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Abstract:

The coronavirus disease of 2019 (COVID-19) pandemic has caused challenges for universities worldwide—especially for educational institutions in developing nations where social inclusion and the digital divide have great relevance. In this paper, I describe the main problems that many educators in Mexico have faced and the actions that stakeholders at its main university took to ensure the academic community could continue academic life. I also review items that education institutions need to address in the future to not only survive the crisis but also benefit from it.

Keywords: COVID-19, Academic Continuity, Social Inclusion, Digital Divide.

1 Introduction

Amid the devastating impact that the coronavirus disease of 2019 (COVID-19) pandemic has caused around the world, no educational institution could carry on as usual. With minimal warning and despite preference and tradition, educational institutions have had to adopt a new educational delivery method. Classrooms and facilities had to close down to contain the virus's spread. Furthermore, this situation has lasted way beyond initial expectations.

Some institutions already had sound measures in place for distance education that they only needed to adapt (mainly for monitoring and control purposes). Yet, a vast proportion of institutions did not see it coming and lacked suitable preparation—especially in countries where technology-based education does not represent the norm. While education institutions have used blended learning methods for a long time, in many developing nations, only some private schools (for whom class size and financial support do not represent significant issues) standardize them. However, one can reasonably believe that these restrictions and concerns may also apply to many institutions in developed nations as well.

But reality differs greatly for public universities in developing countries. They face excess demand and enrolment, insufficient infrastructure, and extreme financial constraints. In this paper, I illustrate some actions that many educators have taken in Mexico, a developing nation, that may reflect the reality that many other countries face. In particular, I describe the actions that stakeholders at the National Autonomous University of Mexico (UNAM) took to provide effective actions for educational continuity during the COVID-19 pandemic. The UNAM shares common problems with other institutions but at a much greater scale due to its size and complexity. I write this paper to share the experience of educators in Mexico so that other, perhaps similar, institutions may benefit from them—what we did well and what we did not.

2 The Higher Education Scenario in Mexico

The public sector provides most higher education in Mexico, although the country also has some important private universities. The latter, however, vary in quality and impact to a greater extent than the public ones. Some private educational systems have good IT infrastructure and use blended learning methods on a regular basis.

Compared to private universities in Mexico, public universities have many different vocations and sizes. Large universities (more than 10,000 students) account for 60 percent of total enrolment in Mexico (i.e., over two million undergraduate students). One million more attend medium and small-sized public universities, and over another million students enroll in the private system (SEP-DGPPEE, 2018 Asociación Nacional de Universidades e Instituciones de Educación Superior, 2018). Some large universities even have their own high school system, which expands the age spectrum of their student population.

The National Autonomous University of Mexico (UNAM) has over 360,000 students, which includes 110,000 in its high school system. It has over 40,000 academics, 75 percent of which are adjunct professors.

Individuals do not have guaranteed access to higher education in Mexico. Physical infrastructure capacity constitutes a primary factor that inhibits students from accessing higher education. As such, the country has the great (but largely unrealized) potential to benefit from hybrid models that require more digitization and less face-to-face interaction.

