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FUTURE CLASSROOM LAB: POSSIBILITIES, CHALLENGES AND RISKS. A MULTI-CASE STUDY

Aula del futuro. Posibilidades, retos y riesgos. Un estudio multicaso.



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Abstract:

The current concept of classroom space is radically distanced from its traditional notion. International proposals advocate classrooms that combine technology, flexibility, and collaboration, facilitating communication using active methodologies. Given the limited empirical studies available in our field of study on the Future Classroom Lab (FCL), we have undertaken a qualitative investigation based on the study of multiple cases and the foundations of Grounded Theory (GT). Three Andalusian public schools were selected, based on key informants. The results indicate that implementing a FCL involves much more than merely filling a space with technology. It requires a process and sets of decisions that ultimately affect multiple aspects of the institutional and pedagogical framework of the educational community. The true potential of the FCL is linked to transformative education, directly connected to the improvement of teaching practices and

educational experimentation.

Key Words: *case studies; educational facilities; educational innovation; experiential learning; future classroom.*

1. Introduction

Since the introduction of a curriculum approach based on the acquisition of competences, a range of recommendations and guidelines from different bodies have emerged to facilitate its implementation. This perspective aligns with initiatives already underway in various experiences and educational centers, aimed at adapting pedagogical frameworks to new educational needs and demands (MEFPyD, 2021). Collectively, these initiatives highlight the importance of the functionality of learning, beyond the mere linear reproduction of disciplinary content. In this regard, both the active development of learning and the transfer of knowledge are emphasized.

In line with these principles, there are recurring references to the need to transform the environment in which learning takes place. Emphasis is placed on initiating changes in the classroom space to configure it in ways that foster connection and communication, within a flexible framework adapted to the different tasks and learning proposals designed for curriculum development and classroom life. In this sense, educational change is understood as an intentional and proactive process involving the incorporation of alternative pedagogical practices with the aim of achieving qualitative transformation within a given context (Sørensen & Torfing, 2011). This definition is consistent with Vidal Ledo et al. (2022), who acknowledge a broad repertoire of possibilities by identifying different types of change, including disruptive innovation, revolutionary change, incremental change, and continuous improvement.

As Torres (2019) notes, classroom transformation has been promoted by various institutions for some time (e.g., Innovative Learning Environment, 2015). Although many of these contributions refer to non-university education systems, demands are also beginning to emerge from the field of higher education (Fernández-Enguita, 2018). At the international level, numerous experiences combine technology, flexibility, and collaboration (Long, 2005). For example, the University of Waterloo (Ontario, Canada) introduced the “Flexible Learning Experience Laboratory (FLEX)” to support pedagogical innovation; similarly, the Carrick Institute for Teaching and Learning in Higher Education in Australia promoted what they termed “next-generation learning spaces” (Radcliffe, 2009). From Brussels, the European Schoolnet project has been developing since 2012 the so-called Future Classroom Lab (FCL), which seeks to experiment with and disseminate an educational model that combines active methodologies with the support of digital technologies and the redefinition of physical learning spaces. This aligns with the requirements synthesized by Bdiwi et al. (2019) for implementing a “Smart Learning Environment” (SLE).

At the national level, the Universidad Complutense de Madrid (2019) has referred to this concept as the “hyper-classroom”. In all cases, flexible furniture and

the integration of various technologies are included within a framework that promotes communication and creativity, with the aim of fostering innovative teaching (Fernández-Enguita, 2023). A similar description is found in the term “Future Classroom” (Aula del Futuro in Spanish, AdF), which has gradually gained ground since its emergence in 2017 (Tena & Carrera, 2020) among educational institutions and teacher training centers, such as the Instituto Nacional de Tecnologías Educativas y de Formación del Profesorado (INTEF, 2020). The number of these experiences continues to grow each year in our educational institutions—whether as individual initiatives or institutional proposals—and many training centers already have such spaces, as well as structured programs for their development and consolidation (Meneses, 2023).

Regardless of the terminology used, the Future Classroom represents an advanced learning space aligned with active teaching approaches. To this end, it is equipped with flexible and technological resources designed to foster collaboration, creativity, and the management of diverse, well-founded content and information. From this perspective, the Future Classroom is conceived as an asset with strong motivational potential and a stimulus for experimentation and research (Hilario-Silva et al., 2022).

