



OPEN ACCESS

EDITED BY

Hasim Altan,
United Arab Emirates University, United
Arab Emirates

REVIEWED BY

Gerardo Fuentes-Vilugrón,
Universidad Autónoma de Chile, Chile
Hans Petter Ulleberg,
Norwegian University of Science and
Technology, Norway

*CORRESPONDENCE

Lien Reekmans
✉ lien.reekmans@uhasselt.be

†These authors have contributed equally
to this work and share first authorship

RECEIVED 29 September 2025

REVISED 08 June 2026

ACCEPTED 22 June 2026

PUBLISHED 10 August 2026

CITATION

Cormio L, Reekmans L, Göksel NN,
Mengoni M and Stevens R (2026)
Blueprints of learning: a European
perspective on policy and school design.
Front. Educ. 11:1715843.
doi: 10.3389/feduc.2026.1715843

COPYRIGHT

© 2026 Cormio, Reekmans, Göksel,
Mengoni and Stevens. This is an open-
access article distributed under the
terms of the [Creative Commons
Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use,
distribution or reproduction in other
forums is permitted, provided the
original author(s) and the copyright
owner(s) are credited and that the
original publication in this journal is
cited, in accordance with accepted
academic practice. No use, distribution
or reproduction is permitted which does
not comply with these terms.

Blueprints of learning: a European perspective on policy and school design

Laura Cormio^{1,2†}, Lien Reekmans^{3*†}, Nisa Nur Göksel^{4†},
Maura Mengoni¹ and Ruth Stevens⁵

¹Department of Industrial Engineering and Mathematical Sciences, Polytechnic University of Marche, Ancona, Italy, ²Department of Humanities, Letters, Cultural Heritage and Educational Studies, University of Foggia, Foggia, Italy, ³Department of Architecture and Arts, Hasselt University, Diepenbeek, Belgium, ⁴Department of Architecture, Mimar Sinan Fine Arts University, Istanbul, Türkiye, ⁵Department of Architecture and Arts & School for Educational Studies, Hasselt University, Diepenbeek, Belgium

Introduction: The design of school environments plays a critical role in shaping educational experiences. However, the extent to which spatial configurations support pedagogical innovation largely depends on how policy guidelines are developed and translated into architectural practice. This paper examines the intersection of policy and design by analyzing recent national school environment policies in Belgium (Flanders), Italy, and Türkiye, and how these are reflected in built primary school projects.

Methods: A three-step qualitative method was applied across the three countries: (1) thematic analysis of policy documents, (2) thematic analysis of interviews with architects of recently built schools, and (3) a triangulation process of both datasets.

Results: As a result, the study proposes a practice-based framework developed across the three countries. Rather than offering a unified model, it links policy orientations to architects' visions. Six interrelated design aspects are identified: building quality, architectural quality, pedagogy, inclusion, sustainability, and community & context.

Discussion: The framework provides a first step toward articulating key design features, offering a theoretical overview of practical implications and a shared language for architects and researchers connecting policy and spatial design.

KEYWORDS

architects, innovative learning environments, interview, learning spaces, qualitative research, school-building policy, school design, thematic analysis

1 Introduction

Over the last few decades, the design of learning spaces has increasingly captured the attention of various disciplines, involving multiple stakeholders, including architects, educators, policymakers, and members of school communities. More and more European governments are taking action to modernize and renovate existing buildings and steer the design of new ones, driven by diverse needs such as improving building quality, expanding capacity, and meeting innovative pedagogical needs (AGION, 2025; Duthilleul et al., 2024). In this study, the term “innovative” is frequently used in the context of pedagogy and the design of learning environments. Innovation is integrated into educational policy programs globally to ensure high educational quality over time, aimed at achieving “21st-century competences” (OECD, 2017). Innovation is not merely understood as introducing novelty into the schooling system, but as the

structural rethinking of traditional educational models through pedagogical, organizational and spatial approaches that support changing learning needs. Innovative pedagogy typically emphasizes individualized and flexible learning (Deppeler and Aikens, 2020; Sigurðardóttir and Hjartarson, 2016), which in turn requires an innovative school design that supports both learners and teachers in these pedagogical practices. This perspective on innovative school design aligns closely with Deppeler and Aikens' (2020) understanding, which additionally highlights the importance of involving diverse stakeholders in the design process. Within this broader agenda, national policymakers play an important role in defining what counts as a 'qualitative' school building and in orienting design expectations for contemporary and innovative educational spaces.

Several studies have examined the role of national school-building policy in shaping contemporary physical learning environments, typically within a single-country context (Hofverberg and Sigurdson, 2023; Sigurðardóttir and Hjartarson, 2018; Stavem, 2025). Despite the growing body of work on this topic, the relationship between school-building policy and architectural design remains an underdeveloped concept. Existing studies tend to describe policy ambitions or analyze spatial outcomes, but rarely examine the processes by which policy discourse is interpreted and transformed into architectural form. This body of research shows that the relationship between policy and school design is neither linear nor uniform. Rather, policy ambitions are mediated by national traditions, funding arrangements, governance structures, professional cultures, and local implementation processes. Stavem (2025), for example, highlights variations even within one national context (i.e., Norway), while Wood (2020) conceptualizes school buildings as policy instruments, whose meaning and effects are shaped by contextual conditions. As a result, school design cannot be understood as a purely technical response to functional requirements, but must be read as part of a broader process situated within policy guidance.

The current literature seems to remain limited in three important respects. First, since most studies are nationally bounded, it remains difficult to differentiate between local peculiarities and broader European tendencies in school design policy and practice. Second, while several authors recognize that policy documents articulate ambitions for innovation, flexibility, and quality, these ambitions are often reported descriptively rather than critically evaluated. In other words, the literature has shown what policy says, but less clearly how such discourse actually operates as a design frame in practice. This limitation is significant because policy guidance in this field is often formulated in aspirational and non-committal terms when outlining design directions of learning spaces (Hofverberg and Sigurdson, 2023; Wood, 2020). Such language does not directly determine spatial outcomes. Rather, it needs to be translated into design decisions, and this translation is neither neutral nor automatic; it is shaped by professional judgment, architectural culture, and project-specific constraints. Third, although it is widely acknowledged that the school design process involves architects among multiple stakeholders, an in-depth theoretical exploration of the architect's role remains limited. Their capacity to interpret, filter, and translate other stakeholders' expectations into spatial design has received limited empirical attention. As already underscored by Hall (2017) and Stavem (2025), an in-depth exploration of how and to what extent design

directions given by the policies are translated into innovative school projects still appears to be unexplored from a scientific perspective. Since architects are the spatial experts among all stakeholders, adopting a spatial lens is essential to enrich the understanding of key design outcomes in physical learning environments. To address this gap, it is necessary to move beyond descriptive accounts of policy and design and instead conceptualize their relationship as an interpretative and contextually situated process, mediated through architects' perspectives.

Therefore, this study addresses these limitations by combining a cross-national perspective with particular emphasis on architects' designerly interpretations. It examines three OECD countries, Belgium, Italy, and Türkiye, that have actively invested in improving their educational infrastructure and rethinking the design of school environments. Rather than only comparing policy frameworks across contexts, the study investigates how and to what extent policy-defined quality criteria are translated into architectural features in recently built schools. In doing so, it moves beyond the assumptions that policy guidance simply flows into design outcomes, and instead treats this relationship as a mediated and interpretative process.

This study is informed by Wood's (2020) conceptualization of how school buildings operationalize policy, which links three spatial conceptions to three levels of policy operations: "School-building" as a policy instrument, "Architecture" as a policy technique, and "Designed spaces" as policy tools. Building on this framework, we argue that architects occupy a critical mediating position in the passage from policy ambition to spatial configuration. This perspective allows us to investigate not only whether policy criteria appear in school projects, but also how they are selectively understood, prioritized, and materialized.

Therefore, the contribution of this study is two-fold. First, it aims to identify the main quality criteria emerging from policies that are intended to guide the design of new schools. Second, it investigates how these theoretical criteria are interpreted and translated by architects into the more recently built schools with innovative designs.

Specifically, the research questions driving the study are the following:

RQ1: What quality criteria surface within policy documents across Europe to guide school design?

RQ2: Which of these are actually applied by architects in newly built school projects, and how are they interpreted and translated into key architectural features?

To address these questions, this study uses a three-step qualitative method, consisting of a first and second thematic analysis and triangulation, as described in detail in the following section.

2 Methodology

This study investigated the intersection of policy frameworks and architectural practice using a three-step method: two rounds of thematic analysis (i.e., steps 1 and 2, each with a different purpose) and triangulation (i.e., step 3). Specifically, firstly, we identified the main national reports and policies, along with reporting guidelines or recommended directions for designing

school buildings in step with the times, for each country (i.e., Belgium, Italy, and Türkiye), and then examined how the selected documents define key design criteria through a thematic analysis. Secondly, we selected a school building with an innovative design as a case study for each country (see “2.2 From theory to practice: a selection of cases”) and conducted interviews with the corresponding architectural firms to investigate how these criteria manifest in built school projects. The qualitative data collected through the interviews were subsequently analyzed through a thematic analysis to identify key architectural features. Thirdly, we used a triangulation method to integrate findings across countries and to create a practice-based framework for innovative school design, adopting a structured consensus-based approach.

Figure 1 shows the flow of the entire multi-method process.

2.1 The theory-based exploration: Thematic analysis and comparison of policy documents

During the document selection phase, each researcher selected the most relevant and comprehensive national policies and reports for each country. In the Belgian context, the focus will be on school-building policy in Flanders. Throughout this text, both terms (i.e., derivations of Flanders and Belgium) will be used, although referring to Flanders. The studied policy documents were the three editions of ‘De schoolgebouwenmonitor’ by AGION¹ (2009, 2014, 2020) and the ‘+School’ guidelines by the Flemish Department of Education and Training (Herman et al., 2018). For the Italian case, the three most crucial documents were: the ‘24 Report’ by Legambiente, the ‘Piano Scuola 4.0’, and the ‘Futura’ guidelines. Finally, for the Turkish case, the leading document is the ‘Educational Structures Minimum Design Standards Guide’, published in 2015 by the Directorate of Construction and Real Estate of the Ministry of National Education.

As a starting point in the study of the documents, the first authors reviewed and coded these using thematic analysis. Thematic analysis is a qualitative method to uncover, interpret, and present the significant patterns, referred to as “themes”, embedded within data (Braun and Clarke, 2006). By adopting a coding process, textual data can be systematically processed to categorize key concepts into codes (Vaismoradi and Snelgrove, 2019). More particularly, this method was applied to extract the key quality criteria defined by each national policy for designing qualitative and innovative learning environments. The identified themes and codes were consolidated into three frameworks, each corresponding to one national policy. To validate the findings, the fourth and fifth authors examined the previously identified codes and themes, following an iterative process to ensure data saturation. Afterward, a comparative analysis was conducted on the three established frameworks regarding the quality criteria identified in policy. This way, the research team could highlight

potential shared ambitions, divergences, and gaps in how school environments are envisioned across different European contexts. The results of this comparative step were later incorporated into the triangulation process to assess the alignment of architects’ practical work with the main design directions outlined in national policies and guidelines. This way, all researchers were informed about the tenor of each national policy and how they relate to one another, as the policies’ tendencies could affect how schools are designed.

2.2 From theory to practice: a selection of cases

Then, to shift from the theoretical directions given by policy to the practical perspective of built school environments, the first authors selected a recently constructed primary school developed under their respective national policy. In selecting the three cases, priority has been given to the analytical richness of the cases and their potential for comparative analysis rather than the size of the sample. This approach allows for a thorough examination of the relationship between the principles defined in policy documents and architects’ design decisions.

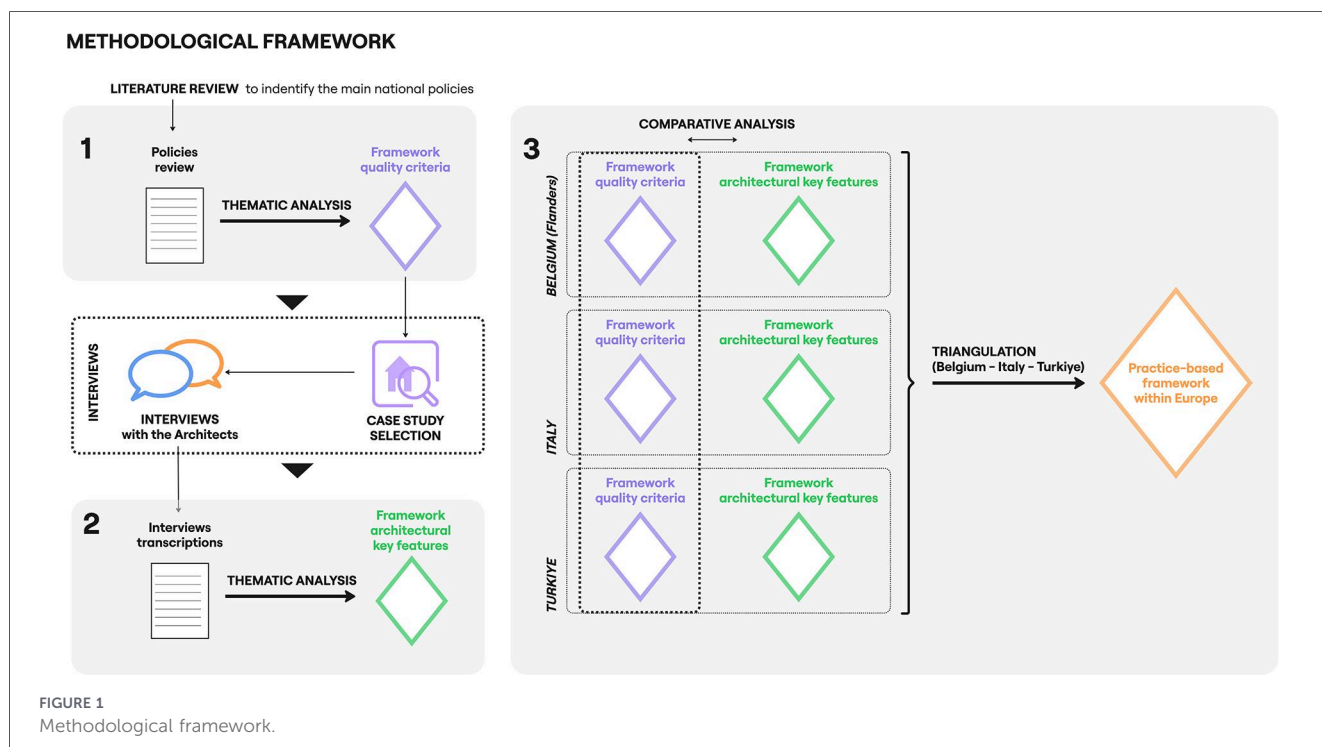
Each case was selected through purposeful sampling to gain an in-depth understanding of the specific school environment (Patton, 2015), and all researchers used the same selection criteria: as a first important criterion, each school was marked as an ‘innovative design’, meaning that it had to be labeled as significant at the national level through publications in relevant journals, awards, or discussion in expert panels. Additional criteria were: primary education level, cooperating designers, and a construction year ranging from 2020 to 2025.

