTech tools. Local governments and schools provide operational support and ensure that the necessary infrastructure is in place. This decentralized approach allows for flexibility and the tailoring of EdTech strategies to local needs while maintaining a shared commitment to improving digital education across the country.

AUSTRIA: URING EDTECH APPLICATIONS, TOOLS AND PLATFORMS IN SCHOOLS

In Austria, the use of EdTech tools in classrooms is guided by several key policy documents at both the federal and regional levels. These documents outline the principles, strategies, and guidelines for integrating digital technologies into education, ensuring consistency across the country while allowing for regional adaptation. Below are some of the most important policy documents:

Federal Level

1. **Digital Roadmap Austria (Digitale Agenda Österreich)**

This comprehensive strategy document, launched by the federal government, outlines Austria's overall approach to digitalization, including in education. It sets broad goals for integrating digital technologies across various sectors, including education, and serves as a foundational policy that guides the development of more specific educational strategies.

2. **Digital Education Strategy (Digitale Bildung)**

The Digital Education Strategy is a crucial document that focuses specifically on the digitalization of education in Austria. It was developed by the Federal Ministry of Education, Science and Research (Bundesministerium für Bildung, Wissenschaft und Forschung, BMBWF). This strategy provides the framework for integrating digital competencies into the curriculum, encouraging the use of digital tools in teaching and learning, and enhancing teachers' digital skills.

3. **Schule 4.0 – Jetzt wird's digital**

Launched in 2017, "Schule 4.0" is a federal initiative aimed at preparing Austrian schools for the digital age. The program includes the introduction of digital literacy into the curriculum, the provision of digital devices to students and schools, and the promotion of digital teaching methods. It serves as a practical guide for schools on how to implement digital tools and integrate them into everyday teaching.

4. **Digitalpakt Schule (Digital Pact for Schools)**

The "Digitalpakt Schule" is a federal funding program aimed at improving digital infrastructure in Austrian schools. Although inspired by Germany's similar program, Austria's version provides targeted investments in digital tools, platforms, and training for teachers. This document outlines the financial and infrastructural support available to schools, ensuring they have the necessary resources to implement digital education effectively.

5. **Curriculum Reforms Incorporating Digital Competencies**

Austria's federal curriculum has been updated to include digital competencies as a core component across various subjects. These reforms ensure that digital literacy and the use of EdTech tools are embedded in the educational process from an early age, guiding how digital tools are integrated into teaching practices.

Regional Level

1. **Regional Digital Strategies**

While Austria's education system is centralized, each federal state (Bundesland) has some degree of autonomy in implementing federal policies and adapting them to local needs. Consequently, regional education authorities often develop their own digital strategies that align with the national framework but address specific regional challenges and priorities. These documents typically provide more detailed guidelines on how schools in the region should implement digital tools and practices.

2. **Regional Funding Programs**

In addition to federal funding, some regions offer their own financial support for digital initiatives in schools. These programs are documented in regional policy papers and guidelines, which specify how schools can access these funds and what criteria they must meet.

3. **Regional Teacher Training Programs**

The training of teachers in digital competencies is often managed at the regional level, with specific programs tailored to the needs of each Bundesland. These programs are documented in regional education policy documents and outline the requirements and opportunities for professional development in digital education.

Austria has several initiatives and strategies focused on integrating educational technology (EdTech) into its education system.

1. **EdTech Austria**: This initiative is a key player in the country's EdTech ecosystem, aiming to establish Salzburg as a hub for EdTech innovation. EdTech Austria supports the development, testing, and implementation of educational technologies by providing networking opportunities, access to expert pools, and support for funding applications. It focuses on building a strong EdTech community by connecting startups, established companies, educational institutions, and research organizations ([EDTECH Austria EDTECH Austria](#)).
2. **EdTech Strategy Lab**: This project is part of the broader European EdTech Alliance and focuses on fostering collaboration among various stakeholders to improve quality assurance in educational technology. The lab engages

with educators, EdTech developers, and researchers to address challenges such as data protection, ethical standards, and the development of unified

3.

frameworks for EdTech tools. The lab's activities include workshops, networking events, and research initiatives aimed at enhancing trust and evidence in the EdTech sector(EdTech Strategy Lab).

