

# Evaluation of the contribution of Portugal 2020 to the Digitalization of Education

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## Executive Summary

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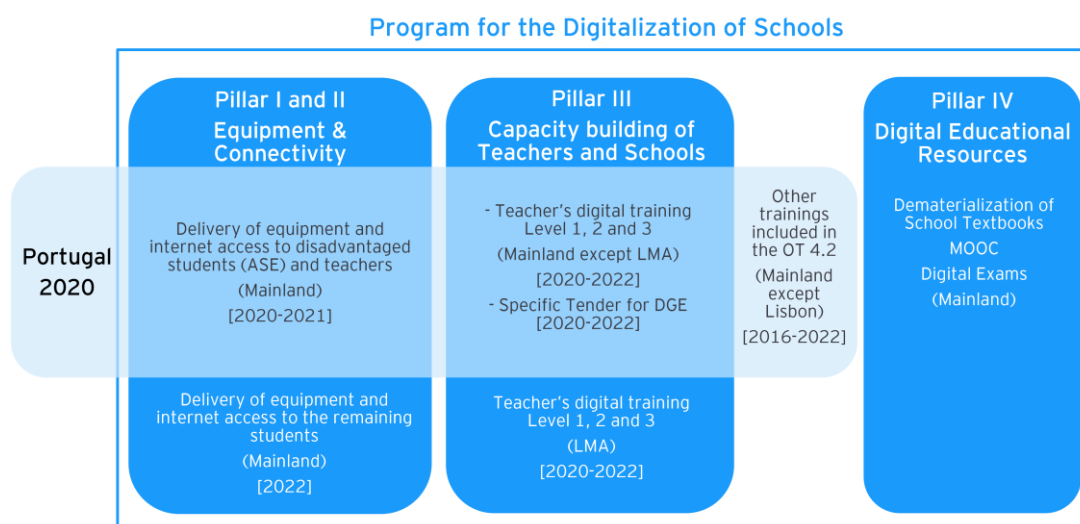
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## 1. Object, scope, and objectives of the Evaluation

Inserted in the Action Plan for Digital Transition, the Program for the Digitalization of Schools operates at three levels: (i) to acquire computers, connectivity and software licenses for public schools, in order to make these resources available to their students and teachers, giving priority to the students covered by the support of social financial aid (ASE) until their universal use is achieved; (ii) to develop a digital training program for the teachers (CDD); (iii) to increase the dematerialization of textbooks and the production of new digital resources.

The crisis triggered by the coronavirus (COVID-19) pandemic has led to the reprogramming of the Thematic and Regional Operational Programs and the Funds that are part of Cohesion Policy within the scope of Portugal 2020 (PT2020). Under the Program for the Digitalization of Schools, resources were then mobilized from the European Social Fund (ESF), which supported the interventions described below (Figure 1). This evaluation is a thematic impact assessment that aims to assess the effectiveness and efficiency of the ESF support/interventions in the field of the digitalization of education, in particular in terms of promoting equal access to education and especially in improving teaching-learning processes. As a second step, it is possible to assess the relevance of these measures in the future, taking into account the progress made in ESI Funds intervention.

Figure 1. Funding of Portugal 2020 under the Program for the Digitalization of Schools



Source: EY-Parthenon, based on the Resolution of the Council of Ministers No 30/2020, Notices of Opening Tenders (NOT) and Terms of Reference.

### Status as of September 30<sup>th</sup>, 2022

13 Notices of Invitation to Tender were published (9 under the Human Capital Operational Program - POCH), resulting in 264 applications. Only 6 operations were overturned / given up / cancelled and more than half of the approved projects are already completed. At the time of reporting, the operations approved under the Digitalization of Education involved €198 million of ESF (see Table 1), of which 83% was related to the 17 CRII-Digital School operations.

Table 1. Number of operations and funding by Operation Typology and Operational Program

Operational Program/ Operation Typology	No. of Operations	Approved eligible investment (€)	Approved funding (ESF)		Cofinancing Rate (%)	Completion Rate (%)
			€	% of total		
<b>POCH</b>	<b>248</b>	<b>146 213 575</b>	<b>137 815 038</b>	<b>69%</b>	<b>94%</b>	<b>88%</b>
4.1 - Quality and efficiency of the education and training system to promote school success - Specific tender for DGE to monitor the process	1	881 370	749 165	0%	85%	100%
4.2 - Training of teachers and other education and training agents	233	37 719 638	32 061 693	16%	85%	50%

