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The effects of ICT on Higher Education in Mexico

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Abstract

This article analyzes how information and communication technology (ICT) has changed higher education in Mexico. While ICT has modified operations and working conditions in almost all sectors of the economy, its impact on higher education remained limited until 2019. In 2020, however, the COVID-19 pandemic led to its rapid adoption in most higher education institutions. Our analysis looks at this phenomenon from three perspectives. Using an educational perspective, we analyze how universities use ICT for teaching and learning. Before 2020, few students and teachers had embraced these technologies. Relying on organizational theory, we analyzed how the structures and rules of the game changed when institutions adapt to outside demands. In this field, research on the effects of ICT in various institutions shows that organizations can become more efficient, competitive and provide better client services. However, there is little research on whether ICT has caused an organizational change in higher education. Lastly, we use an academic capitalism perspective to ascertain how higher education institutions are knowledge-producing organizations, and how incorporating ICT can change the mode of production from a pre-capitalist to a capitalist one. This allowed us to look at how change affects who owns, manages, commercializes, and profits from knowledge. Considering changes from these perspectives, we conclude that digitalization favors ICT providers, but this however hardly benefits academic staff. At the same time, the national government is unconvinced of online teaching and has cut the budget during the pandemic. As a result, Mexican higher education will probably de-digitalize and return to traditional forms of instruction.

Keywords: ICT, digital society, knowledge production, academic capitalism, organizational change, working conditions.

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Introduction

According to social forecasters, society and the economy are moving towards new forms of organization (Harari, 2018). This new stage has received the monikers of a digital, knowledge-based, or post-modern society (Bauman, 1992). These descriptions show that knowledge is increasingly important in the economy and society. If one considers universities as knowledge factories (Enarson, 1973), it is fundamental that they adjust to new societal and economic demands (Delanty, 2001). Information and communication technology (ICT) is vital in this transition (Mokyr, 2002). According to Fuchs (2017), "ICTs are means that humans use for creating, disseminating, and consuming information about the world. The computer and networked computer systems are particular technologies that, unlike traditional media (radio, television, newspapers, etc.), allow not just the consumption of information but its production, coproduction, and dissemination." (p. 2433).

With ICT, teaching and learning could become far more efficient, dynamic, and accessible using learning platforms, MOOCs, and others (Centre for Educational Research and Innovation, 2005). These expectations have led universities and governments to invest in these technologies since the 1980s (Cuban, 2001; Oppenheimer, 2003; Ramirez & Casillas, 2014). After decades of investment, the impact of ICT on the university seemed to be disappointing (Zemsky & Massey, 2004; Ramírez & Casillas, 2014). Some universities had embraced distance education or some form of blended learning, but most continued to teach in the traditional way (Allen & Seaman, 2017). In Mexico, by 2019, only 15% of higher education students had had some experience with online classes (Statista, 2023). The COVID-19 pandemic radically changed the situation. By March 2020, all universities were in lockdown; nearly all had moved their activities online and become fully digitalized. But are these fundamental changes or temporary adjustments to a passing crisis?

This article explores the impact of ICT in Mexican universities from three analytical perspectives: educational, organizational, and academic capitalism. Each perspective focuses on distinct aspects of academic work: the process of teaching and learning, organizational arrangements, and the ownership of knowledge. Thus, analyzing the impact from different perspectives allows for a broader view of possible changes. The use of ICT may affect not only teaching and learning but also organizational structures or labor conditions.

ICT and Higher Education

Around 1980, most higher education institutions were universities that continued to work as they had for centuries (Rashdall, 1987). According to Clark (1983), the universities' existential reason is to produce and disseminate knowledge. Knowledge is intangible, but only academics possess it and can assess whether others have it, which converts academics into the dominant actors. Tribes of academics, organized around their turf of specialized knowledge, defend their territory against outsiders (Becher, 1989; Trowler, et al., 2012). Individual scholars or tribes define the curriculum, course contents, teaching methods, research agendas, and evaluations of colleagues and students. Administrators play a secondary or auxiliary role in supporting academic work. As a result, the typical organizational hierarchy was flat, and decision-making slow. Collegiate bodies made most decisions. Faculty members temporarily occupied managerial posts, with the rector or president *primus inter pares*.