Although there is no single, fixed model, there are illustrative reference frameworks. Indeed, across the documentation and experiences reviewed, greater emphasis is placed on the innovative dynamics to be promoted than on the mere incorporation of technological tools or alternative (mobile and flexible) furniture. What is truly important lies in the pedagogical processes associated with this transformed learning environment (Gómez-García et al., 2022). Its purpose, as Arstorp (2018) points out, is oriented towards promoting active methodologies based on inquiry, collaboration, and student engagement in their own learning.

As noted at the outset, the educational innovation underpinning the practical development of Future Classrooms has deep roots (Pozuelos & García, 2020; Tena & Carrera, 2020). Based on these innovative premises, both the knowledge and skills to be addressed (functional and relevant) and the learning dynamics (active and collaborative), as well as the resources to be incorporated (ICT, among others), are updated. Likewise, assessment practices shift towards a greater focus on creative and well-founded production (formative assessment), rather than on the mechanical and academic reproduction of closed knowledge. The sequence, which may take different forms depending on each specific case (García-Tudela et al., 2024), revolves around: questioning, exploring, creating, presenting, and disseminating. As can be seen, the aim is to design situations (experiences, tasks, activities, etc.) that stimulate learning beyond a single “correct” or uniform response. All of this requires a curriculum capable of connecting content and knowledge to provide a functional perspective to school learning, in line with an integrated curriculum, where new technologies emerge as facilitators and new pathways for teaching in today’s schools (Pozuelos et al., 2023).

The creation of Future Classrooms in educational centers represents an opportunity to introduce a markedly different organization of resources, space, and time. The AdF emerges as an alternative characterized by flexibility, communication,

and shared creation, within a “next-generation learning environment” (Robinson & Rose-Munro, 2014). This contrasts with traditional classroom conceptions based on the “cell-and-bell design” (Cleveland & Woodman, 2009), which centers on knowledge transmission, where time is structured by fixed schedules, spaces are rigidly arranged, and learning is closed—that is, based on predetermined responses. In line with these premises, there is a call for a context designed to motivate, to encourage activity and collaborative creation, and to accommodate diversity so that all individuals have the opportunity to acquire knowledge according to their own characteristics and sensitivities, in line with the contributions of Rikkerink et al. (2016), Feu and Torrent (2021), Pozuelos (2023), and Moya and Luengo (2017). Ultimately, the aim is to humanize learning and bring together teachers, students, and subjects that were previously disconnected.

Given the emerging nature of Future Classrooms in our educational context, empirical research remains limited. Nevertheless, some descriptive studies exist, such as those by Olmos and Pardo (2019) in a rural school. Also noteworthy are the studies conducted by García-Tudela et al. (2023) and Gómez-García et al. (2022). However, as these are based on statistical samples, their contributions mainly reflect broad trends. In-depth studies focusing on specific and complex situations are still scarce. From this perspective, the work of Pardo (2020) is particularly relevant, as it is based on two case studies aimed at analyzing practical dynamics.

Considering this context, the present research aims to examine specific cases in which these classrooms are implemented, despite the considerable personal and professional effort they require. More specifically, the objectives are to identify the factors that trigger this decision, to explain the processes of acquiring and organizing resources, and to analyze classroom dynamics and curriculum development, as well as to determine the intended purposes. Table 2 presents these objectives and relates them to the research questions.

2. Method

This study adopts a multiple case study design within a qualitative methodological framework (Simons, 2011). This analytical, descriptive, and interpretative approach (Vázquez et al., 2021) is particularly suited to addressing the complexity of diverse phenomena such as educational experience (Yin, 2018). This aligns with Stenhouse (1979), who argued that teachers seeking to transform their pedagogical practice tend to find greater inspiration in concrete cases than in broad abstract statements.

In this regard, case studies—given their situated nature and close connection to the everyday dynamics of schools and their participants—provide relevant insights for practical professional development. Nevertheless, the exploratory nature of this contribution should be emphasized, given the limited number of studies of this kind and the emerging character of the experiences examined. The primary aim is to offer an initial approach to the topic, identify certain trends, and propose possibilities for more extensive and specialized research.

