Case study - Computadores para Educar: Ensuring circularity through managing e-waste properly in a computers-for-schools initiative

Written by Julián Casasbuenas, Colnodo

Project/Programme	Computadores para Educar (CPE)
Region/Country	Colombia
Contact Information	https://www.computadoresparaeducar.gov.co
Circularity	Use of refurbished computers and the proper management of e-waste in a computer-for-schools programme.

Overview

A key challenge in education is access to appropriate technology for disadvantaged schools. The limited economic capacity of educational institutions in Colombia means that it is difficult for them to acquire computers and software necessary for teaching and learning. This led the government to develop a programme that could fill this gap, and also contribute to the proper management of discarded electronic equipment. Computadores para Educar (CPE) began as a programme using computers donated by public entities and private companies for public schools, colleges and libraries across the country.

About the programme

CPE is a government-run public programme and entity in Colombia,approved in 1999 by the National Council for Economic and Social Policy (CONPES). It is framed by the National Agenda for Connectivity, which includes strategies to increase the widespread use of information and communications technologies (ICTs). It was launched in 2000.

The main entities involved in the programme are the National Learning Service (SENA), the Ministry of ICT, the Ministry of Education and the National Centre for the Use of Electronic Waste (CENARE). CPE was also supported by the Ministry of Industry of Canada, the country where the SchoolNet and Computers for Schools programmes were developed, which served as an example for the implementation of CPE in Colombia.

The main objectives of the programme include the following:

- To improve the conditions of access to ICTs by the educational communities in the country.
- To increase the skills of teachers in the practical use of ICTs.
- To reduce the negative impact of ICTs on the environment.
- To consolidate CPE as a sustainable programme, contributing to the country’s sustainable development goals.

The programme was initially rolled out for a period of 10 years. After this it was decided to extend the programme for another 10 years. Over this 20-year period, the objectives and goals of the programme have been reassessed to adjust to new policies and technologies.

During its first 10 years, CPE refurbished disused computers donated by private companies and the public sector, and in turn donated the devices to educational entities and public libraries. SENA also received electronic components from computers that were used in its robotics classes. CPE recognises that this has important environmental benefits and also has social benefits for the workforce employed, especially technical operators.

Ensuring the proper disposal of e-waste

CENARE managed the e-waste generated by the programme (i.e. when refurbished computers donated to schools reached their end of life). The refurbished equipment remained in educational institutions for an average of five years of use. After this, CENARE recovered and recycled plastic waste, glass, precious metals, iron, copper and electronic circuits that could be used in other electronic devices. Potentially hazardous materials were separated to be treated or disposed of properly by certified companies. As of October 2020, the number of computers collected in the “Retoma” (“Take Back”) process amounted to 239,264 and was equivalent to 5,471 tonnes of manufactured equipment (disassembled to properly dispose of the parts).

A change in strategy

Later the programme strategy changed to using new equipment, due to the exemption of the value-added tax (VAT) on low-cost computer equipment in Colombia. This exemption meant that the costs of purchasing new computers were lower compared to the costs of refurbished used computers. The costs associated with securing replacement parts, in addition to the technical labour involved and the rental of warehouses in each city (Bogotá, Medellín, Cali, Barranquilla and Cúcuta) where this refurbishment was carried out, exceeded the average cost of a new device.

In March 2020, the CONPES policy document "Technologies for Learning"[1] extended the programme for five more years until 2025. The reasons highlighted included that there is still much to be done in the field of technology for education, and that the programme has generated important social benefits.

As of October 2020, CPE had made an investment of approximately USD 443.84 million and had delivered 2,436,718 terminals (computers and tablets) to institutions. The education system in Colombia has been the largest beneficiary of the programme, going from an average of 20 students per computer in 2010 to eight students per computer in 2019. A key beneficiary of the programme has been teachers who are trained to use computers. As of October 2020, 296,642 teachers from public entities had been trained.

CPE has also contributed to supporting e-waste companies who carry out the final disposal of waste.

Aligning with national strategies aimed at circularity

CPE fulfilled key aspects of the circularity of digital devices framework, particularly in its initial phase. Besides extending the useful life of computers, through the proper disposal of e-waste it lessened the upstream impact of new metal extraction, given that these metals can be recovered from the waste. This reduces the carbon footprint and contributes to an efficient circular economy process.

CPE has also supplied raw materials extracted from e-waste to industries in the United States and Taiwan and, to a lesser extent, to a refinery in Brazil. In this sense, it could be said that they are working in line with the National Circular Economy Strategy[2] announced by the government in 2019, without officially stating that they are part of it.

Conclusion

CPE has been and continues to be a benchmark in the mass delivery of computer equipment to educational institutions, bringing technology closer to educational communities, and involving teacher training in the process. The programme has created opportunities for Colombian children and young people, improving their quality of education, and contributed to environmental sustainability through the management of disused computer equipment.

Three CPE impact studies have been conducted over its 20 years of operation. The first was done by the University of Los Andes, another by the National Consulting Centre and the last by the National University of Colombia. Each one concludes, in different percentages, that the work carried out by CPE has had a positive impact on the students of the educational centers, especially in contributing to the improvement of the performance of the educational centres and contributing to a reduction in school dropouts. Thanks to the better results of the students in the national "Saber" standardised tests, there have been more opportunities for the students to enter working life and more students have felt motivated to enroll in higher education.

On the other hand, the environmental sustainability component deals with the challenge of e-waste, so that other companies can give recovered materials new use. This has been an experience that has not only produced great results due to the recovered materials (glass, ferrous metals, plastic, etc.), but also due to the positive impact on the educational community through leaving educational facilities free of waste.

Although CPE's strategy does not yet refer to the National Circular Economy Strategy, it carries out activities that the circular economy promotes and has great potential to optimise its processes to meet the goals of this strategy in terms of the better management of the flow of industrial materials and products of mass consumption in line with social and environmental needs.

References and further reading

Computadores para Educar: https://www.computadoresparaeducar.gov.co and https://colombiatic.mintic.gov.co/679/w3-propertyvalue-36665.html

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Ministerio de Educación Nacional. (2019).*Plan Estratégico de Tecnologías de la Información 2019/2022* https://www.mineducacion.gov.co/1759/articles-362792_galeria_11.pdf

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Footnotes

[1] Consejo Nacional de Política Económica y Social. (2020).*Tecnologías Para Aprender: política nacional para impulsar la innovación en las prácticas educativas a través de las tecnologías digitales*. https://colaboracion.dnp.gov.co/CDT/Conpes/Econ%C3%B3micos/3988.pdf

[2] Gobierno de la Republica de Colombia. (2019).*Estrategia nacional de economía circular. Cierre de ciclos de materiales, innovación tecnológica, colaboración y nuevos modelos de negocio.* http://www.andi.com.co/Uploads/Estrategia%20Nacional%20de%20EconA%CC%83%C2%B3mia%20Circular-2019%20Final.pdf_637176135049017259.pdf

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