Governing Digital Education in Decentralised Systems: Translating Supranational Frameworks into Regional Policy Practice

Linda Castañeda
https://orcid.org/0000-0002-1055-9241
Universidad de Murcia, Spain.
lindacq@um.es

Ana Yara Postigo-Fuentes
https://orcid.org/0000-0001-7965-1911
Institut für Romanistik, Heinrich Heine Universität, Germany.
ana.postigo.fuentes@hhu.de

Virginia Viñoles-Cosentino
https://orcid.org/0000-0002-9048-5827
Universitat Jaume I, Spain
vvinoles@uji.es

Cesar Herrero-Ramila
https://orcid.org/0000-0001-6208-6055
European Commission – JRC, Spain,
Cesar.HERRERO@ec.europa.eu

Romina Cachia
https://orcid.org/0000-0002-9773-6924
European Commission – JRC, Spain
Romina.CACHIA@ec.europa.eu

Abstract

This article examines how supranational policy instruments—specifically the European Commission's digital education frameworks and tools—are interpreted, appropriated and operationalised by regional authorities within a decentralised education system. Drawing on in-depth qualitative interviews with policymakers across 15 Spanish Autonomous Communities, the study explores how three prominent frameworks (DigComp, DigCompEdu and DigCompOrg) and their associated tools (SELFIE and SELFIEforTEACHERS) shape the formulation of regional strategies for digital transformation in education.

Findings reveal differentiated patterns of adoption, use and adaptation, mediated by existing political, institutional and cultural conditions. While some regions embed these instruments deeply into strategic planning and certification processes, others selectively reference or repurpose them according to local priorities. The analysis shows that these frameworks function not as neutral guides but as governing technologies—mobilised to structure discourse, standardise practices, and align regional action with broader European agendas.

By situating a national case within the context of supranational policy dynamics, the study offers broader insights into how soft governance operates across multi-level education systems. It contributes to ongoing debates on the role of policy instruments in educational reform, the politics

of digital transformation, and the tensions between standardisation and contextualisation in global policy enactment.

Keywords

Educational Policy; Policy Instruments; Digital Governance; Multilevel Governance; Policy Enactment; Supranational Frameworks

Introduction

Digital transformation is a journey, and every journey needs a map. A major effort in implementing the digital transformation has been the development of frameworks and tools that enable the definition of the different digital horizons. There is considerable literature on the development and features of frameworks for digital transformation (Atenas et al., 2023), but there is a noticeable gap in understanding how these frameworks impact policy development. This study delved into the strategic approaches undertaken in Spain to enable the digital transformation of education, focusing on how various tools and frameworks, particularly those developed by the European Commission's (EC) Joint Research Centre (JRC), influence regional strategies.

While the European Commission's frameworks and tools aim to provide a shared vision for digital transformation, their enactment at the regional level is far from uniform. Preliminary observations in this study show that these instruments are not used consistently, nor do they necessarily function as originally intended. For instance, while DigCompEdu is widely embraced as a reference for developing teacher digital competence, the related tool SELFIEforTEACHERS is often adapted, sidelined or reinterpreted. This divergence highlights the complexity of policy translation within multilevel governance structures, particularly in decentralised systems like Spain (Forde & Torrance, 2021; Esteve-Mon et al., 2023).

Rather than treating frameworks and tools as neutral technical instruments, this study approaches them as policy technologies that both enable and constrain action (Partelow, 2023; Legacy et al., 2023). Drawing on concepts of soft governance and policy enactment (Ball, 2016), we consider how supranational policy instruments are mobilised by regional actors not only to support digital transformation but also to legitimise specific educational strategies, institutional practices, and professional expectations. As highlighted by Chugh et al. (2023), digital transformation policies increasingly require coordinated efforts across governance levels, where frameworks act as mediators of discourse and practice.

Spain provides a rich empirical setting for this analysis: its strongly devolved education system, diverse territorial identities, and ongoing engagement with European Union agendas make it an ideal case to examine the tensions between supranational convergence and regional autonomy (Rêgo et al., 2022; Marín & Castañeda, 2023). Against this backdrop, we ask: how do regional policymakers in a

decentralised system use, adapt, or resist supranational policy frameworks and tools in shaping their strategies for digital education?

In addressing this question, the article contributes to broader debates on the governance of education through instruments (Jobert, 1989; Georgalas et al., 2009), the politics of digital transformation, and the enactment of transnational agendas in context-specific ways. It also speaks to the value—and potential constraints—of using common reference frameworks to drive institutional change across diverse educational landscapes.

The European Commission has developed a suite of reference frameworks and tools to guide digital transformation. The DigComp framework addresses citizens' digital competence, DigCompEdu focuses on educators, and DigCompOrg targets educational organisations. Complementing these, the SELFIE tool supports whole-school reflection on digital capacity, while SELFIEforTEACHERS enables individual teachers to self-assess their competences. In Spain, the relevance of these instruments is shaped by the country's decentralised governance model: the national Ministry of Education coordinates overarching policies through the Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado (INTEF), while the 17 Autonomous Communities hold primary responsibility for defining and implementing education policy in their territories. This interplay between supranational instruments, national coordination, and regional enactment makes Spain a particularly rich case for examining how European governance tools are mobilised in practice.

To approach this question, we build on theoretical perspectives that conceptualise frameworks and tools as political instruments within multilevel governance systems. The following section outlines the conceptual framework that informs our analysis.