Operational Program/ Operation Typology	No. of Operations	Approved eligible Investment (€)	Approved funding (ESF)		Cofinancing Rate (%)	Completion Rate (%)
			€	% of total		
4.8 - CRII - Digital School - Reinforcement of the technological equipment and connectivity network	14	107 612 566	105 004 180	53%	98%	100%
<b>OP Norte</b>	<b>1</b>	<b>36 576 138</b>	<b>36 576 138</b>	<b>18%</b>	<b>100%</b>	<b>100%</b>
4.8 - CRII - Digital School - Reinforcement of the technological equipment and connectivity network	1	36 576 138	36 576 138	18%	100%	100%
<b>OP Centro</b>	<b>1</b>	<b>16 822 725</b>	<b>16 822 725</b>	<b>8%</b>	<b>100%</b>	<b>100%</b>
4.8 - CRII - Digital School - Reinforcement of the technological equipment and connectivity network	1	16 822 725	16 822 725	8%	100%	100%
<b>OP Alentejo</b>	<b>1</b>	<b>6 566 325</b>	<b>6 566 325</b>	<b>3%</b>	<b>100%</b>	<b>100%</b>
4.8 - CRII - Digital School - Reinforcement of the technological equipment and connectivity network	1	6 566 325	6 566 325	3%	100%	100%
<b>OP Algarve</b>	<b>7</b>	<b>814 795</b>	<b>651 836</b>	<b>0%</b>	<b>80%</b>	<b>15%</b>
Training of teachers and other education and training agents	7	814 795	651 836	0%	80%	15%
<b>Total</b>	<b>258</b>	<b>206 993 557</b>	<b>198 432 061</b>	<b>100%</b>	<b>96%</b>	<b>92%</b>

Source: EY-Parthenon, based on the list of approved operations. Note: Completion Rate = (Executed funding / Approved funding); Cofinancing Rate = (Approved funding / Approved investment).

## 2. Methodology

This evaluation is an impact assessment in which aims to identify the cause-effect relationships, trying to demonstrate effects (direct and indirect, expected and unexpected) attributable to the intervention. The impact analysis in this evaluation was carried out using the Theory-Based Evaluation method and the "Theory of Change" approach. The Theory of Change is a graphical and systematized representation of what needs to happen for the desired results to materialize, that is, the chain of the various achievements and intermediate results that occur at each stage of the policy or program, which trigger change and lead to the long-term result and impacts. A testable logical framework has thus been established, in particular with regards to the assumptions, risks and mechanisms associated with it.

The preparation of the ToC in the context of this evaluation was supported by a process of literature review and documents' analysis and took into account, with regards to assumptions and risks, a focus on the evaluation criteria governing the evaluation issues (effectiveness, efficiency, impact, sustainability, European Added Value and relevance). The final validation of the ToC was carried out in a Focus Group session with relevant stakeholders involved in the programming of the typologies of intervention under analysis.

The evaluation process was also anchored in a wide range of methods and techniques for collecting and analyzing information, including the collection and analysis of documents and statistical data, the conduction of seven interviews/meetings, three case studies, three focus groups and one final workshop, and two surveys (one to the directors of the schools, direct recipients of the actions of the Digital School, with a 75% response rate, and one to the teachers, final beneficiaries of the Digital School, with approximately 11% response rate). Together, the mobilized elements complemented each other to enable answering to the evaluation questions.

## 3. Main conclusions from answering the Evaluation Questions

### Relevance

- At the end of the 2020/2021 school year, the overall acceptance rate for the Digital School kits was significant, albeit lower than anticipated, standing at 81% for support receiving students and 75% for teachers. The take-up was decreasing according to the level of education, being of around 86% in typologies I and II (1st education cycle and 2nd/3rd education cycles) and 72% in typology III (secondary education and teachers).