These descriptions mainly applied to research universities in the US and Europe. However, Mexican higher education had several peculiarities in the 1980s. Public universities comprised most of higher education, and funding was exclusively public. Tuition fees were minimal, and entrance requirements were virtually zero. Research and graduate programs were scarce; there were few publications in international journals. Research funding and patents were practically inexistent, and collaboration with private companies was rare and seen as inappropriate. About two-thirds of the academic staff were part-time, with only undergraduate qualifications, and public universities had only a rough estimation of the number of students or hired teachers (Galaz & Gil, 2009: 21; Kent, 1993).

Under the banner of raising quality, productivity, and competitiveness, Mexican higher education has undergone many reforms since 1990. The federal government introduced evaluations and new funding mechanisms. As a result, enrollments expanded, and universities created new programs and hired more full-time academic staff (Gil, 2012; De Vries & Álvarez, 2005). A crucial aspect of these reforms has been the gradual introduction of ICT. In this study we use three theoretical perspectives. The first perspective is educational and focuses on how higher education institutions use ICT in teaching and learning. The second one looks at higher education institutions as organizations and analyzes changes in structures and rules of the game. A third perspective concerns academic capitalism, which focuses on how the modes of knowledge production in universities are changing. Each approach asks different questions and finds distinct answers.

Theoretical Framework

The Educational Perspective

The educational perspective has produced extensive literature on how institutions use ICT in teaching and learning. From this point of view, academics increasingly use ICT, but its use remains limited: most continue to teach without the help of technologies inside a classroom, while others use technologies to support blended learning (Gaebel, et al., 2014). This resistance to ICT seems strange, considering that these technologies have invaded daily (academic) life. Most universities use the Internet and intranet, have institutional websites, proclaim electronic learning environments, have electronic libraries, and more (Ramírez & Casillas, 2014).

The use of ICT should, in theory, make higher education less costly for both governments and students. However, this gain is limited because the use of ICT implies continuous upgrading and investments (Deming, et al., 2015). At the same time, not all ICT applications lead to innovations and higher productivity (Fullan & Donnelly, 2013). Most literature concludes that governments should promote ICT through public policies and investments, while universities should provide more training and support facilities for academic staff and students (Bates, 2002; Herrera, 2009). In addition, technologies must be user-friendly, sustainable, and efficient, with the support of experts in online education. The benefits of ICT can be both educational and organizational and are considered necessary because of the heightened competition in the potential global market (CERI, 2005; de Freitas & Oliver, 2005). Mexico and other developing countries consider technology-mediated teaching essential to increase enrollment (Muñoz, 2020).

Other authors are far less convinced of the positive impacts of ICT in higher education. From their point of view, institutions tend to use ICT as an enabler for already planned adjustments while, at the same time, university culture inhibits innovation (Marshall, 2010). Others point out that ICT does not fundamentally change teaching and research (Zemsky & Massey, 2004). Some even observe that most institutions continue successfully without these technologies (Cuban, 2001; Oppenheimer, 2003). Still, others have pointed out that virtual education requires self-taught skills that less qualified students have not developed, whereas elite students are reluctant to substitute face-to-face teaching (Guri-Rosenblit, 2005). Overall, the literature indicates possible gains but also pitfalls for universities. New actors –private companies- could provide courses and award degrees at lesser costs and end higher education institutions' monopoly (The Economist, 2014). However, this perspective primarily focuses on teaching methods and student learning, paying scant attention to organizational change and implications for academic staff (Orlikowski & Iacono, 2001).