Conceptual Framework

Policy Instruments as Technologies of Governance

Rather than treating policy instruments as neutral or purely technical devices, this study adopts a conceptualisation of frameworks and tools as technologies of governance—that is, as instruments that both reflect and shape the political intentions, discourses and power relations underpinning public policy. As Lascoumes and Le Galès (2007) argue, policy instruments are not just tools for implementing decisions, but active components in the construction of policy itself. They embed particular representations of problems, prescribe certain modes of action, and implicitly favour some stakeholders over others.

In the field of education, instruments such as competency frameworks or self-assessment tools do more than offer guidance; they function as symbolic regulators, establishing shared vocabularies, standardising practices and legitimising particular forms of knowledge and action (Georgalas et al., 2009; Partelow, 2023). These instruments often operate through indirect forms of control—what has been

described in the literature as *soft governance* (Lawn & Lingard, 2002)—by enabling coordination without coercion. They are designed to steer behaviour across diverse contexts while leaving room for local adaptation, but this adaptability also makes them susceptible to reinterpretation, resistance or symbolic appropriation.

In this study, the European Commission's frameworks for digital education (DigComp, DigCompEdu, DigCompOrg) and associated tools (SELFIE, SELFIEforTEACHERS) are understood as policy instruments that aim to shape educational reform across national and subnational levels. Their uptake, adaptation and implementation by Spanish regional authorities reveal not only technical preferences but also strategic uses of these instruments for aligning regional priorities, legitimising reforms or complying with broader European agendas. This perspective shifts the analytical focus from *whether* frameworks are used to *how* and *why* they are used, and with what political effects.

In this sense, the conceptualisation of instruments offered by French policy instrumentation does not stand apart from enactment approaches but rather complements them. Instruments not only carry ideas and prescribe certain modes of action (Lascoumes & Le Galès, 2007), they also embed classifications and problem framings that become the very material that actors interpret, negotiate, and reconstruct in practice. Put differently, the "life" of instruments extends into the enactment arena: their categories, benchmarks and discursive framings are precisely what regional actors mobilise, adapt, or resist. Recognising this continuity enables us to treat policy instruments not as external frameworks that are later enacted, but as constitutive elements of enactment itself.

Multilevel Governance and the Circulation of Supranational Policy Agendas

Educational policy today increasingly unfolds within multilevel governance systems, where authority and influence are distributed across supranational, national and subnational actors. In this context, policymaking is no longer confined to national governments but involves networks of institutions, including international organisations, expert bodies, and regional authorities (Ozga & Lingard, 2006). These complex configurations of governance challenge traditional understandings of policy as a linear process and foreground the relational, negotiated and dynamic nature of educational reform.

The European Union plays a key role in shaping education policy through mechanisms of soft coordination and benchmarking, rather than legal enforcement. Frameworks such as DigComp, DigCompEdu and DigCompOrg exemplify the EU's approach to steering national and regional education systems through shared indicators, common languages, and voluntary alignment (Lawn & Grek, 2012). These frameworks operate as part of a European policy space, where ideas circulate, are translated, and take root in context-specific ways.

In decentralised systems such as Spain, the circulation of supranational instruments intersects with territorial governance dynamics, where regional governments possess significant autonomy in education. This creates conditions for both policy convergence and divergence, as regional actors may adopt, adapt or resist external frameworks according to local priorities, institutional histories, and political cultures (Forde & Torrance, 2021). Analysing these processes offers insights into how global policy agendas are negotiated in local settings, and how policy instruments function as vehicles of both cooperation and contestation.

Policy Enactment and Local Translation of Supranational Instruments

Building on this, our use of the term enactment highlights how instruments travel into local settings and are re-signified through practice, reinforcing the idea that instruments and enactments are analytically distinct but empirically intertwined (Ball, 2016).

Understanding how policy is realised in practice requires moving beyond notions of implementation as the straightforward execution of centrally designed plans. Instead, this study draws on the concept of policy enactment, which views policy as something that is interpreted, constructed and performed by actors situated in specific institutional and cultural contexts (Ball, Maguire, & Braun, 2011). From this perspective, regional policymakers are not passive implementers of supranational frameworks, but active agents who make sense of, adapt, and sometimes resist policy instruments in ways that reflect their own strategic, professional and political logics.

Policy enactment is shaped by multiple factors, including local histories, resource constraints, leadership structures, and policy discourses. In decentralised systems, these enactments are even more variable, as regional authorities operate within a mix of autonomy and alignment pressures. As Ball (2016) argues, policy moves through spaces in ways that are always mediated by power, identity and institutional capacity, resulting in "enactments" rather than uniform "implementations."

In this study, the varied uptake and adaptation of EC frameworks and tools across Spanish regions illustrate precisely this phenomenon. Some Autonomous Communities use the DigCompEdu framework as a backbone for teacher training certification; others adapt SELFIEforTEACHERS to fit their internal systems or disregard it altogether. These differences are not just technical but deeply political, reflecting divergent priorities, strategic choices and constructions of what it means to be a digitally competent teacher or institution. Analysing these enactments allows us to better understand how policy is lived, remade and negotiated on the ground.

Together, these conceptual perspectives enable us to move beyond a purely instrumental understanding of supranational policy frameworks, and to interrogate their strategic uses, local translations and political effects. In what follows, we situate our study within the Spanish context, outlining the characteristics of its decentralised

education system and the methodology used to examine regional enactments of digital education policy.