3. ISTE Seal: The ISTE (International Society for Technology in Education) Seal of Approval is another initiative that highlights digital learning tools that mehigh standards of quality and effectiveness. This seal helps schools and educational institutions in Austria identify and adopt reliable and impactful EdTech solutions (EDTECH Austria).

Degree of Autonomy

1. School-Level Decision-Making

Teachers and headmasters generally have the freedom to choose EdTech tools that they believe will best support their teaching objectives and meet the needs of their students. This autonomy allows schools to adapt to local contexts, student demographics, and specific educational challenges.

2. Curriculum Alignment

While teachers can select their tools, these must align with the national curriculum and educational objectives set by the Federal Ministry of Education, Science, and Research (Bundesministerium für Bildung, Wissenschaft und Forschung, BMBWF). The tools chosen should support the development of digital competencies as integrated into the curriculum.

3. Innovation Encouragement

The Austrian education system encourages teachers to innovate with digital tools and integrate them into their teaching practices. Various professional development programs support this innovation by helping teachers develop the skills needed to effectively use EdTech in their classrooms.

Regulations and Limits

1. Compliance with National Strategies

The **Digital Education Strategy (Digitale Bildung)** is a key document that guides the integration of digital tools into the classroom. Schools are expected to follow the principles outlined in this strategy, which include fostering digital competencies, ensuring digital inclusion, and using technology to enhance learning outcomes.

2. Data Protection and Privacy

Austria's data protection laws, aligned with the EU's General Data Protection Regulation (GDPR), impose strict requirements on the use of digital tools in education. Schools must ensure that any EdTech tools they use comply with these regulations, particularly concerning the handling of students' personal data. This requirement can limit the choice of tools, as only those that meet GDPR standards can be adopted.

3. Approved Tools and Platforms

While there isn't a strict national list of approved EdTech tools, the Austrian government provides recommendations and sometimes mandates the use of certain digital platforms, especially those developed or endorsed by the BMBWF. These tools are typically part of broader national initiatives, like the **Digital**

Roadmap Austria or **Schule 4.0** program, which influence the selection process at the school level.

The Austrian quality sea**l** is intended to provide guidance and support for teachers, students, and parents in selecting innovative products already available on the market.

Interested EdTech apps can register for evaluation free of charge. After disclosing the app's functions and target audience, an assessment is conducted to determine whether basic requirements such as GDPR compliance, ad-free operation, and other criteria are met. If these conditions are satisfied, the application is subsequently tested by selected educators from the Austrian Federal Ministry of Education, Science, and Research (BMBWF) and evaluated according to a predefined framework. Additionally, feedback is collected from students regarding their perception of the app's functionality and their willingness to practice or continue using it.

The educators' checklists are then automatically analyzed, and a points-based system determines whether the quality seal will be awarded. Verbal feedback from the educators and the feedback from students do not influence this decision. The quality seal is valid for two years and can be renewed through recertification before its expiration.

While the quality seal itself has no direct impact on the distribution of learning apps—since there is no specific funding allocated for these apps and schools are allowed to purchase other apps within their limited budgets—it does have a positive effect on how educators perceive the application. By the end of 2024, a total of 107 apps had been awarded the seal, including GeoGebra, Anton, eSquirrel, Binogi and many more (completely listed and filterable here for teachers and users interested in approved educational applications: https://www.guetesiegel-lernapps.at/lern-apps).

4. Funding Constraints

The choice of EdTech tools can also be influenced by the availability of funding. Schools often rely on government grants, such as those provided through the **Digitalpakt Schule** or regional funding programs, to purchase digital tools. These funds may come with specific conditions, influencing the tools that schools can afford to implement.