Organizational Theory

Organizations must adapt to new demands and contexts to survive, changing their structures, processes, and rules (Zell, 2003). To do so, they tend to incorporate changes mimicking structures or processes from others through isomorphism (DiMaggio & Powell, 1983). Organizational studies indicate that ICT is an essential driver for innovation and change in organizations in many sectors, such as banking, health facilities, retail services, and public administration (Scott Poole & Van de Ven, 2004; Soete, 2005). Driven by recent technologies, organizations underwent mergers and acquisitions, downsizing, and outsourcing in a constant process of innovation (Fay & Lührmann, 2004). The introduction of ICT can significantly change communication and power distribution, frequently "flattening" organizational structures and hierarchies (Baker, 2007; Bruns, 2013).

However, higher education has not changed much since the introduction of ICT. Most organizational reforms have only had a limited impact on existing structures and rules or the division of labor. Most organizational changes seem peripheral: universities have created new departments or units to respond to outside demands (Clark, 1998). Overall, ICT seems to have made traditional tasks more efficient and less labor-intensive (Marshall, 2010). This exceptionalism raises the question of whether higher education remains impervious to change or that something else might be changing.

Academic Capitalism

According to academic capitalism, universities produce and reproduce knowledge through research and teaching. Over the last four decades, the mode of production has changed from a pre-capitalist to a capitalist form, and knowledge has become a commodity that can be commercialized (Slaughter & Leslie, 2001; Slaughter & Rhoades, 2009). Initially, academic capitalism centered on the increasing commercialization of research produced in universities or by university-private business collaborations (Gibbons, et al., 1994). Over time, the analysis extended to teaching and management in a new context of knowledge production under market conditions for the knowledge society (Jessop, 2017; Slaughter & Rhoades, 2009).

From this optic, academics have become laborers who no longer own their products. Instead, organizations and their managers have become the new owners, as universities become corporate actors trading services in a competitive market (Shattock, 2010; Jarvis, 2012). In many cases, ICT plays a vital role in these new strategies: once academics have put all course content online, these courses can be offered to many clients inside and outside the institution (Mora & Vieira, 2009). In that way, the advance of academic capitalism would mean that teachers would stop owning their products (classes or courses) and sell their labor to owners of the means of production, who, as owners, can trade or sell commodified knowledge to obtain surplus value. Our analysis is based on a review of governmental documents and institutional responses from 1988 to date.

Changes From Three Perspectives

Since 1990, the Mexican federal government has promoted the use of ICT in various spheres of government action, the economy, and education (SCT, 2020). Higher education institutions have sought to expand their technological infrastructure and have promoted ICT in administration, teaching, and research to variable degrees. Individuals (managers, administrators, teachers, and students) have increased, although unevenly, their access to technologies and use them in numerous ways in their personal and professional lives. We will look at these changes from the three perspectives listed.

The Educational Perspective

From the educational perspective, by 2019, e-learning was on the rise but still involved a small part of enrollments in only a few institutions. Most universities continued to operate traditionally (Ortega & Casillas, 2014). Although ICTs have entered the private life of teachers and students, teaching has not changed significantly. It is not clear why ICT had made little progress before 2020. Some publications highlighted the digital divide between rich and emerging countries and the lack of access or experience with these technologies on behalf of students and teachers (ANUIES, 2019). Others point out that ICT perpetuates the traditional model and hinders innovation due to teachers' resistance, the lack of strong leadership to promote changes, and the absence of a systematic self-improvement culture (Pérez, 2018; Fernández, 2013; Marshall, 2010).

The events during the pandemic show that internet connectivity remains a national problem and that the existing infrastructure is only available on campus (Padilla, 2022). Before the pandemic, academic staff had computers, students had access to computer labs, optic fiber facilitated broadband access, and universities had virtual classrooms. However, access to ICT required the presence of academics, students, and administrators on campus. Thus, the lockdown meant faculty and students had to transition toward distance education by personal means, working from home through private, limited connections. It stands out that this transition received little institutional support and none from the federal government.

