

Fernando Albuquerque Costa

University of Lisbon, Portugal
ORCID: 0000-0002-2165-7365

Elisabete Cruz

University of Évora, Portugal
ORCID: 0000-0002-8497-3322

Sandra Fradão

University of Lisbon, Portugal
ORCID: 0000-0003-0800-9934

Emily Sousa

University of Lisbon, Portugal
ORCID: 0000-0003-3364-0023

The Escol@s Digitais Project. An experience of working with technologies in Primary Education in Portugal

Projekt Escol@s Digitais. Doświadczenie w pracy z technologiami w szkołach podstawowych w Portugalii

Abstract

The Escol@s Digitais Project is an action-research project that was born on the initiative of the Municipality of Amadora (Portugal) and has been under development by a research team of the Institute of Education of the University of Lisbon. As part of the Education XXI line of research, it aims to support the ongoing digital transformation in all public schools of Primary Education in the municipality to enhance the quality of processes, performances, and results of learning. Seeking to deepen and consolidate existing knowledge and practices, the Project defines four objectives to be pursued intentionally throughout its term: 1) valuing the work carried out within schools in the digital transition, distinguishing and promoting successful practices; 2) reinforcing the sustained integration of teaching and learning dynamics with digital, in the classroom and in other local contexts; 3) recognizing and assessing students' digital skills, bearing in mind the Portuguese Profile of Students Leaving Compulsory Schooling; 4) monitoring project activities and understand their impact on teachers and students. In this article, we present the main starting questions and the conceptual foundations and premises that underpin the intervention plan's design. Although the plan involved other dimensions, particularly related to school management, here

we will emphasize the assumption of digital technologies that we assumed and how we worked with the teachers. We conclude with the presentation of the Project's assumptions and work axes.

Keywords: digital transformation, digital skills, primary education, curricular integration of technology, teacher education model

Streszczenie

Projekt Escol@s Digitais to projekt naukowo-badawczy, który narodził się z inicjatywy gminy Amadora (Portugalia) i jest rozwijany przez zespół badawczy Instytutu Edukacji Uniwersytetu Lizbońskiego. W ramach linii badawczej Edukacja XXI ma na celu wsparcie trwającej transformacji cyfrowej we wszystkich publicznych szkołach podstawowych na terenie gminy w celu poprawy jakości procesów i wyników nauczania. Mając na celu pogłębienie i utrwalenie istniejącej wiedzy i praktyk, projekt definiuje cztery główne cele, które należy świadomie realizować przez cały okres jego trwania: 1) docenienie pracy wykonanej w szkołach w ramach transformacji cyfrowej, wyróżnianie i promowanie skutecznych praktyk; 2) wzmacnianie trwałej integracji dynamiki nauczania i uczenia się z technologią cyfrową w klasie i w innych kontekstach lokalnych; 3) uznawanie i ocena umiejętności cyfrowych uczniów, mając na uwadze portugalski profil uczniów kończących naukę obowiązkową; 4) monitorowanie działań projektowych i zrozumienie ich wpływu na nauczycieli i uczniów. W artykule przedstawiamy główne pytania wyjściowe, a także podłoże koncepcyjne i przesłanki, które leżały u podstaw konstrukcji planu interwencji. Choć plan obejmował inne wymiary, szczególnie związane z zarządzaniem szkołą, tutaj szczególny nacisk położymy na przyjęte przez nas założenia technologii cyfrowych i sposób, w jaki pracowaliśmy z nauczycielami. Kończymy przedstawieniem założeń projektu i osi pracy.

Słowa kluczowe: transformacja cyfrowa, umiejętności cyfrowe, edukacja podstawowa, integracja technologii w program nauczania, model szkolenia nauczycieli

Introduction

Similarly to what has been happening throughout the context of the European Union¹, namely in the last decade, Portuguese schools have been involved in a process that aims to increase the use of digital technologies in the different areas of educational action. Among the different measures in progress, we highlight the initiatives and actions aimed at promoting the integration of technologies in curricular activities, particularly those that are articulated with preparing teachers to take on this integration process in their hands².

In this article, we intend to share the theoretical and methodological bases that support the work of the research team responsible for the Digital Escol@s Project (2021–2024) when faced with the need to design a specific intervention plan that would enable teachers to, along with their students, benefit from the full potential of the technologies they have at their disposal for the teaching and learning process in the Municipality of Amadora³. The focus was on achieving a training strategy

¹ C. Redecker, Y. Punie (ed.), *European Framework for the Digital Competence of Educators: DigCompEdu*, Luxembourg 2017.