5. Teacher Training Requirements

Teachers must undergo professional development in digital education, and the tools they choose must be ones they are trained to use effectively. This ensures that the technology adopted is used in a pedagogically sound manner, and limits the selection to tools that align with training programs.

6. Centralized Initiatives and Procurement

In some cases, particularly with larger digital infrastructure projects or software licenses, procurement may be centralized at the federal or regional level to ensure consistency and cost-effectiveness. This can limit individual schools' ability to select alternative tools outside of these agreements.

7. Regional Adaptation

While the federal government sets the overarching framework, each of Austria's nine federal states (Länder) has some degree of autonomy in implementing these guidelines. This means that regional education authorities can adapt national strategies to local needs, which might influence the selection of EdTech tools at the regional level.

Introduction to Digital School

The "Digital School" represents a balanced blend of cutting-edge digital infrastructure and forward-thinking pedagogy, driven by the Austrian government's 8-point plan for the digital transformation of schools. This plan addresses all key areas necessary for the operation of high-quality, future-ready schools. Digital competence is framed as not just learning *with* digital media but also learning *about* digital media, fostering an understanding of the evolving digital world. The development of skills related to digital media and computer science encourages analytical, logical, and abstract thinking across subjects.

Goals of the Digital School

The goals of the "Digital School" initiative are as follows:

- Nationwide implementation of digitally supported teaching and learning methods.
- Continuous expansion of innovative teaching and learning formats.
- All educators participate in a **qualification offensive** to prepare for digitally supported teaching.
- Schools implement structured systems for digital learning, including **learning management systems (LMS)** and improved communication between schools and guardians.
- The range of **educational media** is constantly expanding, offering optimal support to both students and teachers.
- **Infrastructural improvements** such as connecting federal schools to **fiber optic networks** and ensuring **Wi-Fi** availability in classrooms.
- All students in lower secondary schools are given access to digital devices under equitable conditions.

Key Elements of the 8-Point Plan

1. **Portal Digital School (PoDS)**: A central platform launched in 2018 by the Ministry of Education, Science, and Research as part of the broader Master Plan for Digitalisation in Education. The portal consolidates existing educational applications, offering teachers, students, and guardians access to essential information in a user-friendly format.
2. **Uniform Communication Processes**: Experiences from distance learning during the COVID-19 pandemic revealed the need for a standardized system for learning management and communication. The goal is to streamline these processes to one solution per school, reducing confusion and inefficiency.
3. **Distance Learning MOOC**: A **Massive Open Online Course** (MOOC) designed for educators, preparing them to teach in both blended and distance learning environments. This course covers four key units, each with learning videos, texts, and reflection exercises to ensure practical transfer of knowledge.
4. **Eduthek**: A digital content platform that offers learning and exercise materials aligned with curricula for all school levels. It allows teachers and students to search and access content using a **metadata search** system. It supports home practice and helps deepen students' understanding of subjects.
5. **Seal of Approval for Learning Apps**: Apps for mobile learning are evaluated and certified based on pedagogical criteria, technical stability, cost transparency, and data protection. This seal guides parents, teachers,

and students in selecting quality learning apps. Certified apps can also be used in the **Free Textbooks** campaign.

6. **Expansion of IT Infrastructure**: The plan includes providing **fiber-optic broadband connections** and **WLAN** coverage across classrooms. This basic IT infrastructure enables digitally supported teaching at federal schools, ensuring equitable access to digital resources.

7. **Digital Devices for Pupils and Teachers**:

Pupils: Students in grade 5 are equipped with a laptop or tablet, with the aim of enabling IT-supported teaching. This initiative is a step toward equal access to digital education and teaching digital skills.

Teachers: Devices are also provided to educators to ensure they can effectively support digital learning. However, not all teachers receive their own devices; they are only available on a loan basis.