Research Context: Strategical Approaches of Educational Digital Transformation

The approach to technological transformation in education has recently undergone a shift in perspective, evolving from an instrumental and tool-acquisition focus to a more systemic view that takes into account the inherent complexity of the factors involved in these processes (Chugh et al., 2023). On the one hand, the institutional digital transformation, formerly viewed through a more managerial lens, focusing primarily on the provision of devices and infrastructure, the institutional digital transformation has now shifted towards a systemic, multi-level process that acknowledges educational systems and schools as complex entities. This shift requires coordinated efforts across various levels for genuine transformation (Esteve-Mon et al., 2023). In the same way, institutions are more aware of the complexity of the implementation of the idea and policies of digital transformation (Ball, 2016), and understanding these processes become a clear objective to national and transnational organisms to improve and maximize their efforts.

On the other hand, the integration of technology into education has long been a strategic objective for institutions, evolving from a distant aspiration to a concrete reality (Caena, 2014), particularly accelerated by the COVID-19 pandemic (Bozkurt, 2020; Cachia et al., 2021; Hodges et al., 2020). This swift transition has led to a broader concept of digital competence and digital teaching competence, transcending mere instrumental approaches, only focussed on usage (Marín & Castañeda, 2023). There is increasing recognition that the impact of technology in education extends beyond the mere use and adoption of specific tools, embracing a more contextual, emancipatory, and critical perspective. (Avello-Martínez & Marín, 2016; Cetindamar Kozanoglu & Abedin, 2020; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and The Committee Of The Regions on the Digital Education Action Plan, 2018).

The impact of digital technologies on teaching and learning processes is key to the debate on the digital transformation of education and to the evaluation of digital education policies (Giannoutsou et al., 2024). As can be observed from the Digital Education Action Plan 2021-2027[1], a European Union initiative, the focus is on a common view on digital education, supporting the Member States education and training systems to become fit for the digital age. This initiative involves two main priorities with several actions each: i) Fostering the development of a high-performing digital education ecosystem and ii) Enhancing digital skills and competences for the digital transformation. For each of these priorities, two Council Recommendations

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[1] Digital Education Action Plan (2021-2027) - European Education Area (europa.eu) https://education.ec.europa.eu/focus-topics/digital-education/action-plan

have been enacted in November 2023 to enable Member States to reach these objectives.

With the ambition of contributing to this new stage of the digital transformation of education in Europe, the EC has developed several frameworks that define key aspects and processes concerning the digital transformation of education. These frameworks include the Digital Competence Framework for Citizens (DigComp), the European Framework for Digitally Competent Educational Organisation (DigCompOrg), and the Digital Competence Framework for Educators (DigCompEdu). These frameworks aim to define the different aspects of digital competencies for citizens, organisations and educations and offer a common language for stakeholders in lifelong learning, serving as flexible tools rather than binding mandates, to aid in achieving individual and organisation competence development goals (Bacigalupo, 2022). Additionally, the EC has developed tools to enable individuals and organisations to reflect on some of these digital transformation key competences, notably SELFIE for self-reflecting on the Digital Capacity of an educational organization and SELFIEforTEACHERS for the digital competence of educators.

However, it is important to recognize that there is considerable diversity in the approaches to using these tools and frameworks in transformation processes, particularly at the regional level. Each perspective is influenced by cultural, political, contextual, social, and academic factors, resulting in distinct pathways and practices (Forde & Torrance, 2021; Rêgo et al., 2022). Acknowledging this diversity, it was considered as a priority to conduct a comprehensive investigation to examine and understand the strategic formulation (Rêgo et al., 2022) of the political approaches adopted by each Autonomous Community in Spain to enhance the Digital Competences of their Teachers and Schools. Spain's decentralised political structure, diverse regional landscape, and ambitious digitisation initiatives, mostly guided by their National Reference Framework for the Teaching Digital Competence[2] (inspired in the European framework DigCompEdu) and supported by recent funding, provide an ideal setting for understanding the implementation of EC Tools and Frameworks.

As we previously stated the primary aim of this study was to ascertain the extent to which the self-reflection tools (SELFIE and SELFIEforTEACHERS) and the frameworks (DigCompOrg, DigCompEdu and DigComp) have been integrated, utilized, or served as sources of inspiration within the formulation of regional strategies in each case examined (Castañeda et al., 2023). Throughout this investigation, several analyses emerged, including those examining how frameworks and tools created for different purposes but to cover the same domain, influence differently the strategic formulation of regional policies within non-higher education contexts, which constitutes the focus of this paper.

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[2] Marco de Referencia de la Competencia Digital Docente - INTEF https://intef.es/Noticias/marco-de-referencia-de-la-competencia-digital-docente/

The Role of Frameworks and Tools in Digital Transformation Implementation

A significant number of research studies have emphasised the value of frameworks and tools in change/adoption processes, as they have the potential to enhance the successful implementation of new approaches or technologies.

Primarily, frameworks and tools provide a common language and facilitate discourse that delineates the boundaries and characteristics of the object of study (Partelow, 2023). They facilitate the adoption of products or ideas by streamlining procedures and standardising management characteristics (Georgalas et al., 2009). Simultaneously, they are pivotal for translating ethical principles into practical applications, thus addressing critical issues (Prem, 2023).