² Governo de Portugal, *Programa de digitalização para as Escolas*, Lisboa 2020.

³ The Municipality of Amadora (Portugal) is a heavily urbanized territory nearby Lisbon, the capital, with about 1.7% of the Portuguese population living there. In terms of education, the municipality's

that would, not only prepare teachers to use effectively and productively different technologies but also to empower their students to engage with digital technologies.

Assuming, therefore, a logic of isomorphism⁴ between the learning of technology by students and how teachers should be prepared in the technological area, the challenge was to consider an intervention model that would enable teachers to acquire digital skills consistent with the type of digital preparation intended for students as well. The realization of this goal implied the design of a holistic and integrated approach to teacher training in the broader context of educational dynamics. That is, considering the general purposes and objectives foreseen in the National Curriculum in Portugal, inscribed in the different curricular documents in force at the time of the beginning of Project⁵, particularly the documents referring to primary education⁶, all of them characterized by being based on an imminently humanistic and emancipatory content matrix. In addition, the dual focus, focused on the digital empowerment of teachers and students, implied the establishment of a training strategy that would make it possible to explore and make the most of digital technologies' potential, namely in terms of learning tools, i.e., tools students can use to work with.

Consequently, as the literature argues, it would be essential to support teachers in overcoming the traditionally presented obstacles to justify the low uptake of digital technologies, namely factors of an emotional and affective nature⁷. These factors, often named second-order factors⁸, include teachers' attitudes towards technologies in general and their integration into schoolwork, or even the resistance to innovation and changes that their use may entail⁹. But they also include what they think about the potential benefits of using technologies for educational purposes or their beliefs about their ability to use them effectively in the teaching and learning process¹⁰.

political action is based on a humanistic vision, seeking to ensure that all children and young people achieve academic success, regardless of their background or abilities. With regard to the organization of the public compulsory education network, the municipality is organized into 12 groups of schools with 29 public primary schools, involving about 6,500 students and 430 primary school teachers.

⁴ G. Mialaret, *Psicopedagogia dos meios audiovisuais no ensino do primeiro grau*, Petrópolis 1973.

⁵ Governo de Portugal, *Perfil dos Alunos à Saída da Escolaridade Obrigatória*, Lisboa 2017.

⁶ Governo de Portugal, *Aprendizagens Essenciais – 1.º CEB*, Lisboa 2018; Governo de Portugal, *Orientações Curriculares para as TIC – 1.º CEB*, Lisboa 2018.

⁷ H. Peralta, F. Costa, *Teacher's Competence and Confidence regarding the use of ICT*, "Sísifo" 2007, 3.

⁸ P. Ertmer, *Teacher pedagogical beliefs: The final frontier in our quest for technology integration?*, "Educational Technology Research and Development" 2005, 53(4).

⁹ J. Tondeur, J. van Braak, P. Ertmer, A. Ottenbreit-Leftwich, *Understanding the relationship between teachers' pedagogical beliefs and technology use in education: a systematic review of qualitative evidence*, "Educational Technology Research and Development" 2016, 65(3).

¹⁰ A. Ottenbreit-Leftwich, J. Liao, O. Sadik, P. Ertmer, *Evolution of Teachers' Technology Integration Knowledge, Beliefs, and Practices: How Can We Support Beginning Teachers Use of Technology?*, "Journal of Research on Technology in Education" 2018, 50(4).

To address the need for a conceptually based intervention strategy, informed by previous experience, the Escol@s Digitais Project intervention was designed around the following starting question: *How can we best support teachers in using digital technologies effectively to promote student learning and development?*

In the following sections, we will briefly reflect on the challenges of digital transformation, the pedagogical potential of digital technologies, and the type of pedagogical and technological preparation of teachers, and then we will briefly present the set of assumptions on which the Digital Escol@s Project was based.

The Challenge of Digital Transformation of Schools

The digital transformation of schools has been an increasingly present topic in the European Commission's concerns, due to the underutilization of investments made in equipment and teacher training in the last two decades in different countries¹¹.

It is along these lines that the Action Plan for Digital Education (2021–2027)¹² should be understood, as it aims to stimulate different countries in the creation of an integrative approach to the use of digital technology in Education. Assuming digital education and the development of specific skills as a strategic priority for a Europe prepared for the highly technological context present in the different spheres of life in society, the core idea of this plan is to guide the different European countries in the establishment of a digital education system with high transformative potential. The goal is to empower the education systems themselves so that they can go beyond mere adaptation, becoming true driving agents of innovation and change in the society in which they are inserted.

