Inclusion in times of pandemic: The advantages and difficulties of virtual education for students with functional diversity

La inclusión en tiempos de pandemia: las ventajas y las dificultades de la educación virtual para los estudiantes con diversidad funcional

Carmen Ángela López-Álvarez

Universidad de Puerto Rico, Río Piedras, Puerto Rico

carmen.lopez5@upr.edu

https://orcid.org/0000-0001-9172-6074

Abstract

By the second half of March 2020, the leaders of many nations took drastic measures - isolation, closures and curfews - to stop the covid-19. One of the sectors most affected by these decisions was education: from preschool to university level. Faced with the cancellation of face-to-face classes, university institutions -prepared or not- opted for virtual education in order to save their finances and avoid student desertion. In spite of the difficulty of its implementation in the classroom, this modality has become very popular. This research arises from the need to examine the advantages and difficulties of virtual education for both typical students (those who do not have difficulties) and those who have some impediment during these last months. Likewise, the impact -favorable or adverse- of virtual education on the inclusion of students with functional diversity will be analyzed. Throughout this article, definitions such as virtual education, impairment, functional diversity, inclusion, reasonable accommodation/modification, and universal design will be provided. Finally, recommendations for incorporating universal design into online courses and what the future of education looks like in times of pandemic will be offered.

Keywords

Resumen

Para la segunda quincena de marzo de 2020, los dirigentes de muchas naciones tomaron medidas drásticas —el aislamiento, los cierres y los toques de queda— para detener el covid-19. Uno de los sectores más perjudicados por estas decisiones fue la educación: desde el nivel preescolar hasta la universitaria. Ante la cancelación de las clases presenciales, las instituciones universitarias —preparadas o no— optaron por la educación virtual con miras de salvar sus finanzas y evitar la deserción estudiantil. Pese a lo atropellado de su implantación en las aulas, dicha modalidad ha cobrado gran vigencia. Esta investigación surge de la necesidad de examinar las ventajas y las dificultades de la educación virtual tanto para los estudiantes típicos (no poseen dificultades) como para los que poseen algún impedimento durante estos últimos meses. Asimismo, se analizarán las repercusiones —favorables o adversas— de la educación virtual en la inclusión de los alumnos con diversidad funcional. A lo largo de este artículo, se brindarán definiciones tales como educación virtual, impedimento, diversidad funcional, inclusión, acomodo/modificación razonable y diseño universal. Por último, se ofrecerán recomendaciones para incorporar el diseño universal en los cursos en línea y cómo se vislumbra el futuro de la educación en tiempos de pandemia.

Palabras clave

1. Introduction

1.1 Historical background

On December 31, 2019, when many citizens around the globe were in preparations to welcome the new year, the Wuhan Municipal Health Commission (Hubei Province, China) notified about a cluster of pneumonia cases in the city. Later, "they are determined to be caused by a new coronavirus" (World Health Organization, 2020, para. 1).

Initially, it was assumed that "the epidemic outbreak could be controlled locally in China" (Serrano-Cumplido et al., 2020, p. 56). Perhaps the geographic remoteness between China and our America may have created a false sense of confidence that this virus would be delayed or would never reach our seas. In the light of truth, it was not the first time in recent times that epidemics have occurred in remote places that, fortunately, never reached our countries (e.g. Ebola) or did so in a rather contained manner since they could be contained relatively quickly.

After three months, on March 11, 2020, the WHO declared a state of pandemic in view of the progressive expansion of the epidemic at the international level. By the second half of March 2020, the leaders of many nations felt that drastic and rapid measures had to be taken to stop the five-letter, two-numbered monster, covid-19. Therefore, on March 15, 2020, "the then governor of Puerto Rico, Licenciada Wanda Vázquez Garced, signed an executive order decreeing a curfew to curb the spread of covid-19" (Pascuas, 2020, para. 1). He also reported the cessation of the functions of governmental and educational entities (schools, colleges, institutes and universities), and of businesses, with the exception of essential services such as restaurants, supermarkets, pharmacies and gas stations, among others.