Furthermore, frameworks and tools serve as crucial resources for researchers and policymakers alike. They are fundamental for policy making by establishing mutually accountable agreements and addressing conflict factors through integrated approaches, thus contributing to capacity development (Ponzio, 2010) and playing a crucial role in providing a coherent understanding of innovative objects and effectively integrating territorial plans (Wilson, 2004). In this way, they assist in the design of empirical research within policy-making processes (Partelow, 2023).

Additionally, tools and frameworks shape the social perceptions that influence policymaking dynamics within institutions (Jobert, 1989), and enable the comparison of policy models, theories, and frameworks, thereby enriching our comprehension of the political adoption process (Schlager, 2019). They contribute to comprehend political contexts, discerning actors' roles, and understanding agenda-setting in systems design and participation processes (Gartner & Wagner, 1996).

Understanding the impact of these frameworks and tools on implementation processes is crucial. While frameworks can legitimize participation in local governance and set standards, they can also potentially constrain creativity in participatory planning by presenting obstacles or boundaries that inhibit critical perspectives (Legacy et al., 2023).

Therefore, understanding how policy makers use and perceive frameworks and tools was described by respondents as essential. It enables us to refine these elements, empowering the involved groups and maximizing the benefits of their definition and development.

Giannoutsou et al. (2024) defined a framework for the assessment of the impact of the self-reflection tools in digital education programs, highlighting the importance not only of the factors involved in it (goal, outcomes, methodology, tool...), but also the relationships among them.

Method

This study is based on research that examines the implementation of digital transformation initiatives in various Spanish regions. Through this approach, this study aims to explore the reasons behind the predominance of certain EC tools or frameworks on the strategic formulation and their implications for government decision-making in education.

With this main goal in mind, we have proposed four specific objectives that have guided the exploration of our data:

- Identify the reasons that justify usage and impact of different EC frameworks on the strategic formulation of the change processes.
- Investigate the reasons that justify the use of specific tools as a basis for strategic formulation of the change processes.
- Discuss the relationship between frameworks and tools in the context of digital development.
- Investigate whether differences exist in the utilization of frameworks and tools concerning the same competence.

The research relied on in-depth interviews with policymakers, including key stakeholders working on the national approach led by the Ministry of Education and Vocational Educational Training (MEFP) through the National Institute for Educational Technology and Teachers' Training (INTEF[3]). Additionally, 15 interviews were conducted with regional officials directly responsible for digital education policy in their Autonomous Communities (Andalucía and Galicia could not be included within the data collection period), and 1 interview with national-level officials from MEFP/INTEF, making a total of 16 interviews. This sampling design reflects Spain's decentralised governance structure: while the national ministry provides coordination and overarching strategies through INTEF, the Autonomous Communities hold primary responsibility for defining and implementing education policy in their territories.

These interviews followed a semi-structured format, developed collaboratively, and refined through multiple iterations. They covered various aspects including the objectives of the interview, contextual information, and questions related to educational digital transformation plans, the use of EC tools and frameworks, and other pertinent topics (all instruments available in the general report at Castañeda et al., 2023). Conducted primarily in Spanish, the interviews aimed to gather systematic data on how the different regions utilise the tools and frameworks provided at European level to develop their digital strategy. At this point, it is important to highlight that the education systems in Spain are managed at regional level by the regional ministries and coordinated at a national level by the national ministry.

To ensure uniformity among interviewers, a checklist was created to guarantee adherence to the interview process. Participants were selected through a self-

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[3] https://intef.es/

selection process initiated by each Autonomous Community, following a request for participation from the research team and supported by the Spanish Ministry. Ethical considerations were paramount throughout the scheduling, conducting, and recording of the interviews.

The data obtained from these interviews underwent analysis using descriptive and deductive coding methods, with the goal of identifying patterns, themes, and insights aligned with the study objectives. In order to protect the privacy of each region, we refer to the different Autonomous Communities as "territory A," "territory B," during the data analysis.

Findings

In this section, we present an overview of the findings across four areas: the use and impact of various EC frameworks on the strategic formulation of change processes; the role of specific tools as a foundation for strategic planning; the relationship between frameworks and tools in the context of digital development; and the differences in how frameworks and tools are applied to address the same competence. The findings are illustrated with quotations from the interviews, providing qualitative insight into stakeholders' perspectives.

Use and impact of different EC frameworks on the strategic formulation of the change processes.

DigComp Framework (citizens' digital competence):

The DigComp framework provides a structured reference for assessing and developing citizens' digital competence. While widely known, it is not extensively used in practice across the territories: all interviewees reported awareness, but only four reported active use.

Some regions consider that DigComp's indicators are already addressed within the general curriculum:

> "DigComp was used to establish what competences a 16-year-old citizen should have, and for this we used the reference to a digital competence benchmark, which is clearly included in DigComp, and then we replicated it in many of the parts of these subjects and subjects that I mentioned before. We also created an exit profile for primary education" (interview, Territory A)

In other cases, alternative mechanisms are cited:

> "The digital competence of citizens in general is being addressed by the Ministry of Finance" (interview Territory G).

Several communities used DigComp to underpin student certification (e.g., Territory K developed a tool to assess and certify citizens' digital competence). Where

DigComp was not preferred, interviewees generally pointed to limited salience for their current priorities or to existing curriculum integration.

DigCompEdu Framework (educators' digital competence):

The DigCompEdu framework emerges as a central choice for Spanish regions: all but one reported using it. The exception, Territory D, indicated awareness but not use.