- Acceptance rates among the most disadvantaged students was higher in the different types of equipment, evidencing the relevance of the instruments mobilized in the pursuit of public policy objectives, to the extent that students from lower income households will have, from the outset, greater difficulties in accessing their own equipment.
- The total liability of the parents for the integrity of the equipment, associated with the absence of risk mitigation mechanisms (e.g., insurance against damage and breakdowns) represented the main factor for the non-acceptance of the Digital School kit by the disadvantaged students. The expectation of incurring repair costs proved to be particularly conditioning among lower income households, especially given that there is the perception, identified throughout the auscultation process, that the equipment is fragile and prone to damage even with a normal level of usage and care. The acceptance was also conditioned by the previous access to a computer by the students, making the acceptance of the Digital School kit unnecessary.
- The lower acceptance rate of teachers is mainly explained by the preference for their own equipment compared to what would be available (indicated by 63% of the teachers surveyed). The fact that the teacher is in a temporary hiring situation or the need to return the same equipment after a short time of its reception were also identified as relevant constraints. Although to a lesser extent, the conditions of responsibility for the equipment, the quality of the equipment or the delay in delivery may also explain the lower take-up of the teachers.
- With regard to the teacher training component, there is also a massive adherence to the reporting date (July 2022). By the end of 2022, about 91% of teachers had already performed the Check-In diagnosis (99,740 in absolute value, percentage based on the teachers of the 2021/22 academic year), and there were in total 47,771 participations in Level 1, 2 and 3 training (44% of teachers from the 2021/22 total).
- The rate of adherence of teachers to training measures maintained its trajectory throughout the 2022/2023 academic year, with an adherence rate of 72% in March 2023, some with multiple participations. The evidence collected indicates that the response of the training offer being below the demand by teachers may have been a conditioning factor for a faster evolution of the coverage rate.
- The desire to increase digital skills and the recognition that digital tools and content facilitate teaching and learning by students were the main reasons identified by teachers for participating in the digital training of teachers. Teachers' interest for and appreciation of digital skills, notwithstanding the possibility of it being allied to the need (mentioned by half of teachers) to carry out hours of training for career progression, is also reflected in the fact that 53% of respondents who participated in the training have also participated, in the last five years, in another course related to the acquisition of digital skills.

## Effectiveness

- The operations of PT2020 inserted in the Program for the Digitalization of the Education (OT 4.1 - Quality and efficiency of the education and training system to promote school success and 4.8 - CRII - Digital School: Strengthening the network of technological equipment and connectivity) are financially executed, concluding that most of the completion goals associated with the operations are achieved or in the process of being achieved at the time of reporting, so it may be concluded on the effectiveness of the policy instruments mobilized.
- The operations promoted by SGEN, more significant in volume of funding, for the supply of Digital School kits to students and teachers, have a globally high rate of achievement of indicators, with targets for delivery of equipment to teachers already having been exceeded, and completion rates for delivery of equipment to students being around or even exceeding 90%, with the exception of operations supported by POCH in less developed regions (type III equipments), with a rate of 80%.
- With regards to the operations promoted by the DGE, most of the activities had significant achievements at the time of reporting, with a significant number of participation of teachers and schools in the diagnostic and training activities, and the implementation was increasing over the subsequent months. Most schools were already implementing their PADDE (705), with 21 schools still in the design phase.
- At the time of writing of this evaluation, all schools are already implementing the actions of their respective action plans. In this sense, it is expected that the operation of the DGE financed by POCH will reach the contracted targets by the end of the implementation period.
- The level of achievement of the goals for the operations is a reflection of the success of the Digital School operation regarding the acquisition and delivery of equipment to students and teachers, in a context of pandemic

and constraints in supply chains, during which even so, the deliveries of the equipment occurred within the expected deadlines.