The first authors each conducted one semi-structured interview with the architect involved in the design of the selected case. This allowed the researchers to gain in-depth insights into the architectural key features in newly built school environments. In the following paragraphs, each case will be briefly introduced, outlining the main characteristics of the school design.

2.2.1 GO! Basisschool Klim Op, Zandbergen, Belgium

The Flemish case study concerns GO! Basisschool Klim Op, a renovated primary school and kindergarten in Zandbergen, a village west of Brussels. In 2021, the Belgian design office B2Ai, together with Rosan Bosch Studio, was selected through a public procurement procedure by the Flemish Community Education Commission. The school has been in use since September 2024 and received the award for Best Interior Project in Education at the World Architecture Festival in 2025. The architectural concept is grounded in contextual integration, resulting in three house-like volumes organized around a central atrium. Each volume reflects the local building typologies through its two-story structure and gabled roof, while the central atrium refers to the village square as a collective meeting space. The building’s positioning and materialization further reinforce its integration within the local context (see Figure 2a). The 3.360 m² gross floor area is organized according to the

¹Following the thematic analysis of the Flemish policy documents, a new edition of ‘De Schoolgebouwenmonitor’ (AGION, 2025) has been released and is therefore excluded from the policy analysis.



volumetric logic: one volume accommodates administrative functions and a sports hall, while the others house learning landscape units across both floor levels. The central atrium functions as a shared space with a tribune staircase, discovery room, and informal “living room” (B2Ai, n.d.; see Figure 2c).

Pedagogical principles are integrated throughout the school design. The school is conceived as a continuous learning landscape, extending across indoor and outdoor environments. Conventional classrooms are replaced by learning landscape units, composed of different learning settings that facilitate interaction across age groups and support both individual and collaborative learning (see Figure 2b). Outdoor spaces similarly depart from traditional playground models, offering a differentiated landscape of orchard, meadow, and vegetable gardens (B2Ai, n.d.; Bosch, n.d.; see Figure 2d). Strong visual and spatial connections between the atrium and outdoor learning spaces, enhanced through large openings, reinforce spatial continuity and daylight penetration.

For this study, the project lead architect of the Flanders-based office B2Ai was invited to participate in the interview. B2Ai is a 140-person design office based in Brussels, Gent, and Roeselare. Their extensive project list contains a variety of building types. Among their team, several architects have a profound expertise in designing school environments, ranging from nursery to higher education.

2.2.2 Sforzacosta preschool, Macerata, Italy

Completed in 2023 by the Turin-based architecture firm BDR Bureau, the Sforzacosta preschool in Macerata, Italy, constitutes an example of architectural innovation and pedagogical principles. The school, designed for children aged 0–6, covers a footprint of 600 square meters and is part of a broader educational redevelopment initiative (Professione Architetto, 2024). The

preschool consists of three independent yet interconnected volumes, unified under a large pitched roof, which accommodate classrooms, workshops, a library, and communal areas (see Figures 3a–e). The flexible layout of the building makes spaces adaptable to different learning activities and age groups, where even transitional spaces take on an active role and, instead of being simple passageways, encourage informal interaction and play (BDR bureau, 2025) (see Figures 3c–g). A core feature of the building is the connection between indoor and outdoor spaces reinforced by large windows and multiple access points to the surrounding garden, allowing generous daylight into the building and creating openness (see Figure 3d). The materials were selected carefully, with extensive use of timber, along with other recyclable and non-toxic materials, that contribute to the interior’s quality, the performance, and sustainability of the entire building. Other sustainable choices are a natural ventilation system, a setback façade for solar shading, and good acoustics.

The school’s pedagogical philosophy is reflected in its spatial logic. Rather than rigid compartmentalization, the layout encourages fluid movement and social interaction of all users (BDR bureau, 2025). Architectural elements such as portals, skylights, and varying ceiling heights define activity areas. Dedicated spaces for music, sensory workshops, and creative play are seamlessly integrated into the overall spatial framework, promoting a holistic approach to early childhood education. Beyond its functionality, the preschool is an aesthetically engaging environment. The warm material palette, natural light, and intentional framing of views create a space that is both calming and stimulating.

School design seems to be the hallmark of the BDR bureau. This Turin-based studio particularly focuses on the architecture of re-adaptation and the design of living, work, and learning spaces, its projects always prioritizing a deep understanding of



FIGURE 2

(a–d) Primary school Klim Op in Zandbergen, Belgium. All images and floor plans in the figure are copyrighted by B2Ai. Reprinted with permission from Basisschool Klim Op Zandbergen by B2Ai, photographs licensed under © Klaas Verdu and floor plans licensed under © B2Ai. <https://b2ai.com/projecten/basisschool-klim-op-in-zandbergen/>

the context. BDR bureau has also received awards and international recognition (BDR bureau, 2025), such as the “Young talent of Italian architecture” award, participation in two editions of the La Biennale di Architettura in Venice, and publication in historical architecture magazines, such as *Casabella* (Magni, 2025). The Sforzacosta preschool has been nominated for the EUMies Award 2026.

2.2.3 Akşemsettin primary school, Istanbul, Türkiye

Akşemsettin Primary School was designed in 2021 by Uygur Architects, one of Türkiye’s leading architectural firms. The firm has received numerous awards in both national and international competitions and was honored with the 2026 Mimar Sinan Grand Prize. The school is one of the educational buildings constructed under the “45 Public Buildings in Istanbul” project, which was also designed by Uygur Architects (Uygur and Uygur, n.d.a). This initiative, which involves the demolition and reconstruction of schools in Istanbul as part of

the ISMEP (Istanbul Seismic Risk Mitigation and Emergency Project), aims to modernize educational spaces while increasing their capacity. The newly designed schools, which are rebuilt on the same plots, have been tailored to their specific contexts. Reinterpreting the architectural and social significance of Akşemsettin Primary School, located in Küçükçekmece, an area undergoing rapid transformation from dense informal settlements to mass housing developments, has been a key consideration (Uygur Architects, 2022). Until 2018, Akşemsettin Primary School operated in a building with poor seismic resistance, occupying a constrained, inflexible space of 3,497 m² with 35 classrooms and 2 kindergarten rooms with a capacity of 1,400 students (Archdaily, 2022). Despite the increase in the school’s program, which resulted in a dramatic shift in the mass-open space ratio, the challenge of accommodating this dense program was resolved through a balanced composition of several orthogonal units, which accommodate common and social functions, integrated in the site’s topographical variations. The unit’s composition forms a plinth with a central courtyard. On top of the plinth, classroom units are organized in a



FIGURE 3

(a–g) Sforzacosta Preschool in Macerata, Italy. Reprinted with permission from Sforzacosta Preschool by BDR Bureau, licensed under © BDR Bureau. <https://www.bdrbureau.com/portfolio/preschool-in-macerata/>



FIGURE 4

(a–g) Akşemsettin Primary School in Istanbul, Türkiye. Reprinted with permission from Akşemsettin Primary School by Uygun Architects, licensed under © Uygun Architects. Photos: Cemal Emden, Gürel Kutlular. <https://www.uygunarchitects.com/site/en/projects/aksemsettin-io>

compact disc-like form. The interstitial spaces that arise from this composition function as areas for social interaction.

To accelerate the school reconstruction process, Uygun Architects developed a strategic approach by designing a “library” of materials, details, and their various compositions (Uygun and Uygun (n.d.b)). While each project remains unique, the architects view this library as an “alphabet” from which different “sentences” can be composed for each project. In Akşemsettin Primary School, brick and exposed concrete are

prominently featured, with the façade of the disc-shaped mass using textured concrete (see Figures 4a–c, f). The gross built area of the demolished building was expanded 2.5 times, increasing from 3,497 m² to 11,669 m², adding communal spaces, laboratories, sports fields, and multipurpose halls. The openings in the ceiling ensure maximum daylight efficiency. The materials remain bare indoors, based on the assumption that children will add color to the space (see Figures 4b–d, g). The number of classrooms increased to 56, incorporating music

ateliers, support education rooms, laboratories, art classrooms, and additional kindergarten playrooms, while the overall student capacity remained unchanged. The project's pedagogical dimension is reflected in the provision of diverse learning and social environments beyond conventional classroom settings. The central courtyard and the interstitial spaces formed between the orthogonal units encourage informal interaction, collective activities, and social engagement among students. In addition, specialized facilities such as laboratories, music studios, art classrooms, and remedial education rooms support multiple modes of learning. Together, these spatial features contribute to a holistic educational environment where formal instruction is complemented by social, creative, and experiential learning opportunities unlike typical school projects in Türkiye.

2.3 The practice-based exploration: Thematic analysis of case study interviews

2.3.1 Data collection

The first three researchers contacted the respective design office for each of the selected school projects. Before the interview took place, the questionnaire and informed consent form were provided to ensure the interviewee was well informed about the interview's setup. Each researcher prepared a specific interview model based on the thematic analysis of their policy review (see [Supplementary Appendices 1–3](#)). The identified themes and quality criteria were integrated into the questions concerning the school's design and the planning process. Specific questions on the use of policy documents and other guidelines, as well as the moments of consultation during the design process, were also included in the interview models, with the aim of investigating whether and how architects follow, modify, or decline to follow the key policy aspects in their own way.

The final sample of architects participating in the study consisted of 3 architects, including 2 men and 1 woman, all with a Master's Degree in Architecture. After the architects signed a form agreeing to participate in the research, all three semi-structured interviews were conducted via online meetings on Google Meet² and Zoom³. Each interview followed the protocols of [Kallio et al. \(2016\)](#), in which each researcher first introduces themselves and the study's scope, then submits the questions. For the Flemish case, the interview was conducted on 19 August 2025 and took about 105 min. For the Italian case, the interview took place on 8 July 2025 and lasted 90 min. For the Turkish one, the interview took place on 20 August 2025 and took about 90 min.

To support data collection, all interviews were recorded with participants' prior consent, except for the interview with the Italian architect. In that case, to respect the interviewee's preference not to be recorded, the researcher used MaxQDA⁴ software to instantly transcribe the architect's narrative and simultaneously took notes to assess the transcription's accuracy afterward. All interviews were transcribed verbatim in the primary language of the first three researchers, i.e., Dutch,

Italian, and Turkish, using AI transcription software, followed by a manual review of the transcribed file.

2.3.2 Data analysis and triangulation

After the thematic analysis of the policy documents, each researcher conducted a second thematic analysis of the interview transcripts. Following a three-step coding process, a new set of codes was assigned to relevant paragraphs, which were then grouped into themes and finally integrated into a second framework. These second frameworks summarize the key architectural features of the design qualities for each school. Each researcher established two separate frameworks based on two thematic analyses: one framework on quality criteria from the analysis of national policy reports (see [Tables 1–3](#)), and a second framework on architectural key features according to the analysis of the interviews with architects (see [Tables 4–6](#)). Before starting the triangulation process, the first three researchers conducted a comparative analysis of their two established frameworks (see [Figures 5–7](#)). This way, they examined how the designers in each country interpreted and spatially integrated the policy quality criteria. These findings were then triangulated to establish a practice-based framework for key design interpretations in a European context. The triangulation process took place via an online discussion through a video call, with the first three researchers participating. This final step marks the two kinds of triangulation present in this study: data source triangulation and investigator triangulation ([Patton, 2015; Stake, 1997](#)). Data source triangulation involves comparing various data sources within the same methodology, derived by different means and from different perspectives ([Patton, 2015; Stake, 1997](#)). In this study, the different information sources refer to the policy documents and the interview transcripts, whilst the different perspectives are linked to the nature of the cross-country research. Second, investigator triangulation involves reviewing the same phenomenon with multiple researchers ([Patton, 2015](#)). In this study, the researchers have investigated the same research questions using the same methodological steps. Although each investigated a unique case in a different national context, comparing and collectively discussing the results enhances their credibility. The triangulation process was carried out through structured iterations in the discussion among the researchers, during which the themes derived from policy documents and interview data were systematically compared. Instances of convergence and divergence were explicitly identified and critically examined. Interpretative discrepancies among researchers were resolved using a structured, consensus-based approach, in which independently coded data were compared and discussed iteratively until full consensus was reached, ensuring the reliability and consistency of the resulting practice-based framework ([Miles et al., 2014](#)).

3 Results

This section illustrates the multiple results obtained from (1) the thematic analysis of the policy documents, (2) the thematic analysis of the interviews with architects, and (3) the comparative analysis of the frameworks and the triangulation

²<https://meet.google.com/>

³<https://www.zoom.com/>

⁴<https://www.maxqda.com/>

TABLE 1 Themes and codes derived from the thematic analysis of Flanders' policy documents.