Distance Learning & Digital Tools

The **Distance Learning MOOC** equips educators with the skills necessary for teaching in both blended and distance learning environments. It is open to all educators and provides practice-oriented training for using digital tools in the classroom.

Eduthek serves as a comprehensive platform that provides digital content for all school types and subjects. This content is aligned with curricula, offering materials for both teachers and students, making it easier to practice and enhance learning at home.

Seal of Approval for Learning Apps

The seal of approval certifies apps based on educational and technical criteria, guiding schools, parents, and students in selecting high-quality mobile learning apps. Certified apps are evaluated on factors like learning management, cost transparency, data protection, and pedagogical content. The certification lasts for two years, and apps can apply for recertification as needed.

IT Infrastructure and Devices for Schools

The **IT infrastructure expansion** ensures that schools have the necessary technical support for digital learning. This includes:

- **Fiber-optic connections** to school buildings.
- **WLAN/LAN equipment** in classrooms for seamless internet access.
- Sustainability and standardization measures that ensure long-term infrastructure usability and scalability.

In addition to the infrastructure, the plan includes providing **digital devices to both pupils and teachers**. Devices for students come with a small financial contribution from legal guardians, and schools are responsible for choosing the appropriate operating systems for these devices. Teachers receive a sufficient number of devices to support the digital teaching environment.

7. AI in Education

Artificial Intelligence (AI) is poised to transform education in Austria. The integration of AI tools, such as learning programs that adapt to individual learning paths, presents a significant opportunity to improve educational outcomes. Schools are encouraged to explore AI-powered tools and integrate them into their teaching processes through pilot programs like **AI Pilot Schools**.

These pilot schools are equipped with **AI learning software** and provided with project budgets to document the possibilities and limitations of AI in learning.

Additionally, schools are invited to submit innovative prompts and best practices for AI-powered tools like **ChatGPT**, with the best submissions being recognized and rewarded.

There is an AI plan. Please find it here: https://www.bmbwf.gv.at/Themen/schule/zrp/ki.html

8. Teaching and Teacher Education

The **Digital Basic Education** curriculum, introduced in the 2022/23 school year, is a mandatory subject for students in lower secondary schools. It aims to develop students' digital competence through a structured framework, focusing on understanding how digital technologies work, their societal impacts, and the options for interaction.

For educators, **MOOCs**, webinars, and training programs have been launched to ensure they are prepared to teach digital subjects. Teachers are trained to integrate AI, data protection, and practical tools for AI in education into their teaching strategies.

9. Digital School Portal

The **Digital School Portal** is a hub that connects various educational applications used by Austrian schools. It provides easy access for teachers, students, and guardians to essential tools and resources. The portal includes **e-government functions** such as electronic ID cards for students and secure delivery of digitally signed documents.

The **EdTech Hub** ensures compatibility between different applications by standardizing data exchange, supporting schools in managing digital tools more efficiently.

Educational Research and Future Focus

Educational innovation is driven by evidence-based research. In 2023, nine research consortia were funded with 8.8 million euros to explore educational priorities, including digitalization. The next funding call in 2024 will focus on **AI in everyday school life**, supporting research that examines AI's impact on education.

Additionally, by the end of the 2024/25 school year, all schools in the **eEducation Austria network** are expected to earn at least one **AI badge**, encouraging sustainable engagement with AI across the education system.

Conclusion

In Austria, the key federal policy documents guiding the use of EdTech tools in classrooms include the **Digital Roadmap Austria**, **Digital Education Strategy**, **Schule 4.0** initiative, **Digitalpakt Schule**, and curriculum reforms incorporating digital competencies. At the regional level, the implementation of these federal policies is supported by regional digital strategies, funding programs, and teacher training initiatives, which are adapted to the specific needs and circumstances of each federal state. Together, these documents provide a comprehensive framework for integrating digital technologies into Austrian education.