- The contribution of the digital training to the strengthening of teachers' skills is perceived globally in a very positive way, whether in the field of communication and collaboration, selection, creation and sharing of digital content or in the context of learning and evaluating, despite there being, in some cases, a misalignment between the result of the diagnosis (Check-In) and the real capabilities of the teacher, and a dispersion of contents, in which the superficial approach to many tools has prevented the deeper exploration of the potential of digital resources in the context of class and learning.
- For the vast majority of teachers, the digital skills acquired in the training actions were useful for all the functions performed in the school, especially for the teaching and learning functions. About 50% of the teachers surveyed who participated in the training actions recognize a high contribution of participation in the training actions for the increase of digital skills, integration of digital tools and resources in the teaching-learning activities, and performance of activities aimed at the digital training of students. The contribution of the evaluation and improvement of the inclusion of the students was more moderate, although visibly positive.
- The lack of free time to participate in training actions and the feeling of global demotivation of teachers regarding the exercise of their profession were the main determinants for non-participation in them. Some teachers also did not participate because they considered that the training was not relevant to their professional activity, and/or because they had a low natural tendency to work with digital tools and content.
- The initial deliveries of equipment only occurred after the first lockdown, with 99,000 kits arriving in schools in January 2021, and only 27% of these being delivered to students before the start of the second lockdown (from late January to April 2021). The effectiveness of the measures in mitigating the pernicious effects of lockdown on student learning was limited, but still positive effects of the delivery of the digital kits in the second confinement were identified, comparing the reality between the two confinements. The distribution of the kits was perceived as fundamental in cases where there were still students without any equipment at home or where there was only one equipment available in the household, shared by parents in remote working and by siblings.
- It stood out as strong constraints to the achievement of the results of the digital plan during the period of lockdown, in addition to factors related to the date of delivery of the equipment and its distribution to the students, the technical assistance, the network coverage, the digital skills of the students and their family/housing context. The family and housing conditions of the student, in addition to access to equipment, conditioned learning during the period of lockdown, particularly in a context of overcrowding or inadequacy of the student's housing. In addition, the lack of digital skills of parents was also highlighted as a constraint in that they did not have, in many cases, the skills to help students during distance learning activities.
- There was a pattern of notable increase in the intensity of use of digital tools and contents in the performance of different activities by teachers from the pre-pandemic period to the lockdown period. Subsequently, in the transition from lockdown to face-to-face teaching, there was a setback in the intensity of use, but still with average values higher than those reported in the pre-pandemic period. This pattern was verified for all schools with teachers surveyed.
- The use of digital tools and resources in the classroom is currently significantly higher than before the pandemic, having moved from close to occasional use to frequent or very frequent use. During the lockdown, digital tools were used by teachers very often and in a transversal way, with a strong focus on the use in a teaching-learning context, given that both classes and training in the context of work (professional education) took place remotely. In the return to face-to-face teaching, there was a reduction in the use in the classroom context of teaching-learning, maintaining the intensity of the use in administrative tasks, preparation of classes and communication with members of the educational community closer to the levels recorded during the lockdown.
- The intrinsic characteristics of the teachers, namely their digital natural tendency, are probably the determinants of the greater/lesser use of digital tools, and not so much other observable characteristics, since variables such as age and length of service do not influence the intensity of use. However, there was a relative higher intensity in the use of digital tools among women compared to men (average of 3.3 in all activities compared to 3.1 in men) and some variability in the intensity of use in the post-lockdown classroom context due to the specificities of the recruitment groups of teachers.
- The conditions in the classrooms for the use of the equipment, the access to the internet in the schools, and the technical assistance, were the most conditioning factors of the results of the implementation of the digital plan in the return to face-to-face teaching.



- The availability of students' computers in the classroom is another conditioning factor that does not have the desired regularity and consistency, whether it being a decision of the parents motivated by the weight of the equipment or the fear of damage to it, or for reasons of damage, this inconsistency conditions the use of pedagogical methods with resources the digital tools in the classroom.
- The students' pattern of digital competencies was perceived as a conditioning factor for the use of digital in the context of teaching-learning during the pandemic. In the return to face-to-face teaching, this factor has become slightly more favorable, possibly due to the skills acquired during the lockdown, and the decrease in intensity of use.
- The availability of digital content to support classes, digital skills and proficiency in the use of tools by teachers and confidence in the effectiveness of digital are recognized as factors that facilitated the use of digital tools and content, which reinforces the adequacy of teacher training actions. The actions supported had a high contribution to the production of positive results, highlighting the contribution to the improvement of communication in the school community, to the reinforcement of digital skills of teachers and students, to the efficiency of administrative tasks and to the organization and management of the work of teachers.
- The contribution of a structural change in pedagogical practices with the use of collaborative, innovative and active work methodologies is evaluated as much more positive among teachers than among school principals who responded to the survey, which may indicate that expectations and ambition at the level of school management about the results are higher.
- The process of change was, therefore, significant for all those involved (students, teachers and parents), with the search and use by teachers of digital tools and resources that were not used before. Some of these changes persisted after the lockdown, either with the use of digital tools in administrative tasks and communication with students and parents, or also, in a less regular but still transformative way compared to the past, with the use in a teaching and learning context. Thus, the role of schools, together with the school community, in combating digital illiteracy is relevant.
- It was not possible to establish a causal relationship between the Program for the Digitalization of the Education's actions, centered on school kits, and the school performance of the supported students. For this performance, measured by the reduction of school dropout and school failure, there are a multiplicity of effects contributing, among which the verified change in the evaluation criteria by teachers, due to the context experienced and the conditioning placed on learning.
- Transition, retention, and dropout rates among disadvantaged students have seen significant changes during the lockdown period. In 2019/20, the percentage of retentions among the most disadvantaged tier in the different education cycles saw significant reductions compared to previous years, bringing them closer that year to the rates of non-beneficiary students (from financial social aid ASE). The trend was also observed at the level of dropouts, although assuming a smaller and more evident dimension in secondary education. In the 2020/21 school year, the recorded evolution was the opposite, with a "return to normal" in retention and dropout rates.
- The positive results achieved seem therefore to be mainly explained by the changes in the evaluation criteria applied during these two school years.

