POST COVID-19: DIGITAL EPISTEMOLOGY AND FLEXIBLE EDUCATION IN THE DIGITAL ERA

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KEYWORDS	ABSTRACT
Innovation *Flexible education systems* *Digital epistemology* *COVID-19*	*This essay presents a strategy on school innovations supported by ICTs, MOOCs, and the internet in pedagogies as well as in learning modalities during and after COVID-19. A review of the literature on educational systems and innovation in educational quality and epistemology of digital education is included. Therefore, the problem is to flexibly rethink the internal processes of the school, but also to develop technological skills for both teachers and students in the transition from the traditional epistemological model to the digital one.*

GLOBAL KNOWLEDGE
ACADEMICS

1. Introduction

Quality education is undoubtedly important to "obtain qualified work, better health, more dignified living conditions and active participation in citizenship" (Cabrol & Székely, 2012 cited by Rivas & Delgado, 2017, p. 4). In Latin America and the Caribbean (LAC), the level of competencies is below the basic level, which means that a small group of high-achieving students is not enough to promote development through innovation, entrepreneurship, and competition (OECD / CEPAL / CAF, 2016, cited by Rivas & Delgado, 2017, p. 5).

This time of the COVID-19 pandemic revealed the technological lag of many of the countries in the region in terms of educational coverage and quality. Currently, there are many countries that have paralyzed the return to classes to prevent students from catching the COVID-19 virus and spreading more within the population. This situation affects the most vulnerable students in poverty or rural areas of the region's public schools because they often do not have access to the internet and much less access to energy in relation to those who study in private schools that can otherwise, continue to receive virtual education from private or public schools, even if it is of dubious quality.

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It is important to reflect on some questions in this time of pandemic such as: What is the result of the actions of governments to maintain student coverage virtually? And what is the effect of virtual education versus face-to-face education in terms of learning and tax efficiency? In addition to the issues raised by these questions, governments can create rationalized myths in their political speeches to increase their electoral flows, such as the greater availability of traditional virtual spaces like education by radio or television. The greater the learning and educational quality of the student population, without guaranteeing the training of teachers and students in the virtual and digital world, the higher is the risk of the development of the nations and for the future productive life of the student population. Therefore, it is clear that we must move from the traditional model to the digital one but developing capacities for the populations so that they can develop in their future lives.

2. Literature Review

The understanding and teaching of digital epistemology is fundamental for the emancipation and integral development of societies, organizations, and people through critical thinking in this digital age, without leaving aside their security and privacy.

Merejo (2015) mentions that digital epistemology "implies the development of the technoscientific and the expansion of cyberculture, digital power and the umbilication with the tacit and explicit knowledge of the cybernetic subject" (p. 159). This author affirms that this episteme is the result of a subject that lives in cyberspace networks, which is a hybrid between organs and technological devices.

In the field of the Internet of Things or Internet of Things (IoT), which for Sánchez-Torres, Rodríguez-Rodríguez, and Guerrero (2017) affirm that the IoT "is a complex network that connects millions of devices and people with multiple services and objectives through multi-technology, multi protocols and multi-platforms" (p. 93).

Merejo (2015) expresses that the, "internet of things points to the connection of all things in this world" (p. 159). However, this is not a strategy only of capital movements, of investment and profit, but of new forms of social control and digital power over the cybernetic subject that cannot be approached on the basis of traditional epistemology (Merejo, 2015).

Merejo (2015) affirms that Michel Foucault never imagined this new form of social control in which we are living, a combination of biometric knowledge about the individual body and the social, as a power

Ursua (2013) at this point highlights how this new technological control influences the identity formation and media culture of users, causing an impoverishment of argumentative and critical thinking, due to the constant exposure of the visual and acoustic image.

Mario Vargas Llosa (2012) in an interview on the future of the digital-book mentioned that this can lead to societies to be manipulated and limited to their own thoughts.