School teachers and headmasters in Austria have a degree of autonomy in selecting EdTech tools for classroom use, but this freedom is moderated by national and regional regulations, guidelines, and strategies designed to ensure consistency, effectiveness, and compliance with broader educational goals and legal requirements. Here's an overview of their freedom, regulations, and liimits.

CONCLUSION: A UNIFIED OVERVIEW OF EDTECH USE IN SCHOOLS ACROSS SIX EUROPEAN COUNTRIES

The survey of EdTech use in schools across six European countries -Serbia, Hungary, Spain, Austria, Germany, and Estonia - highlights both the opportunities and challenges associated with integrating digital tools and platforms into education systems. Despite varying degrees of centralization, technological infrastructure, and policy frameworks, these countries share common goals of enhancing digital literacy, modernizing teaching methods, and preparing students for a digitally-driven job market.

1. National and Regional Approaches

Across all six countries, national governments play a crucial role in setting broad frameworks and funding for digital education. For instance, Austria's **Schule 4.0** and Hungary's **Digital Education Strategy** focus on improving infrastructure and teacher training, while Germany's decentralized system allows individual states (Bundesländer) to adapt their digital strategies to local needs. In Spain and Estonia, the regional and local authorities exert significant influence, allowing for tailored implementation of EdTech strategies that address specific regional challenges. This decentralization, however, often leads to discrepancies in access to and use of technology, with some regions being better equipped than others.

2. Teacher Training and Digital Competence

A consistent theme across all countries is the emphasis on teacher training and professional development. Austria, for example, has rolled out MOOCs and comprehensive training programs to ensure teachers can effectively use EdTech tools. Estonia and Hungary similarly prioritize training teachers to integrate digital tools into the curriculum, with Estonia being a leader in digital education through programs like **ProgeTiiger**. However, countries like Serbia and Germany face challenges in providing sufficient training opportunities, especially in rural or underserved areas, which affects the effective deployment of EdTech.

3. Digital Inclusion and Infrastructure

The digital divide remains a significant challenge in several countries, particularly in Serbia, Hungary, and parts of Spain. Rural and underserved areas often lack the infrastructure necessary to fully implement EdTech solutions, exacerbating educational inequality. Programs such as Hungary's **RRF-1.2.1** and Serbia's **Connected Schools Project** aim to address these gaps by providing digital devices and improving internet access in schools. In contrast, Austria and Estonia have made significant progress in providing nationwide digital infrastructure, supported by federal and regional funding.

4. Curriculum Integration and EdTech Tools

Countries are increasingly embedding digital competencies into national curricula, ensuring that students acquire critical digital skills from an early age. For example, Spain's **LOMLOE** reform and Austria's **Digital Education Strategy** mandate the inclusion of digital literacy in the curriculum. Estonia stands out for its holistic approach, using platforms like **eKool** to facilitate communication between students, teachers, and parents, while also integrating coding and digital skills into primary education. Germany, however, faces challenges in standardizing the use of digital tools across its decentralized education system, leading to varied levels of EdTech adoption across states.

5. Data Protection and Ethical Use of EdTech

Data protection is a prominent concern in all six countries, especially with the rise of AI and personalized learning tools. Compliance with the **General Data Protection Regulation (GDPR)** is a requirement in all countries, with specific initiatives like Germany's **Federal Data Protection Act** and Hungary's **Digital Child Protection Strategy** focusing on safeguarding student data. This regulatory environment often limits the use of certain EdTech tools, as schools must ensure they adhere to strict privacy standards.

6. Opportunities for Growth and Innovation

Despite challenges, the survey highlights significant opportunities for innovation and growth in the EdTech sector. Programs like Austria's **EdTech Austria** and Germany's **EdTech Next** foster collaboration between educators, technology developers, and researchers, encouraging the development of new, effective digital learning tools. Estonia's leadership in digital education, with initiatives like **Digipeegel** and **eKool**, provides a model for other countries aiming to scale digital literacy and improve classroom engagement through technology.

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