## Efficiency

- The homogeneity in the cost of acquisition per equipment is explained by the adopted model of acquisition and distribution of equipment centralized in SGEN, with technical specifications of equipment pre-defined by typology, and suppliers transversal to the different regions. The average cost per equipment was relatively homogeneous at the level of the regional funding OP: €307 in the Alentejo OP, €316 in the North OP and €326 in the Centre OP. In the case of POCH, which concentrated the financing of the most expensive type III equipment (plus type I and II equipment in Lisbon and Algarve), the cost per equipment was €407.
- In the distribution process, the lack of human resources to respond to the technical and administrative requirements of the schools was identified as the main constraint, linked with the lack of human resources, especially technical/computer resources to assist in the configuration of equipment. The excessive bureaucracy of the processes, the complexity of the platform used and the logistics and storage of the equipment were also mentioned.
- Delays in the design and launch of the measure were the main factor increasing the completion time, rather than constraints on the supply chain. These constraints also translated into delays on the planned, due to the macro

context experienced, in which the high demand for computer equipment was combined with the disruption of supply chains. The extension of delivery times was a factor of inefficiency (in particular in the lower tier of the ASE supported students and among teachers), as some families will have anticipated the acquisition of equipment.

- The equipment distributed proved to be adequate to the professional needs, according to the vast majority of the teachers interviewed. Those who considered the equipment less suitable justify their assessment with the absence of software relevant to their work - because the equipment does not support certain programs and because it does not allow, in the case of Microsoft Office, access to the same functionalities as the mode of installation by means of license on the equipment itself - and with the low quality of the hardware - for example, slow, heavy, and noisy equipment. On the students' side, the fragility of the equipment is pointed out, especially in the cases of younger students (who received the type I equipment, instead of the type III equipment that teachers received) and consequently less experienced (higher probability of inappropriate use).
- The deficient conditions in the classrooms for the use of the equipment are pointed out as key determinants for a lower efficiency of the measures in the return to face-to-face teaching. It was highlighted the lack of outlets, the difficulties of access to the internet in the schools (coverage and / or speed) and the low availability of equipment among the students in the room, especially because the schools do not ensure conditions to store the equipment safely. Also conditioning, are the technological equipment (computer, projector or interactive whiteboard) in the classrooms, at times being insufficient and obsolete. The self-reported lack of time for teachers to prepare digital resources, is also a conditioning factor, aggravated by the fact that the preparation of digital resources, which go beyond the mere transcription of contents from paper to digital support, requires a change in working methods, replacing tasks in which teachers already have a lot of experience, and therefore efficiency, with new tasks that require more time for reflection and adaptation.
- Technical assistance has also been proved to be a condition for the efficiency of the measures. In most cases, technical assistance in schools is performed by an internal team with only part-time dedication, which can only partially respond to the needs of students and teachers and solve simpler situations usually related to software, the hardware problems usually involving the supplier.
- With regards to the digital training of teachers, its contribution to improving the skills of teachers with usefulness for the performance of their functions was clear. With regards to the cost efficiency of CDD operations, it is not possible to quantify the cost per trainee of the digital training alone, as the operations supported financing of a wide range of teacher training actions (not exclusively digital ones).
- Even so, the mismatch between the moment of the need for greater use and the moment of the offer of training actions does not seem to have been a factor of critical inefficiency, although it has potentially represented inefficiency of time management for teachers, who in the first confinement were forced to do autonomous learning or in collaboration with other teachers in order to adapt to the circumstances.
- The lower responsiveness of the training offer to the demand, the frequency or overlap with other trainings and the schedule of training, the fact that teachers already have previous training or the necessary number of training hours for their level, and the approximation of the retirement age, are all factors that affected the maximization of the efficiency of the digital training measure.
- Additionally, the unavailability of time on the part of teachers and their feeling of global demotivation regarding the exercise of the profession may be factors of inefficiency. That is, teachers did not benefit as much from the training as would be possible, especially considering that more teachers participated in the training with intrinsic motivations (appreciation of the digital and willingness to learn) than extrinsic (such as career progression), although some teachers have assumed that the training was mandatory.
- The schools' diagnostic tool, SELFIE, was efficient in terms of usefulness and adherence (of the schools surveyed, 98% adhered to it). In relation to the PADDE, although its adherence was considerable, in some cases it was mentioned that the actions developed within it would have been carried out even if the PADDE had not been elaborated.