Themes	Codes	Frequency ¹
B_A) Structural quality	B_A1. A robust structural system	3
	B_A2. A good condition of all building elements	3
	B_A3. Risk prevention (safety, health, and hygiene)	4
B_B) Sustainability	B_B1. Use of sustainable materials	4
	B_B2. Energy-efficiency	4
	B_B3. A comfortable indoor climate (temperature, lighting, air quality, acoustics)	7
B_C) Functional quality	B_C1. Size and spatial capacity	4
	B_C2. Optimal spatial organization	5
	B_C3. A clear spatial structure	3
	B_C4. Integration of ICT and technology	6
	B_C5. Opportunities for student supervision	3
	B_C6. Spatial support of the pedagogical project	4
	B_C7. Flexibility and multifunctional use	6
	B_C8. Integral accessibility	4
	B_C9. Connection between classrooms and outdoor spaces	4
B_D) Design and experiential quality	B_C10. Qualitative rooms for staff	3
	B_C11. Meeting ergonomic needs	1
	B_C12. Opportunities for privacy and casual encounters	3
	B_D1. A stimulating working and learning environment	6
	B_D2. Cultural-historical value	4
	B_D3. Design elements with a didactic function	3
	B_D4. The design conveys the school's identity, mission, and values	4
	B_D5. An inviting meeting space	3
	B_D6. An appealing design	4
B_E) Quality of the school environment	B_E1. Accessible mobility and traffic safety	7
	B_E2. Extending the physical learning environment beyond the school domain	1
	B_E3. Presence of natural elements in the school domain	3
	B_E4. Spaces for after-school activities and the local community	4
	B_E5. Use of public facilities in the school's proximities	4
	B_E6. Qualitative public spaces surrounding the school site	1
B_F) Costs	B_F1. Cost-efficiency	3

process to combine the various data and highlight how school design is interpreted by architects across Europe.

3.1. Quality criteria in policy documents among the three countries

For each country, the policy findings were grouped into two broad categories, marked in different colors across [Tables 1–3](#). Specifically, the themes in light orange are seen as design aspects for **quality learning spaces**, since they tend to represent more technical and building-related features. The light blue ones, instead, are regarded as aspects related to the **quality of living in learning spaces**, since they tend to reflect more conceptual features, connected to users' needs and experiences.

Regarding Flanders' policy, six main themes were determined: "Structural quality", "Sustainability", "Functional quality", "Design and experiential quality", "Quality of the school environment", and "Costs" (see [Table 1](#)).

"Structural quality" concerns the importance of a solid construction, the building's stability, the building's envelope,

technical installations, and compliance with various regulations, such as fire safety, risk of falling, pollution, and burglary safety. "Sustainability" entails the use of sustainable materials and renewable energy in an energy-efficient way. These technical installations allow for a comfortable indoor climate, enhancing user comfort. In this regard, the importance of acoustics is emphasized. "Functional quality" describes the spatial organization of the school building, which was highly emphasized in all analyzed documents. The two most frequently mentioned criteria are the integration of ICT and technology, and the multifunctional use and flexibility of spaces. Additionally, the physical school environment must spatially support the pedagogical practices. "Design and experiential quality," elaborates instead on how the school building is experienced by its users. The school is a working and learning environment that should foster an inviting and stimulating atmosphere. Moreover, the design must convey the school's identity, mission, and values and integrate architectural and natural elements with a didactic function. "Quality of the school environment" focuses on the school domain and its surrounding context, mainly emphasizing traffic safety for all road users and

TABLE 2 Themes and codes derived from the thematic analysis of Italian policy documents.

Themes	Codes	Frequency ¹
I_A) Building quality	I_A1. Comfort and Safety	7
	I_A2. Size and Distribution	2
	I_A3. Integrating spaces with technology	9
	I_A4. Integrating the school into the context	3
	I_A5. Flexible and Interconnected spaces (also integrating nature)	4
I_B) Sustainability	I_B1. Low tech solutions	4
	I_B2. Energy efficiency	4
	I_B3. Sustainable materials and building techniques	2
	I_B4. Renewable energy sources	3
	I_B5. Natural light	2
I_C) Inclusion	I_C1. Accessibility for all	3
	I_C2. Supporting learning for all (supporting different cognitive styles)	3
I_D) Pedagogical design of spaces	I_D1. Supporting students' needs:	7
	– Classrooms should help consolidate students' various skills and adapt to their different needs;	(3)
	– Tailoring learning experiences.	(4)
	I_D2. Supporting learning and wellbeing of school community:	5
	– Spaces should support wellbeing;	(2)
	– Spaces should support active and collaborative learning;	(3)
	I_D3. Valuing pedagogical leadership:	8
	– Teachers' spaces as a resource of educational action;	(2)
	– Importance of teaching design;	(2)
I_E) A school for community	– Understand what classroom allocation system the school plans to adopt;	(2)
	– Interdisciplinary dialogue.	(2)
	I_E1. The school as a social place to promote an “implicit pedagogy” (educate school and non-school community and transmit values)	3
	I_E2. The school as a place to foster social interaction within the building	3
	I_E3. Involvement of school and non-school community	5

accessible mobility. The immediate surroundings should offer quality public spaces and facilities for learning outside of the school. In return, the school must share its infrastructure for after-school activities and engage with the local community. Finally, “Costs” focuses on low infrastructure costs relative to the building's footprint.

The Italian policy resulted in five core themes: “Building Quality”, “Sustainability”, “Inclusion”, “Pedagogical Design of Spaces”, and “A School for Community” (see Table 2).

“Building Quality” emphasizes spatial organization of learning spaces to support a flexible management of learning activities, while connected with other indoor and outdoor school areas. The school building should be integrated into the local context, offer good indoor comfort, and a safe environment to learn and work. In line with the topical issue of digital transition, school spaces should accommodate new technologies. “Sustainability” involves sustainable materials, building techniques, enhancing natural light, and using energy consciously. Another theme covered in the Italian policy documents is “Inclusion”, which underlines how Italian schools should support students' diverse abilities and learning styles to ensure an inclusive learning environment for all. Additionally, all classrooms and school areas should be accessible to all. All the themes seem to be related to the “Pedagogical Design of Spaces”. This key aspect is evident in the attention to both students and teachers. Indeed,

on the one hand, school spaces should adapt to students' diverse needs to enable personalized learning experiences and strengthen their skills. On the other hand, the documents indicate that the school design must prioritize pedagogical leadership enhancement by providing appropriate workspaces. Furthermore, Italian school-building policy encourages an interdisciplinary dialogue between designers and educators. Additionally, the spaces should support an active and collaborative learning environment and promote the overall well-being of the entire school community. “A School for Community” represents an “implicit pedagogy”, which means educating the entire community by transmitting values. Finally, being a social place, the design should encourage interactions between educational spaces and the whole community.

In Türkiye, school design regulations are overseen and developed by the Ministry of National Education. There is only one official guide on school design in Türkiye, published in 2015. This guide covers requirements ranging from school grounds to building parameters. This guide revealed five main themes: “Building quality”, “Architectural and spatial organization”, “Inclusion”, “Sustainability”, and “Pedagogical criteria” (see Table 3).

“Building quality” represents the importance to use modular building forms for future building extensions and adaptation to the local site in terms of form, organization, and structure. “Architectural and spatial organization” emphasizes

TABLE 3 Themes and codes derived from the thematic analysis of Turkish policy documents.

Themes	Codes	Frequency ¹
T_A)Building Quality	T_A1. Building form, orientation, construction	14
	T_A2. Building elements and materials	12
	T_A3. Safety and emergency standards	12
	T_A4.Building services and infrastructure	12
T_B)Architectural and Spatial Organization	T_B1.Classrooms should be naturally lit, well-ventilated and optimally oriented	6
	T_B2.There should be common areas such as libraries, multipurpose halls, sports fields, dining halls, canteens	14
	T_B3.Administrative areas should be designed in accordance with standards	8
	T_B4.Circulation areas should have wide corridors, ramps, fire escapes	11
	T_B5.Wet areas should be designed in accordance with standards	8
	T_B6.Technical rooms (generator, system room, etc)	10
	T_B7.Minimum 15 m2/student indoor-outdoor space separation (certain sq-meter conditions)	7
	T_B8.Flexibility and adaptability	13
	T_B9.Open space and landscaping	10
T_C)Inclusion	T_C1.User comfort and feeling of convenience	9
	T_C2.Feeling of security and peace	5
	T_C3.Feeling of ownership and belonging	6
	T_C4.User orientation and Accessibility for all	11
	T_C5.Comfort Conditions	9
T_D)Sustainability	T_D1.Site Selection and Land Standards	7
	T_D2.Proximity to residential areas	8
	T_D3.Easy access to public transportation	3
	T_D4.Distance from traffic, noise, and pollution sources	6
	T_D5.Energy efficiency	15
	T_D6.Renewable energy systems	10
	T_D7.Recycled materials, eco-friendly landscaping	7
T_E)Pedagogical Criteria	T_E1.Environments where students can express their expectations in social and work areas	6
	T_E2.An architecture aligned with 21st-century skills, interdisciplinary learning, community-based education	5
	T_E3.School for community approach	6
	T_E4.Lifelong learning approach	4

multiple criteria, such as natural and artificial lighting in classrooms, multi-functional spaces in common areas, spatial requirements for administrative and management areas, requirements for circulation areas, solutions for technical rooms, flexibility and adaptability, and outdoor space landscaping. Next, “Inclusion” involves user comfort, a sense of belonging, feeling secure, user orientation, physical accessibility, and physical comfort. “Sustainability” instead highlights correct land selection, proximity of residential areas to public transportation, prevention of traffic noise pollution, physical energy efficiency solutions, renewable energy systems, recycled materials, and environmentally friendly landscaping. Finally, “Pedagogical criteria” discuss meeting the 21st-century competencies and hosting different kinds of learning, such as interdisciplinary learning.

3.2 Educational spaces: key features in the words of architects

This subsection outlines the key architectural features identified by architects in built schools. The findings were

grouped into three distinct categories of different natures, each marked with a different color (see [Tables 4–6](#)). The first and second categories were also present in policy guidelines: (1) the design quality of learning spaces marked in light orange, and (2) the quality of inhabiting learning spaces marked in light blue. The third category, highlighted in light brown, lies at the intersection of the other two, as (3) it includes themes or codes that are technical or design-oriented but whose relevance ultimately depends on their contribution to the liveability and experiential quality of educational spaces.

For the Belgian case, five themes were identified: “Qualitative spaces for learning and experience”, “Connection to the spatial context”, “Flexibility and extensive use”, “Optimal spatial organization”, and “Sustainability”(see [Table 4](#)). The design concept is related to the rural context of the village Zandbergen, which refers to “Connection to the spatial context”. The architects created a ‘village-like architecture’ of three house-shaped volumes clustered around a central atrium, which hints at the village square. Each house-like volume accommodates a different set of functions. The characteristics of the local neighborhood are reflected in the metal cladding, the gabled roof typology, and the materials and colors used in the interior.

TABLE 4 Themes and codes derived from the thematic analysis of the interview with the architect of the Belgian case.

Themes	Codes	Frequency ²	Sentences ³
B_a) Qualitative spaces for learning and experience	B_a1. Design classrooms as learning landscapes	7	<i>“[...] all those typical spaces that are, yes, sometimes very open and, and transparent, to spaces with a lot of privacy, which are very secure. All those gradients for students to be able to, yes, intuitively do their tasks and to learn in a way that works for them.”</i> <i>“[...] those learning landscapes are didactic as such. Also, I think, definitely, the landscape design; there’s a vegetable garden, there’s a rain garden, those chickens and rabbits there, the orchard, it’s all meant to be didactic.”</i>
	B_a2. Provide differentiated learning spaces (in scale, size, privacy gradient, openness, materialization, etc.)	7	
		2	
	B_a3. Stimulate students to intuitive and independent learning	2	
	B_a4. Enhance learning from peers through visual and acoustic interaction	2	
	B_a5. Different types of didactic outdoor spaces		
B_b) Connection to the spatial context	B_b1. Align the scale and typology to the characteristics of the neighborhood	2	<i>“In terms of scale, of course, we tried our best to adopt the scale of the village into our architecture [...].”</i> <i>“[...] all kinds of things are happening at the school gate, and actually we had the idea to make a kind of transitional space and make a kind of village square here [...].”</i>
	B_b2. Create transitional zones between the school and surroundings	2	
	B_b3. Architectural elements referring to the spatial context	2	
	B_b4. Visual interaction between the school and surroundings	2	
B_c) Flexibility and extensive use	B_c1. A column and beam structure to create an open floor plan	2	<i>“But we try to position as few load-bearing walls as possible in the interior of the rooms [...] in favor of flexibility.”</i> <i>“[...] just that flexibility of all those corners and spaces is very positive [...] for the students [...].”</i>
	B_c2. Different ‘nooks’ for flexible use	4	
	B_c3. Facilitate extensive use	3	
B_d) Optimal spatial organization	B_d1. Spatial layout linked to the volumetric concept	2	<i>“That led us to actually connect three small house-shaped volumes together around a central atrium. One of these volumes houses everything in terms of supporting functions [...]. Those two other volumes contain the learning landscapes, kindergarten on the ground floor, and upstairs, the elementary school.”</i> <i>“But all the circulation space in there, we’re trying to design it into sitting areas [...]. Anything that can support those students with the available money, using it as best as we can.”</i>
	B_d2. Circulation becomes a space to stay in	1	
	B_d3. Maximize the space for learning	2	
B_e) Sustainability	B_e1. Use of circular materials and demountable building systems	1	<i>“As for the facades, we have also tried to focus on things that can be dismantled, such as corrugated metal cladding on the walls and on the roof [...].”</i> <i>“In terms of technical installations, we have a heat pump, a system D ventilation, [...], green roofs, rainwater recovery, solar shading, [...], solar panels, [...], daylight control.”</i>
	B_e2. Use of modern technical installations for the user’s comfort	1	
	B_e3. Use of renewable energy sources	1	

Also, the design of the outdoor space is inspired by the surrounding nature, resulting in various typological outdoor areas. An entrance square acts as a transitional zone between the school site and the village. Also, opening up the sports hall, outdoor spaces, and main atrium to the local community contributes to neighborhood connection. To enable extensive use, the architects carefully planned the location of entrances, considering accessibility and security of spaces after school hours. Next, regarding “Qualitative spaces for learning and experience”, the architects designed classrooms as learning landscapes, which are large and dynamic open areas containing different zones for various learning activities. Each learning landscape is designed around a specific theme related to the natural structures around Zandbergen, such as the Dender River. All learning spaces are connected to

adjacent spaces, either visually and/or acoustically, to enhance didactic potential. The open floor plan is achieved by a column-and-beam structure. This way, the architects dedicated most of the available area to learning spaces with circulation areas designed as open common areas for learning and play, reflecting an “Optimal spatial organization”. The openness of the school building and the multitude of working areas reflect the theme “Flexibility and extensive use”, whilst the differentiation in learning areas relates to the theme “Qualitative spaces for learning and experience”. Finally, regarding “Sustainability”, the newly-built school meets contemporary requirements for renewable energy and technical installations, while also using reusable insulation and a demountable cladding system for the facades and the roof.