Many countries closed -totally or partially- their borders to foreigners and opened them only for people in exceptional situations, but with requirements such as a negative covid-19 test and quarantines of different lengths. Within these terrible circumstances, it is discouraging that neither essential sanitary measures (e.g. constant hand washing, the use of hydroalcoholic gel, masks and social distancing) nor mass vaccination in some countries -such as Puerto Rico- have managed to put a stop to this virus. It should be noted that this virus has been transmuting into multiple variants (e.g. delta, delta plus, lambda and omicron, among others) that are increasingly resistant and easily transmitted. In fact, a series of outbreaks have been triggered by high vaccination rates. It should be noted that immunization does not prevent contagion, but rather reduces the severity of covid-19 symptoms (e.g. fever, fatigue, headache, cough and congestion, among others).

An aggravating factor for our countries is that "21% of the urban population lives in slums, informal settlements or substandard housing, where overcrowding and lack of basic services are some of the factors that create an environment particularly conducive to the spread of the disease" (Organization for Economic Cooperation and Development, 2020, para. 6). Despite these obstacles, some segments of the population - particularly in the 20-40 age range - have misconceptions and/or misinformed notions about the virus (e.g., covid-19 does not exist, the virus is a hoax invented by pharmaceutical companies for profit, it is a strong flu, vaccines are not safe, "you have to die of something" and "it won't touch me") and act unthinkingly, ignoring the restrictions imposed by governments in pursuit of the common good. Of course, one cannot ignore the fact that taking care of oneself is a responsibility that falls on each individual.

Prevention and the instinct of self-preservation must prevail without punitive actions (e.g. fines, sanctions, imprisonment and closure of premises, among others) by the State. Even so, reckless behavior has often led to the prolonged hospitalization, death or infection of children under 12 years of age (who have only recently gained access to the Pfizer or Soberana vaccine, depending on the country of residence) or the elderly with compromised health. To this day, hospitals are still overcrowded with covid-19 patients. In such circumstances, there have been instances in which patients with chronic and serious conditions have been left behind due to lack of beds and equipment. Within this bleak picture, front-line workers such as doctors, nurses, first aid workers and cleaners could not and cannot cope with so many patients. This overcrowding has resulted in a growing need for "health workers" who have become scarce. Many have died and continue to die daily in the service of their fellow man.

In addition to the health risks, covid-19 "has had a major socio-economic impact on the Latin American region which was already facing structural difficulties" (OECD, 2020, para. 3). The containment measures profoundly affected supply and demand in many sectors such as tourism, which suffered countless postponements and cancellations. As a result, incomes in many households were reduced, unemployment increased due to permanent business closures, and inequality was exacerbated. In addition, domestic violence, child abuse and mental health problems have skyrocketed.

Both the isolation and the uncertainty caused by the covid-19 pandemic have altered, to a greater or lesser degree, the daily lives of millions of people around the world. There is now talk of a "new normality" to which there is no choice but to adjust. One of the most affected sectors was education: from preschool to university. Thousands of students were waiting for a grade, a promotion or a diploma with a view to their academic and professional future. Thus, the covid-19 pandemic forced higher education institutions to postpone face-to-face classes and abruptly replace them with purely virtual semesters. It was necessary to act with haste because university finances and student retention rates were at stake, among many other factors.

With respect to Latin American universities, the levels of preparation for this monumental, hurried and rushed transformation varied from institution to institution. Such a gap, in the words of Rama (2016), "is due to the fact that Latin America shows a high degree of heterogeneity and differentiation in distance education" (p.1). Rama (2016) adds that "it ranges from countries with low or non-existent levels of development to countries with education systems with a high presence of virtual education" (p.1). Since the end of the twentieth century and the beginning of this one, many university centers, inside and outside Latin America, have been gradually moving towards the increase of virtual offerings. This evolution has a budgetary impact because universities must invest in the purchase of equipment, improvements to the physical/technological infrastructure with its corresponding maintenance, the recruitment of experts (internal and external), the continuous training of administrators, professors, non-teaching employees and students. These changes in teaching modalities entail curricular revisions, search for new techniques and methodologies that could have an impact on the licensing and accreditation processes of the institutions.