## Impact

- In a first consideration of the expected impacts of the Program for the Digitalization of the Education measures, especially through the distribution of equipment, there is an improvement in students' access to technology and the internet, which ultimately leads to an improved access to education in the digital age. The contribution to improving student access can be measured by the context indicator for the number of students per computer that



showed a significant reduction compared to pre-pandemic (from 4.5 in 2018/19 to 1.9 in 2020/21), and the reduction in the number of students per computer with internet was even more significant (from 4.9 to 2).

- The number of equipment accessible to the educational community has also increased considerably with the renovation of the schools' computer park. In the school year immediately preceding the pandemic, 2018/19, only 16% of schools' computer equipment was up to 3 years old, reaching 62% with the distribution of the new Digital School computers.
- The initiatives of the Digital School have contributed to the reduction of inequality in the access to computer equipment and the internet. The increase in access occurred unevenly, as it affected the most underprivileged students, who on the outset would have greater difficulties in accessing digital equipment and the internet. Of the approximately 295,000 equipment delivered to public school students during the 2020/21 school year, 49% went to the top tier of the ASE receiving students (A tier) and 39% to the B tier.
- The strong conjunctural dynamics of the use of the internet for teaching-learning activities by students during the pandemic, led to an accentuation of the trend observed in previous years for an increasing average of use, gradually contributing to the increase of digital skills of young people. According to Eurostat data for Portugal, in 2022, about 60% of individuals between the ages of 16 and 19 accessed online learning materials, 74% used online tools to communicate with teachers/trainers, and 77% used the internet to carry out activities related to formal education.
- The support to the Program for the Digitalization of the Education allowed access to personal computers among lower-income households. In this sense, considering the volume of equipment distributed to disadvantaged students, the initiatives will have contributed to an increase in access to computers on a substantial part of households with lower incomes, also contributing to the inclusion component of INCoDe.2030 (indicator "% of households with Internet access" with a target of 90% by 2025).
- Although both students and teachers have increased their digital skills, with regard to the objective of increasing them, it is a long and medium/long term process, and as such it is not expected to observe an immediate and widespread impact in Portugal. In 2021 only 28.5% of the Portuguese population had levels of digital skills above basic (although slightly higher than the EU average), but this figure was 34.9% for the employed population aged 25 to 64 and 50.8% for students. Although there has been a focus on the acquisition of digital skills of teachers, it should be the skills of students that ultimately drive the increase in the indicator value in the long term.
- The increase in intensity observed in the return to face-to-face teaching does not seem to have been proportionally accompanied by a significant change in teaching-learning methods, in order to enhance the educational functionalities of digital tools. It is fundamental to combine the progress of access and use of digital to the changes in pedagogical methodologies and processes in the teaching-learning context. The use of digital tools and content in a school context does not seem, by itself, to have a significant impact on student success and learning. Changes in practices are still barely visible, but should evolve alongside the digital skills of students and teachers, and may translate into additional benefits of greater autonomy of students and greater sense of responsibility for their learning.
- The actions supported under the PTDE (delivery of equipment, digital training of teachers, and development of the PADDE) as a whole, do not seem to have had a measurable contribution in the areas of school failure and dropout, but had a high contribution to the reduction of inequality in access to education among disadvantaged students and to the improvement of communication between the different agents of the teaching community.

## Sustainability

- The conditions of maintenance and renovation of equipment, the school infrastructure, and the lack of technical and human resources in schools to handle the maintenance and breakdowns of equipment will be the most relevant issues with regards to the sustainability of the Digital School measures at the level of the network of technological equipment and connectivity, and will be all the more pressing the greater the use of digital in the school context.
- It will be indispensable to define a sustained model of maintenance and reconditioning of existing equipment, given the useful life / obsolescence of the typology of goods in question, which will require a large volume of recurrent investment in equipment, and also in the support infrastructures of the school.
- There are still not enough conditions to make a complete digital transition in education and an optimal use of digital tools in teaching and learning activities. Nevertheless, the supported initiatives were essential in terms of the sustainability of the results and the use of digital in the school context, being a complementary lever for other

initiatives, namely the dematerialization of the assessment tests and the dematerialization of the textbooks. This leverage effect is dependent on an investment in the continuity of the supported interventions.

### European Added Value

- The intervention of the ESI Funds has enabled the implementation of the PT2020, allowing to increase the scale and broaden the spectrum of intervention, leading to a holistic approach. There is a great deal of complementarity with other Community instruments, in particular the Program of Recovery and Resilience, which financed the equipment distribution in a second phase. At the same time, funding boundaries were clearly defined from the outset, avoiding the problem of double funding or funding gaps.
- The European contribution to the effectiveness and efficiency of the Program for the Digitalization of Education was also based on the availability of instruments such as SELFIE and Check-In, which allowed the rapid implementation of en masse and standardized competency diagnosis.
- In the operational aspect, the rules and bureaucracy associated with the procedures related to European financing, namely with regards to the equipment delivery process, were listed as potentially inducing inefficiencies.
- From the point of view of the impacts, the intervention has contributed to bring Portugal closer to the European average in internet access.