The study is grounded in a research process informed by the principles of Grounded Theory (GT), originally developed by Glaser and Strauss (1967). From this inductive standpoint, the aim is to build theory based on qualitative data obtained from direct sources. This systematic process entails “adopting a more holistic approach that allows for understanding and interpreting reality, meanings, perceptions, and people’s experiences in a given situation” (Lúquez, 2016, p. 103). Within this methodological framework, relationships and categories are identified that help explain specific phenomena, particularly in “the study of complex subjective processes such as meanings, perceptions, experiences, interactions, among others” (Palacios, 2021, p. 69).

For the development of the study, three educational institutions representing markedly different contexts were selected. Several criteria guided the selection process: they were identified as particularly significant by key informants (teacher training center advisors, school inspectors, and university faculty); they had prior experience with “Future Classrooms”; they expressed willingness and openness to voluntary collaboration after being informed; and they represent diverse contexts, thereby expanding learning opportunities.

All three institutions have an operational Future Classroom, have undertaken various training processes, and have a framework project defining their foundations and lines of action. These cases involve participation from the educational community to varying degrees. Furthermore, they represent bottom-up initiatives, which have led them to seek alternative means for acquiring necessary resources. Finally, they demonstrate a sustained trajectory of innovation, building on previous experiences aimed at improving teaching.

These are public institutions. In terms of location and contextual reality, they reflect diverse settings, ranging from urban to rural environments. The study includes direct contributions from teachers (class tutors), school leadership teams, groups of students, external collaborators, coordinators of AdF and Educational Digital Transformation (TDE in Spanish), and family representatives. As shown below (Table 1), the aim was to ensure plural representation, incorporating diverse perspectives and varying levels of responsibility.

Table 1.

Interviews conducted and citation nomenclature

Sector	Number of interviews and distribution by institution	Citation nomenclature
Leadership teams	3, one per institution	ENT/DIR
Class tutors	9, three per institution	ENT/T
AdF coordination	3, one per institution	ENT/Coord. AdF
TDE coordination	3, one per institution	ENT/Coord. TDE
External agents	3, one per institution	ENT/External
Student groups	3, one per institution	ENT/Students

Families 2, in two institutions ENT/Family

Source: Authors' own elaboration

Data collection was carried out through in-depth interviews, occasional dialogue, document analysis, non-participant observation, and a research diary. Interviews followed a semi-structured script tailored to each group, previously agreed upon, reviewed, and refined by the research team. Their duration ranged from 17 to 32 minutes. All interviews were recorded, transcribed, and reviewed by participants until their final version was established. Descriptive data were compiled using templates designed to systematize information on: (a) teachers, (b) the institution, and (c) students. Incidental or spontaneous contributions were recorded in the research diary and later refined into reflective memoranda. These include observations, informal conversations, telephone discussions, and emails, among others.

Fieldwork was conducted between December 2023 and March 2024. The analysis process was carried out concurrently with data collection. As initial evidence was reviewed, emerging focal points guided further data collection. This iterative dynamic generated cycles of analysis and data accumulation, leading to a broad and sufficiently grounded understanding. Once all information was classified and coded, emerging categories were identified in order to establish coherent relationships that explain the situated meaning of the research object and to develop the corresponding theoretical framework (Table 2).

Table 2.
Categories, research questions, and objectives: resulting node matrix

Categories	Research questions	Objectives
Origin and triggers	What factors stimulate the implementation of Future Classrooms?	To determine the reasons for implementing Future Classrooms.
Classroom configuration	How are the necessary resources acquired? How is the classroom organized?	To explain how resources are obtained. To describe the organization of the space and the resources incorporated into the AdF.
Practical development	What teaching process is followed? To what extent does it connect with the school curriculum?	To outline the teaching process followed. To indicate its connection with the curriculum.
Expectations	What purposes motivate their implementation? What outcomes are expected?	To identify the expectations associated with the AdF.