3 IT in Higher Education

Mexican universities, especially public ones, tend to be very traditional. They also face considerable financial challenges to provide an appropriate IT infrastructure that would allow them to explore distance education and hybrid models. Figure 1 shows the gap between the current available bandwidth available and the capacity that experts and vendors recommend aggregated for all public universities (Rodríguez-Abitia & Kriscautzky-Laxague, 2018). This gap becomes even greater when one considers only small and remote facilities; in some cases, these facilities do not have any Internet access at all.
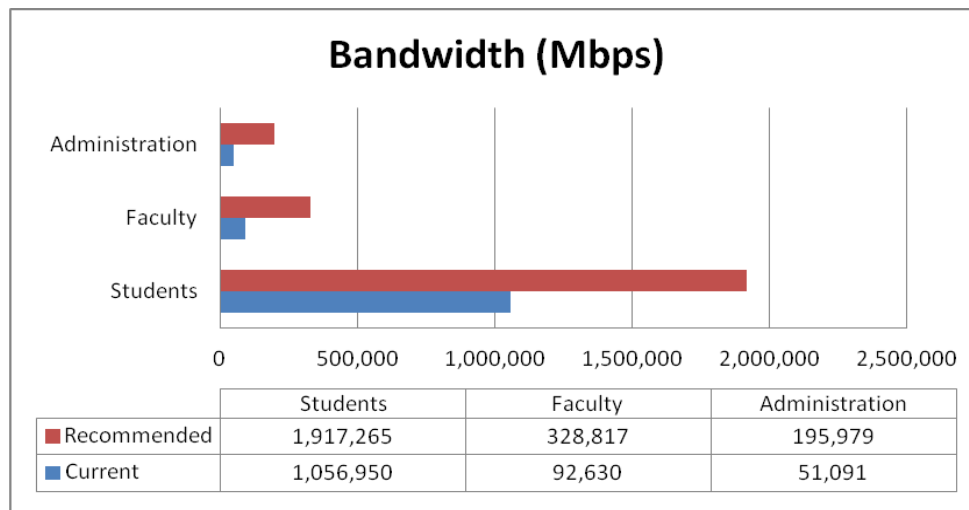
Figure 1. Actual and Recommended Bandwidth by User Type (Rodríguez-Abitia & Kriscautzky-Laxague, 2018)

The fact that many education institutions do not use learning management systems (LMS) constitutes an added factor that inhibits students from accessing higher education. Only 39 percent higher education institutions in Mexico provide LMS support to their communities (the ones that do mostly use Moodle (71%))(Asociación Nacional de Universidades e Instituciones de Educación Superior, 2019). Furthermore, 87 percent do not have qualified IT personnel, and only nine percent have a mobile app to provide students with access to administrative and academic functionalities. Meanwhile, only 20 percent report having a clear catalog of IT services. Thus, it seems that IT plays a basic role rather than a strategic one; that is, it provides only minimal infrastructure and does not enable innovative educational delivery methods (Rodríguez-Abitia & Kriscautzky-Laxague, 2018).

4   Information and Communications Technology (ICT) Access off Campus

Mexico also provides poor ICT access off campus. According to Lloyd (2020), the country ranked 87th in the world and 8th in Latin America for ICT access. Furthermore, Lloyd also states that 45 percent of Mexicans have a computer and 53 percent have Internet access at home. Needless to say, these figures worsen for individuals who live in rural areas.

At the UNAM, a diagnostic study applied to freshmen in the high school level has indicated that 95 percent of the students have access to Internet at home. However, almost all these studies access the Internet via a mobile phone (92.7%) (Dirección General de Cómputo y de Tecnologías de Información y Comunicación, 2019).

Based on a different survey made especially to assess the student technology access situation during the pandemic, UNAM authorities recently estimated that approximately 38 percent of the university's population (i.e., almost 130,000 students) lack Internet connection and/or access to a computer at home, which would make it difficult to impossible for them to engage in remote learning activities.

5   So What Did We Do?

In summary, when the COVID-19 pandemic forced education institutions in Mexico to move to online instruction with minimal warning, many factors complicated their effort to do so: 1) many instructors lacked the general and technological skills to teach online, 2) many students lacked the necessary technology and possibly the experience to access the learning environments that the university could establish, 3) limited financial resources, and 4) vast student numbers. In addition, stress and concern for the pandemic and its potentially catastrophic effect on daily life affected almost everyone—students, instructors, and administrators. In this respect, we likely faced a similar situation to many of our sister institutions around the world.

As with many universities in Mexico, the UNAM first focused on defining a date to close down its face-to-face activities. It decided on 23 March, 2020 for most faculties, schools, institutes, and research centers (collectively known at UNAM as academic entities). In the week prior, each academic entity had to design a strategy for academic continuity based on its own needs and possibilities. The actions that the university implemented at the central level and offered to all academic community members helped school units in this task. We outline these actions in Sections 5.1 to 5.11.

