



European  
Commission



# A Vision for Educational Interoperability

Output of the EDEH Educational Interoperability Squad

EUROPEAN  
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## Output of the EDEH Educational Interoperability Squad

Interoperability in the field of education refers to the ability of different educational systems, technologies, and institutions to work together seamlessly. While closely related to digitalisation, digitalisation alone does not bring about interoperability, and implemented wrongly, can even hinder it. The European Interoperability Framework thus considers interoperability as being made up of four aspects:

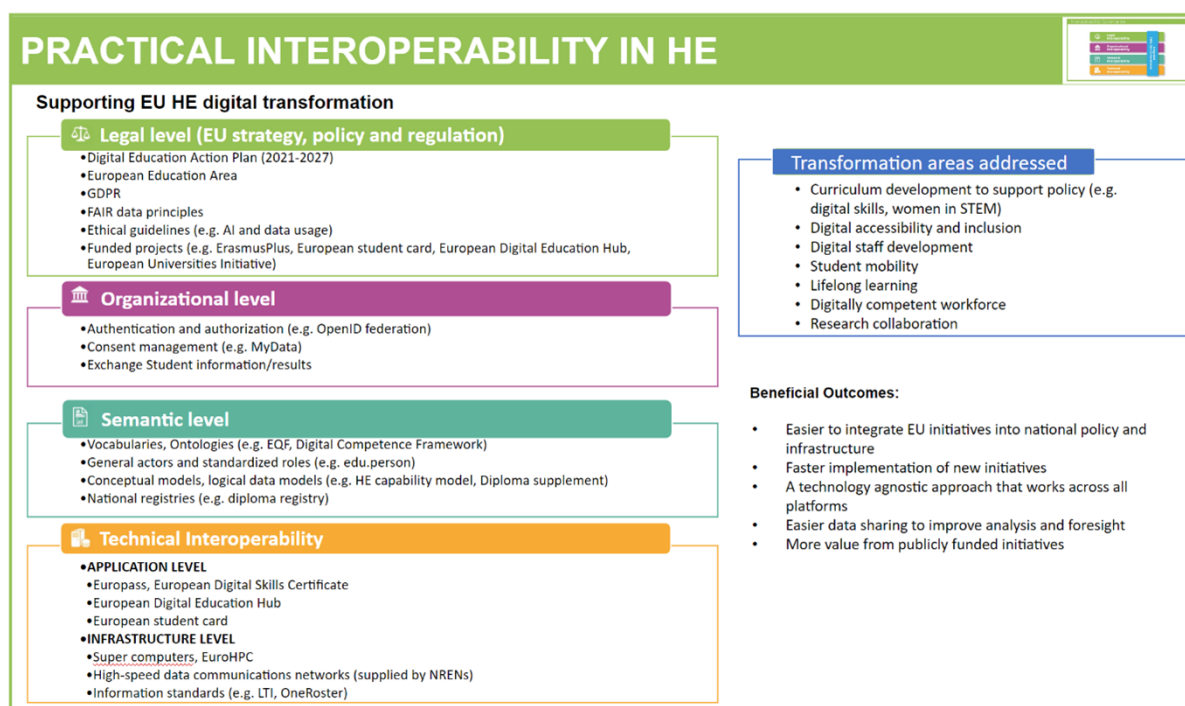


*Source: European Interoperability Framework*



In this framework, legal interoperability describes the policies and legal texts which support cross-border cooperation, free flow of information and innovation between different actors across the EU. Organisational interoperability describes the processes put in place to allow specific organisations to work as a network. Semantic interoperability describes vocabularies and ontologies which allow concepts and terms to be described in standardised manners, while technical interoperability describes the technical services (in terms of software and hardware) that are implemented to support interoperability.

Examples of these concepts in practice in Higher Education are described below:



*Credit: Patrik Maltusch (Aalto University), Esa Suominen (Helsinki University) and Ari Rouvari (CSC fi)*



The vision of a European Education Area in which learning, studying and doing research would not be hampered by borders was set out for the first time in 2017 by the European Commission, and is rooted in decades of European cooperation in Education and Training. At its heart, the European Education Area is in itself an interoperability initiative designed to support the sharing of European culture, boosting of mobility and the creation of a joint academic space for the free exchange of ideas.

## What is the state of interoperability?

In Europe, true interoperability is still a pipe-dream. Even the most basic questions, such as “How many universities are there in Europe?”, or “Will a university accept my digital school leaving certificate?” cannot be answered definitively.