Source: Authors' own elaboration

Credibility is supported by both theoretical and empirical saturation derived from triangulation across instruments, perspectives, sources of information, and collaborative deliberation among researchers. Likewise, trustworthiness is ensured

through adherence to ethical and procedural principles: negotiation, confidentiality, participant review, and a progressive approach (Pozuelos, 2002). All these aspects align with the criteria of narrative quality described by Heikkinen et al. (2005) in relation to reports derived from action research processes.

3. Results

The Centro Rural Agrupado Adersa 4 is composed of the merger of two former schools located in the towns of Cañaveral de León and Hinojales (Huelva). The buildings housing these schools have been refurbished. Notably, two Future Classrooms (one in each location) have been created. Altogether, the center serves 61 students across Early Childhood Education, Primary Education, and the first cycle of Compulsory Secondary Education. Educational stages are organized into multigrade groups, enabling interaction across different levels. Grade repetition rates are very low, and absenteeism or early school leaving is non-existent. Most families are engaged in the primary sector, and their participation is described as “high and across various aspects of school life” (Case 1. ENT/DIR/DIR). The teaching staff consists of 18 teachers and is characterized by pedagogical commitment and collaboration: “the entire staff is involved, and a Working Group coordinated by two teachers has also been formed” (Case 1. Memorandum 1). Several pedagogical projects are currently underway, including Erasmus, Peace Education, School Garden, and Healthy Habits, among others. All are integrated to avoid fragmentation or superficiality.

CEIP Onuba is in the peripheral neighborhood of Alcalde Diego Sayago in the city of Huelva. The school has undergone several renovations and improvements over the years and currently has 78 students. It serves families who, for the most part, depend on the Minimum Vital Income (Student and Family Profile Document). To address the needs of students and families, numerous initiatives have been undertaken aimed at “identifying and facilitating resources for students and coordinating with other organizations working alongside our school” (Case 2. ENT/DIR). The teaching staff comprises 14 teachers: 8 class tutors and 6 specialists, of whom 3 work across multiple schools. Most have been appointed through specific positions. Except for 3-year-old Early Childhood Education and Years 1 and 2 of Primary Education, the remaining groups are organized as follows: Early Childhood Education (ages 4 and 5), Years 3 and 4 of Primary Education, and Years 5 and 6 of Primary Education. In addition to conventional classrooms, the school has a library, gymnasium, and other spaces, among which the recently created Future Classroom stands out. The school has participated in various innovative programs and initiatives in recent years.

CEIP Luis Valladares is in Las Cabezas de San Juan (Seville), in the most socioeconomically disadvantaged area of the town. The school is currently undergoing renovation. It is the only school in the locality with a specialized classroom as a schooling modality. The teaching staff consists of 19 teachers: 11 class tutors and 8 specialists, of whom 2 work across multiple schools. Most are temporary or substitute teachers. Despite this, a certain degree of stability is achieved through the possibility of retaining staff via the “Learning Communities” program. In addition

to conventional classrooms, the school has a library, dining hall, and several other spaces, including a recently established Future Classroom. The school has actively participated in various programs in recent years, such as Healthy Habits, the State Pact for Equality, STEAM, Robotics, and Computational Thinking. It is also highly active in professional development, with working groups and school-based training programs.

3.1. Origin and triggers

The analysis of the origins of these initiatives reveals a dual source: internal and external factors. The interaction between both drives their initial implementation, with one of the most recurrent causes being the desire to continue and expand previous innovative experiences, as reflected in the following statement: “when we started hearing about the Future Classroom, we saw it as a project that could complement what we were already doing as a Learning Community” (Case 3. ENT/DIR).

In this sense, Future Classrooms connect with innovative perspectives and assume responsibilities required by contemporary society. Today’s way of life, strongly connected to and dependent on digital resources, opens new and previously unknown scenarios. Schools cannot remain detached from this demand and must provide competency-based education to develop critical citizens (Ramírez-Montoya et al., 2024). This is reflected in teachers’ statements: “seeing everything that was happening and how society was changing, we felt the need to create a Future Classroom” (Case 1. ENT/DIR). At the same time, there is sensitivity towards digital training, as noted: “after what we experienced during COVID, we need to place much greater emphasis on the school’s digital transformation” (Case 3. ENT/DIR).