In this context, as some authors suggest, it is important to recognize the growing influence of external dynamics on educational institutions and, consequently, the notion that the school is part of a broader ecosystem in which it is inserted¹³. This is already the case for schools that collaborate, establishing networks or partnerships with other schools or organizations, such as universities and research centers, as in the case of this Project, or even with technology companies¹⁴.

At the school level, according to the action plan, the focus should be on two priority areas. One is to create a supportive ecosystem for the use of digital technologies

¹¹ S. Avdeeva, A. Uvarov, K. Tarasova, *Digital Transformation of Schools and Student's Information and Communication Literacy*, "Voprosy Obrazovaniya / Educational Studies Moscow" 2022, 1; L. Luić, D. Švelec-Juričić, J. Lasić-Lazić, M. Šantalab, *Planning, Managing and Leading the Digital Transformation of Schools*, "ICERI2020 Proceedings", 2022, 1; OECD, *Education at a Glance 2018*.

¹² European Commission, *Digital Education Action Plan (2021–2027). Resetting education and training for the digital age*, 2020.

¹³ A. Renz, G. Vladova, D. Hellmuth, *Beyond Technology: Dimensions of Digital Transformations in Schools*, 2021.

¹⁴ OECD, *OECD future of education and skills 2030. OECD learning compass 2030*, 2019.

in teaching and learning. This ecosystem should include the necessary digital infrastructures and equipment, as well as well-prepared teachers, effective organizational strategies, and a school culture that supports innovation. The other is a set of complementary measures to promote the comprehensive and integrated use of digital technologies in the educational process, focusing on students, teachers, and schools¹⁵.

For each of these areas, different actions are predicted, and different working tools are made available (such as self-assessment tools, for example) so that education systems and schools can define their action plans.

In the case of Portugal, we have the transposition of the Dynamic Digital Competence Framework of Reference to the national context¹⁶, or the Action Plan for the Digital Transition¹⁷, with a component specifically aimed at schools (Digitalization Program for Schools) and which integrates several initiatives related to digital.

If the first is the benchmark of the digital skills to be acquired by citizens in general, the second includes different concrete actions to be implemented in schools. Actions that include the provision of individual equipment to students and teachers and their free mobile connectivity, the creation and availability of digital educational resources, and, of course, the development of a digital training plan for teachers.

Influencing and reinforcing each other, it can be said, in brief, that the adoption of the above-mentioned guiding documents will have as its main merit allowing greater internal coherence and cohesion between the digital plans developed by schools (School Development Action Plans), the curriculum and the teacher training programs.

It was precisely in this scenario that the intervention to be initiated within the scope of the Escol@s Digitais Project was carefully designed. Aware of the influence and role of factors external to the school itself, such as international and national standards and guidelines, we sought to create an environment suitable for the involvement of teachers, either in articulation with those responsible for schools and school groups, or with the City Council's Education services within the scope of their attributions in terms of infrastructures.

The Potential of Digital Technologies in Learning

Despite the criticism and doubts that have been raised more recently regarding the presence of digital technologies in schools¹⁸, particularly in the first years of

¹⁵ Y. Volkov, G. Chikarova, *Current Issues young teachers' professional identity in a big city*, "World Journal on Educational Technology: Current Issues" 2021, 13(2).

¹⁶ INCoDe2030, *Quadro Dinâmico de Referência de Competência Digital para Portugal*, Lisbon 2019.

¹⁷ Governo de Portugal, *Plano de ação para a transição digital de Portugal*, Lisboa 2020.

¹⁸ C. Player-Koro, A. Rensfeldt, N. Selwyn, *Selling tech to teachers: Education trade shows as policy events*, "Journal of Education Policy" 2018, 33(5).

schooling¹⁹, there are still many who advocate their use for educational purposes. Although digital technologies can be used based on different theoretical and conceptual foundations and, therefore, at the service of different practices, several studies consider them as a factor of innovation and change in the ways of organizing teaching and learning²⁰.

Since the pioneering work of researchers, such as Seymour Papert, the need for a change has emerged in the sense of considering digital technologies as a factor that induces a “new culture of learning”²¹ and as a support for the global development of individuals, both intellectually and socially²². This change in perspective denotes greater attunement to a world in constant transformation and highly advanced from a technological point of view. In addition, it is a perspective that also reflects recent developments in the way of envisioning the role of the school in the formation of individuals present in the curricular documents of different countries on a European scale.