The federal government, even the President, repeatedly insisted that public universities return to face-to-face teaching as soon as possible (Domínguez, 2022). It did not offer any support but instead continued to cut back funding. Between 2015 and 2021, the public higher education budget fell by 10.7% in real terms (Moreno & Cedillo, 2022). At the same time, enrollment continued to grow, so funding per student dropped by 23.6% (Mendoza, 2022). By 2018, households covered 31% of the expenditure at the tertiary level (OECD average: 23%) (OECD, 2019). The lack of policies or financial support also meant that the transition toward digitalization has been minimal. Faced with the emergency, most faculty simply opted to replace their presentations in front of the classroom with online meetings without changing their courses' contents, schedules, or logic. From an educational perspective, very little changed during the pandemic.

The Organizational Perspective

The reforms enacted by the federal government after 1990 prioritized management reform and created several special funds to invest in improving infrastructure (Moreno, 2014). Institutional management started to gain administrative control over academic staff and students. Universities acquired administrative software for student and staff administration, planning, salary and tax payments, and accountability (Didriksson & Herrera, 2002). By 2019, most public universities had their administration completely automatized (ANUIES, 2019). ICT has been crucial in the federal government's evaluation programs since 1990. The first merit payment schemes, such as the National System of Researchers (SNI), created in 1984, relied on researchers submitting boxes full of photocopies, but researchers now report their activities online with scanned evidence. Similarly, all special federal programs, where public institutions submit funding proposals, moved from paper to digital, which allowed the federal government to construe national databases on courses, academic staff, students, and finances (Rubio, 2006).

By 2019, almost all administrative tasks had been automatized, digitalized, and dependent on ICT. Computers are everywhere and connected to the Internet. All personnel and most students had institutional email accounts, cell phones, and laptops or computers. However, from an organizational perspective, university structures have changed little. Current universities continue to have faculties, centers, institutes, and departments for teaching and research and a variety of administrative offices. While formal structures have changed little, the inner workings of most administrative offices have changed significantly. Departments such as student administration or human resources have moved from manual workers that receive and archive paper documents to personnel who design online formats, organize databases, and produce reports. This new type of personnel tends to have a university degree and, in many universities (public and private), receive higher wages than full professors (Muñoz, 2019a).

Additionally, most universities have set up special offices or units for e-learning and educational technology. These new offices employ administrators and experts in ICT or instructional design, not teachers. However, they tend to be small (10-20 employees) and fit within the existing structures and legislation as administrative units that provide services to academic departments or faculties (ANUIES, 2019). Regarding research, changes have occurred in how knowledge is produced and communicated. Internet searches replace consultation in physical libraries, and experimental and social sciences incorporate modern technologies and artificial intelligence. Publications circulate faster through Open Access and Creative Commons licenses, as pre-prints and post-prints. Knowledge is produced, distributed, and accumulated at an increasing speed, and competition and collaboration between research groups are greater. These are organizational changes at the bottom of the institutions.

On the contrary, teaching continues in its centuries-old mold, with professors dictating lectures in front of classrooms and students taking handwritten notes (De Garay, 2005). This dynamic did not change during the pandemic: teachers now dictate the same classes online. The organizational rules of the game have changed little. For example, most universities evaluate and pay academic staff based on their teaching load, expressed in the number of hours in front of a classroom. It is still common in many universities to check attendance with (now digital) time punch clocks. Student evaluations also stress physical presence –with checklists- and many rules and regulations still state that students must attend at least 80% of classes to be allowed to present exams. There has been a change in the balance of power: university bureaucracies oversee the different evaluation and rewarding systems, present proposals to the government, implement policies, and present accounting reports. The balance has changed from one where bureaucracy had an auxiliary function to one where bureaucracy administers and surveils academic staff using ICT (Muñoz, 2019b).

The Academic Capitalism Perspective

Regarding academic capitalism, Mexico has seen a different dynamic than other countries. As Slaughter and Leslie (1997) observed, research universities have primarily commodified research through projects collaborating with or for industry (Gibbons, et al., 1994), obtaining patents, licensing them, or directly selling products. However, very few Mexican universities have found commercial value in their research, although they have been able to distribute it by digitizing it and publishing it online. Since the 1980s, the Mexican government introduced merit-pay programs that reward researchers for the number of publications in indexed and refereed journals and books (Galaz & Gil, 2013). Public programs even offer to pay the fees publishers charge. In the process, most researchers must cede their property rights. Once published, the government, universities, or even researchers must pay subscription fees to access these publications. An essential part of the public research budget (always less than 1% of GDP) goes to payments to researchers and publishers.