However, responses to social change are strongly conditioned by the sociocultural context of each setting. As educational research has shown, technological advances do not reach all individuals or contexts equally. Consequently, schools play a key role in ensuring more equitable access, as reflected in the following statement: “our children have very limited opportunities, so we always try to introduce new things because it is very difficult at home” (Case 2. ENT/Coord. AdF).

One of the factors that contributes most to expanding the scope of innovation is contact with other experiences. These serve to illustrate and demonstrate, in practical terms, the potential of each initiative: “I attended a presentation by a school in Granada where they showcased their good practice with the Future Classroom, and it really sparked my interest” (Case 2. ENT/Coord. AdF). Likewise, the role of Teacher Training Centers (CEP) in disseminating Future Classroom experiences is highlighted: “we had the opportunity to visit the CEP in Lebrija and see a project they were implementing, and the reception was truly excellent” (Case 3. ENT/DIR).

It is evident that the initiation of a change process, driven by strong enthusiasm and commitment, does not stem from a single factor. Rather, multiple variables of different kinds are usually involved, acting in a unique way in each case.

3.2. Classroom configuration

The decision to create a Future Classroom represents not only a pedagogical challenge but also a significant material effort. These new spaces require a considerable number of resources. Although the Educational Administration supports the promotion of digital devices, the resources provided are often not aligned with the needs of such initiatives, as illustrated in the following statement: “this is not funded by a budget from the Administration; it has come from the school’s self-management and from making good use of the resources we have” (Case 1. ENT/DIR).

This creates tension between possibilities and expectations. As a result, a wide range of measures are adopted, often stretching beyond desirable limits. Beyond the limited budget available to public schools for capital expenditure, additional funding sources must be sought, such as funds from participation in projects, awards, and other initiatives: “they invest part of the school budget, PROA support, additional funding for rural schools, and all the projects they can access” (Case 1. ENT/External).

In addition to diversifying funding sources, efforts are made to maximize efficiency by acquiring low-cost equipment and materials. This task goes beyond the strict professional duties of teachers, further intensifying their workload and, in some cases, diverging from official requirements regarding “approved” products: “we have acquired items from large-scale commercial retailers because prices there are more affordable than those offered in the official market for this type of furniture” (Case 2. ENT/DIR).

It is important to highlight that, in all cases, this effort involves the local community and, especially, teachers, who demonstrate both personal and professional commitment: “teachers and families are involved, so it is something being collaboratively built within the school by all members of the educational community” (Case 3. ENT/Coord. TDE).

Once resources and space have been secured, the complex task of organizing and arranging them arises, to support the intended educational transformation. While widely recognized reference models exist to guide classroom design, these often exceed the real possibilities of schools constrained by economic and spatial limitations. As a result, inspiration is drawn from other similar initiatives: “we have consulted INTEF, Extremadura, Cádiz, and other places, and taken elements from each to adapt them to our space and context” (Case 1. ENT/DIR 2).

Moreover, adaptation to context is always necessary, as highlighted by the headteacher in Case 1: “we have had to adapt and assemble it... otherwise it would not be possible. We would not have sufficient resources, so we have no choice but to search and adapt”.

Accordingly, the design of Future Classrooms is not conceived as a predefined space but as a flexible and contextualized construction. While there are guidelines and suggestions, their implementation requires an adaptation process that shapes each experience according to its specific context.

3.3. Practical development

As noted, implementing a Future Classroom is a demanding process full of challenges. However, redefining the educational space necessarily requires a different approach to teaching. The transition towards a student-centered pedagogical model and the functional use of learning cannot be achieved solely by changing resources and their arrangement; it requires new dynamics in which participation in tasks and projects fosters the acquisition of diverse knowledge, attitudes, and skills. The aim is to stimulate change so that it permeates the entire teaching practice of the school. As the headteacher in Case 1 states: “we do not want it to be an isolated session separate from what we do in class”.

Nevertheless, this transformation is gradual, and in practice, it often coexists with more traditional dynamics: “in the regular classroom I am a bit more traditional, but in the Future Classroom I like to innovate more” (Case 1. ENT/Coord. TDE). This highlights the distinction teachers make between practices inside and outside the Future Classroom: “in a regular class it is inevitable that I take a more directive role in delivering knowledge, whereas here students themselves discover knowledge” (Case 3. ENT/T2).