The framework is mainly employed in designing digital strategies at regional and school levels. This uptake illustrates how supranational instruments are selectively enacted to support region-specific priorities, particularly around certification and pedagogical development. Such enactments reflect both the technical relevance of DigCompEdu and its value as a policy instrument that legitimises regional strategic goals within a broader European discourse (Lascoumes & Le Galès, 2007; Ball et al., 2011).

> "It has been a valuable tool to know what our goals are and also to define the instruments to reach those goals, which is fundamentally that of training" (interview, Territory L).

> "We now have a roadmap that sets out what is understood to be a teacher's digital competence, based on the DigCompEdu framework" (interview, Territory D).

Use of the framework is closely associated with the development of regional digital strategies, the need to certify teacher competences, and a focus on pedagogical aspects. No specific reasons for non-use of DigCompEdu were mentioned in the data.

> "When we see that it is necessary to unify the competences and that we also have the challenge of telling people that they have to prove that they have a digital competence, we choose to map everything and direct everything towards that." (interview, Territory P).

DigCompOrg Framework (digitally competent organisations):

Five territories reported knowing the framework but not using it, while eleven reported active use. DigCompOrg is applied in organisational planning and development, particularly in the design of digital school plans, and is valued for supporting leadership, governance and strategic considerations.

> "Since DigCompOrg came out, we have turned it into this digital plan for the school, which is what we are promoting and is the interest that we have shared with the autonomous communities that have also adapted it." (interview, Territory A).

The eleven territories that use DigCompOrg actively regard it as a main source for understanding digital organisations, appreciating its guidance on multiple dimensions of digitisation:

> "The administration must take decisions that may be courageous, but that must have significant technical and scientific backing. Why do we use these tools? Well, because there is work that has been done, there is a very well elaborated framework by a group of people (…) that aligns a vision with which we identify on the concept of citizenship in Europe and how we exercise this citizenship, both technically and academically they are very well elaborated." (interview, Territory F).

DigCompOrg is particularly used as a reference in creating school digital plans, offering a structured approach to digitisation. The Spanish Ministry requested schools' digital action plans by a set deadline, recommending DigCompOrg and its tool SELFIE to guide their preparation. No specific reasons for non-use of DigCompOrg were mentioned in the interviews.

From a national perspective, DigCompOrg was the major reference in preparing the *School Digital Plan. Description and Guide*, designed to support schools in creating digital plans adapted to their needs and circumstances.

Use of specific tools as a basis for strategic formulation of the change processes.

SELFIE Tool (school self-reflection):

All territories studied reported using the SELFIE tool, which is widely seen as useful for supporting initial diagnosis of digital capacity and promoting self-reflection and awareness.

> "In the awareness-raising phase the contextualisation analysis phase where we use the SELFIE and then we move on to the design phase, i.e. what we want to do with our digital plan for the school." (interview, Territory G).

> "It helps us to set our sights on a place and take small steps until we can get to it." (interview, Territory E).

SELFIE was widely reported by interviewees as useful in the development of digital school plans, particularly for supporting initial diagnosis and encouraging continuous improvement. Respondents often highlighted its role in providing a shared basis for evaluating schools' digital competence. Its widespread uptake can be interpreted as an instance of soft governance at work, with a non-compulsory tool nonetheless influencing planning practices through its perceived legitimacy and discursive authority (Lawn & Grek, 2012).

> "We used SELFIE and our own self-questionnaire (adapted from SELFIEforTEACHERS), because we wanted to measure both individual digital

> competence and collegiate digital competence at school level." (interview, Territory L).

The tool aligns with regional needs for self-assessment and provides a tangible means of evaluating schools' digital capacity.

> "In the Digital Plan of Territory C, we have made it not only compulsory for a diagnosis, but when you finish your plan, carry it out and implement it, the need to redo the self-reflection exercise using SELFIE not only as a diagnosis, but also a diagnosis and an evaluation." (interview, Territory C).

However, in some cases SELFIE was not fully embraced, due to difficulties in making effective use of the information provided or perceived misalignment with existing strategies.

> "SELFIE is a tool that is very good, that has to be handled properly, that provides very complete information, but it is information that has to be interpreted, that you have to know how to handle, and well, maybe we are not at that point yet." (interview, Territory D).

SELFIEforTEACHERS Tool (teacher self-reflection):

The SELFIEforTEACHERS tool is used less consistently. It is known in all territories but actively applied in only nine. Where it is used, it serves as a self-evaluation tool for teachers' digital competence, offering educators an opportunity to reflect on their skills. Its use is often optional or recommended rather than compulsory.

Limited use was attributed to perceptions of misalignment with specific needs, or to the tool's strong focus on self-reflection, which some regions considered insufficient for robust assessment or certification purposes

> "The outcome of the evaluation was good; nevertheless, the questions were complex and it was sometimes difficult to answer them. It already requires a minimum level of competence to be able to complete it." (interview, Territory D).

Some regions adapted the tool to make it more usable for teachers:

> "We have adapted it a little bit because what we saw was that it was a little bit difficult, we did a first test and people found it very cumbersome, so we have created from it, we have created one called NAME OF A TOOL, which is the same thing." (interview, Territory P).

Where it was not adopted, non-use was often linked to its non-compulsory nature or the perception that self-reflection alone was not enough. These reasons were explicitly mentioned in several interviews, for instance Territory D highlighted that completing the questionnaire required an already high level of digital competence.