The architects' statements on the Italian case resulted in five themes: "A well-designed school building", "Sustainability", "Inclusion", "Spaces for learning and wellbeing", "A school for community" (see Table 5). All these broad aspects, as affirmed by the architect himself, are taken into account during the early stage of the design process (i.e., conceptualization) and gradually articulated throughout the process, until completion of the building.

"A well-designed school building" is perhaps one of the dearest to the interviewee, along with "A school for

community". It refers to the role of a good design, seen as a primary aspect: with good design, the other essential aspects in today's society (e.g., sustainability, inclusion, learning and wellbeing, and openness to community) will follow naturally.

The Italian architect emphasized the organization of spaces by valuing the school's contextual integration, making spaces versatile according to students and teachers' needs, and creating distribution spaces for informal activities and learning. A good architectural design is also determined by architectural details,

TABLE 5 Themes and codes derived from the thematic analysis of the interview with the Italian architects.

Themes	Codes	Frequency ²	Sentences ³
I_a) A well-designed school building	I_a1. Connection between Interior and Exterior	2	
	I_a2. Sweating the details	4	
	– Well-integrated technological and structural aspects	(2)	
	– Designing customized and comfortable furnitures	(2)	
	I_a3. Non-predetermined spaces	3	<i>"It is important that spaces are not predetermined, which means that even the distribution space [...] is open to interpretation [...]. If (the designed spaces) do not match the ideas of the teaching staff, those spaces become a mistake. [...]"</i>
	I_a4. Distribution spaces as active spaces	2	
	I_a5. Comfort comes naturally	8	<i>"For us, it is precisely the architecture that creates comfort. The fact that we had feedback from students who are there and are happy to be there is, in my opinion, the first very strong confirmation."</i>
	– Feeling good in the school	(4)	
	– Acoustics	(2)	
	– Geometrical shape of the building	(2)	
I_b) Sustainability	I_b1. Energy efficiency and use of renewable energy sources	2	<i>"With this project, we built a photovoltaic field [...]. (The building) is entirely heated by heat pumps, [...] so there are no radiators and absolutely no gas boiler. [...] Everything is in line with [...] NZEB (principles), which stands for Near Zero."</i> <i>"The materials are natural, starting with the structure, which is made of wood [...]. We requested that the windows and doors [...] be made of aluminum for durability. The interior flooring is linoleum."</i>
	I_b2. Sustainable materials and building techniques	2	
I_c) Inclusion	I_c1. Inclusion is a consequence of good design	1	<i>"A decompression space therefore gives the child the opportunity to take their time, relax, and then join the other students."</i> <i>"By working with materials, with open spaces, and in some cases with spaces that are partitioned and partitionable, you can manage this type of situation. At Sforzacosta, for example, [...] it wasn't possible to freely work on this, [...] but in my opinion, working with welcoming spaces, acoustically controlled spaces, and well-balanced materials in terms of colors and surfaces (may be helpful)."</i>
	I_c2. Providing decompression spaces for students with SEN (and others)	1	
	I_c3. The importance of choosing the right materials, textures and colors	2	
	I_c4. Adopting an interdisciplinary approach to make schools inclusive (learning inclusion from teachers and school staff)	2	
I_d) Spaces for learning and wellbeing	I_d1. Spaces that support various activities and users' needs	2	<i>"An important point that we apply to all projects is to try to give a sort of 'domesticity' to the environments, in the sense that the users feel as if they were at home. [...] It is a welcoming environment that supports you throughout your studies and your time in that building."</i> <i>"I often see [...] that teachers, for example, gather in spaces like this auditorium-library, that are spaces with multiple functions, [...] spaces where they can read, go outside and so on."</i>
	I_d2. Making school feel like home	4	
	I_d3. Providing both private and shared spaces	2	
	I_d4. Everyone has their own space	2	
I_e) A school for community	I_e1. The school as a center of attraction, open to community	3	<i>"There is a whole big issue behind this question of community, which is fundamental. Schools must be points of reference for communities, because unfortunately, in our current society, there is not much space or support. Therefore, schools are a center of attraction; they must be."</i>
	I_e2. The school as a social place to educate school and non-school community	1	

TABLE 6 Themes and codes derived from the thematic analysis of the interview with the Turkish architects.

Themes	Codes	Frequency ²	Sentences ³
T_a) User-centered design approach	T_a1.Ensuring physical comfort conditions and safety	7	“These schools were already built because of the earthquake [...]As for fire, it was built in accordance with the existing standards for fire regulations for the types of use of the space.” “But we mostly did not make the classrooms face each other, unless we had to face each other because of the problems of the opposite plot of land, in terms of smallness, in terms of dimensional adequacy.”
	T_a2. Accessibility	3	
	T_a3.Aesthetic decisions (color, furniture, graphic designs, etc.)	4	
	T_a4. Resistance against type (standard) projects	4	
	T_a5. Material selection decisions	9	“What we do everywhere is to honor the material. They all preserve their own identities and bring each other into existence without destroying each other.” “Here, we are trying to use every square centimeter of the land as an open and closed education area, which sits on the land like a claw and establishes a relationship with all its elevations.”
	T_a6.Relationship with place/topography	6	
	T_a7.Interactive architecture approach	2	“This process, which we define as “interactive architecture,” is evident in our work, as it takes into account not only the users of the building, but also everyone who is indirectly affected by it.”
T_b)Sustainability	T_b1.Considering of environmental conditions	3	“[...] to be socially sustainable and to fulfill the laws of physics regarding the building.”
	T_b2.Low maintenance	3	
	T_b3.Long-lasting material decisions	1	
	T_b4.Energy efficiency	3	
	T_b5.Social sustainability	3	“[...] to be socially sustainable and to fulfill the laws of physics regarding the building.”
T_c)User needs and participation	T_c1.Limitation of user participation	1	“Before the school started, the school administration was listened to. Their wishes and needs were listened to...” “Our concern is that students learn about life in this space.” “Participation is not an issue for us. It is not an issue for any building. I don’t know about the private sector, but since 98% of the buildings we design are public buildings, I am speaking from that side.”
	T_c2.School administration, teacher/parent requests	2	
	T_c3.Student oriented	7	
T_d)Spatial organization and flexibility	T_d1.Layered spatial composition	9	“...what we aimed to do here is to ensure that the dividers between the classroom and the corridor are removable, which will help the educational environment to be more participatory and collaborative in the future.”
	T_d2.Movable doors and walls	3	
	T_d3.Flexible classroom layouts	4	“...can also be removed if desired, making the corridor and the classroom one.” “Movable panel. The dividing wall and door can be removed.”
	T_d4. Social and shared spaces	5	
T_e)Social and community impacts of educational space	T_e1.Stereotypical perceptions of quality in public schools	2	“There is a perception in our country. What the state does may not be good. Private is better, more qualified, more wonderful.” “However, what the state does should be the most successful example of what the state does and what the state does should be the one to be inspired by. The state, which makes the rules and sets the laws, cannot make mistakes. We especially need to improve the standards of public schools.” “...that housing prices are increasing, students’ attendance and success rates are increasing.”
	T_e2.Students’ well-being, achievement and self-confidence	7	
	T_e3.Impact on the neighborhood	7	
T_f)Pedagogy and student experience	T_f1.Learning through social interaction spaces	6	“expressing themselves through physical and intellectual activities will cause these children to grow up as self-expressive individuals who are much more self-confident and much more confident than what they learn from what the teacher tells them, we tried to pay special attention to these.”
	T_f2.Participatory/active learning	5	
	T_f3.The school being the first social space	6	“In our designs, the interior of the school is all about the playground. We say that the real place of learning is in these places of learning from each other, which we design as indoor or outdoor playgrounds.”

such as integrating technological and structural aspects seamlessly into the project and designing custom-made furniture. According to the architect, a good architectural design naturally constitutes comfort through elements such as good acoustics and welcoming spaces. “Sustainability”, in the architect’s words, can be achieved by paying attention to the materials and building techniques used as well as to the use of renewable energy and energy efficiency. As mentioned above, “Inclusion” is also a consequence of a good architectural project, achieved through a few design considerations, such as providing decompression spaces, learning from teachers’ experiences, and choosing the right materials, textures, and colors. Turning to the pedagogical aspects, the interviewee acknowledged the importance of caring for students’ learning and the well-being of the entire school community, as represented by “Spaces for learning and wellbeing”. Indeed, the school environment should support multiple activities for both informal and formal learning, as well as the school community’s various needs. Additionally, the architect underlined that, to ensure users’ well-being, the design should make the inhabitants feel at home. This can be achieved, for instance, by providing both private and shared spaces and, more generally, by designing a building where everyone has their own space. Finally, “A school for community” was highly emphasized along with “A well-designed school building”. The architect conceives the school building as an essential social hub to attract and connect the community. In this regard, schools could serve as important social aggregators, charged with a pedagogical role as they are capable of educating the entire community.

Six main themes were identified by the Turkish architect: “User-centered design approach”, “Sustainability”, “User needs and participation”, “Spatial organization and flexibility”, “Social and community impacts of educational space”, and “Pedagogy and student experience” (see Table 6). These themes cover all stages of design, from the beginning of the design process to the construction phase and post-use process. This case, in the context of Türkiye, has a distinct feature: it is a project that emerged from a request to demolish and rebuild an existing school structure due to its lack of earthquake resistance. The site and region where the building is located are part of Istanbul, Europe, characterized by relatively high levels of migration and unplanned urbanization. Therefore, architects found the urban fabric in which the school is located to be quite critical in terms of demographic, sociological, and political context during the conceptual phase. The design was carried out from a comprehensive perspective, ranging from the city scale to a 1:1 scale. The architects create a unique solution for each school design by opposing the “typical sample projects”, relatively guided by the MoNE Standards. However, the project’s primary focus is the “schools should be alive” manifesto. The architects applied a user-centered design approach, considering the needs of students, school administration, and the neighborhood residents. The removal of the residential buildings around the school land and the relocation of residents were one of the most challenging aspects of this project. When addressing “Sustainability”, the architectural office especially emphasizes social aspects. In the selection of materials, the architects developed proper solutions such as reducing maintenance costs, using long-lasting materials that can be left bare, and energy

efficiency. “User needs and participation” emerged as carrying out a multi-faceted study, such as receiving requests from the project contractor, engineers, and school administrators, especially at the beginning of the project process. However, the interviewee also acknowledged that user participation in public buildings remains limited in Türkiye. Regarding “Spatial organization and flexibility”, learning spaces are not merely classrooms but also social spaces, considering a flexible classroom layout, multi-purpose use of courtyards, and layered spatial organization. “Social and community impacts of educational space” emphasizes the school as a social center for the community, opening the gymnasium and conference hall to the residents of the neighborhood. According to the Turkish architect, a well-designed school will turn students into good individuals and have a snowball effect on the future of society and the world. Finally, the architects considered “Pedagogy and student experience” as the student as an active rather than passive learner, and that spaces should support self-confidence. The school is the student’s first social space, the center of learning, with sports and art spaces contributing to students’ success and self-confidence.

3.3 Triangulation results

Through triangulation of national policy guidelines and architects’ perspectives in Belgium (Flanders), Italy, and Türkiye, first within each country and then across them, we derived a final interpretative framework.

3.3.1 Results within each country

For Flanders, most of the policy quality criteria are evident in the school’s design (see Figure 5). The policy criteria most prominently featured in the design concept were also those most clearly expressed in spatial form, except for “integration of ICT and technology integration”, which was hardly mentioned by the architect. Concerning pedagogy, policy criteria “spatial support of the pedagogical project” and “design elements with a didactic function” were translated into the design of differentiated learning landscapes and outdoor spaces. Next, the criterion of “optimal spatial organization” was reflected in shaping circulation areas as functional spaces, such as the main atrium and the kindergarten atrium. The criterion of “flexibility and multifunctional use” was reflected in the creation of different learning nooks and in the open floor plan enabled by the structural system of columns and beams. Then, policy criteria concerning the connection between the school site and the spatial context were translated into the scale, typology, materialization, and window positioning of the building. Furthermore, the policy criteria concerning traffic safety and quality of public space around the school were translated into the design of a transitional zone and a village square at the school entrance, including bicycle parking and drop-off areas. The criteria related to sustainability were reported in forms close to those expressed in policy. Criteria concerning the policy themes “Structural quality” and “Costs” were considered during the design process, but did not determine the quality of the school design.