One factor is the diversity of educational systems across the European Union. Each country has its own curriculum, assessment methods and qualifications, which can make it difficult for students to transfer credits or qualifications between institutions. Systems and platforms used for online learning, are often not compatible. Another factor is the lack of standardisation in educational technology, which makes it difficult for students to access and use educational resources from different institutions or countries. A lack of common data standards and protocols for sharing student information makes it difficult for institutions to share information about student progress and achievements, which can hinder student mobility and the recognition of qualifications.





## What benefits does interoperability bring?

The goals of interoperability policy boil down to putting users at the centre of every educational process. It is about enabling access to education and employment without barriers, seamless recognition of learning, smooth approvals and easy to use interfaces.

Via the General Data Protection Regulation (GDPR), the Digital Services act and other related legislation, Europe is becoming a global “gold standard” for the protection of individual rights around privacy and security. Industrial policy is being oriented around the idea of a human-centric industrial ecosystem. These goals are achieved in the education sphere via a focus on interoperability. Europe is providing a vision of software/system development in line with ethical values, but the application needs to catch up with the vision. Interoperability needs to be action oriented!

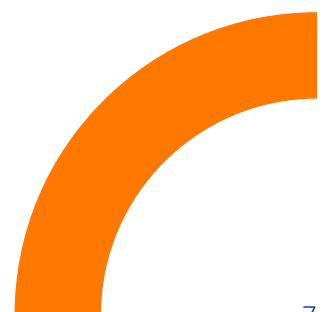
Interoperability provides an opportunity to strengthen the tradition of European education – a vision of humanism based on exchange between people and culture.

## Benefits for lifelong learners

In today’s education systems, learners face unnecessary barriers in practically every step of their learning. While the discovery of knowledge via research is a highly collaborative affair – with global networks working together towards the same goal – learning is still very much a local affair, often defined by the relationship between a student and a single organisation.

Investing in interoperability would allow a massive increase in student mobility between educational systems, organisations and jurisdictions.

- **Standardising course metadata** as well as recognition procedures would allow students to personalise their learning pathways using courses from multiple providers across their lifetime;
- **Publishing standardised quality information** about courses and providers would allow students to make informed decisions about which providers would best suit their style of learning and life aspirations;
- **Allowing students to document and present skills** achieved via any educational pathway would improve permeability and access to education and employment – making education more merit-based and improving the fidelity of guidance services;
- Interoperable systems would allow for **administrative procedures** at every stage of learning to become essentially invisible – facilitating every process in learning including admission, recognition, assessment and certification.





## Benefits for educators

In too many institutions, educators have exchanged academic autonomy for radical self-sufficiency. An educator is expected to teach a wide variety of students with different levels of knowledge, learning styles and socio-cultural backgrounds. A curriculum provides some guidance as to what to teach and how to teach, while support services may assist the learning process in special cases – but otherwise, an educator is essentially on their own. Interoperability for educators is about creating communities of educators who can share knowledge and experience.

- **Communication technologies** can make it easier to create cross-functional teams of educators spread across different institutions to tackle specific issues;
- **Search indexing and discovery** can make it easier to find and reuse learning materials – enabling an ecosystem that allows an educator to choose the tools that suit their particular pedagogy;
- **Exchanging quality and performance data** using standardised rubrics (data analytics) can help answer longstanding questions as to how to effectively connect teaching to skill acquisition.

## Benefits for educational organisations

Digitisation brings educational organisations multiple benefits including easier administrative procedures, easier monitoring of quality and enhanced ability to assess the design of courses for impact. However, digitisation often comes with significant down-sides – including the inability of IT systems of different institutions to communicate with each other, and issues around vendor lock-in straddling institutions with costs over decades.

Interoperability would allow institutions to choose the right tool for the right purpose, change tools they use at will, based on what is best, and take a user-centred rather than systems-centred approach to educational provision.







## Benefits for the labour market

For the labour market, interoperability is about bridging the gulf between skills which are taught at educational organisations, the skills held by users and those needed by employers.

- **Interoperability of systems** enables employers to transparently present the skills they need, and for educational institutions to present the skills they teach – allowing for gaps to be found and addressed;
- For jobseekers, it allows for them to **present their skills to a potential or current employer** in a way that allows their experiences to be understood quickly and easily,
- For the labour market as a whole, it **enables increased efficiency** and responsiveness to a changing economic format.

## What do we need to make this happen

**The four levels of interoperability must be addressed simultaneously**, in order to be able to truly bring about system-level change. In terms of policy focus, legal and organisational interoperability have often ignored or deprioritised the equally important topics of semantic and technical interoperability. All too often, this has led to the creation of organisational systems that do not have the tools to realise their objectives.