Sánchez-Torres et al (2017) mention some trends in the areas of i) security, ii) home automation, iii) health, iv) industrial processes and v) agriculture. However, we must ask ourselves and reflect on the following questions:

In the field of security, one must ask who will guarantee the individual security of the data? Is the system or applications connected to the IoT sufficiently reliable to avoid committing fraud, selling information, or committing illicit acts such as the case of Facebook with the Cambridge Analytica consultancy that stole information from 87 million people without authorization to influence the elections of Donald Trump and what could represent a threat to future university government elections on the planet? Hirsch & Ng (2011) point out that one of the challenges of the iCampus, is how identity, property, privacy, and security is to be defined? How can an original thought be identified with so much information on the internet? And with respect to that question, how will ownership be established to that identified "original" work or thought?

With regard to privacy and security, they mention that there are different objectives, "such as integrity, confidentiality, authentication, authorization and non-repudiation" (Hirsch & Ng, 2011, p.6)

In smart homes, the danger is to influence what goods and services to consume by having user information and the benefits of marketing companies that pay for people's private information such as internet cookies, which instead of generating intelligent people, would create a generation of foolish and dominated people, in other words, robots of the 21st century, without any decision-making power or committing illicit acts by not having the sufficient infrastructure to secure and safeguard student information.

With regard to health, there must be a certain degree of reserve if everything falls on the dehumanized and standardized technology or technological system, what will happen if it stops working or the system falls? If it is badly programmed or new phenomena or pathologies appear that cannot be addressed and that would leave irreversible damage to the health of the population due to poor programming, interpretation, or lack of diagnosis and timely and exact medical prescription.

Industrial processes in societies and organizations would be dehumanized, for example, consensual decision-making by human beings, together with many jobs at the governmental and private sector levels by artificial intelligence or systems, will be left aside, adaptive to the detriment of governability and human governance, generating new social problems or intensifying existing ones.

In the educational field, we would experience automatic learning and teaching processes based on pre-planned and pre-programmed curricula, without any concrete participation of the stakeholders (private company, State, and civil society), which could be very dangerous, because the school and the university are considered as mechanisms of social reproduction and manipulation after the second half of the 20th century.

On the subject of agriculture, several questions will remain in the pipeline. For example, how will the quality and quantity of agricultural goods produced be guaranteed taking into consideration such factors as prices and the demands of local and international markets? How will prices or consumption of cultivated agricultural products be guaranteed? How and who will program, guarantee, qualify and validate the inputs, processes, and outputs of IoT technology or specialized systems for the generation of vital information to ensure local food security and environmental sustainability? Will it diminish freedom and independence in the production of goods and services?

However, Ursua (2013) mentions that before talking about digital epistemology or epistemology in the digital age, we must consider the dynamics and transformations due to the increasing digitization of daily life, these include such factors as i) the world of objects and phenomena, ii) knowledge and the processes to get to know, iii) the constitution of the knowing subject, iv) the significance and balance between the

different ways of knowing, associated with the growing process of digitization, and v) the dynamic and continuous changes that take place in to the perception of new technologies.

Ursua (2013) contends that it is almost impossible for people to navigate properly in the immensity of the available data, concluding that what exists is knowledge by the assembly (knowledge assembly) as a collective assembly. This knowledge by assembly uses the Internet. Lévy (2015) explains that in this digital age, algorithms play a very important role in the classification and analysis of data on the network.

According to Merejo (2015), *digital epistemology* is the knowledge that is mobilized in knowledge workers and researchers and networks, and which flows from one organization to another, whether public or private. This is what Lévy (2004) calls *collective intelligence*. However, we can observe that, at present, knowledge, in addition to crossing borders, is omnipresent and available to any citizen.

Lévy (2004) says that in this era "we are immigrants from subjectivism." (p.9). The nomadism of this era is related to the rapid dynamic transformation of the scientific, technical, professional, and mental, and that, even if we did not move, the world would change around us.