So, more than true capitalism, where researchers sell their goods to consumers, it is a market where researchers, institutions, and the government pay for research publications in return for prestige and merit payments. In this market, researchers act as a peculiar type of "prosumers" (Fuchs, 2013): they produce what they later consume to gain academic relations, public visibility, more citations, and economic incentives. As Brunner et al. (2019) and Fernández (2009) have pointed out, research had never developed much in Latin American or Mexican higher education, leaving little opportunity to commodify and commercialize research findings. Most universities are dedicated primarily to teaching. As a result, the theory of academic capitalism did not seem to have much explicatory power and encountered little response from researchers in Latin America (Brunner et al., 2019).

Capitalism and Commodification

In many countries, universities are gradually discovering that digitization permits better surveillance of teachers, a nearly costless reproduction and circulation of online courses, and attending more students who will continue to pay full fees and tuition (Agasisti & Catalano, 2006; Agasisti & Johnes, 2010). Additionally, once a full-time professor has designed

and digitized a course, the university can hire a part-time teacher for the job. Finally, the university can continue to function online during a pandemic or thereafter. Crucial in this process is the commodification of teaching materials, courses and programs, scientific research and publications, and the new definition of intellectual property rights (Perelman 2002). ICT has contributed to the commodification of knowledge and put ownership in dispute. The COVID-19 pandemic rapidly moved towards online teaching, and universities contracted Learning Management Systems (LMS) and other software. LMS registers content, learning objectives, activities, readings, teaching and evaluation methods, interaction, student satisfaction surveys, grades, and the underlying evidence.

The process of converting knowledge into a commodity depends highly on ICT. Once knowledge is digitized and put on platforms, it ceases to be owned by the producer and becomes the employer's or the ICT developer's property (Jessop, 2017). The owner can reproduce it almost without additional cost and sell or trade it to clients or consumers. As to teaching, the first step toward academic capitalism in Mexico has been the rise of the private sector. Private institutions started to appear in the 1980s but expanded from the 1990s onward. By 1990, they attended 17% of enrollments; by 2019, 35% (OECD, 2019). Current legislation excludes private institutions from public funding, save for some research projects and scholarships for post-graduate programs. Therefore, their survival and success depend on attracting students willing and able to pay tuition fees and other services, such as parking fees, restaurants, shops, or on-campus housing. Likewise, several public universities own gas stations, pharmacies, and soccer clubs.

Academic capitalism advanced when private universities started to create campuses around the country and when (national and international) corporations began to buy up existing institutions. The fact that universities can freely buy others or be purchased indicates that these institutions operate in an almost unregulated market. Although legislation prohibits for-profit higher education, most private universities generate revenues for their stakeholders. Particularly in the private sector, universities adopt commercial criteria in decision-making and try to increase revenue by reducing costs or increasing sales and incurring financial risk management. Prominent private universities have successfully negotiated land grants from state governors to install branch campuses. Furthermore, branding has become a feature for several private universities, while some public universities seek to stand out in national and international rankings (Álvarez & González, 2017; De Garay, 2017).

The next step would be a capitalist market economy in education and research, raising capital from financial and commercial markets, not only from revenues such as tuition. This stage is not reached yet and is perhaps unlikely to occur, at least not in the public sector. According to Marginson (2013: 353): "… no country has established a bona fide economic market in the first-degree education of domestic students. No research university is driven by shareholders, profit, market share, allocative efficiency, or the commodity form." While Marginson may have a point regarding public or publicly funded universities, by 2019, many private universities had evolved into profit-maximizing enterprises or corporate universities (Waks, 2004; De Garay, 2017; Silas, 2013). These universities have shareholders (the Laureate Corporation owns a network of universities in Mexico), charge tuition fees that fully cover costs, permanently seek to increase their market share (by marketing or buying out the competition), and sell online courses, particularly at the graduate level. By 2018, private universities enrolled 69% of master's students (compared to 32% of undergraduate students) and offered 67% of distance education programs nationally (OECD, 2018). Moving courses online allows these universities to hire part-time faculty. The combination of corporatization and oligopolization has led to the second stage of academic capitalism (Álvarez & Morales, 2019).