Relationship between frameworks and tools in the context of digital development.

DigCompEdu Framework:

The DigCompEdu framework has played a significant role in fostering digital transformation within various Autonomous Communities in Spain. It has provided a structure to map training courses, what is needed to enhance the digital competences of teachers and also common terminology amongst educational stakeholders.

> "We have started to map the training courses from 2020/2021 with the framework." (interview, Territory O).

The framework provides a structured and comprehensive approach to assessing and developing teachers' digital competences:

> "We all talk about the same thing, things have names, it helps to understand each other. It also helps to know what the final goal is and what steps I must take to get there." (interview, Territory E).

Respondents stated that the framework offers a clear roadmap for improving teachers' digital competence by facilitating training initiatives, creating relevant materials, and designing training courses based on its defined levels.

> "It [DIGCOMPEDU] is a very well designed, very well planned and very well-grounded framework that serves as a roadmap, a kind of programming or progression that allows us to reach or achieve greater digital competence. For us it is very interesting because it also allows us not only to establish this progression, but also to structure it into levels of teacher training; otherwise, we would not have these keys to be able to prepare the training." (interview, Territory D).

By aligning with European standards and enabling mutual recognition of qualifications, DigCompEdu is seen as promoting cohesion and harmonisation across regions.

> "In this sense, it also helps us to use a European framework to bring European education systems closer together. If we are working in this more European perspective, it is also to the benefit of all the education systems in the European countries." (interview, Territory J).

Respondents associated DigCompEdu's emphasis on systematic improvement and pedagogical alignment with its widespread use for advancing teachers' digital competences. This interpretation is consistent with the fact that 14 of the 15 regions studied reported active use of the framework.

DigCompOrg Framework:

Across Autonomous Communities, the DigCompOrg framework has emerged as a reference for guiding digital transformation at regional and school levels.

> "If all communities are working along these lines, there is no point in creating more frameworks, let's keep working along these lines, then we can have documents, information, resources, but we move with the DigCompEdu and DigCompOrg." (interview, Territory M).

It plays a crucial role in the development of regional and school-level digital competence strategies and plans.

> "We adapt it to the school's digital plan which is a replicable manual that they can take and do the study we always pass in SELFIE." (interview, Territory A).

By ensuring coherence between school plans, curricula, and teacher education programmes, DigCompOrg fosters a comprehensive and unified approach to digital competence. Its structured assessment process supports identification of improvement areas and alignment of digital goals with broader educational objectives—an approach that is already adopted in 11 of the 15 regions studied.

> "It gives us a very clear picture of what competence is expected, both by an organisation such as an educational institution and by a professional in the field of education, and all training actions have been based on these reference frameworks." (interview, Territory L).

SELFIE Tool:

Interviewees described the SELFIE tool as having an important role in regional digital transformation strategies, particularly by enabling schools to diagnose their digital capacity and by raising awareness of the broader role of technology in education.

> "It is a very good tool, very adaptable to the different teaching levels and, well, that is why, as we have said then, based on this tool it helps you to diagnose and evaluate, but at the same time as you evaluate, you diagnose the next step and so on. So, for us it is essential." (interview, Territory C).

The tool helps schools identify areas for improvement, refine digital practices, and integrate digital goals into broader strategies.

> "It is very useful to change the vision and point of view on digitisation, for pedagogical use and awareness raising." (interview, Territory E).

Its standardised evaluation basis has supported the development of comprehensive digital strategies, making it widely used across communities, as all regions reported using it as part of their digital planning processes.

> "If there is someone who offers you certain tools that have been developed on the basis of quality processes, it is good that they are made available to the educational community and can be reused." (interview, Territory J).

SELFIEforTEACHERS Tool:

The SELFIEforTEACHERS tool has been used in several Autonomous Communities to support teachers' reflection on their digital practices, raising self-awareness of their digital competence:

> "...[the tool] helps you, and I do not think you do that with many things, that is to say that analysis of the situation you find yourself in and hey, look, this is the path you could take." (interview, Territory A).

It enables individual teachers to identify areas for improvement and design targeted professional development.

> "It is more for self-assessment. So this assessment allows you to create a needs analysis, establish a diagnosis and from there you can build on that framework, which would be like a tool for the initial phases." (interview, Territory J).

Its contribution lies mainly in encouraging incremental changes in teaching practices and supporting integration of digital skills into pedagogy.

Differences that exist in the use of frameworks and tools concerning the same competence.

The findings show varying approaches taken by different Autonomous Communities in Spain regarding the use of frameworks and tools to enhance teachers' digital competence. The analysis is organised into six subsections, each highlighting a specific aspect of digital competence improvement: improving teachers' digital competence, self-assessment and reflection, alignment with European standards, cohesion and structured planning, certification of digital competence, and adapting training and development. While all regions share the overarching goal of improving teachers' digital proficiency, they employ different frameworks and tools to achieve it.

1. Improving Teachers' Digital Competence:

A common objective across regions is the enhancement of teachers' digital competence. For this purpose, most communities use the DigCompEdu framework. It provides a comprehensive guide, with structured competences essential for effective digital teaching and learning. Its tailored approach addresses educators' needs and offers a roadmap for advancing digital competence.

> "We have created a team of 180 technical advisors who are responsible for advising schools in this sense, guiding them in the process and in the creation of their digital school plan and also, depending on the characteristics of each

> school, its teaching staff and its students, designing this digital school plan and the specific training that this school can design. This has already begun to operate before the start of the school year and is expected to be in operation until the end of 2024." ((interview, Territory I).