It is, in practice, a method of comprehending the teaching and learning process that assigns greater protagonism and a more cognitively active role to the student, as opposed to the traditional centrality of the teacher in the transmission of information²³. Something that assumes, on the other hand, a more open and dynamic curricular structure in which technological resources must be at the service of meaningful, personalized, and progressively more autonomous learning on the part of the student.

Within this framework of thought, and in opposition to the closed and transmissive methods characteristic of traditional curricular practices, it is expected that students will be involved in a logic of curricular transversality based on projects and problems, assuming a growing co-participation in decision-making, not only on the contents to be studied but also on the ways of doing so. that is, about what strategies and resources to use.

One of the proposals that best fit this perspective is what some authors call *mindtools* which, from a constructivist perspective of learning, David Jonassen understands as “learning *with* technologies”²⁴. According to the author, *mindtools* can be all the technologies that facilitate critical thinking and, to that extent, allow

¹⁹ M. Bănuț, I. Albușescu, *The integration of Digital Competences into the Primary Education Curriculum*, “Astra Salvensis” 2021, 2.

²⁰ C. Lewin, A. Smith, S. Morris, E. Craig, *Using Digital Technology to Improve Learning: Evidence Review*, London 2019.

²¹ S. Papert, *What's the big idea? Toward a pedagogy of idea power*, “IBM Systems Journal” 2000.

²² M. Bers. *Designing Digital Experiences for Positive Youth Development: From Playpen to Playground*, Oxford 2012; D. Jonassen, *Computers as cognitive tools: Learning with technology, not from technology*, “Journal of Computing in Higher Education” 1995, 6; M. Resnick (ed.), *Lifelong kindergarten: cultivating creativity through projects, passion, peers, and play*, Massachusetts 2017.

²³ J. Hunter, *Technology Integration and High Possibility Classrooms. Building from TPACK*, New York 2015.

²⁴ D. Jonassen, *Computers as cognitive tool...*

for meaningful learning. Tools that allow students to think critically when using them to explore and represent the content being studied or what they already know about a particular topic. From this perspective, computer applications such as databases, spreadsheets, semantic networks, simulators, or multimedia and hypermedia creation tools can, therefore, function as intellectual partners of students, expanding and broadening their thinking, and in this way, making students active agents in the construction of knowledge instead of reproducers of information.

The main idea of this proposal is that digital technologies have a high potential for the teaching and learning process to be approached pedagogically in an unusual way. Beyond the teaching of curricular contents, it is assumed that the use of technologies favors the exploration of a wide variety of pedagogical strategies with a view to personal and social development of students as active, critical citizens prepared to deal with everyday problems in a technologically advanced society.

According to Papert, the potential of digital technologies lies precisely in the fact that they constitute a powerful language of understanding and self-expression, allowing students to be cognitively engaged when they use them to create something, communicate and interact with others, but also to express themselves and find solutions to the different types of challenges and problems they face²⁵.

In summary, assuming the diversity of pedagogical possibilities that this perspective contains, it is easy to understand that it also results in changes in the role of the teachers and their function within the classroom. Since the use of digital technologies provides a new relationship among the educational actors and about knowledge and the way of understanding learning, teachers are faced with new challenges and responsibilities. Aspects that are a reason to question traditional practices and, in this way, justify the need to talk about change and innovation of processes by these professionals.

The Teachers and their Training

Despite all the efforts made in recent decades to train teachers in the use of digital technologies, the prospect of changing practices and routines often places teachers in a situation of discomfort and insecurity. Unlike what happens in the majority of other areas of society, in companies and the world of work in general, we are still far from a regular and natural use of technologies in school.

This discrepancy between schools and other areas of society raises several questions about the strategies and support implemented to foster the integration of digital technologies in education, especially if we consider the investments that have been made, namely in terms of the technological training of teachers.

²⁵ S. Papert, *What's the big idea...*

On the one hand, this finding implies questioning the vision and effectiveness of the processes that have been used to promote digital technologies in teaching and learning situations. On the other hand, no matter how qualified this training might have been, it might be natural that the technological development that has taken place in recent years has brought new demands on teachers. A clear example of this, similar to what had happened with other previous technological proposals (web, multi/hypermedia, social networks, mobile technologies, augmented reality, gamification, among others), is the emergence of generative artificial intelligence and the numerous possibilities announced for its use in school.