Specific schedules are also established to create clearly differentiated time slots: “we come to the classroom every two weeks... and they really look forward to it because they enjoy it so much” (Case 2. ENT/T3). The aim is to immerse teaching activity in situations and environments that promote experimentation, thereby fostering confidence in new teaching approaches.

This arrangement allows staff members to progress from their own starting points, avoiding a divide between those who are more open to innovation and those who are more hesitant: “There are people who are more proactive in using the Future Classroom and its tools, and others who find it more difficult and are more reluctant, mainly because they are unsure about their role in the new classroom dynamics and how it connects to the curriculum” (Case 1. ENT/DIR).

The findings suggest that Future Classrooms function as experimental frameworks for adopting clearly innovative approaches to teaching. These spaces are described as “open and full of possibilities” (Case 1. ENT/Coord. AdF).

Furthermore, the interdisciplinary nature of tasks is emphasized. These do not align with strictly separated subject areas but rather with the need to produce well-argued, functional outcomes: “we work on current topics related to what we are covering in Science or Mathematics, because they need to calculate for robotics or learn the steps needed to investigate something...” (Case 2. ENT/T3).

Students also recognize this interdisciplinary, functional, and motivating character: “it has been a step towards learning more, improving, and being able to use what you learn in the future” (Case 1. ENT/Student 2).

Within this framework, the teacher’s role takes on a different meaning, shifting towards designing learning environments and situations rather than directly transmitting information. Traditional classrooms, with their routines and

organization, are not suitable for developing a teaching model based on participation, communication, and creativity. A more flexible space with different resources is required.

3.4. Expectations

Future Classrooms are grounded in a transformative pedagogy aimed at fostering procedures, knowledge, and competences, in contrast to the linear transmission of academic and disciplinary content promoted by supranational bodies (Bonilla, 2023). In this sense, the cases studied show that Future Classrooms function as genuine laboratories for pedagogical change. As a result of this experimentation, a set of expectations emerges regarding the desired evolution.

Firstly, there is a clear intention to extend this approach to teaching and learning until it becomes standard practice. That is, to move from exceptionality to everyday practice, establishing these processes as the ordinary pedagogical reference in participating schools: “most of the teaching staff saw the Future Classroom as an opportunity to expand this methodology and become familiar with it” (Case 3. ENT/DIR).

The aim is for it to become a reference framework and a defining feature of the school as a whole—something that permeates the educational project and influences all teaching practices. It is not merely a space or a set of resources, but rather a way of understanding teaching and professional practice: “a driving force for change and, progressively, for that change to reach all classrooms in the school” (Case 3. ENT/Coord. TDE).

There is also an emphasis on connecting with students’ everyday habits and skills. The expectation is to integrate into formal learning processes what students already do informally, and which holds considerable educational potential: “We constantly see in class that students are very skilled with phones, tablets, laptops, TikTok, Facebook, Instagram—why not use that knowledge for their education? There are many tools that can help them learn” (Case 3. ENT/T1).

Given the strong presence of digital resources in daily life and the important role of families in fostering functional knowledge, there is also hope to involve parents more actively, ensuring that this transformation is supported by the entire community and becomes sustainable (Del Moral et al., 2014): “We are going to improve family involvement, which we have not fully achieved yet. This year we plan to have them participate in activities with us in the Future Classroom, as it is also motivating for students” (Case 2. ENT/Coord. AdF).

However, a process of this magnitude cannot rely solely on enthusiasm; it requires the implementation of professional development strategies for teachers to fully harness the pedagogical potential of the Future Classroom. The goal is to progressively achieve greater pedagogical autonomy, diversify experiences, and develop a comprehensive vision encompassing all educational action, as reflected in the following statement: “it would be very beneficial to continue until we become more specialized...” (Case 2. ENT/T3).

The narrative of change associated with the implementation of Future Classrooms reflects determination and aspiration. It looks towards the future and, above all, expresses the hope that these efforts will not fade into the transient and often superficial trends that frequently characterize the field of education.