Lévy (2004) expresses that the "nomadic objects" of mobile electronics are not the means to approach today's nomadism. The images of movement take us on immobile journeys, in a world of meanings. Moving no longer means physically moving from one point to another on the earth's surface, but rather going through universes of problems. In other words, without moving, we can now travel, meet and feel pleasure, disappointment, empathy, apathy, and even generate needs and desires by simply opening applications such as Facebook, Instagram, CNN, Google Earth, Tripadvisor, YouTube, among others.

In this new space of nomadism for this author does not mean a geographical territory, neither in the institutions of the state nor the state per se, but in an invisible space of knowledge, which he describes as a quantitative, dynamic and I live, where humanity is producing its world (Lévy, 2004).

This new world is undoubtedly now, the new field of competitiveness and battle between economies and organizations, which can lead to the creation of cybercultures and at the same time to manipulate the behavior of people in the countless number of cybermarkets.

For Ursua (2013) the main production force of society is knowledge with increasing digitization, and it can be characterized by the following aspects: i) knowledge as an international product that can become a national and international competitive advantage, ii) reinforcement of State security and international monitoring, iii) abandonment of what cannot be translated into useful amounts of information, and iv) knowledge is available to the knower and the role of the learner and the teacher becomes a product relationship between the supplier and the user.

Derived from the above, governments, societies, and individuals must consider intellectual property in public policies or business strategies for the generation of new knowledge or solutions as an international product, not only as a competitive advantage but as a differentiating strategy. and protection of copyrights and/or patents.

This can promote and facilitate the sustainable economic growth of societies and organizations. On the other hand, it is very important to redefine the roles and relationships of the student and the teacher, along with as the objectives of the student and the curriculum and structure of educational systems in this 21st century. For example, the student must become an actor more and more critical of social systems (governmental, intra-governmental, international or supranational entities) and physical and virtual organizations that contain data of people in general. These forces can negatively influence or condition people related to what and where to buy, what to eat, how to dress, and who to vote for? The educational systems must be flexible and resilient to the continuous exogenous changes that globalization and the infosphere create and demand.

Aponte (2015) points out that in LAC, there are few technological capabilities that depend on its economic structure and innovation dynamics, and especially on imports of goods and services that we consume due to the lack of development of these, in high technology, disintegrated global value chains, and of course by the consequent "dependence on imported knowledge of science, technology, and innovation" (p. 60).

Rivas and Delgado (2017) affirm that "Innovation works as a process, not as an event" (p. 71) and they say that countries, in addition to Peru, Brazil, Argentina, Mexico among others, must develop "laboratories for research and development of solutions as an intrinsic part of innovations is a fundamental lesson for

future experiences" (Rivas & Delgado, 2017, p.71). Other examples are those of UNICEF with ICT schools in Argentina, the Virtual Educa initiative of the OAS. Civil society has been key in promoting and supporting public policies, such as the Escuela Nueva or, in the tutoring networks of the *Telesecundaria*. (Rivas & Delgado, 2017). But the problem is trying to take a "successful" lesson learned to another country, as these organizations do, without contextualizing it.

There are many definitions of *innovation* used in different contexts and disciplines, according to the Oslo Manual (OECD, 2014) including the private and public sector, in the first are schools, universities, new products, and services, in the syllabus, new processes to deliver services, the use of ICTs for learning, marketing and price differentiation in postgraduate courses, among others. The public sector focuses more on increasing quality, equity, coverage, and efficiency, so these isolated innovations or objectives lead to conflict and indefinite social inequality between these sectors.

Villalba mentions that the "innovation policies of the European Union in education focus more on the economic sphere and very little on the interests of social justice" (Keating, 2008, p. 404).

The OECD (2014) proposes to measure educational innovation with a methodology and objectives, to improve educational innovation in the future. Firstly, for informational and comparative purposes, and secondly, to illustrate two different types of methods in the field of innovation in a "complementary way" than that of expert opinions only. The OECD shows that the quantitative and qualitative paradigms can coexist in harmony to respond to the needs of the real world.