To deepen the understanding of the challenges faced by teachers, it might be useful to distinguish between the two aspects involved in the issue. Firstly, it is important to reflect on the individual characteristics of the teachers themselves, both personally and professionally. Secondly, the training strategies in which teachers have participated intending to promote the integration of digital technologies into their practices, also need to be carefully considered.

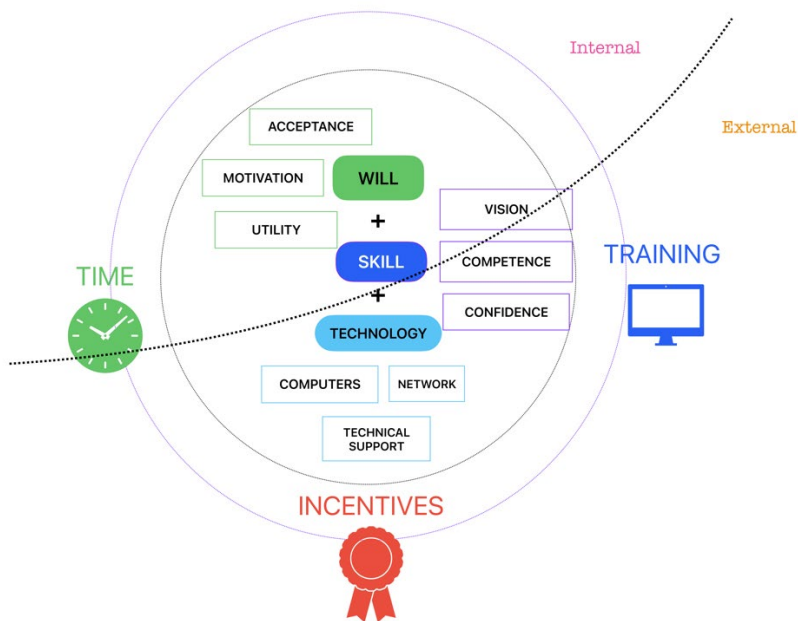


Figure 1. Understanding the relationship between teachers and the digital as a transformative tool

Bearing in mind that teachers are both people and professionals, it is a matter of understanding the relationship between individual variables (abilities, knowledge,

beliefs, attitudes, etc.) and their acceptance and predisposition to use them when they plan and implement activities to be put into action with their students²⁶.

Regarding teacher preparation, we underline the importance of professional development through in-service training to promote pedagogical innovation. However, it is recognized that the effectiveness of such training will depend on the approach taken. It is difficult for training practices to be effective in promoting change and innovation in teachers' practices if digital technology is introduced by valuing its technological aspect (how a given tool works and what it allows to do) to the detriment of exploring its specific potential from a pedagogical and didactic perspective.

As we have argued in other contexts, the problem seems to lie in the inadequacy of the traditional model of working with teachers²⁷. This refers to the vision regarding the potential of technologies that guide the action of the trainers, as well as the configuration of the training itself, which is usually something sporadic instead of continuous with little or no time for application in a school context and focused mostly on the tools themselves.

Nonetheless, as other studies suggest, the work carried out in professional development training can effectively help teachers overcome the second-order barriers mentioned above²⁸, as it can contribute to exploring and demonstrating the usefulness of digital technologies in the service of concrete and contextualized learning²⁹. Moreover, it can also help teachers develop a positive outlook on innovation and change³⁰, gain confidence in their abilities and, on that basis, be willing to take risks and experiment with new ways of working. The results of some studies do show that teachers' competence and confidence are indeed decisive factors in the implementation of innovation in educational practices³¹.

Equally crucial are the methodologies employed in teacher training, which should serve as both examples and catalysts for innovation. Thus, the attention given to methodological issues³² can be particularly decisive for the success of

²⁶ A. Bartolomé, *Revisando actitudes ante las tecnologías digitales*, "Innovaciones Educativas" 2021, 23.

²⁷ F. Costa, S. Viseu, *Action and Reflection – nuclear strategies of teacher training for ICT use* [in:] ed. M. Persson, *The Learning Teacher Network*, Karlstad 2006; F. Costa, *Curricular development and ICT: From technological deficit to methodological deficit*, "Proceedings of the European Distance and E- Learning Network", 2016.

²⁸ T. Makki, L. O'Neal, S. Cotten, R. Rikard, *When first-order barriers are high: A comparison of second- and third-order barriers to classroom computing integration*, "Computers and Education" 2018, 120.