5.1 Virtual Campus

The university's central administration defined three different strategies for faculty members to choose depending on the degree to which they had worked with IT platforms to communicate with and manage classes. First, the university provided basic support to professors who could already competently use LMS tools mainly by strengthening their videoconferencing capabilities. The university targeted professors who could use technology to a moderate degree for training in LMS (Google Classroom and/or Moodle) and videoconferencing tools such as Zoom and Blackboard Collaborate. Finally, the university advised professors with no previous technological engagement in teaching to use email and social networks to exchange files and videoconferencing tools to conduct synchronous meetings. In all cases, the university asked professors to respect the original times and dates assigned to their classes when the semester started. The university created videos and visual materials to offer information on tools available and how to use them. With the help from suppliers, the university offered many tools with free licenses for an extended period with unlimited use. Thus, faculty members could freely use Google Classroom, Moodle, Blackboard Collaborate, Zoom, GoToMeeting, Google Meet, Teams, and many other tools. This variety of options caused an increase in complexity for integration, support, and training, but the university preferred to rely on whatever help it could and on tools that users could use with relative ease or only minimal retraining.

5.2 ICT Use Monitoring

The university implemented a system for ICT managers in the academic entities to report weekly how faculty members used the technologies that both the managers and the university offered to them. Figure 2 demonstrates the skyrocketing demand for the educational technologies (the constraints above notwithstanding). The apparent decline in demand in the last two weeks for two of the technologies reported may have resulted from the fact that many programs had begun to wind down as the end of term approached.
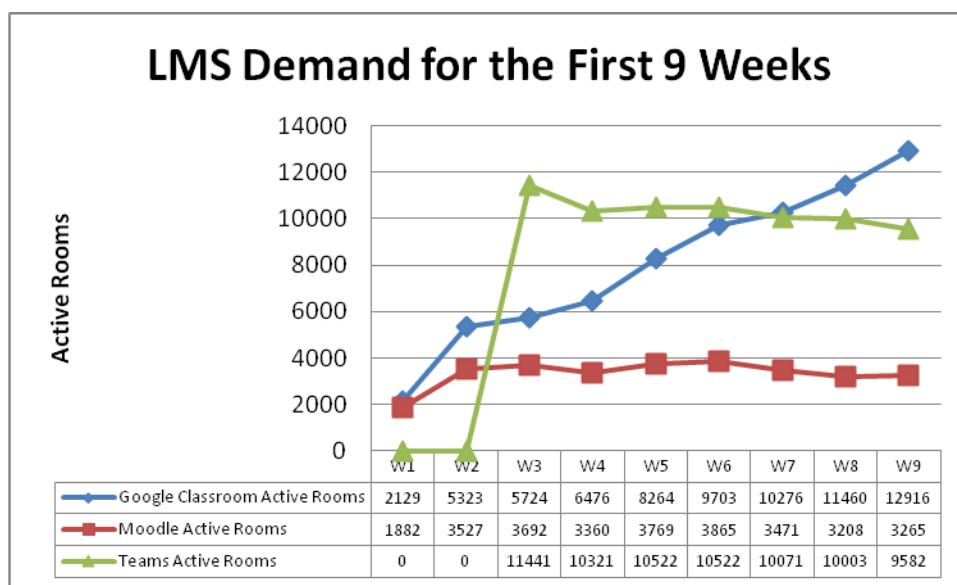

LMS Demand for the First 9 Weeks

	W1	W2	W3	W4	W5	W6	W7	W8	W9
Google Classroom Active Rooms	2129	5323	5724	6476	8264	9703	10276	11460	12916
Moodle Active Rooms	1882	3527	3692	3360	3769	3865	3471	3208	3265
Teams Active Rooms	0	0	11441	10321	10522	10522	10071	10003	9582

Figure 2. Demand Growth for LMS Technologies in the First Nine Weeks

Since faculties and schools did not have to report the technology they used, the numbers in Figure 2 refer to only 17 out of 82 academic entities. Accordingly, one can expect numbers for the entire university wide numbers to be much bigger. Note that most Teams and Google Classroom users had not used LMS users

before. On the other hand, while it may appear that the use of Moodle active rooms is smaller compared to the other technologies, many sections or groups of the same subject can share one active room at the same time, so the actual number of served students may have increased significantly. As expected, existing Moodle users tended not to change technology. Additionally, the number of videoconferencing sessions increased from 356 in the first week to 315,306 in the final week—an extraordinary increase by any standards and one that anyone could expect to strain the infrastructure.