But, the results PISA, TIMSS, PIRLS, among others from the OECD highlight the need for innovation in literacy, numeracy, and science in many countries and these results serve as benchmarking to compare innovation based on evidence-based policies. (OECD, 2014). But this can be dangerous because benchmarking can be dangerous because it is basically the copy of best practices, and this limits innovation and creativity.

The OECD (2016) mentions that "the capacity for technological innovation is conditioned to the levels of digital skills of the population…" (p. 3). It also states that, "The role of education and skills is critical to promote innovation" (OECD, 2016. p. 3). On the other hand, in education, "many innovative initiatives have emerged that seek to guarantee and accelerate the closing of skills and learning gaps in children and young people in the region" (Mateo, 2017, parr. 1). But, these have been sterile by the traditional epistemological model that we continue to use.

Chavez (2017) states "There is no communication between what the industry needs and what the universities are investigating" (Chavez, 2017, para. 4). "World Bank evaluations can help identify what types of innovation are impacting economies and can encourage funding to investigate those opportunities" (Chavez, 2017, para. 4). However, these evaluations[1] are more oriented to quantitative processes and procedures and standards of some international organizations of what is considered correct or not, to decide what is bankable and what is not.

According to UNESCO (2014):

> Educational innovation is a deliberate and planned act of problem-solving, which aims to achieve higher quality in student learning, surpassing the traditional paradigm. It implies transcending academic knowledge and moving from passive student learning to a conception where learning is an interaction and is built between everyone. (p. 3)

Poggi (2011) mentions that educational innovation is "the novel configuration of resources, practices, and representations in the educational proposals of an educational system, subsystem and/or institution, aimed at producing improvements" (p. 10). Marcelo (2013) affirms that "Innovation needs innovators" (p. 30). This author cites some international reports such as the one published by the OECD (2005) Teachers matter: attracting, developing, and retaining effective teachers that highlight the important role of the teacher for the learning possibilities of students.

Correa and Pablos (2009) contend that "many myths persist about the role of ICTs in learning in schools" (p. 134). They also mention that the real progress is in the unlimited options and in freedom. But,

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[1] This represents a quantitative epistemic contradiction of the use of indicators and trying to interpret the realities with a constructivist model.

the true social problem of innovation that we face is the ubiquitous digital dynamics that is to rethink education in this new socio-technical system, recognizing that there is no longer absolute authority that says that it is true or false, that it is good or bad, becoming this, a little scary or perhaps, in epistemic anarchy.

Ursua (2013) expresses that the traditional epistemological model allows various variations of justified true ones, which is entering a permanent crisis because the counter examples of technology and digitization do not generate knowledge. Ursua (2013) also highlights how this new technological control influences, causing an impoverishment of argumentative and critical thinking, due to the constant exposure of the visual and acoustic image. Vargas (2012) in an interview on the future of the digital-book mentioned that it can lead societies to be manipulated and limited to their own thoughts.

In this new environment, the new pedagogy will be totally different because knowledge evolves rapidly and everyone has access to knowledge in the infosphere, which is also revolutionizing the education and learning industry (Lévy, 2015). Lévy (2015) mentions that the new literacy is related to data, where the individual, the community, and the new algorithmic tools are present. This author mentions the three types of intelligence that must be developed in the population to generate critical thinking, which are: i) personal intelligence, ii) critical intelligence from sources, and iii) finally collective intelligence. This means that there will be no technical limitations, but rather cognitive ones, and that learning will be autonomous and that current and new generations will select the topics of interest to learn.

Lévy (2015) presents a list of contemporary practices where everyone is a librarian, critic, curator, reader, marker, and data analyst, and where the new practices will be free science, free intellectual property, free software, digital humanities, citizen journalism, educational technologies, massively multiplayer games, social and digital companies, social marketing, among others[2]. In sum, what you want to reflect is the common denominator of collaborative open authoring, which will affect all areas, for example, education, in the news, in the publishing industry, in marketing, and almost everywhere.