		FLEXIBILITY AND EXTENSIVE USE			OPTIMAL SPATIAL ORGANIZATION			SUSTAINABILITY			QUALITATIVE SPACES FOR LEARNING AND EXPERIENCE				CONNECTION TO THE SPATIAL CONTEXT			
		2nd Analysis Codes																
		1st Analysis Codes																
STRUCTURAL QUALITY	A robust structural system																	
	A good condition of all the building's elements																	
	Risk prevention regarding safety, health and hygiene																	
SUTAINABILITY	Use of sustainable materials																	
	Energy-efficiency																	
	A comfortable indoor climate																	
FUNCTIONAL QUALITY	Size and spatial capacity																	
	Optimal spatial organisation																	
	A clear spatial structure																	
	Integration of ICT and technology																	
	Opportunities for student supervision																	
	Spatial support of the pedagogical project																	
	Qualitative rooms for staff																	
	Flexibility and multifunctional use																	
	Integral accesibility																	
	Meeting ergonomic needs																	
	Opportunities for privacy and casual encounter																	
	Connection between classrooms and outdoor spaces																	
DESIGN AND EXPERIENTIAL QUALITY	A stimulating working and learning environment																	
	Cultural-historical value																	
	Design elements with a didactic function																	
	The school's design conveys the school's identity, mission and values																	
	An inviting meeting space																	
QUALITY OF THE SCHOOL ENVIRONMENT	An appealing design of the building																	
	Accessible mobility and traffic safety																	
	Presence of natural elements in the school domain																	
	Extending the physical learning environment beyond the school domain																	
	Spaces for after-school activities and connection with the local community																	
COSTS	Use of public facilities in the school's proximities																	
	Qualitative public spaces surrounding the school site																	
	Cost-efficiency																	

FIGURE 5
Comparison between the 1st and 2nd analysis results of the Belgian case.

Shifting to the Italian context, the main themes resulting from the architect generally correspond to those resulting from the policy (see Figure 6). Starting with building quality, the integration with technology was reflected in “Sweating the

details”, as well as in structural aspects and customized, comfortable furniture. The integration of the school into its context was reflected in the emphasis placed on the connection between the interior and exterior. The organization of spaces

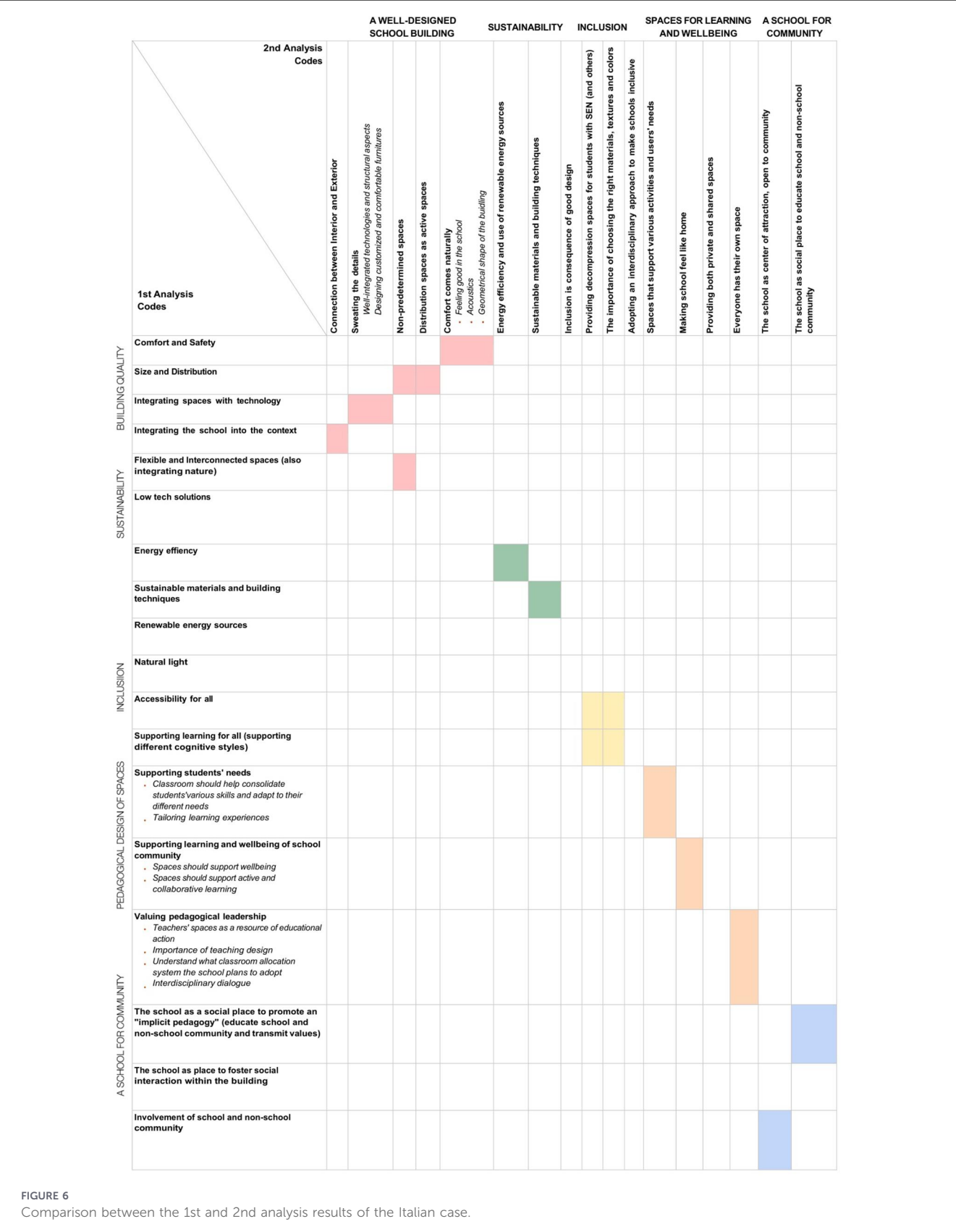
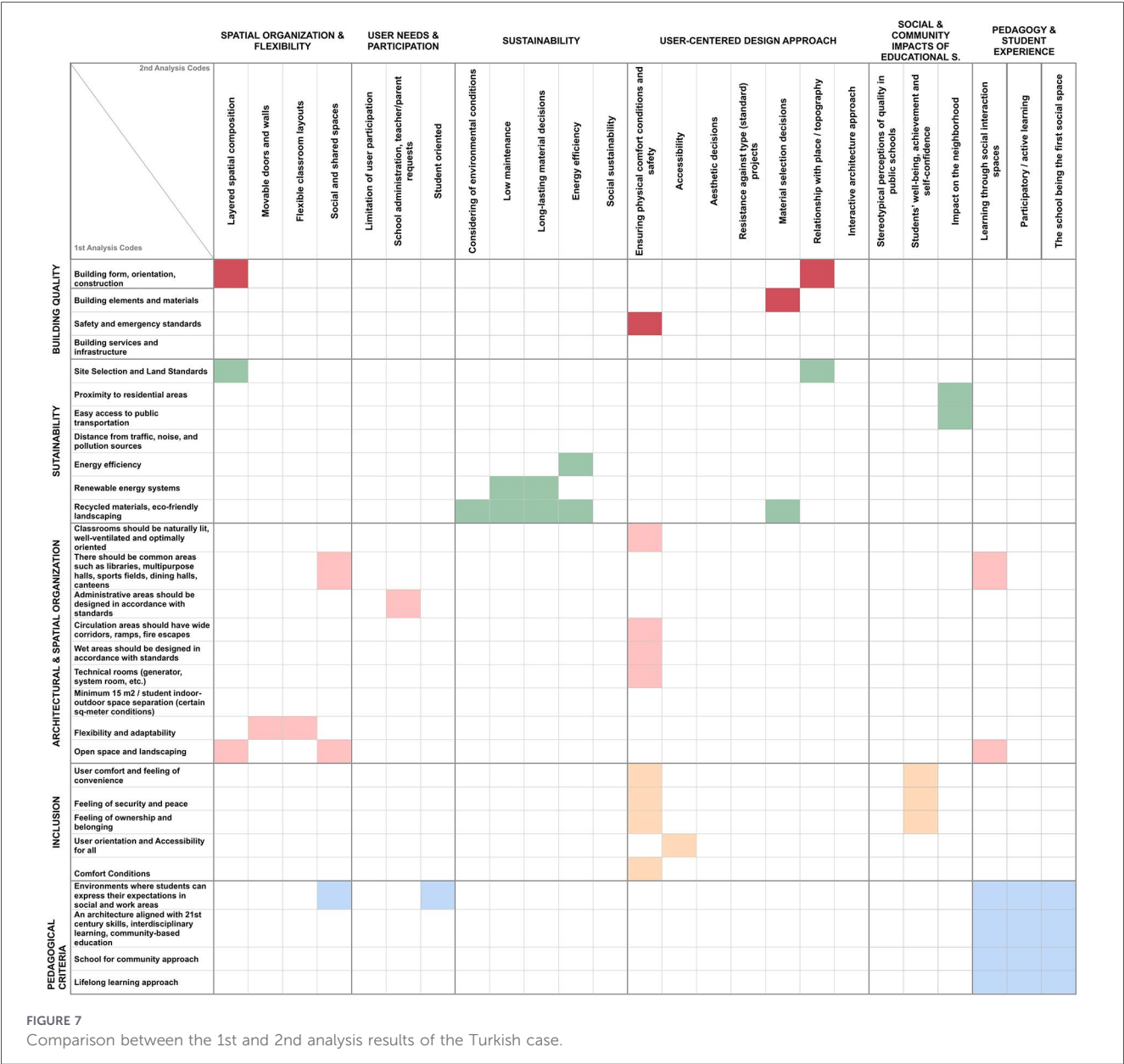


FIGURE 6
Comparison between the 1st and 2nd analysis results of the Italian case.

was reflected in the consideration of distribution spaces as active spaces and in the construction of fluid spaces able to accommodate multiple activities. This latter aspect also corresponded to the policy indication of flexible and interconnected spaces. Finally, comfort and safety were also mentioned in the architect’s account, with comfort described as part of a good architectural project. “Sustainability” was represented in the architect’s narration by fewer codes than in



the policy analysis, condensed into aspects related to the use of energy, materials, and building techniques. By contrast, inclusion was articulated through more specific design aspects by the architect. The policy references to accessibility and learning for all were reflected in the architect's account through inclusion as a consequence of good design, the provision of decompression spaces, and the use of appropriate materials and colors. In addition, learning from teachers and school staff in designing inclusive environments was additionally identified. The pedagogical aspects were present in both policy and interview, "Pedagogical design of spaces" and "Spaces for learning and well-being". The policy indication supporting students' needs was found in the architect's account. The policy statement on supporting learning and wellbeing was reflected in the concept of 'feel like home'. The importance of private and shared spaces and spaces for teachers to work in emerged as additional aspects. Finally, regarding community, the school as a social place for education was reflected in "The school as a

social place to educate school and non-school community", while the suggestion to engage the community was reflected in the idea of opening schools to the community and making them centres of attraction. In Türkiye, the architect applied the policy criteria to some extent (see Figure 7). Many design criteria considered important by the architect were overlooked in policy. In this regard, the shortcomings of the guide and its inadequacies were discussed during the interview. For example, the architect emphasized aesthetic decisions, actively showing resistance against the standard type projects. Therein, an interactive design approach was adopted, considering the impact on all users in and outside the school building. Regarding "Social and community impacts of educational space", the architect considered students' well-being and the stereotypical perceptions of public schools' quality, which were not mentioned in policy. Meanwhile, "User needs and participation" and "Spatial organization and flexibility" seem most consistent with "Building quality" and