5.3   Academic Calendar Changes

To provide a safe environment, university authorities modified the academic calendar. It extended the semester beyond the holidays in July. In addition, it delayed the start of the next term to the end of September rather than the regular start in mid-August. In that way, everyone had extra time to plan for the shift to online instruction.

5.4   Model Courses Development

The university encouraged the professors who taught common subjects that many students attended to collaborate in creating what the staff in charge of education technologies called "model courses". Professors decided these subjects' content and activities in a collegiate process and could use the resulting class in Moodle in as many instances as necessary.

5.5   Virtual Educational Tools for Experimental Sciences

Since not being able to perform traditional laboratory sessions posed a problem for teaching experimental sciences, a group of technical personnel, responsible for a university repository of educational digital resources, identified 139 free-access tools and prepared an evaluation instrument that considered pedagogical issues, content quality, technical performance, interface design, and financial aspects (when applicable). Subsequently, 58 professors applied the instrument to assess them and to verify their quality and the degree to which they pertained to the university's study programs. The participating professors recorded and subjected 1,012 individual online evaluations to group evaluations to obtain collegial recommendations to adopt (or not) each tool. As of August 2020, the university had begun a second phase to evaluate commercial tools and planned a third to identify potential in-house developments to complement the adopted tools.

5.6   Open Repositories

The university fast-tracked many educational resources for their inclusion in the open repositories for educational resources so that students could access them as needed. Figure 3 shows how the access to the main educational repository named "University Learning Network" increased compared to the same period in the previous year under normal circumstances. In general, access increased by 130 percent— particularly in April and May once the lockdown had begun in earnest.
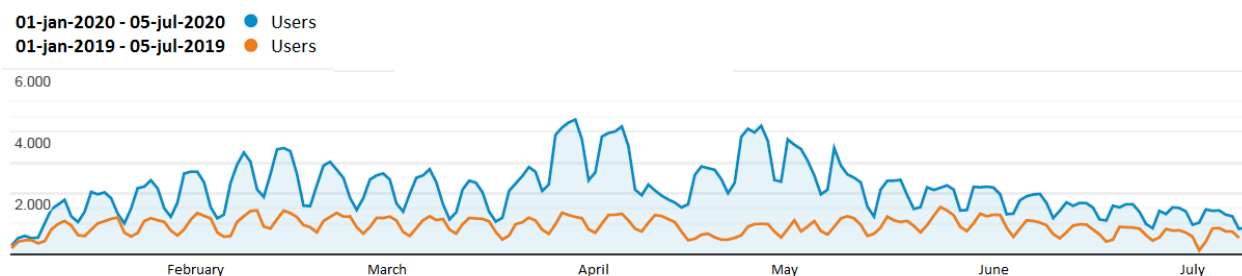

Figure 3. Use of Educational Resources Repository Increase with Respect to the Same Period in the Previous Year

5.7   Internet Connection Upgrades

To improve home connectivity, the university made an agreement with the main telecommunications carrier in Mexico, Telmex, to provide a free temporary upgrade to the maximum bandwidth capacity to any

student or employee with an existing contract. As a result, the carrier upgraded more than 15,000 home lines in less than two months.

5.8 Call Center

The university established a support line to help faculty and students use technology to support distance and online learning. ICT personnel from the academic entities helped strengthen this service.

5.9 Free Massive Open Online Courses (MOOCs)

The university reached an agreement with Coursera to make any MOOC freely available to the university's academic community for a specific period.