## 4. Recommendations

### R1. Rethink the distribution model of the Digital School kits, in order to ensure the sustainability of universal access to teaching with the use of the digital

In an overall positive framework with regard to the ability to deliver the Digital School kits to disadvantaged students and to teachers, some constraints detected point to the need to make the adopted base model more flexible (equipment is the property of the State and is temporarily transferred to the recipients, being in their custody and responsibility during the time of use), in order to guarantee, in a transversal way, equality in access to the Digital School.

- Make adjustments to the current basic model, creating conditions for the sharing of responsibility for the equipment transferred. In addition to the revision of the declaration of responsibility requested from parents and teachers, this sharing of responsibilities could involve an insurance of the equipment shared by the State according to the income of the household, allowing to reach the students of lower incomes.
- Create a complementary (optional) model in which the equipment is purchased by parents or teachers, through a financing line and / or subsidized loan for the purchase of equipment at prices below those of the market, and / or through the granting of tax benefits in the IRS, with limited access to one per student or teacher during a certain period of useful life of the equipment (for example, 3 years). The obligations to take the equipment to school must, in this case, accompany those stipulated in the general model.
- In addition, consider the possibility of the transfer of equipment to be affected in relation to the school instead of to the students, in cases where the respective parents do not intend to assume the responsibility of transporting the equipment on the home-school route. In this scenario, security conditions would have to be ensured in schools for the custody of this equipment, complemented also with an insurance mechanism to cover theft, damage or breakdowns. Although the flexibility of the model promotes a differentiated response to different needs, this last option conditions the use of the equipment for the purpose of study and learning outside of classes, so it should only be considered as a last resort.
- Redefine the procedures for returning the equipment by teachers in cases where their permanence in the same school is not assured, providing the possibility of the equipment remaining the responsibility of the teacher in the transition between schools with a term of responsibility and adequate registration on the platform. An equivalent situation should be considered for the transition between the 2nd and 3rd education cycles of type II equipment.
- Minimize the bureaucracy of the processes of availability of computer equipment and facilitate administrative processes for the delivery and accountability of equipment to students and teachers. This could be achieved through a platform accessed by schools, but also by parents with the password of the finance portal so that they could authenticate their identity.

- The procedures to be defined should ensure computerized control of the equipment trail and promote the efficiency (reducing the administrative burden for schools and teachers) and effectiveness (enhancing the greater use of digital content in learning) of the measures.

## **R2. Improve the adequacy of the equipment, in terms of quality, functionality and safety**

- Ensure higher quality of equipment, namely physical resistance, weight, processing speed, considering the needs of the target audiences of the different types I, II and III of equipment.
- Negotiate with suppliers possible improvements in quality and functionality in new equipment.
- Consider the possibility of also negotiating with suppliers the insurance to cover damage or breakdowns of equipment if it proves to be more adequate in terms of conditions and cost.
- Enable the use of programs/software and key content, educational apps or licenses in order to overcome limitations of current access to these programs (limitation of the functionality of Office online vis-à-vis, for example, the most common licensing versions). This should take into considerations the different groups of beneficiaries.

## **R3. Ensure classroom's conditions and school's logistics to establish a frequent use of the equipment in the classroom**

- Aligned with the planned investments under the Recovery and Resilience Plan (general and professional teaching), improve the physical conditions in the classrooms for the use of the equipment (e.g. sockets to charge equipment and electrical installation appropriate to the capacity that is intended to ensure in these spaces).
- Ensure internet access in the schools and full and simultaneous network coverage in the school and classrooms. Consider the needs of schools in Community funding (including through Regional OPs) of the amplification of the network of digital broadband connectivity infrastructures in the low-density territories not covered by market dynamics, in line with the objectives set out in the National Broadband Plan.
- Create logistical conditions of storage and safety of equipment in the schools for the wide use of equipment in classrooms (e.g. lockers, a base room or other safe and adequate place for packaging of equipment at times of break or meals, favor the use of the same classroom for each class for all teaching activities that do not require specific spaces).
- Ensure the periodic maintenance and renovation of the technological equipment of the classrooms (computer, projector or interactive whiteboard).