4. Discussion and conclusions

The results show that implementing a Future Classroom involves far more than equipping a space with technology to complement a school's teaching resources. Rather, it entails a process and a set of decisions that ultimately affect multiple dimensions of the institutional framework: organizational (teacher participation and collaboration, resource allocation, scheduling and school time management), pedagogical (teaching dynamics, curriculum organization, student participation processes), and community-related (involvement of families and other stakeholders) (Pardo, 2020).

Firstly, the factors driving its adoption have both external and internal roots. When examining the reasons behind this decision, reference is often made to the continuation of an already established trajectory of innovation (Gairín et al., 2010), now seeking new directions to revitalize and update it in response to both educational demands and broader social contexts. In line with the legacy of educational innovation, there is a shared understanding that contemporary schools must promote up-to-date and relevant knowledge, currently associated with a broad set of skills supported by technological tools, in order to move beyond the rote reproduction of narrowly defined academic content (Adams et al., 2017; Almanza, 2021; Fernández-Enguita, 2023).

The Future Classroom is structured around a flexible organization of space and the integration of various technologies, with the aim of approaching teaching from innovative perspectives. However, implementing these changes requires resources that are not easily accessible. To address this shortfall—only partially covered by educational authorities—schools resort to purchasing low-cost, non-certified furniture, recycling materials, and participating in complementary projects. In this way, a form of budgetary synergy emerges that is both creative and diverse. As evidenced by the data, this has not hindered implementation; on the contrary, it has, to some extent, contributed to strengthening group cohesion around a shared project.

Regarding classroom organization, all evidence points to a reconfiguration based on zones aligned with specific purposes and skills associated with 21st-century learning (such as investigating, creating, adapting, communicating, and sharing), complemented by technological resources and specialized furniture. Nevertheless, although general guidelines exist, each case ultimately develops its own unique configuration (ProFuturo, 2016). As López-Company (2023) suggests, this is not a model to be replicated, but rather a space for experimentation that must be adapted to the characteristics and possibilities of each context.

Regarding practical dynamics, and in line with the findings of García-Tudela

et al. (2023), the cases analyzed reveal a dual position in which clear differences exist between ordinary classroom activity and that carried out in the Future Classroom. In all instances, the latter is characterized by more innovative practices. These include active, participatory, and collaborative methodologies, often framed within an integrated curriculum approach, such as project-based learning, service learning, and inquiry-based learning (Arstorp, 2018; Lomas & Oblinger, 2006; Olmos & Pardo, 2019). This reinforces the recurring argument that pedagogical transformation is more important than technology or physical space in these next-generation classrooms.

The expectations generated by these experiences should also be highlighted. Based on the data collected, there is a high level of satisfaction, particularly in relation to the collaboration and innovation observed in teaching practices. This aligns with the findings of García-Tudela et al. (2023), the Novigado report (2022), European case studies described by Attewell (2019), and the accounts of González (2023), all of which emphasize the promotion of innovation and the collective dimension of these initiatives. However, as Pardo (2020) points out, this reality is not always homogeneous, and there remains the possibility—and risk—of limiting these experiences primarily to technological aspects.

In conclusion, the implementation of a Future Classroom is a complex undertaking. There is neither a single pathway nor a universally replicable model. Depending on this diversity, different levels of development can be identified. At one end, the Future Classroom functions as an additional resource within the school, hosting occasional activities with limited curricular impact (parallel model). At an intermediate level, it supports certain curricular activities but remains significantly distinct from the regular classroom (dual model). Finally, although less common, there are cases in which the Future Classroom closely aligns with the regular classroom, working in conjunction with it to address the curriculum from an innovative and transformative perspective that reshapes the pedagogical culture of the school community (integrated model).

From this perspective, it can be inferred that the true potential of the Future Classroom lies in its connection to transformative education (Blasco-Serrano et al., 2023). It can be understood as a laboratory for pedagogical renewal (Feu & Torrent, 2021; Pérez Gómez & Soto, 2022), directly oriented towards improving teaching and fostering pedagogical experimentation. Otherwise, it risks becoming yet another passing trend that barely scratches the surface of classroom practice.

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