The understanding and teaching of digital epistemology are fundamental for emancipation. and integral development of societies through critical thinking in this digital age (Vargas, 2012). Ursua (2013) based on the work Digital Literacy by Gilster (1997) and says that it is almost impossible for people to be adequately managed in the vastness of the available data. This knowledge uses the Internet. Lévy (2015) explains that in this digital age, algorithms play a very important role in the classification and analysis of data on the network.

For Ursua (2013) some main productive forces of society in the growing digitization can be characterized by: i) knowledge as an international product that can be a competitive advantage, ii) abandonment of useless amounts of information, and iii) available knowledge to the knower[3] and the shift from the role of student and teacher to a relationship between provider and user.

A global challenge to reduce this disparity is the harmonization of the denotation of what is a universal digital educational model that provides coverage and quality for the citizens of the region during and after the COVD-19 pandemic. There are different definitions of traditional educational normative models of imposed and competing international organizations, as explained in detail by Claro (2010), for example, UNESCO, WB and the IDB focus on the institutional strengthening of educational systems, mainly in the secretariats or ministries of education, but in the cases of the WB and IDB through conditional financing which represent a limitation for the contextual innovation of the different realities by not considering civil society, while the OECD does so

Arias and Cristia (2014) state that, "Technological innovations also affect the labor market, educational currents and even the very process of research and development of effective educational models" (p. 6). In other words, it affects people's present and future income, but apparently, there are no incentives in LAC to promote innovation and competitiveness because according to World Bank figures the richest 1% have 11% of total income in 2018, and therefore, this represents disproportionate percentage of concentrated wealth (World Bank, 2017).

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[2] In addition, we look at the trends of digital governments and open parliaments, besides digital schools.

[3] Twani (2017) asserts that the education monopoly ended because it is now ubiquitous.

Figure No.1 Income Distribution 2018

Distribución del ingreso en América Latina y el Caribe
2018
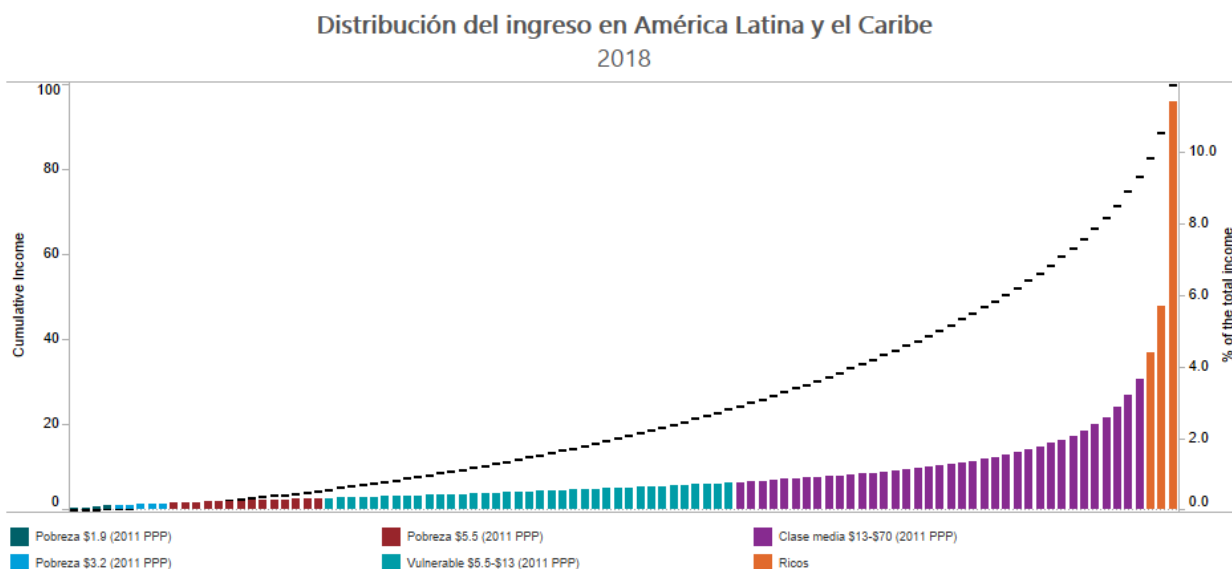
Fuente: Tabulaciones del LAC Equity Lab con datos SEDLAC (CEDLAS y el Banco Mundial) y los Indicadores del Desarrollo Mundial.
Nota: La línea discontinua representa ingreso acumulado. Las cifras presentadas se basan en un esfuerzo de armonización de datos estadísticos regionales conocido como SEDLAC que aumenta la comparabilidad entre países de los resultados derivados de encuestas de hogares. Por este motivo, las cifras aquí analizadas podrían diferir de las estadísticas oficiales suministradas por los gobiernos y las oficinas nacionales de estadística. El agregado LAC es basado en los 17 países de la región para los cuales hay microdatos disponibles; no se incluye Haití. Se recurrió a la interpolación cuando en algún año no habían datos disponibles con el fin de poder analizar el mismo grupo de países todos los años. Todos los valores monetarios se expresan como USD en paridad de poder de compra de 2005. *Actualizado abril 2020.*

