

Identifying the Cognitive and Digital Gap in Educational Institutions Using a Technology Characterization Software

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ABSTRACT

This research aims to identify the existing technological and cognitive gaps in educational institutions through the implementation of characterization software. To meet this objective, the study establishes a framework of digital competencies to validate the level of performance using the input of educational community members, which allows for establishing a diagnosis regarding the use and appropriation of technological resources. The study utilized an applied research methodology based on a validation approach using the technological acceptance method. The findings reveal educational institutions' lack of knowledge in identifying and appropriating technological resources. The research concludes that recognizing technology and technological resources can lead to the improvement of educational processes. It also provides a framework for researchers to present proposals that allow them to recognize technology's mediating role in the teaching-learning process.

KEYWORDS

Attitudinal, Axiological, Cognitive, Digital Gap, Instrumental, Software

INTRODUCTION

This article presents the aspects giving rise to the problem of limited access to technology in remote areas, which gave rise to the present investigation. The research aimed to address these difficulties through technological mediation. Therefore, the following question shaped the scope and approach to the research: In what way can technology contribute to the improvement of digital connectivity and be a facilitating medium in the teaching and learning process?

The paper also presents the literature supporting the study. These reports show the digital divide in Latin America regarding access to digital connectivity, use of platforms, and infrastructure. Several aspects of this divide became more evident with the emergence of the COVID-19 pandemic, as discussed below.

The so-called digital transformation—a consequence of the fourth industrial revolution—has integrated various disciplines, such as machine learning, artificial intelligence, nanotechnology,

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quantum computing, biotechnology, 3D printing, the Internet of Things, and autonomous vehicles (Florez et al., 2019). Despite this extensive technological development, the absence of digital connectivity in the 21st century is still evident in some regions of the world (Compaine, 2001). According to the internet connectivity map, approximately 60% of the world's population enjoys a digital connection. Regions such as North America, Western Europe, China, and some areas of South America have the greatest access, while Africa and Asia have the least access to the network (El Orden Mundial, 2021). However, studies by the Economic Commission for Latin America and the Caribbean (ECLAC) show that in Latin America, only 66.7% of the population has internet access (ECLAC, 2020). Similarly, the 2019 Latin American Telecommunications Congress (CLT19) revealed that despite technological advances in recent years, the internet has not reached everyone. Table 1 shows internet coverage in Latin America expressed in usage numbers and penetration levels.

During the COVID-19 pandemic, governments adopted mandatory quarantines to prevent the transmission of the virus, forcing educational institutions to adjust their training processes and use digital models. This situation revealed the digital divide, that is, the differences in connectivity between those who can widely access information and communications technology (ICT) and those with limited access (Compaine, 2001). One of the consequences of this phenomenon, particularly in Latin America, involved students dropping out of school due to their lack of connectivity and the appropriate technological tools.

Although governments have advanced various actions and strategies to mitigate this situation, many users still face an abysmal gap in accessing technology and connectivity. Herein lies the relevance of this project, which is oriented, first, toward proposing tools and strategies to estimate the technological resources possessed by educational institutions and, second, in allowing these institutions to join efforts to obtain new resources to strengthen their technological infrastructure.

Table 1. Internet coverage in Latin America

South America	Population	% Pop.	Internet Usage	% Population	% Users
	(2022 Est.)	Table	June 2022	(Penetration)	Table
Argentina	45,873,172	10.5%	41,800,000	91.1%	11.3%
Bolivia	11,935,560	2.7%	8,817,749	73.9%	2.4%
Brazil	215,016,658	49.2%	178,100,000	82.8%	48.3%
Chile	19,383,887	4.4%	18,835,100	97.2%	5.1%
Colombia	51,771,495	11.8%	43,091,700	83.2%	11.7%
Ecuador	18,086,232	4.1%	15,618,700	86.4%	4.2%
Falkland Islands	3,653	0.0%	3,6	98.5%	0.0%
French Guiana	311,788	0.1%	162,8	52.2%	0.0%
Guyana	792,695	0.2%	574,5	72.5%	0.2%
Paraguay	7,276,583	1.7%	6,177,748	84.9%	1.7%
Peru	33,729,630	7.7%	29,359,300	87.0%	8.0%
Suriname	595,213	0.1%	428,2	71.9%	0.1%
Uruguay	3,493,160	0.8%	3,255,800	93.2%	0.9%
Venezuela	28,887,118	6.6%	22,735,000	78.7%	6.2%
Total South America	437,156,844	100.0%	368,960,197	84.4%	100.0%

Source: Internet World Stats (2022)

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