This reliance on DigCompEdu was reported in 14 of the 15 regions studied.

2. Self-Assessment and Reflection:

Promoting self-assessment and reflection among educational institutions and teachers is a shared aspiration in different regions. For this purpose, the SELFIE and SELFIEforTEACHERS tools are widely embraced. These tools empower institutions and educators to engage in meaningful self-assessment, shedding light on their digital practices. According to several interviewees, the SELFIE tools encouraged a culture of reflection that helped identify strengths and areas for growth, supporting an iterative approach to improvement. All 15 regions reported using SELFIE, while 9 reported using SELFIEforTEACHERS.

3. Alignment with European Standards:

The alignment of digital practices with European standards is another recurring objective. Both DigComp and DigCompEdu frameworks are used for this purpose, as they were developed in line with European guidelines and ensure compatibility across Member States.

> "Many of the things that have been developed have a European perspective. In all this design that we are seeing, even from before the pandemic, some of the tools developed by the JRC were used for this whole series of projects, with SELFIE being the most prominent one." (interview, Territory I).

This European dimension was explicitly mentioned by several interviewees as a rationale for adopting these frameworks.

4. Cohesion and Structured Planning:

Several regions emphasised the importance of structured planning for digital transformation. For this, DigCompOrg is the preferred framework. It provides a structured approach for creating regional and school-level strategies and ensures coherence with curricula and teacher education.

> "The next step was the agreement of the General Secretariat of Education of the Sectorial Conference of Education, and the agreement of all the autonomous communities, on how the digital competence of teachers is going to be certified and accredited competences with evaluations, etc. We have done this among all the communities and now we are precisely starting to put it into practice." (interview, Territory C).

DigCompOrg was reported in use in 11 of the 15 regions studied.

5. Certification of Digital Competence:

The certification of students' and teachers' digital competences is a shared goal in several regions. For certification, the DIGCOMP framework emerges as the favored choice. Renowned for its categorization and assessment levels, the DIGCOMP framework offers a clear structure for certifying digital competence. This framework proves particularly valuable for regions aiming to standardize and acknowledge digital skills, serving as a basis for official recognition.

> "We [Spain, The Ministry] have made a commitment to the Commission that we are going to dedicate 300 million euros to improving the digital competence of the education system through two means: one focused on teachers, guided by established frameworks." (interview, Territory A).

6. Adapting Training and Development:

Finally, adapting training and development to meet teachers' evolving digital needs is a prominent objective. DigCompEdu again plays a key role, as its detailed descriptors map training levels and guide programme design.

> "It would have helped us a lot if there had been professional incentives, that is to say, just as very interesting incentives were created with the issue of bilingualism, beyond whether we like them or not, that is to say, people who have a qualification in languages have a few profiled places, it is assumed that, well, with better conditions." (interview, Territory P).

Strengths and Limitations

This study provides a robust and context-rich examination of how supranational policy instruments are enacted in decentralised educational systems. Among its main strengths is the breadth and depth of the qualitative data, drawn from 16 one-hour interviews with senior policymakers representing 15 of Spain's 17 Autonomous Communities as well as the national level. While the number of interviews may appear limited, this coverage provides an unusually comprehensive view of Spain's decentralised system. The inclusion of both regional and national perspectives offers a rare and valuable lens into the multilevel governance of digital education policy.

The research design enabled a comparative analysis of how common frameworks and tools—such as DigCompEdu and SELFIE—are differently interpreted, mobilised and adapted according to territorial contexts. This contributes empirically and conceptually to understanding the strategic use of policy instruments and their enactment across governance levels.

At the same time, some limitations should be acknowledged. First, the sample is restricted to policymakers directly responsible for digital education, which means that other important perspectives—such as teachers or school leaders who ultimately enact these policies—are not included. Second, the self-selection of participants may introduce some bias, as those most engaged in digital policy may have been more inclined to participate. Third, although the sample covers nearly all Autonomous Communities, the absence of two territories (Andalucía and Galicia) leaves out potentially relevant perspectives. Finally, the analysis is based solely on qualitative interviews and does not incorporate systematic discourse analysis of policy documents or triangulation with quantitative metrics, which could have further strengthened the findings.

While the study is grounded in the Spanish context, its generalisability to other national systems is necessarily limited. Nonetheless, the patterns of enactment and translation observed here resonate with broader dynamics in decentralised and federal education systems worldwide. Future research could build on these findings through cross-country comparisons, mixed-method approaches, or longitudinal studies to trace how policy instruments evolve over time and across governance spaces.

Concluding Discussion

This study has examined how supranational policy instruments—namely the European Commission's digital education frameworks and tools—are enacted by regional authorities within a decentralised education system. Grounded in qualitative data from 15 Spanish Autonomous Communities, the analysis was structured around four research objectives:

Regarding the research objective 1: Explore the Usage and Impact of Different EC Frameworks on the Strategic Formulation of Change Processes, we found significant variation in the uptake of DigComp, DigCompEdu and DigCompOrg. While DigCompEdu emerged as the most widely adopted, particularly in relation to teacher certification and training design, DigComp and DigCompOrg were mobilised more selectively. These differences are not simply technical but reveal how frameworks serve as symbolic and strategic instruments—used by regions to legitimise reform, align with EU agendas, or reinforce local priorities.