The commodification of courses is also one of the ways to extract profits from private institutions. For example, Laureate International owns courses and educational models for which it charges high fees to its national affiliates to get earnings in countries where private institutions are not allowed to do that. Course content on learning platforms will enable owners to buy or sell it. It even makes buying or selling complete institutions with their operating licenses and course contents possible, as Laureate announced in Mexico in 2020. In the public sector, changes have been minor. Although universities charge tuition, the income from this source is less than 10%. Public institutions depend more than 90% on public revenues; salaries are federally controlled. In the public sector, student demand still exceeds institutional capacity. Previous federal governments introduced semi-market funds to encourage enrollment growth, but the current government has canceled these. Thus, most institutions do not seek to enroll more students, and given the recently legislated gratuity and austerity policies, public institutions lack incentives to grow. However, even in the public sector, government and universities look at what courses have demand or might spur additional (public) funding (Mendoza, 2018). As a result, university governance has become less collegial and more dependent on managers and financial professionals, combined with outsourcing and hiring consultants (López, 2003).

In the public sector, the commodification of teaching played a very marginal role until 2019. The digitization of lectures and teaching materials during the COVID pandemic has been only partial: most teachers started communicating with students online without using Learning Management Platforms. The public sector is subject to contradictory policies. On the one hand, as soon as the pandemic subdued, the national government and institutions discouraged online lectures and stressed the physical presence of academics and students (Domínguez, 2022). On the other, the evaluation of teaching online generates controversies in most public universities, especially in the case of merit pay policies (Piña & Bohn, 2014).

Even so, there are recent examples of commodification in the public sector in Mexico. For instance, in May 2019, Claudia Sheinbaum, governor of Mexico City, announced the opening of a new public higher education institution to attend students that existing public universities could not admit. The new institution offers undergraduate courses, which existing public universities such as the UNAM, the IPN, Colegio de México, and UAM have designed (Forbes, 2019). Likewise, by the end of the first semester of 2020, public university rectors announced that most courses would be online by the second semester of 2020 (PULSO, 2020) and encouraged teachers to migrate their courses to Learning Management Platforms. However, universities, like the Benemérita Universidad Autónoma de Puebla (BUAP), clearly stated that: "After elaborating the online content of the program, the teacher must sign a waiver that cedes all property rights of the course contents to the university." (BUAP, 2020).

These changes open the path to new university business models. Students can take their courses partially online with providers of Massive Open Online Courses (MOOCs) or with universities, and these courses are freely available online. The newly created public university in Mexico City allows students to take all or most of their courses online without tuition and obtain credits and a degree from two public universities. However, digitizing knowledge also means that intellectual or academic labor becomes a product with a new owner, subject to commercial considerations, and academics become knowledge workers.

ICT Dependency

In Mexico, universities have become dependent on outside ICT providers. All major Mexican universities now have licensing agreements with ICT providers, plus contracts for specific software products that support electronic databases and publications, communication platforms, LMS, entrance exams, human resources management, broadband connections, or power supply. It is hard to estimate the costs involved, as universities register these expenses in distinct parts of their budget. Before the pandemic (2015), US universities' data estimated IT costs on average around 4.2% of the total annual budget, of which 80% is spent on operational costs, about 13 percent on incremental changes, and about 5 percent on non-incremental changes. No institution type spends more than 8 percent of its technology budget on transformative projects (Kim, 2016). Only 10% of the IT budget goes to educational technology (Dahlstrom, 2015).