Source: World Bank, 2020

3. Final thoughts

It is clear that the COVID-19 pandemic forced the countries of the LAC region to move from the traditional model to the digital one and exposed the weaknesses of traditional education systems with respect to the technological infrastructure necessary to democratize quality education. Therefore, one of the main post-COVID-19 challenges for the governments of the region is that they must propose changes in pedagogy to introduce practices closer to constructivist models using MOOCs or ICTs, in order to provide students with knowledge and skills to perform throughout your life in this digital age.

For this, the countries of the LAC region should move from the traditional model of government to the model of digital government, in which digital identity and digital signature are not only essential tools for transactions in society in general, reducing government bureaucracy, but also for the digital transformation of the country, transparency and accountability and the efficiency of the services provided by the state and public spending. In educational systems, digital government is a condition to legitimize academic content and accreditations within the system, as well as to streamline public spending and that of families, for example, transportation, uniforms, textbooks, paper, etc.

Ruiz (2016) makes a critical reflection on MOOCs concluding that they are more democratizing by ICTs and the internet and that they are fosters of innovation "MOOCs represent a world cultural movement, supported by international organizations such as the UN and supported by ICT, internet resources and social networks" (Ruiz, 2016, p. 12). These MOOCs should be a priority for the secretariats or ministries of education during and after the pandemic because in this way education could be universalized, so these entities would offer education 24/7. In this way, governments could focus their efforts on investment in technological infrastructure in rural and urban areas without access to energy and the internet in order to increase the coverage and quality of education.

The feasibility and cost-effectiveness of this proposal for governments to focus more on the quality of MOOC content and technological infrastructure in rural and urban areas without access to energy and internet can be financed by operating cost savings and greater transparency of the system, for example, school maintenance (water, electricity, stationery, surveillance, etc.), better registration and control of the

teachers' payroll, the number of students enrolled, dropouts, approved and failed in real-time. Likewise, there would be timely and reliable information to improve the Educational System, and therefore, quality.

A low-cost strategy that educational systems during and after the pandemic era could consider, for example, would be uploading the classes for each academic grade to the YouTube platform and exams using Google Forms. To achieve this strategy, teachers must be trained on how to record classes in digital format and upload them to YouTube? How to answer questions and rate tasks by email? and how to perform exams through Google Forms?

In the case of continuing with the traditional model after the COVID-19 pandemic, Twani (2017) mentions that the "success" of education systems depends mainly on what happens within the school and refers to the implementation of the learning process that entails the autonomy and investigation of student learning. Continuous, flexible, and contextualized innovation processes must be built into the internal processes of the different schools. However, we find the paradox that innovation is required of teachers and students, on the one hand, but schools continue to standardize with national and international norms with the same traditional epistemology and with different socio-economic environments.

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