## Map existing initiatives

The goals of interoperability policy are widely shared – and have led to a proliferation of hundreds of initiatives to improve communication. The current ecosystem is characterised by fragmentation. Some initiatives may cover the same subject using complementary but different approaches, others may take the same approaches but in different networks or jurisdictions, others exist as small-scale





initiatives or pilot projects without the ability to scale. Sometimes interoperability initiatives create competing systems and tools – possibly even making the problem they are trying to solve worse. The first step to untangling this web of initiatives is to have a clear understanding of existing work.

**This includes a map of existing initiatives, the people and organisations behind them, their reach and their maturity.**

Such a map would inform policy and practice by providing the data required to:

- Ensure convergence between similar and related initiatives or standards;
- Pick prevailing systems or standards in cases where these are incompatible;
- Perform gap analysis and identify solutions that still need to be incentivised.

Of note are mappings being created by the EduXs and DS4Skills projects as well as by the DAAD. Similar initiatives should be strengthened and supported.

## Prioritise scaling existing initiatives

Interoperability is governed by the principle of the ‘network effect’, i.e., that the gains from interoperability rise with the number of users of a particular service or product. This logic dictates that wherever possible, government institutions, funders and educational organisations should **use or extend existing standards** to achieve any stated goal, rather than develop new ones, unless there is a true gap in the market.

An initiative can be considered ‘mature’ and appropriate for scaling when it is based on open standards, has well-functioning open governance, is openly licenced and uses open technologies. Wherever possible improvements to systems should be made by participating in such governance arrangements.

The European Student Card here provides an example of best practice. A series of European projects were funded in succession to test and build out aspects of the same system, which was eventually scaled into a production service to facilitate mobility amongst all Higher Education institutions in Europe. Similar consolidations would be useful in everything from digital credentials to sharing of learning content.





## Integrate the four levels of interoperability into impact analysis

Impact analysis is a key tool that drives policy-and decision-making. It is valuable as a tool to forecast and evaluate the impact of policy-initiatives, market-interventions, public-funding support and organisational projects. Current protocols for such analysis consider factors such as ‘adoption’, ‘scaling’ and ‘sustainability’ but do not fully understand the mechanisms of interoperability. The Bologna Process is the prime driver for European legal and organisational interoperability – yet it only even acknowledged a digital aspect in the last three years. Effective policy needs appropriate tools to implement it – which means making legal, organisational, semantic and technical interoperability part of every evaluation.

## Use learner skills at the lingua franca of education and employment

The legacy of the last centuries of educational policy is a system whereby institutions recognise learning at the level of ‘courses/degrees’. Such a system promotes silos – recognition at the level of courses is inflexible, tied to a single provider, bundle unnecessary activities, and hard to transfer or recognise between organisations or systems. Also, they propagate inequalities in education during access, progression and completion. Learning achieved through informal and non-formal learning is often considered inferior to the formal type.

In both education and employment, recent theory promotes the need for a ‘skills-based’ approach – where education and employment become about skills earned by an individual irrespective of the context. Courses should be coherently built up out of learning outcomes – on the level of skills, but skills can also be acquired across courses. The ambition or success of any system of interoperability should be measured by its ability to help learners earn or recognise skills more easily, effectively or efficiently.





## Coordinate interoperability coherently

Interoperability is not a process that can be confined to a single subject or department. Within the education domain it requires coordination between authorities responsible for different sectors of education (pre-primary, compulsory, tertiary, adult, etc.), across education types (formal, non-formal), between education and employment. Ancillary policies include ICT policies, skills development policies in any thematic area and even areas such as migration policy. In recognition of the need to cut across governance silos, large companies will employ a Chief Information Officer as part of their senior management. Within the EU, skills and data spaces are attempting a loose of coordination of individual organisations in the sector.

Further work is needed to:

- coordinate the work of different policy units working in areas affecting interoperability to ensure consistency in policies, as well as sufficient support to scaling interoperability initiatives;
- Continue exploring cooperation between government, civil society and enterprise around interoperability policy.

## A call to Action

Suffering from a syndrome of 'Not made here' too many actors try to reinvent the wheel – losing the benefits of network effects and economies of scale for little additional benefit. The core of education is the creation of knowledge through collaboration and knowledge sharing. As such, these principles need to be reflected in digital education solutions as well. Every IT system in education should be thought of as a node in a network, not as a standalone system for a single institution.

Dealing with interoperability is an urgent imperative – every day it is not addressed leads to more fragmentation, more lost opportunities and greater possibilities of division. No institution, from a tiny educational provider up to a government, can afford to ignore it. These recommendations require an appropriate and proportionate response.