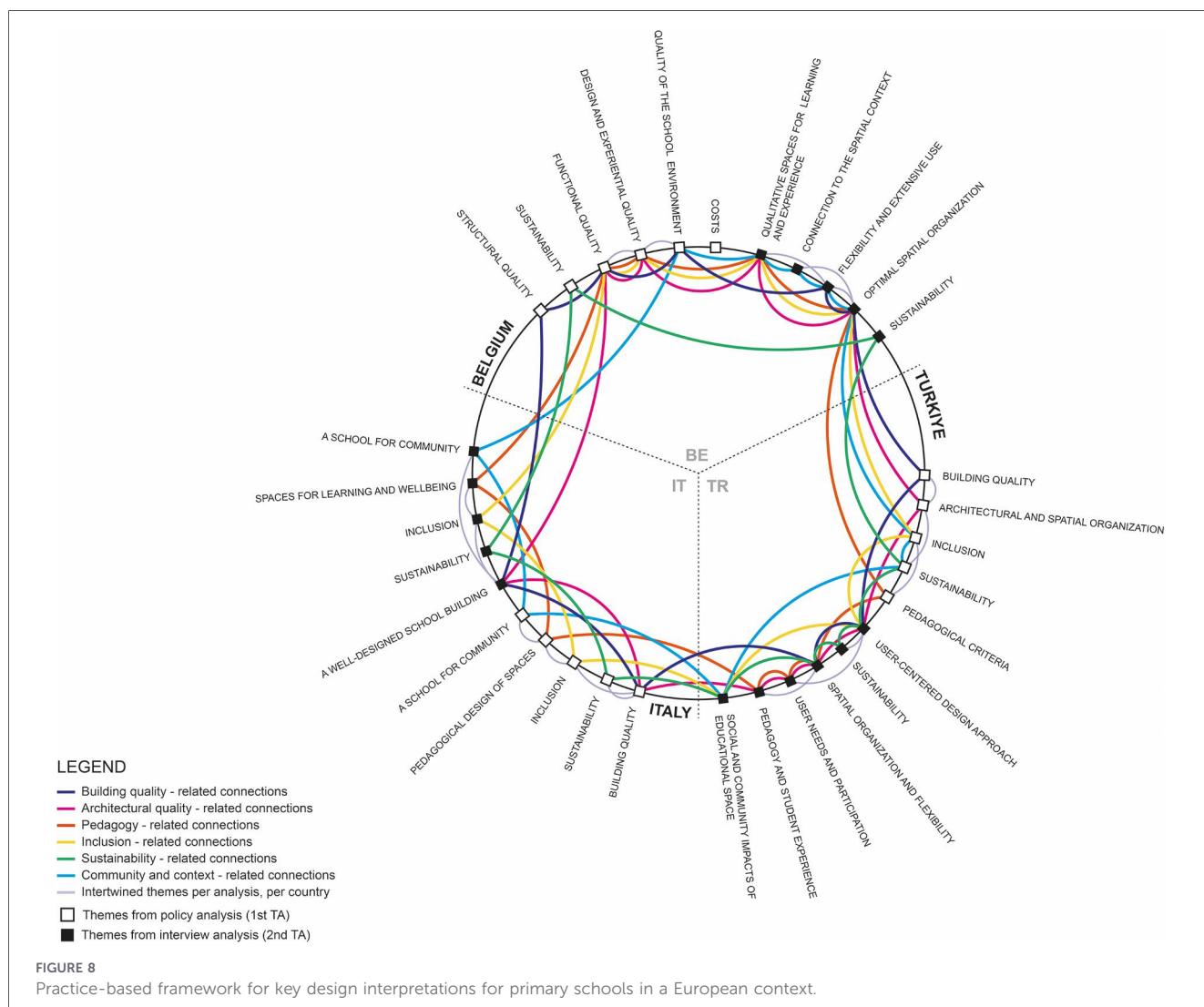
“Architectural and spatial organization” in policy. Instead, “Sustainability” slightly differs. Concerns about “Social sustainability” are clearly evident for the architect, particularly for existing residential structures within the project area and the positive impact on the neighborhood. As shown in Figure 7, the differentiation between policy and the architect highlights that a user-centered approach and students’ well-being were prioritized in form and design, while still meeting the quantitative requirements (i.e., measurements and size) outlined by policy. The expectations for user comfort outlined in policy were elaborated through the design’s perceptual and psychological effects.

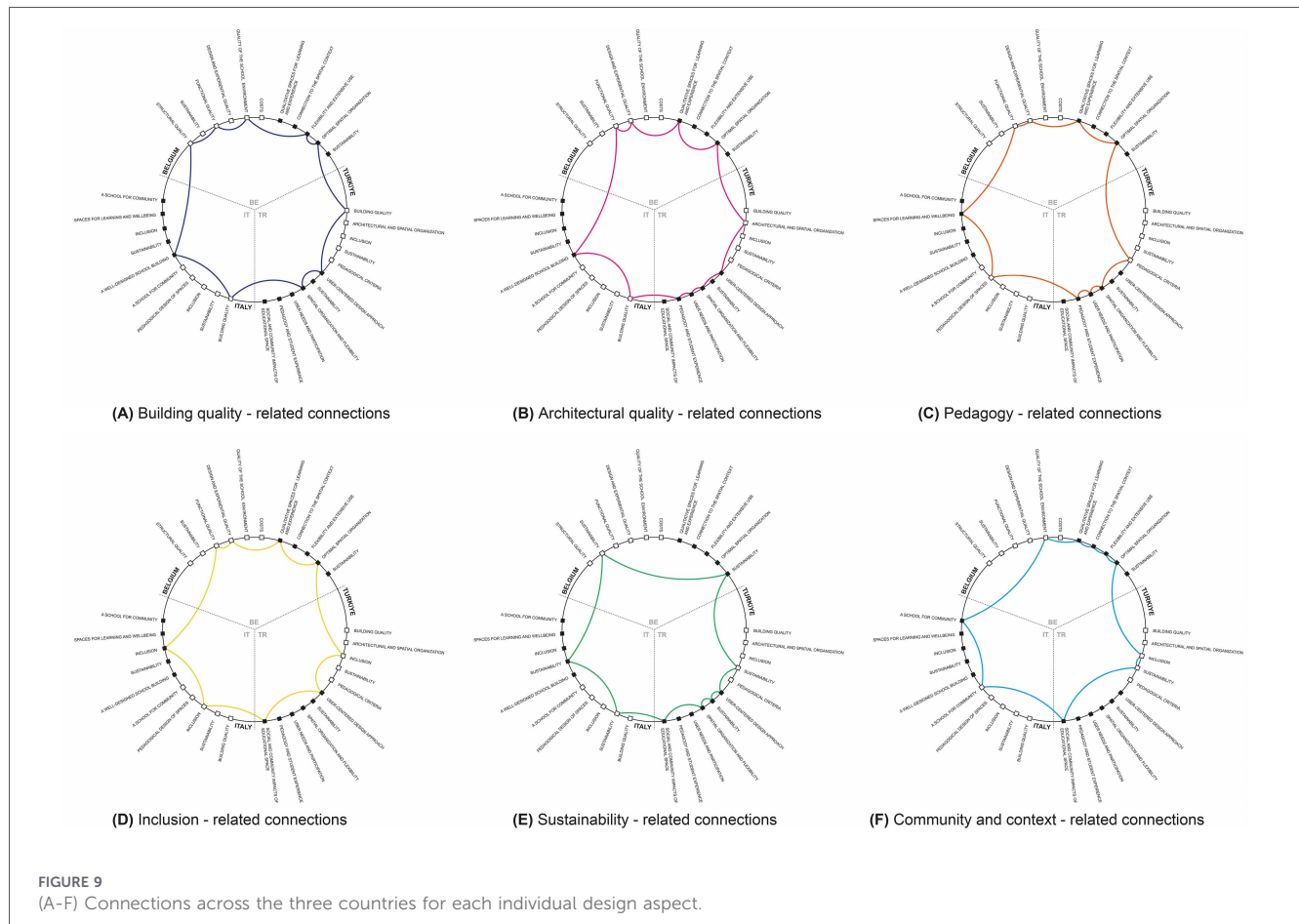
3.3.2 Results across the three countries

As a final result, significant connections were identified across all countries and categorized into six design aspects: building quality, architectural quality, pedagogy, inclusion, sustainability, and community and context. Figure 8 presents a practice-based framework that illustrates the interrelationships among the six recurring design aspects through colored connection lines. Figure 9 clarifies these

connections for each design aspect separately. Additionally, connections within each country highlight the intertwined themes, representing the interpretative layer from policy guidelines to designed spaces. The following paragraph outlines the six design aspects.

A distinction was made between building quality and architectural quality. **Building quality** encompasses the technical and structural aspects of the building, including school building conditions, safety, risk prevention, and infrastructure services (see Figure 9A). **Architectural quality**, instead, refers to the functional and experiential qualities in school spaces. In Italy, architectural quality was considered part of “building quality” in policy and was interpreted similarly as “a well-designed school building” by the architect (see Figure 9B). For Türkiye and Belgium, architectural quality was evident in themes related to spatial organization and spatial experience. All architects regarded spatial experience as a key aspect of the school design, prioritizing students’ experience. This student-centered approach was evident in all countries’ policies and practices and central to the connections related to **pedagogy** (see Figure 9C). In Italy, pedagogical criteria were evident both as a policy focus and as a practical theme. In Flanders, these criteria appeared across





policy guidelines related to functional and experiential qualities. In the Belgian case, pedagogy was a central concept in the design process, manifested through the spatial organization of the school building. For Türkiye, pedagogical criteria were identified in policy as well and reinterpreted by the architect into practices similar to those in Belgium, such as spatial organization and flexibility, user needs, and pedagogical and student experience. Considering the diversity of students, connections related to **inclusion** emerged (see Figure 9D). In Italy, policy and practice truly emphasized an inclusive educational approach. In contrast, Flemish and Turkish policies considered inclusion as a mere technical matter, focusing on accessibility and ergonomics. However, in both designed schools (i.e., Belgian and Turkish cases), fostering student well-being and independent learning were identified as inclusion-related practices. Additionally, **sustainability** was a recurring design aspect in both policy and practice, with similar criteria recognized across the three countries, such as the use of circular construction materials, renewable energy sources, and energy efficiency. All three architects considered these specific criteria in the school design. As shown in Figure 9E, the architect of the Turkish case broadly interpreted sustainability, encompassing criteria such as impact on the neighborhood, relationship with the topography, and introducing the idea of 'social sustainability'. Finally, all three countries shared key criteria regarding the school's role in the **community** and its integration into the surrounding **context**. The concept of community was a key theme in Flemish and

Italian policy, while in Turkish policy, community-related criteria were integrated within inclusion and sustainability concepts. Both Italian and Turkish architects recognized the importance of community and context in their design approaches. However, in the Belgian school case, the integration with and alignment to the spatial surroundings were significantly emphasized compared with the Italian and Turkish cases. This is illustrated in Figure 9F, which shows that community and context-related criteria were present in 4 out of the 5 key design aspects mentioned by the Belgian architect.

4 Discussion

This section discusses the themes and aspects of policy that emerged across the three school designs, showing where little frictions or differences might occur.

4.1 Quality criteria for the physical learning environment in school policies

Belgium, Italy, and Türkiye share common policy guidance and discrepancies, reflecting each country's peculiarities. Among the three document-based frameworks, Italian policies place greater emphasis on the quality of living in learning

spaces than Flemish and Turkish policies do. Specifically, Italian documents tend to focus greatly and in detail on inclusive, pedagogical, and community aspects. This is not surprising when we consider the ongoing attention to inclusion in both the literature and the work of the National Institute INDIRE. Indeed, policy's focus on supporting learning for the diverse physical and cognitive needs of students strongly aligns with some Italian-authored articles in this matter (AIELLO et al., 2014; Bellacicco et al., 2022; D'Alessio, 2012), but also with one of the four research fields of INDIRE's activity on school design, which discusses inclusive and functional spaces to increase life school quality (INDIRE, n.d.-a).

Turkish and Flemish documents, in contrast, delve more into technical features, such as the structural and functional qualities of the school building and its internal organization, with Turkish policy particularly emphasizing a regulatory approach (OECD, 2020). For example, in both cases, inclusion is understood in terms of accessibility and physical comfort in school spaces, reflecting a long tradition of attention to the elimination of architectural barriers, first presented through "The Architectural Barriers Act" of 1968 (U.S. Access Board, 2015) and then widely discussed since the 1980s and 1990s onward (Erekson, 1980; Goldman, 1983; Paulson et al., 1993).

Sustainability, instead, seems consistent across the three policies, as all of them focus on implementing energy-efficiency measures and using sustainable materials and building techniques. This may be attributed to the ongoing discourse on promoting sustainable approaches and practices not only across Europe but worldwide. This direction is set by the definition and adoption of the UN 17 Sustainable Development Goals, which provide "a shared blueprint for peace and prosperity for people and the planet, now and into the future" (United Nations, n.d.), increasingly discussed in the academic literature and requested in research projects and initiatives.

All three countries incorporate pedagogical criteria into their policy, albeit with different interpretations. Multiple educational aspects in the Italian documents closely align with those in the Flemish documents, including the importance of supporting education through technical design features and of ensuring quality living and learning experiences for school users. This interpretation is consistent with the work on school buildings in the Flemish community, where quality has been discussed in relation to habitability and safety, as well as to responsiveness to contemporary pedagogical and social needs (Leemans, 2009). These aspects were also evident in Italian documents, where a commitment to supporting both students' and workers' needs and well-being is explicitly stated. This seems to align closely with initiatives, such as the Constructing Education framework (Duthilleul et al., 2024), which reflects European efforts to incorporate student-centered educational perspectives into school design, or OECD's documents conveying the importance of considering users' needs to improve the quality of learning and school building (Kuuskorpi and González, 2011; OECD, 2017). In Turkish documents, in contrast, educational criteria are strictly interpreted in terms of community and social aspects, within a lifelong learning framework, with only a limited focus on students' skill development and learning. This highly resonates with Principle Seven of The OECD Handbook for Innovative Learning Environments (OECD, 2017). It

highlights that education is most meaningful when it connects knowledge across subjects, real-life contexts, and the wider world. Such a 'horizontal connectedness' helps schools become active communities of participation.

The relation to the community, in fact, has its very own space in all three countries. In Italy, the concept not only fully reflects the 'horizontal connectedness' described by the Seventh learning principle mentioned above (OECD, 2017), but to define its edges: the school is seen as a social place to educate and involve both the school and the non-school community, and to foster social interaction. This perspective is consistent with recent Italian policy around *Patti educativi di comunità* and the broader idea of the school as an 'educating community', a shared educational network involving schools, families, local authorities, and civil society actors (INDIRE, n.d.-b). In Belgium, instead, the conceptualization of a school for the community is expressed through practical design guidelines, such as including the school's surroundings in the design project. The situation is similar in Türkiye, but with a single code that emphasizes opening the school to the public. However, this difference does not necessarily mean that this dimension is less present in the Flemish and Turkish documents than in Italy, but rather that it is articulated through somewhat different lenses, for example, in terms of participation and institutional governance in Belgium (Eurydice, 2023), and through school-family cooperation in Türkiye (OECD, 2020).

4.2 Architectural key features in built schools

As illustrated by the three distinct categories (see Tables 4–6), all interview-based frameworks place greater emphasis on the experiential and human dimensions of educational space than the document-based frameworks (see Tables 1–3). While policy tends to foreground principles, requirements, and design categories at a systemic level, the interviews highlight how spaces are actually interpreted in everyday educational practice. They reveal a stronger social dimension, with greater attention to relationships, interactions, belonging, and the school as a shared environment rather than merely a designed facility. Each interview framework shows a distinctive orientation that reflects a dominant trait in architects' design approaches. In the Turkish case, this orientation appears to center on the social component, especially on how school space can foster collectivity. In the Belgian case, the focus seems more closely tied to learning and pedagogy, with technical and architectural aspects framed primarily in relation to educational goals and teaching-learning processes. In the Italian case, by contrast, the architect's narrative particularly emphasizes the overall quality of architectural design, understood as a foundational condition from which all other experiential dimensions can more easily emerge.