In the case of Mexican public universities, the costs were probably higher, at least while the special financing programs that the federal government introduced at the start of the 1990s lasted. Those special funding programs represented 10 to 20 percent of universities' budgets and were spent mainly on technological infrastructure (Tuirán, 2011). However, those special funds began to dwindle under the previous government and have disappeared under the current one. Recent reports by ANUIES show that the budget allocated to the units in charge of ICT in higher education institutions, without considering salaries, hardware, software, or infrastructure, drastically decreased by 48.91% between 2019 and 2021. This last year showed, in comparison with 2020, a short recovery due to spending on face-to-face teaching. But the percentage of the budget allocated to ICT is only 1.53% (ANUIES 2019; ANUIES 2021).

Nevertheless, recent developments, accelerated by the COVID-19 pandemic, suggest that these investments may have increased significantly since 2020. Most Mexican universities signed contracts with companies that sell learning platforms or offer Internet conferences (Casanova & González, 2022). The cost of these contracts can be considerable. "According to investment intelligence firm HolonIQ, the first half of 2020 was the second-largest half year for global edtech investment — at $4.5 billion — three times greater than the average 6-months of VC investment during the prior decade. Much of this investment is focused on higher education and its intersection with the workforce" (Gallagher & Palmer, 2020). Videoconferencing platforms saw an impressive rise in users and revenue. For example: "Zoom generated $2.6 billion in revenue in 2020, a 317% increase year-over-year" (Sadler, 2021). This amount suggests that most Mexican universities have invested considerably. Likewise, academic staff and students had to make personal investments. During the pandemic, they had to work from their personal computers or cellphone and pay for their internet connection.

This dependency creates a new form of academic capitalism. In its original conception, academic capitalism signaled that the academic staff at research universities started selling knowledge as commodities to society or industry, which allowed them and universities to profit. However, recently higher education has become a consumer of knowledge

and technology and has grown dependent on these technologies. As it seems, most universities currently buy more knowledge than they sell, and outside ICT providers make part of the profits. In practice, the users, or "prosumers" of ICT (institutions, academics, and students), are the ones that generate research and course content they later consume, which is gathered and commodified by ICT companies that charge high fees for their services.

Implications and Conclusions

The transition towards online education occurred without government policies and with little institutional support. The rapid transition depended on the individual initiatives of students and academic staff, who moved from the classroom to the Internet to communicate. From an educational point of view, this transition did not alter course content or organization. The transition relied almost entirely on individual efforts, with little institutional or government support. Online courses are cheaper and could improve through better training, equipment, and internet connection. However, most involved prefer in-class teaching and learning to regain social interaction. From this perspective, teaching and learning will probably de-digitalize.

From the organizational perspective, it stands out that university administration has become automized and that digital infrastructure has improved. During the pandemic, meetings and documentation continued online. However, most infrastructure is only accessible on campus, and as the pandemic subdues, administrators seem eager to return to deeply rooted bureaucratic procedures. Meetings require the physical presence of participants, paper has reappeared, and all documents need to be rubber-stamped and signed with a blue ballpoint. Academic capitalism offers a novel perspective. The move towards online education and the digitalization of teaching material raises the question of who owns course content. Before the pandemic, universities left course content to teachers' discretion, but during the pandemic, they started to claim online materials as their property. As a result, course content and entire (private) universities could now be bought and sold. However, it also implies that teachers lack any incentive to elaborate course content, digitalize it, and put it online.

Finally, the digitalization of teaching, research, and administration during the pandemic increased ICT dependency and reliance on for-profit ICT developers, the cost of which was borne by institutions and individuals. The federal government never offered financial support for digitalization and practically cut the infrastructure and operational costs budget. In turn, ICT providers started to make part of the profits. To conclude, ICT has penetrated all spheres of universities. The classroom was the last area of the university where ICT had not wholly entered, but the pandemic rapidly changed this. Although digitalization offers promises, it also entails critical costs, profits, and ownership pitfalls. Under current conditions in Mexico, academic staff would be the losing party. That might explain why almost all want to return to pre-pandemic times and de-digitalize higher education.

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