Regarding the research objective 2 Investigate the Use of Specific Tools as a Basis for Strategic Formulation of Change Processes, SELFIE was universally adopted and used as a diagnostic tool to support institutional planning, suggesting that it operates effectively as a soft governance mechanism. In contrast, the use of SELFIEforTEACHERS was more contested. Some regions adapted it, others disregarded it—demonstrating how tools are enacted according to local perceptions of usefulness, alignment with policy needs, and professional cultures.

About the research objective 3, Discuss the Relationship Between Frameworks and Tools in the Context of Digital Development, despite shared objectives, the study revealed diverse enactments of the same instruments. Some regions used DigCompEdu to structure certification schemes; others relied on locally adapted versions of SELFIEforTEACHERS. These differences underscore the contingent nature of policy translation and the importance of regional agency in shaping policy outcomes.

Taken together, these findings contribute to a broader understanding of how educational governance operates across levels, and how supranational policy instruments are reinterpreted and enacted in decentralised systems. They affirm the value of approaching frameworks and tools not merely as resources for implementation, but as political technologies that both reflect and construct policy realities.

This study highlights the complexity of digital transformation across different territories, driven by diverse strategic priorities and educational contexts. The varied adoption and application of EC frameworks and tools underscore the importance of flexibility and adaptability in addressing regional needs, especially in the case of Spain, where education policy is shaped by both national coordination and regional autonomy (Forde & Torrance, 2021).

The findings show that frameworks such as DigCompEdu, DigCompOrg, and DigComp are not merely technical instruments but act as governing tools—used to structure discourse, legitimise policy decisions and define desirable competencies (Partelow, 2023; Georgalas et al., 2009). Their function aligns with what Lascoumes and Le Galès (2007) define as policy instruments that embed political rationalities, and with Ball's (2016) understanding of policy as something that "moves" and is reinterpreted in context.

The widespread adoption of SELFIE can be read as an example of soft governance at work, where a non-compulsory tool nonetheless shapes planning practices through its perceived legitimacy and discursive authority (Lawn & Grek, 2012). This interpretation is grounded in the fact that all 15 participating regions reported active use of SELFIE, despite its non-compulsory nature. At the same time, the more ambivalent uptake of SELFIEforTEACHERS suggests that the perceived usefulness of a tool depends on how well it aligns with local strategies, professional cultures and expectations for accountability (Avello-Martínez & Marín, 2016; Legacy et al., 2023).

Meanwhile, the nuanced use of the three EC frameworks reflects the strategic positioning of regions within a multilevel governance space. The preference for DigCompEdu, particularly in relation to teacher training and certification, demonstrates how regional authorities selectively enact supranational guidance in ways that consolidate their own institutional agendas (Esteve-Mon et al., 2023; Chugh et al., 2023). These enactments support the idea that regional policymakers are not

mere implementers, but active agents in the translation and operationalisation of European-level frameworks (Ball et al., 2011).

Importantly, these dynamics do not occur in a vacuum. They are mediated by cultural, political, social, and academic factors, which influence how digital transformation is framed, prioritised and integrated into broader educational reforms (Rêgo et al., 2022; Marín & Castañeda, 2023). The reliance on these frameworks and tools helps streamline procedures and offer coherence but can also constrain local creativity and lead to tensions between standardisation and contextual adaptation (Ball, 2016; Jobert, 1989).

By analysing how regional actors appropriate and adapt these frameworks and tools, this study contributes to the understanding of how educational policy is enacted through instruments, how global agendas are negotiated locally, and how digital transformation is governed in practice. While situated in the Spanish context, the findings are relevant to any system grappling with supranational pressures and decentralised realities, such as federal states in Europe and beyond.

Beyond documenting territorial variation, this study identifies the mechanisms through which supranational instruments acquire governing force in a decentralised system: they are mobilised as strategic resources for certification, planning and discourse alignment; they are adapted or sidelined when they do not fit regional priorities; and they are leveraged to signal convergence with European agendas while preserving local autonomy. Conceptually, we also connect policy instrumentation and enactment by showing how the categories, benchmarks and self-assessment routines embedded in these instruments become the very materials of enactment. This dual contribution—comparative mapping across 15 regions and a theoretically integrated account of instrument-as-enactment—constitutes the paper's central added value.

Declarations and Ethics Statements

Ethical approval:
This study was conducted in accordance with the ethical standards of the European Commission's Joint Research Centre and was approved by the University of Murcia Research Ethics Committee (ID: 4144/2022) on October 10, 2022.

Informed consent from participants:
All participants provided informed consent prior to the interviews. Participation was voluntary, and all data were anonymised to protect the identity of individuals and institutions.

Data availability statement:
The data that support the findings of this study are available from the corresponding author upon reasonable request. Due to the nature of the data, which include

potentially identifiable information, they are not publicly available in order to protect participant confidentiality.

Clinical trial registration:
Not applicable.

Consent to publish statement:
Not applicable.

Competing interests:
The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Author contributions:

- Linda Castañeda: Conceptualization, Project administration, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing.
- Ana Yara Postigo-Fuentes: Investigation, Formal analysis, Writing – original draft, Writing – review & editing.
- Virginia Viñoles-Cosentino: Investigation, Formal analysis, Writing – original draft, Writing – review & editing.
- César Herrero-Ramila: Conceptualization, Writing – review & editing.
- Romina Cachia: Conceptualization, Writing – review & editing.

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