Examining the three interview-based frameworks more closely, "Sustainability" is the only aspect that appears quite similar across the three countries, except for the Turkish architect, who uniquely included 'social sustainability'. While Italian and Belgian interviewees refer to merely technical issues (see all the codes in light orange), the Turkish architect adds a

social dimension and values architectural design not only for its efficiency, but also for its capacity to support the quality of everyday life and users' lived experience. This perspective appears broadly consistent with the literature on social sustainability in buildings, which frames sustainability not only in terms of material performance, but also in relation to wellbeing, inclusion, safety, social interaction, participation, and sense of belonging for the community (Dempsey et al., 2011; Murphy, 2012).

"Architectural quality" is considered to connect the school to its context, provide flexible spaces and furniture, and focus on users' experience and comfort, recurring across all interview-based frameworks, in line with the literature on these elements (INDIRE, n.d.-a; OECD, 2017). However, each architect seems to approach school quality through a specific lens. The Italian interviewee presents good architectural design as a prerequisite for quality living and positive spatial experiences, which means imparting a certain degree of non-predeterminacy to the spaces and a sense of 'domesticity' to the environments to improve users' well-being. This view is supported by a growing body of research suggesting that high-quality design should not be regarded as merely aesthetic or secondary, but rather as a foundational condition for improving accessibility, comfort, health, and well-being (Arif et al., 2016). The focus on a 'domestic dimension' in educational spaces, on the other hand, reflects recent research highlighting the value of qualities typically associated with domestic settings, such as familiarity, comfort, and a welcoming atmosphere, for positive learning experiences (Costa, 2025). In the Belgian interview, architectural quality appears more explicitly learning-oriented. This reflects a learning-centered understanding of school quality, according to which built environments effectively sustain teaching and learning through spatial diversity, peer interactions, outdoor learning opportunities, and appropriate sensory conditions (Barrett et al., 2015; Deppeler and Aikens, 2020). For the Turkish architect, architectural quality is more closely related to a place's topography and a social dimension. "Akşemsettin Primary School" reflects a site-responsive, socially oriented approach to architectural design, in which topography is seen not merely as a physical constraint but as a generative condition for environmental integration, place identity, and user experience (Casino Rubio et al., 2024). In school design, this relationship between the building and the site becomes part of the educational experience (Rosado et al., 2025). In this sense, architectural quality is framed through a user-centered perspective and can be interpreted as a vehicle of broader social value, given its potential to shape students as individuals and, in turn, influence society.

Regarding "Pedagogy," while the Belgian architect considers it the focal point of school design, both of the other two interviewees underlined the importance of supporting learning, but in distinct ways. For the Italian interviewee, this heavily depends on good architectural design: the project should provide spaces for various activities and, above all, foster a home-like, welcoming atmosphere in the school to truly support learning. The Turkish architect once again takes on a social dimension, noting that "the real learning takes place in social places", which can significantly enhance students' self-confidence, and considers schools as the students' primary social environments. This

concept mirrors Vygotsky's (1978) sociocultural perspective on learning, according to which "human learning presupposes a specific social nature and a process by which children grow into the intellectual life of those around them" (p.88). This is also consistent with studies showing that social relationships at school contribute to students' academic self-perceptions (Sette et al., 2023) and that learning happens through active peer interactions (Tenenbaum et al., 2020).

Shifting to the conceptualization of "Inclusion", the architects' narratives reveal different interpretations. The Turkish architect emphasized the importance of accessible space, in line with national and international regulations and the well-established discourse on the removal of architectural barriers (U.S. Access Board 2015; Erikson, 1980; Goldman, 1983; Paulson et al., 1993). In the Belgian interview, inclusion, instead, subtly emerged through prioritizing students' needs, offering diverse learning spaces, and enabling different ways of learning. This interpretation aligns with research discourse suggesting that inclusive design should go beyond accessibility and address human diversity through usability and spatial choices to meet diverse users' needs (Heylighen et al., 2017; Zallio and Clarkson, 2021). The Italian architect articulated this perspective more explicitly and presented it again as an outcome of good design. Based on his work and experience, school environments are inclusive by providing spaces for relaxation or retreat, paying special attention to materials, textures, and colors, and valuing the contributions of school staff and teachers. Indeed, spaces should incorporate different sensory profiles, promote self-regulation through transitional or quiet areas, and match spatial choices with teaching practices and users' daily experiences (Adams et al., 2025; Aminpour et al., 2025).

Finally, on "Community and context", the Belgian architect primarily focused on contextual integration, as the building was conceived in close relation to the rural landscape, local scale, and surrounding built typologies, while visual openings and transitional zones mediated the relationship between the school and the public realm. This reading resonates with the literature on school architecture, which describes it as rooted in local context and able to foster a sense of belonging through adaptation to site-specific conditions (Gislason, 2007). In the Turkish and Italian cases, by contrast, school quality seems linked less to the building itself than to the social environment it helps create. The school is understood as an open, civic space that can extend its value to the neighborhood through shared use, accessibility, and social presence, thus functioning as community infrastructure (Teo et al., 2022).

4.3 Design interpretations for innovative school environments

The comparison between the policies and designs of built schools (see Figures 5–7) reveals both shared tendencies and context-specific interpretations in the design of innovative school environments across the three countries. Overall, the findings indicate that contemporary school design increasingly aims to foster positive, inclusive, and user-centered learning cultures. In all cases, architects position the student at the center of the design process, addressing diverse user scenarios through

differentiated learning environments, flexible common areas, and a balance between private and shared spaces. This reflects a shift away from traditional, standardized classroom models toward more flexible, user-centered learning environments, as widely supported by school-building policies, as discussed by Kuuskorpi and González (2011).

The comparison highlights how architects interpret and operationalize policy priorities. In Belgium (Flanders), there is a strong correspondence between policy-defined quality criteria and architectural practice. In Italy, the relationship between policy and practice is less direct and characterized by interpretive expansion in design. In contrast, the Turkish case reveals a more fragmented relationship between policy and practice. This is illustrated by the distinct interpretations and realizations of the six related design aspects (i.e., building quality, architectural quality, pedagogy, inclusion, sustainability, and community and context). For instance, flexibility is consistently associated with adaptable learning environments and is closely linked to pedagogical objectives and architectural quality. However, it is realized in distinct spatial ways: through differentiated and open spatial systems in Belgium; user-defined, non-prescriptive environments in Italy; and structural solutions, such as movable partitions, in Türkiye. Similarly, while sustainability is identified as a core design aspect across contexts, it shifts from a performance-based, technical approach in Belgium to a more context- and experience-oriented interpretation in Italy. In Türkiye, it combines environmental compliance with an increasing emphasis on social sustainability. This expanded understanding reflects a broader shift in sustainability discourse, moving beyond environmental performance towards socio-spatial considerations. Pedagogical spatial design, as a central design aspect, follows a comparable pattern. While all three contexts extend learning beyond the classroom, Belgium demonstrates a systematic integration of pedagogical principles into spatial organization, Italy emphasizes emotional and experiential qualities, and Türkiye articulates these ambitions more at a conceptual level, with limited translation into built form. This suggests that spatial design can play an active role in shaping learning processes, consistent with literature emphasizing the interdependence of space and pedagogy (Sigurðardóttir and Hjartarson, 2016). Likewise, the relationship between school and community, corresponding to the design aspect of community and context, is recognized across all cases but materializes differently: as strong contextual integration in Belgium, as an active social hub in Italy, and as an emerging yet underdeveloped potential in Türkiye. These variations suggest that while the role of the school as a civic anchor is widely acknowledged, its spatial realization depends heavily on local design and planning cultures and institutional frameworks.

Finally, these findings directly address the research question by showing that the relationship between policy-defined quality criteria and architectural practice is neither uniform nor linear, but context-dependent and mediated through interpretation. Although policy frameworks establish a common set of priorities, architectural practice selectively translates, expands, or challenges these principles. This reflects broader discussions in the literature that emphasize that the impact of school design is shaped by multiple spatial, pedagogical, and user-related factors rather than

determined solely by technical criteria (Barrett et al., 2015; Lippman, 2010). In this sense, school design can be understood as a dynamic, interpretative process in which the interaction between normative frameworks and local spatial practice ultimately determines the quality of educational environments.

4.4 Implications for stakeholders

This study offers insights for various stakeholder groups (such as architects, policymakers, educators, and researchers) involved in the design and development of physical learning environments. The implications for architects underscore the importance of adopting a user-centered design approach that goes beyond mere compliance with technical and regulatory requirements. The study's findings indicate that architects play a pivotal role in translating often abstract and normative policy guidelines into spatial configurations that support pedagogical innovation, inclusivity, and well-being. In terms of implications for policymakers, the study reveals a discrepancy between the language used in policy documents and their implementation in practice. Therefore, it is recommended that they develop more operational and co-constructive guidance to support the school design process. Furthermore, policies should more explicitly address pedagogical, experiential, and social dimensions, rather than focusing solely on technical and regulatory aspects. In terms of implications for educators, although they may not be directly involved in the design process in every context, the findings reveal that educators are key contributors to shaping learning environments. Their pedagogical needs and teaching practices should be more systematically integrated into policy development and architectural design processes. Collaboration among educators, policymakers, and designers should be promoted to enhance spatial literacy, a crucial environmental competence for aligning spatial design and pedagogical practice (Lackney, 2008). Recent research by Stevens and Balendonck (2026) on the architectural design of learning environments proposed a design-based strategy to enhance teachers' spatial literacy, which refers to the capability to comprehend and effectively identify spatial affordances in learning environments to support pedagogical practices. In this study, we argue for enhancing spatial literacy among all stakeholders involved in the design process, empowering them to become co-agents in the design and use of the learning environment. Implications for researchers are presented in the next section on "limitations and future works".

4.5 Limitations and future works

Although this study reveals important findings by examining the relationship between school design policies and architectural practice in the European context, it has certain limitations. First, while limiting the study to Belgium (Flanders), Italy, and Türkiye allows for a comparison of different policy and implementation approaches, it does not claim to be a representative sample of all of Europe. Secondly, not all stakeholders in school environments were included in the study. This particularly limited the ability to assess user experience and everyday spatial practices. Due to practical constraints, including

the summer holiday period during which the research was conducted, access to a broader range of stakeholders was restricted. Therefore, excluding aspects of user experience from the scope of this study is a limitation.

In light of these limitations, various research directions are suggested for future studies. First, studies with larger sample sizes could enrich the findings and enable comparisons across architectural approaches. Secondly, adopting user-centered approaches in future research is of great importance. Studies that incorporate the experiences of students, teachers, and school administrators will provide critical insights into the actual performance of school spaces. In this context, conducting post-occupancy evaluation studies is recommended. Another key focus of future research could be a more in-depth examination of the gaps between policy and implementation. In particular, analyzing the effects of factors such as budget constraints, legislation, implementation processes, and stakeholder communication on this relationship will help to fully understand the design process.

5 Conclusions

In conclusion, this study presents an exploratory, practice-oriented framework that critically examines how policy-defined quality criteria are interpreted and materialized in architectural practice across three European contexts. Through a triangulated qualitative approach, combining policy analysis and architect interviews, it reveals not only alignment in ambitions but, more importantly, divergence in how these ambitions are operationalized. While Belgium (Flanders), Italy, and Türkiye converge around the goal of inclusive, sustainable, and pedagogically responsive learning environments, they embody distinct epistemologies of design: a predominantly technical rationality in Türkiye, a user-centered and relational approach in Italy, and a hybrid position in Flanders. Crucially, the findings demonstrate that technical criteria tend to stabilize design interpretation, whereas pedagogical and social dimensions remain inherently open, negotiated, and contingent upon architects' agency and interpretive frameworks.

By foregrounding this asymmetry, the study challenges the assumption that policy can be linearly translated into spatial outcomes. Instead, it positions architectural design as a mediating practice in which meaning is actively constructed. In doing so, the paper contributes to ongoing debates on the role of the physical learning environment as a pedagogical actor and highlights the need for more explicit articulation of pedagogical intent within policy frameworks.

The proposed framework thus serves not only as an analytical tool but as a conceptual bridge between policymakers, architects, and educational stakeholders. It invites a more critical and reflexive engagement with how learning environments are conceived, negotiated, and realized, and underscores the importance of developing spatial literacy as a shared competency across disciplines. Ultimately, the study calls for a rethinking of policy-design relations as dynamic, situated, and co-constructive processes within the international discourse on educational environments.

Notes in [Tables 1–6](#)

1. The frequency number in the third column refers to the number of times a certain code recurred throughout the documents.
2. The frequency number in the third column refers to the number of times a certain concept was repeated during the interview.
3. The sentences in the fourth column refer to the verbatim transcription of the corresponding interview.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving humans were approved by Social and Societal Ethics Committee of UHasselt and the Research Ethics Committee of Polytechnic University of Marche. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

LC: Writing – original draft, Writing – review & editing, Conceptualization, Data curation, Investigation, Methodology, Visualization. LR: Writing – original draft, Writing – review & editing, Conceptualization, Data curation, Investigation, Methodology, Visualization. NG: Writing – original draft, Writing – review & editing, Conceptualization, Data curation, Investigation, Methodology, Visualization. MM: Writing – review & editing, Supervision, Validation. RS: Writing – review & editing, Conceptualization, Methodology, Supervision, Validation.