5.10 Faculty Training

The university offered courses to aid in designing online courses and using distance education tools to professors to help them improve their online skills both for teaching and for performing online assessments. This training offer increased as inter-semester periods began.

5.11 Planning and Restructuring

In order to effectively transition to online instruction, the university also made structural changes by joining its distance education and educational innovation areas together. Also, it developed a plan to migrate to a blended learning model in all classes to reduce its dependence on existing infrastructure. In addition, it began to implement technology access centers around the city so that students would not have to commute every day to their schools and could instead use a closer location as long as they conformed to sanitation and social-distancing standards. The university originally planned to create seven centers that had the capacity to serve 1,036 students concurrently. Later, when deemed appropriate, the university plans to distribute equipment to smaller centers in all academic entities to provide infrastructure and pedagogical guidance to faculty members.

6 Now What?

We know with certainty that we will not go back to business as usual. In this paper, I show how universities need to address three main challenges when transitioning to online instruction: insufficient technology access, lack of technology skills, and a strong need for pedagogical change to better suit an online delivery system.

The university tried to provide access to as many members of the university community as it could. One can say it did a good job, but it certainly could not serve such a large number of people in diverse conditions. Competing for scarce connectivity and computing resources at home with other family members constituted a major challenge for students. Accordingly, the university recently began a plan to purchase at least 25,000 tablets with 4G carrier-provided connectivity to implement a long-term loan system so that students can take the tablets home and access remote synchronous videoconferencing classes and materials contained in LMS and other platforms. The tablets will also allow students to use personal productivity software at home. In addition, the university will establish three more access centers in Mexico City's northern suburbs to significantly reduce or almost completely close the access gap.

Many professors and students lack digital fluency and, thus, need to develop their digital literacy. Even though it may seem surprising, many members of the university community lack skills to search and discriminate between information sources on the Internet, create effective presentations, or use an electronic spreadsheet appropriately. Even fewer lack the ability to use technology for education, such as LMS, digital learning resources and repositories, or videoconferencing tools. Also, many lack the ability to troubleshoot telecommunications problems. The university has begun to offer more courses to faculty members to improve their ability to use videoconferencing tools and LMS platforms. Most schools and colleges have made course completion mandatory for faculty members before future terms begin. Digital literacy has become more important as the idea of having a blended learning-based environment has become infeasible, and the university formally declared it would deliver courses fully online until February, 2021.

Finally, need has driven away resistance to change. Professors and students know that, at least for 2020, they have no other option. They need to come up to speed and learn skills for self-directed learning,

collaborative learning, and technology-mediated learning. Faculty and students will find the process equally hard. The university has provided large-scale online training to faculty members to transform their class to an online setting so they can better plan and reduce synchronous activities, learn how to design offline activities, and build a distance education course with the appropriate pedagogical focus. As at August, 2020, more than 2,000 professors had enrolled in a MOOC designed for that purpose. Furthermore, the university has complimented these efforts by broadcasting a program every Saturday on the university TV channel that presents and discusses helpful information for effective distance education.

7   Lessons Learned

In retrospect, I find many things worth reflecting on and, accordingly, provide advice from my experience in helping the UNAM transition to online instruction. Taking on the task of quickly creating a reasonably robust distance education environment in a gigantic university in a megalopolis constitutes a major endeavor, but team-work, the use of existing resources, and a good deal of creative thinking can help make it possible.

Transitioning from a face-to-face learning environment to distance education involves more than conducting full classes via videoconferencing tools. Furthermore, universities need to provide infrastructure and software as swiftly and smoothly as possible since such things constitute a basic requirement for online instruction. One should also not underestimate others' willingness to help. IT vendors, governmental institutions, and the community all recognized the problem, engaged in solving it, and generously raised funds, gave away software licenses, reduced hardware prices, and so on. As such, one should look for partnerships and do not be afraid to ask for help. Beware, however, that large purchase orders for hardware items, both for computing and telecommunications devices, may be delayed due to excess demand. Plan your solutions accordingly such that you schedule implementation efforts alongside feasible delivery times.