²⁹ D. Petko, *Teachers' pedagogical beliefs and their use of digital media in classrooms*, "Computers and Education" 2012, 58(4).

³⁰ A. Hargreaves, *Changing teachers, changing times*, Toronto 1994.

³¹ M. Barajas, *Final synthesis report on projects' findings, policy recommendations and future research tasks*, Barcelona 2002.

³² F. Costa, *Curricular development and ICT...*

preparation in the area of digital technologies, as teachers have opportunities to experiment with new strategies for working with students and to be able to reflect, preferably with the support of experts, on the processes used and the results obtained³³. Something that requires time and leads us to a path that each teacher must take to observe changes³⁴. A process with distinct stages and moments, as can also be induced from most of the models of understanding the process of adoption of innovation in general³⁵, or, specifically, of the adoption and incorporation of digital technologies in pedagogical practices (ACOT³⁶, SAMR³⁷, Triple E³⁸, and others). In other words, teachers need enough time to acquire new skills, try out new working strategies with their students, reflect on the results of the experiences carried out, and, as a result of this process, intentionally incorporate changes and transform their current practices.

The Assumptions of the Digital Escol@s Project

As we have previously discussed, the configuration of the intervention was based on a set of conceptual assumptions that summarize and configure the research team's vision regarding the different aspects that determine the success of the digital transformation work to be carried out by schools.

We refer specifically to the theoretical foundations that support the integration of digital technologies into the curriculum and how teacher training should be considered and implemented. Overall, it can be said that this is a vision in which digital technologies are assumed as potential inducers of innovation and transformation of teachers' pedagogical practices. As we have seen before, thinking about technologies with this transformative view means discovering and exploring new ways of developing the teaching and learning process, while preparing young people to be active and competent agents in solving everyday problems.

According to this view, the concept of the potential of digital technologies for learning implies the assumption that: 1) the use of these technologies can bring added value to the learning process if assumed as tools with which the student is led to reflect on what he is learning and how he is learning; 2) digital technologies can therefore assume a role that goes far beyond being an instrument to support conventional practices of transmission by the teacher, constituting above all as an

³³ F. Costa, S. Viseu, *Action and Reflection...*

³⁴ Apple Computer, *Apple Classrooms of Tomorrow – Today Learning in the 21st Century*, Cupertino 2008.

³⁵ E. Rogers, *Diffusion of innovations*, New York 1995.

³⁶ D. Dwyer, C. Ringstaff, J. Sandholtz, Apple Computer, *Teacher Beliefs and Practices Part I: Patterns of Change. ACOT Report #8*, Cupertino 1992.

³⁷ R. Puentedura, *SAMR: Getting To Transformation*, 2011.

³⁸ L. Kolb, *Learning First, Technology Second*, Portland 2017.

“intellectual partner” of the student in the exploration and construction of knowledge; 3) digital competence is a decisive dimension of the personal and social development of individuals, if the work that students are called to develop with them preferably fits into a logic of transdisciplinarity and curricular transversality; (4) digital technologies can induce innovation in teaching and learning processes, as they enable achievements otherwise beyond the reach of learners.

On the other hand, concerning teachers and in-service training for professional development, this perspective assumes that: 1) any process of innovation and change implies individual decision-making, adherence and involvement on the part of each teacher; 2) it is mainly the internal variables that determine teachers’ adherence to the changes that the use of digital technologies will entail, such as their own willingness to change, or willingness to expend the effort that this entails; 3) for the success of the support provided by the trainers, it is decisive to pay particular attention to methodological issues, i.e. to the way in which teachers asked to work and, in a homologous way, to the way in which teachers are expected to work with their students, adopting the idea of isomorphism between the practices of the trainers and the practices of the teachers with their students; (4) teachers’ confidence in the pedagogical use of digital technologies is strengthened by the knowledge and mastery acquired through their effective use in the curriculum; 5) it is through experimentation and reflection on new work strategies with students, identifying what works, or does not work, and making the necessary adjustments to the way they usually work, that effective transformation takes place; (6) it is essential to provide the necessary and sufficient time for the expected changes to take place.

The Working Axes of the Project

In operational terms, the Digital Escol@s Project develops action on the ground around three distinct axes, but strongly articulated with each other and oriented towards the support of each school and their teachers in achieving the desired digital transformation.