Funding

The author(s) declared that financial support was not received for this work and/or its publication.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated

organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2026.1715843/full#supplementary-material>

References

- Adams, D., Dargue, N., Malone, S., Carroll, A., and Simpson, K. (2025). Are sensory aspects of the built school environment associated with learning or well-being outcomes for autistic students? A systematic review. *Int. J. Inklus. Educ.*, 1–27. doi: 10.1080/13603116.2025.2589290
- AGION (2009). *De Schoolgebouwenmonitor 2008: Indicatoren Voor de Kwaliteit van de Schoolgebouwen in Vlaanderen*. Agentschap voor Infrastructuur in het Onderwijs.
- AGION (2014). *De Schoolgebouwenmonitor 2013: Indicatoren Voor de Kwaliteit van de Schoolgebouwen in Vlaanderen*. Agentschap voor Infrastructuur in het Onderwijs.
- AGION (2020). *Schoolgebouwenmonitor 2018–2019: Indicatoren Voor de Kwaliteit van de Schoolgebouwen in Vlaanderen*. Agentschap voor Infrastructuur in het Onderwijs.
- AGION (2025). *Schoolgebouwenmonitor 2024: Een Onderzoek Naar de Kwaliteit, het Beheer en het Gebruik van de Vlaamse Schoolgebouwen*. Agentschap voor Infrastructuur in het Onderwijs.
- Aiello, P., Di Gennaro, D. C., Palumbo, C., Zollo, I., and Sibilio, M. (2014). Inclusion and universal design for learning in Italian schools. *Int. J. Digit. Lit. Digit. Competence (IJDLDC)* 5 (2), 59–68. doi: 10.4018/ijdlc.2014040105
- Akşemsettin Primary School/Uygur Architects. (2022). *ArchDaily*. March, 9. Available online at: <https://www.archdaily.com/978179/aksemsettin-primary-school-uygur-architects> (Accessed July 4, 2026).
- Aminpour, F., Skattebol, J., and Katz, I. (2025). Neurodiverse-friendly preschools: aligning inclusive pedagogy and spatial design. *Front. Architect. Res.* 15 (4), 1267–1282. doi: 10.1016/j.foar.2025.10.007
- Arif, M., Kafatygiotou, M., Mazroei, A., Kaushik, A., and Elsarrag, E. (2016). Impact of indoor environmental quality on occupant well-being and comfort: a review of the literature. *Int. J. Sustain. Built Environ.* 5 (1), 1–11. doi: 10.1016/j.ijbsbe.2016.03.006
- B2Ai (n.d.). *Klim Op Basisschool Zandbergen*. Available online at: <https://b2ai.com/projecten/basisschool-klim-op-in-zandbergen/> (Accessed August 13, 2025)
- Barrett, P., Davies, F., Zhang, Y., and Barrett, L. (2015). The impact of classroom design on pupils' learning: final results of a holistic, multi-level analysis. *Build. Environ.* 89, 118–133. doi: 10.1016/j.buildenv.2015.02.013
- BDR Bureau (2025). *Preschool in Macerata*. Available online at: <https://www.bdrbureau.com/portfolio/preschool-in-macerata/> (Accessed September 24, 2025)
- Bellacicco, R., Dell'Anna, S., and Francesco, M. (2022). School inclusion in Italy: a mapping review of empirical research. *L'integrazione Scolastica Soc.* 21 (4), 40–79. doi: 10.14605/ISS2142202
- Bosch, R. (n.d.). *GO! BS Klim Op Zandbergen*. Available online at: <https://www.rosanbosch.com/en/project/go-bs-klim-op-zandbergen> (Accessed August 13, 2025)
- Braun, V., and Clarke, V. (2006). Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101. doi: 10.1191/1478088706qp0630a
- Casino Rubio, D., Rodriguez Ramirez, F., and Fernández-Elorza, H. (2024). Strategies for sustainable rooting in landscape: arrangements between architecture and the ground. *Buildings* 14 (4), 1006. doi: 10.3390/buildings14041006
- Costa, A. R. (2025). Homing into school to create the ideal classroom: young people want to combine the best of home and school learning environments. *CoDesign* 21 (1), 74–94. doi: 10.1080/15710882.2024.2363925
- D'Alessio, S. (2012). Integrazione scolastica and the development of inclusion in Italy: does space matter? *Int. J. Inclusive Educ.* 16 (5–6), 519–534. doi: 10.1080/13603116.2012.655495
- Dempsey, N., Bramley, G., Power, S., and Brown, C. (2011). The social dimension of sustainable development: defining urban social sustainability. *Sustain. Dev.* 19 (5), 289–300. doi: 10.1002/sd.417
- Deppeler, J., and Aikens, K. (2020). Responsible innovation in school design—a systematic review. *J. Responsible Innov.* 7 (3), 573–597. doi: 10.1080/23299460.2020.1809782
- Duthilleul, Y., Guallar, S., Woolner, P., Tapaninen, R., Carro, R., and Tosi, L. (2024). *Constructing Education: Building for Impact*. Luxembourg: Thematic Reviews Series Council of Europe Development Bank, Paris and European Investment Bank.
- Erekson, T. L. (1980). Identifying, removing architectural barriers. *NASSP Bull.* 64 (432), 102–108. doi: 10.1177/019263658006443218
- Eurydice (2023). *Administration and Governance at Local and/or Institutional Level: Belgium – Flemish Community*. Brussel: European Commission. Available online at: <https://eurydice.eacea.ec.europa.eu/eurydice/belgium-flemish-community/administration-and-governance-local-and-or-institutional-level> (Accessed June 24, 2025).
- Gislason, N. (2007). Placing education: the school as architectural space. *Paideusis* 16 (3), 5–14. doi: 10.7202/1072485ar
- Goldman, C. D. (1983). Architectural barriers: a perspective on progress. *W. New Eng. L. Rev.* 5, 465.
- Hall, T. (2017). Architecting the 'third teacher': solid foundations for the participatory and principled design of schools and (built) learning environments. *Eur. J. Educ.* 52 (3), 318–326. doi: 10.1111/ejed.12224
- Herman, L., Berbel, M., and Touceda, M. (2018). *+School Inspiratiegids. Vlaams Ministerie van Onderwijs en Vorming*. Constructing Education: Building for Impact. Available online at: <https://data-onderwijs.vlaanderen.be/onderwijsonderzoek/project/723> (Accessed August 13, 2025)
- Heylighen, A., Van der Linden, V., and Van Steenwinkel, I. (2017). Ten questions concerning inclusive design of the built environment. *Build. Environ.* 114 (1), 507–517. doi: 10.1016/j.buildenv.2016.12.008
- Hofverberg, H., and Sigurdson, E. (2023). Who controls the learning environments? A critical inquiry of national policy of school architecture in Sweden. *Educ. Inq.* 16 (3), 394–410. doi: 10.1080/20004508.2023.2232582
- INDIRE (n.d.-a). *Ambienti e Benessere*. Architetture Scolastiche. Available online at: <https://architetturescolastiche.indire.it/risorse/#ambienti-e-benessere> (Accessed June 16, 2025).
- INDIRE (n.d.-b). *Osservatorio Nazionale sui Patti Educativi*. INDIRE. Available online at: <https://www.indire.it/progetto/osservatorio-nazionale-sui-patti-educativi/> (Accessed June 16, 2025).
- Kallio, H., Pietilä, A.-M., Johnson, M., and Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *J. Adv. Nurs.* 72, 2954–2965. doi: 10.1111/jan.13031
- Kuuskorpi, M., and Cabellos González, N. (2011). *The Future of the Physical Learning Environment: School Facilities That Support the User* (No. 2011/11). Paris: CELE Exchange, Centre for Effective Learning Environments, OECD Publishing. doi: 10.1787/5kg0lkz2d9f2-en
- Lackney, J. A. (2008). Teacher environmental competence in elementary school environments. *Child Youth Environ.* 18 (2), 133–159. doi: 10.1353/cye.2008.0007
- Leemans, G. (2009). *Monitoring the Quality of School Buildings in Belgium's Flemish Community* (No. 2009/08). Paris: CELE Exchange, Centre for Effective Learning Environments, OECD Publishing. doi: 10.1787/220808504374
- Lippman, P. (2010). *Can the Physical Environment Have an Impact on the Learning Environment?* (No. 2010/13). Paris: CELE Exchange, Centre for Effective Learning Environments, OECD Publishing. doi: 10.1787/5km4g21wpwr1-en
- Magni, C. (2025). BDR Bureau. Sperimentare nel campo dell'edilizia scolastica/ experimenting in the field of school construction. *Casabella* 967, 6–21.
- Miles, M. B., Huberman, A. M., and Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook*. 3rd ed. California: SAGE Publications.
- Murphy, K. (2012). The social pillar of sustainable development: a literature review and framework for policy analysis. *Sustainability Sci. Pract. Policy* 8 (1), 15–29. doi: 10.1080/15487733.2012.11908081

- OECD. (2017). *The OECD Handbook for Innovative Learning Environments*. Paris: OECD Publishing. doi: 9789264277274-en
- OECD (2020). *Education Policy Outlook in Turkey (No.23)*. OECD Education Policy Perspectives. Paris: OECD Publishing. doi: 10.1787/b7c69f4c-en
- Patton, M. Q. (2015). *Qualitative Research & Evaluation Methods: Integrating Theory and Practice*. Thousand Oaks, CA: Sage Publications.
- Paulson, C., Dahl, R., and Wasch, W. K. (1993). Eliminating architectural barriers: a multidisciplinary approach. *Top. Geriatr. Rehabil.* 9 (2), 59–73.
- Professione Architetto (2024). *Macerata, Terminata la Scuola di Bdr Bureau Costruita in 150 Giorni*. Available online at: <https://www.professionearchitetto.it/news/notizie/32181/Macerata-terminata-la-scuola-di-Bdr-Bureau-costruita-in-150-giorni> (Accessed August 2, 2025).
- Rosado, S., Ribeiro, J. T., and Jeronimo, V. R. (2025). New trends in planning school buildings design: outdoor pedagogical spaces approach. *Buildings* 15 (17), 3118. doi: 10.3390/buildings15173118
- Sette, S., Zava, F., Laghi, F., Baumgartner, E., and Coplan, R. J. (2023). Linking social relationships at school, loneliness, and academic self-perceptions among primary school children. *J. Appl. Dev. Psychol.* 88 (4), 101568. doi: 10.1016/j.appdev.2023.101568
- Sigurðardóttir, A. K., and Hjartarson, T. (2016). The idea and reality of an innovative school: from inventive design to established practice in a new school building. *Improv. Sch.* 19 (1), 62–79. doi: 10.1177/1365480215612173
- Sigurðardóttir, A. K., and Hjartarson, T. (2018). “Design features of Icelandic school buildings: how do they reflect changes in educational governance and daily school practice?,” in *Making Education: Material School Design and Educational Governance*, eds. I. Grosvenor, and L. R. Rasmussen (Cham: Springer International Publishing), 71–91. doi: 10.1007/978-3-319-97019-6_4
- Stake, R. E. (1997). *The Art of Case Study Research*. Thousand Oaks, CA: Sage Publications.
- Stavem, S. M. (2025). Governance of physical learning environment design in a decentralized policy context. *Nord. J. Stud. Educ. Policy* 11 (2), 189–204. doi: 10.1080/20020317.2024.2430030
- Stevens, R., and Balendonck, S. (2026). The teacher's rider: a speculative, identity-based method for integrating pedagogical insight into the architectural design of learning environments. *Archnet-IJAR Int. J. Architect. Res.* 1–34. doi: 10.1108/ARCH-08-2025-0353
- Tenenbaum, H. R., Winstone, N. E., Leman, P. J., and Avery, R. E. (2020). How effective is peer interaction in facilitating learning? A meta-analysis. *J. Educ. Psychol.* 112 (7), 1303. doi: 10.1037/edu0000436
- Teo, I., Mitchell, P., van der Kleij, F., and Dabrowski, A. (2022). *Schools as Community Hubs. Literature Review*. CT: Australian Council for Educational Research. doi: 10.37517/978-1-74286-684-0
- U.S. Access Board (2015). *Architectural Barriers act (ABA) Standards*. Washington, DC: Department of Defense, General Services Administration, U.S. Postal Service, Department of Housing and Urban Development. Available online at: <https://www.access-board.gov/files/aba/ABASTandards.pdf> (Accessed March 24, 2026).
- United Nations (n.d.). *The 17 Goals*. Sustainable Development Goals. Available online at: <https://sdgs.un.org/goals> (Accessed March 24, 2026).
- Uygur Architects (2022). Akşemsettin İlkokulu. *Yapı* 476, 64–71.
- Uygur, S., and Uygur, Ö (n.d.a). *Akşemsettin Primary School*. Istanbul: Uygur Architects. Available online at: <https://www.uygurarchitects.com/site/en/projects/aksemsettin-io.html> (Accessed August 13, 2025).
- Uygur, S., and Uygur, Ö (n.d.b). *Akşemsettin İlkokulu*. Istanbul: Arkiv. Available online at: <https://www.arkiv.com.tr/proje/aksemsettin-ilkokulu1/12202?lang=en> (Accessed August 13, 2025).
- Vaismoradi, M., and Snelgrove, S. (2019). Theme in qualitative content analysis and thematic analysis [25 paragraphs]. *Forum Qual. Sozialforschung/Forum* 20 (3), 23. doi: 10.17169/fqs-20.3.3376
- Vygotsky, L. S. (1978). *Mind in Society*. Cambridge MA: Harvard University Press.
- Wood, A. (2020). Built policy: school-building and architecture as policy instrument. *J. Educ. Policy* 35 (4), 465–484. doi: 10.1080/02680939.2019.1578901
- Zallio, M., and Clarkson, P. J. (2021). Inclusion, diversity, equity and accessibility in the built environment: a study of architectural design practice. *Build. Environ.* 206 (6), 108352. doi: 10.1016/j.buildenv.2021.108352