Being forced to move forward to adopt educational technology can be a blessing in disguise. However, many professors tended to simply replicate their classes using technology and began to realize that that approach did not work well and that they had to adapt their teaching plan by recognizing that current conditions will not allow students to reach the same achievement level as in face-to-face settings. Therefore, instructors need to prioritize learning objectives and focus on the most relevant ones. They also need to promote autonomous learning conditions, avoid giving excessive assignments, plan for mostly offline activities to minimize the impact of poor infrastructure, be flexible about deadlines, and consider various technological tools beyond a simple LMS.

In addition to the key findings that I outline above, I make several other suggestions that might help others in coping with similar conditions:

- Faculty members should recognize that students will also need a different form of guidance and support and that reducing their stress will help them succeed. They should try to establish a safe and respectful environment, provide quick and thorough feedback, and redesign teaching plans according to the results they obtain.

- Furthermore, faculty members may benefit greatly from joining groups with their academic peers to exchange their experiences and generate innovative practices.

- Faculty members should look for new ways to monitor and control their ICT and education processes. They should evaluate their options in multidisciplinary teams. They should also take this opportunity to fortify undergoing educational innovation projects that just happen to make more sense after COVID-19 contingencies came into effect and resistance to change decreased.

- Universities should provide complementary services, such as health and psychological help, help lines, and the like. The current crisis has many dimensions that may affect the expected outcomes of the solutions that higher education institutions implement.

In short, no matter how hard it looks, look for innovative solutions and be creative! We must actively seek out innovations that will help the ICT market evolve. Indeed, faculty and university staff need to do so not just in contingency periods but onwards into the future—we do not want the new normality to enshrine or, worse, increase the digital divide. Hopefully, it will have the opposite effect.

References

Asociación Nacional de Universidades e Instituciones de Educación Superior. (2018). Anuario estadístico de educación superior: Ciclo escolar 2018-2019. Retrieved from http://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior/anuario-estadistico-de-educacion-superior

Asociación Nacional de Universidades e Instituciones de Educación Superior. (2019). *Estado Actual de las TIC en las IES de México: Estudio 2019.* Retrieved from http://estudio-tic.anuies.mx/Estudio_ANUIES_TIC_2019_ca.pdf

Dirección General de Cómputo y de Tecnologías de Información y Comunicación. (2019). TICómetro bachillerato: Resultados de la octava aplicación. Retrieved from https://educatic.unam.mx/publicaciones/ticometro/Ticometro-Bachillerato-2019.pdf

Lloyd, M. (2020). Desigualdades Educativas en Tiempos de la Pandemia. *Campus Milenio*. Retrieved from https://www.campusmilenio.mx/download/campus-849-ff.pdf

Rodríguez-Abitia, G., & Kriscautzky-Laxague M. (2018). Uso de tecnologías de información y comunicación en la educación superior en México. *Dirección General de Cómputo y de Tecnologías de Información y Comunicación.* Retrieved from https://educatic.unam.mx/publicaciones/estudio-uso-tic-educacion-superior-mexico.pdf

SEP-DGPPEE. (2018). *Principales cifras del Sistema educativo nacional 2017-2018.* Retrieved from https://www.planeacion.sep.gob.mx/Doc/estadistica_e_indicadores/principales_cifras/principales_cifras_2017_2018_bolsillo.pdf

About the Author

Guillermo Rodríguez-Abitia, a Fulbright scholar, obtained a PhD in Information Systems at the University of Texas at Arlington. He has more than 35 years of academic experience in various institutions. He has numerous publications in journals and conferences and currently serves as Senior Editor of *The Database for Advances in Information Systems* and an editorial board member of *The Latin American and Caribbean Journal of the Association for Information Systems.* He helped to found the former. His research interests include innovation, IT and education, and IT and culture. He has been an active participant in the Association for Information Systems, being twice conference co-chair for AMCIS, and member of the council for four years. He is the current Director for Innovation and Technology Development at the General IT Direction of the Universidad Nacional Autónoma de México.