In the first axis, termed *Learning with Technologies*, the perspective emphasizes the utilization of digital technologies to support learning. It involves fostering and implementing an action plan collaboratively with teachers.

The second axis, referred to as *Digital Certification*, encompasses a series of activities and accomplishments within each school grouping that differentiate three components: 1) the *Digital Certification of Students*, to value, support, and recognize the acquisition of digital skills, naturally considering the learning that is socially relevant today in the digital area and the stage of development of the students involved in the project; 2) the *Digital Certification of the Schools* themselves, through the assessment of merit according to their involvement and achievements throughout

the project, about the transformation of the school environment, namely in terms of changes in the teaching and learning process; and 3) *Pedagogical Guidance*, aiming at the development of the certification model and procedures, to achieve comfort, confidence and mastery of digital tools by all involved in the process.

Finally, the third axis integrates all activities related to the creation of an *Observatory*, aiming at the collection, interpretation, and systematization of data throughout the project's life, to support decisions based on empirical evidence. In addition to the preparation of an initial diagnosis, the planned activities include the global monitoring of the actions to be developed, the general monitoring of the data of the schools covered, and the final evaluation of the project, with the preparation of annual reports to be returned to schools and teachers for reflection and support for the design of future activities.

Concluding Remarks

The experience referred to here is grounded in the fundamental idea that digital technologies have significant potential to innovate and transform the pedagogical practices that teachers employ in the classroom with their students. In addition, as a complementary idea, it recognizes the need for certain conditions to be met, particularly the willingness and openness of teachers to explore, experiment, and discover what technologies have to offer them. And, based on this experimentation and exploration, they can bring about changes in the way they usually work and put their students

to work using digital technologies, in short, determining and taking into their hands the direction of those changes³⁹.

Thinking about technologies as a tool that may transform current practices means, on the other hand, deciding to change towards a working model in which the students are at the center of the teaching and learning process. In this perspective, the aim is to discover new and unusual ways of doing things, preparing young people so that they can contribute to innovation in solving the problems they will face in the future and in which digital technologies will certainly play a decisive role,

Thus, teacher's decision-making ability and their actions using digital technologies are seen as a touchstone of the expected digital transformation, moving towards the construction of a school in greater harmony with the digital society we live in and the culture that these same technologies have provided in all spheres of human action.

Essentially, according to this perspective, the integration of technology should facilitate the exploration of new and diverse approaches to teaching and learning.

³⁹ F. Costa, E. Cruz, S. Fradão, C. Rodriguez, *Repensar as TIC na Educação. O Professor como Agente Transformador*, Lisboa 2012.

The goal is to equip young people with the skills to harness the undeniable potential of today's available technologies. This approach is rooted in a vision of school transformation that revolves around teachers, considered the primary agents of any educational change.

Bibliography

- Apple Computer, *Apple Classrooms of Tomorrow – Today Learning in the 21st Century*, Cupertino 2008.
- Avdeeva S., Uvarov A., Tarasova K., *Digital Transformation of Schools and Student's Information and Communication Literacy*, "Voprosy Obrazovaniya / Educational Studies Moscow" 2022, 1, doi: 10.17323/1814-9545-2022- 1-218-243.
- Bănuț M., Albulescu I., *The integration of Digital Competences into the Primary Education Curriculum*, "Astra Salvensis" 2021, 2.
- Bartolomé A., *Revisando actitudes ante las tecnologías digitales*, "Innovaciones Educativas" 2021, 23.
- Bers M., *Designing Digital Experiences for Positive Youth Development: From Playpen to Playground*, Oxford 2012, doi.org/10.1093/acprof:oso/9780199757022.001.0001.
- Costa F., Cruz E., Fradão S., Rodriguez C., *Repensar as TIC na Educação. O Professor como Agente Transformador*, Lisboa 2012.
- Costa F., *Curricular development and ICT: From technological deficit to methodological deficit* [in:] ed. EDEN, Tallinn 2016.
- Costa F., Viseu S., *Action and Reflection – nuclear strategies of teacher training for ICT use* [in:] ed. Persson M., Karlstad 2006, doi:10.1163/23528230-08002005.
- Dwyer D., Ringstaff C., Sandholtz J., *Apple Computer, Teacher Beliefs and Practices Part I: Patterns of Change. ACOT Report #8*, Cupertino 1992.
- Ertmer P., *Teacher pedagogical beliefs: The final frontier in our quest for technology integration?*, "Educational Technology Research and Development" 2005, 53(4).
- European Commission, *Digital Education Action Plan (2021–2027). Resetting education and training for the digital age*, Brussels 2020.
- Governo de Portugal, *Aprendizagens Essenciais – 1.º CEB*, Lisboa 2018.
- Governo de Portugal, *Orientações Curriculares para as TIC – 1.º CEB*, Lisboa 2018.
- Governo de Portugal, *Perfil dos Alunos à Saída da Escolaridade Obrigatória*, Despacho n. 6478/2017, Lisboa 2017.
- Governo de Portugal, *Plano de ação para a transição digital de Portugal*, Lisboa 2020.
- Governo de Portugal, *Programa de digitalização para as Escolas*, "Resolução do Conselho de Ministros n. 30/2020, Lisboa 2020.
- Hargreaves A., *Changing teachers, changing times*, Toronto 1994.
- Hunter J., *Technology Integration and High Possibility Classrooms. Building from TPACK*, New York 2015.
- INCoDe2030, *Quadro Dinâmico de Referência de Competência Digital para Portugal*, Lisboa 2019.
- Jonassen D., *Computers as cognitive tools: Learning with technology, not from technology*, "Journal of Computing in Higher Education" 1995, 6.
- Kolb L., *Learning First, Technology Second: The Educator's Guide to Designing Authentic Lessons*, Portland 2017.
- Lewin C., Smith A., Morris S., Craig E., *Using Digital Technology to Improve Learning: Evidence Review*, London 2019.