## **R4. Increase the technical assistance and computer support to students and teachers**

The sustainability of the results of the supported interventions implies that the equipment made available is renewed at the end of its useful lifetime and that its assistance and reconditioning are ensured. It is recommended in this context to:

- Ensure in schools the necessary resources for the administrative tasks of registration, collection and distribution of equipment and for the configuration of new equipment.
- Ensure technical assistance to the equipment of the schools (or assigned to them, in the current model), either from the point of view of hardware (repair, reconditioning) or software (reconfiguration, installation, technical support to users). Given the existence of differentiated situations in schools - in terms of size and human resources with the capacity to perform care tasks - the care model should be flexible, and it may be considered, together or alternatively:
  - the establishment of a technical assistance team in schools, which has dedicated human resources, full or part time (in the latter case, the hourly credits of teachers should be reinforced to accommodate the additional tasks of maintenance and management of technological resources).
  - the subcontracting of an external team/entity (from the private sector or in partnership with the municipalities).

The teams can be shared by schools geographically close, allowing for the distribution of alternating service hours between schools.

- Create a model of loan of temporary equipment in cases of damage and breakdowns, until the regularization of the situation.

**R5. Give continuity to and diversify the training actions for the digital capacity-building of teachers**

- Ensure the continued implementation of tools for diagnosing the skills of teachers (Check-in) and schools (SELFIE) until their universal generalization.
- Increase and diversify the offer of Digital Training actions for Teachers. In parallel with the actions of a more transversal nature, explore a greater differentiation of the actions according to the target audiences, with contents adjusted to the disciplinary group and more specific (for a certain tool, for example), with a greater degree of depth, valuing the practice and experimentation and the training oriented to the pedagogical innovation.
- Increase and diversify the offer of continuing training actions related to active methodologies that provide more tendency for the use of digital technologies (e.g., by creating short-term training actions on a particular digital tool, with its exploitation and sharing of results, offering enough flexibility to respond to the specific needs of the different subject groups).
- Reinforce the non-teaching component and/or the hourly credit to accommodate the additional tasks of adapting lesson plans and assessment methods and digital training and capacity building actions, as a way to promote adherence to training and the use of digital in a teaching context.
- Reinforce the evaluation of the adequacy of training actions to the effective needs of teachers.
- Promote other collaborative training processes between teachers/groups of teachers - for example, forums for peer learning and practical communities - encouraging projects that can be developed within the framework of initiatives and the autonomy of schools.

**R6. Promote, in a sustained way, the use of the digital in a teaching-learning context**

- Promote the pedagogical integration of digital technologies in the initial teacher training courses.
- Integrate in the curricula of the different levels of education the use of digital resources and tools and/or amend the document "Profile of the Student Leaving Compulsory Schooling" in order to strengthen the digital skills of students in an era in which digital is assumed as one of the greatest challenges (or opportunities) of knowledge and integration in the labor market, as a way to foster their integration into pedagogical practices and to support students' digital literacy.
- Ensure education initiatives for cybersecurity and responsible use of the internet. Promote training on the regulatory framework for data protection and the right to image. Promote actions to disseminate good practices to the educational community, involving the school community partners, and a campaign to raise awareness for students and parents about the importance of digital literacy for an active citizenship.
- In a perspective of collaborative work, create working groups in schools or broad networks of schools on the same geographical area, by disciplinary groups, or transversal to encourage interdisciplinarity, self-training and sharing of experiences with the use of technologies, with the granting of non-teaching hours to carry out these activities.
- Create a platform (or improve the existing one) for sharing digital resources with "seal of approval", subject to a prior evaluation of their quality, and good practices/success stories. Also promote the sharing of resources and digital content, in addition to those produced by the DGE.
- Given the en masse access of the internet through mobile devices by students, envisage its use in the teaching-learning process (m-learning) and respective teacher training.
- Increase the supply of professional courses in the field of ICT. The students of these courses could develop the internships in the school itself, in an office/workshop to be created that would offer support and technical assistance under supervision.

**R7. Monitor and evaluate the implementation of the PADDE and the pilot projects, and disseminate good practices**

- Continuously support the design and implementation of the Action Plan for the Digital Development of Schools (PADDE) and monitor their achievements and results through an integrated and uniform monitoring system, involving periodic reports.
- Carry out an Evaluation of the operationalization and results of the PADDE.
- Evaluate the results of the implementation of the pilot projects of the dematerialization of textbooks, identifying adjustment measures and good practices that guide the digital transformation of schools early on.
- Disseminate the good practices identified both in the pilot projects and in the implementation of the PADDE to the educational community, aiming to increase the effectiveness and efficiency of the implementation of these instruments.

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