- Luić L., Švelec-Juričić D., Lasić-Lazić J., Šantalab M., *Planning, Managing and Leading the Digital Transformation of Schools* [in:] ed. IATED, Valencia 2022, doi: 10.21125/iceri.2020.
- Makki T., O'Neal L., Cotten S., Rikard R., *When first-order barriers are high: A comparison of second-and third-order barriers to classroom computing integration*, "Computers and Education" 2016, 120, doi:10.1016/j.compedu.2018.01.00.
- Mialaret G., *Psicopedagogia dos meios audiovisuais no ensino do primeiro grau*, Petrópolis 1973.
- OECD, *Education at a Glance 2018*, 2018.
- OECD, *OECD future of education and skills 2030. OECD learning compass 2030*, 2019.
- Ottenbreit-Leftwich A., Liao J., Sadik O., Ertmer P., *Evolution of Teachers' Technology Integration Knowledge, Beliefs, and Practices: How Can We Support Beginning Teachers Use of Technology?*, "Journal of Research on Technology in Education" 2018, 50(4), doi: 10.1080/15391523.2018.1487350.
- Papert S., *What's the big idea? Toward a pedagogy of idea power*, "IBM Systems Journal" 2000.
- Peralta H., Costa F., *Teacher's Competence and Confidence regarding the use of ICT*, "Sísifo. Educational Sciences Journal" 2007, 3.
- Petko D., *Teachers' pedagogical beliefs and their use of digital media in classrooms: Sharpening the focus of the «will, skill, tool» model and integrating teachers' constructivist orientations*, "Computers and Education" 2016, 58(4), doi: 10.1016/j.compedu.2011.12.013.
- Player-Koro C., Rensfeldt A., Selwyn N., *Selling tech to teachers: Education trade shows as policy events*, "Journal of Education Policy" 2018, 33(5).
- Puentedura R., *SAMR: Getting To Transformation*, 2011.
- Redecker C., Punie Y. (ed.), *European Framework for the Digital Competence of Educators: Dig-CompEdu*, Luxembourg 2017, doi: 10.2760/178382 (print),10.2760/159770 (online).
- Renz A. Vladova G., Hellmuth D., *Beyond Technology: Dimensions of Digital Transformations in Schools* [in:] ed. ISPIM Connects, Valencia 2021.
- Resnick M. (ed.), *Lifelong kindergarten: cultivating creativity through projects, passion, peers, and play*, Massachusetts 2017.
- Rogers E., *Diffusion of innovations*, New York 1995.
- Tondeur J., van Braak J., Ertmer P., Ottenbreit-Leftwich A., *Understanding the relationship between teachers' pedagogical beliefs and technology use in education: a systematic review of qualitative evidence*, "Educational Technology Research and Development" 2016, 65(3).
- Volkov Y., Chikarova G., *Current Issues young teachers' professional identity in a big city*, "World Journal on Educational Technology: Current Issues" 2021, 13(2), doi: 10.18844/wjet.v13i2.5713.