Prior to the covid-19 pandemic, potential students were already faced with a wide range of university centers throughout the world with e-learning alternatives. This offer extends to undergraduate studies, graduate studies (master's degrees, doctorates and certifications), continuing education and even includes free courses. Some have totally virtual courses (e.g. the Universidad Nacional de Educación a Distancia de España and the Universidad Tecnológica de México), others have a considerable number of online study programs (e.g. the Universidad Nacional Autónoma de México and the Universidad Interamericana de Puerto Rico) and others have a robust offer of virtual courses (e.g. Harvard University and the Massachusetts Institute of Technology), while others have a large number of online courses (e.g. the Universidad Nacional Autónoma de México and the Universidad Interamericana de Puerto Rico) and others have a large number of online courses (e.g. Harvard University and the Massachusetts Institute of Technology).

Although there were already many advances in this direction, there were still many universities in Latin America whose offerings were predominantly face-to-face. At that time, prior to March 2020, student selection was based on personal tastes and particularities (e.g., budget, employment, marital status, location relative to the institution, and special needs, among other factors). After the first eleven weeks of 2020 and, in the midst of the uneasiness that gripped every sector of educational institutions at all levels, virtual education emerged as an option - exclusive and mandatory - to finish the academic year and protect themselves from the deadly virus. Overnight, administrators, teachers, students and support staff had to adopt e-learning as a literal subsistence measure with its benefits and challenges.

This research sets out to investigate primarily the merits and disadvantages of e-learning for functional diversity. First, these will be examined in light of recent articles. Using the data from these papers, a questionnaire on the advantages and difficulties of virtual education during the covid-19 pandemic was drafted. It was administered to 133 students, both typical and impaired, from the University of Puerto Rico (Río Piedras Campus). Its results are presented in order to corroborate the validity of the studies cited. These pages conclude with the effects -favorable or adverse- of virtual education on the inclusion of students with functional diversity and with recommendations to promote it within e-learning.

1.2 Some relevant terms

Before moving on to any other considerations, it is necessary to clarify some terms that will come up repeatedly in this paper. These are: impairment, functional diversity, inclusion, reasonable accommodation or modification, and universal design. The Dictionary of the Royal Spanish Academy (2021) defines the word impediment as "obstacle, embarrassment

or hindrance to something" (Impedimento, para. 1). Michael Bérubé, an expert in impairment studies at Pennsylvania State University, explains that the term impairment "names myriad human conditions and varieties of dysfunction, from mild to severe, from imperceptible physical disability to inexplicable developmental delays. It is a category whose constituents are inherently contingent" (1996, p. 52). The Puerto Rico Charter of Rights of Persons with Disabilities (2004) calls a "person with disabilities" "any person who has a physical, mental, or sensory impairment that substantially limits one or more essential life activities; has a history or medical record of physical, mental, or sensory impairment; or is regarded as having a physical, mental, or sensory impairment" (Article 2, para. 8).

Beyond any definition (although some make it possible to obtain services or legal protection) of the many that are available or any label attributed to persons with disabilities, they have many faces, many voices and many identities. One can speak of a diversity within diversity because an impairment can be observed in an individual regardless of race, color, gender, religion, nationality, age, education, social class, etc. Similarly, an impairment can be observed in an individual regardless of race, color, gender, religion, nationality, age, education, and social class, among others. Likewise, an impairment may be congenital or acquired; permanent or temporary; or visible or imperceptible. On the other hand, the Digital Accessibility Unit of the University of Alicante (Spain) states on its website that functional diversity is understood "as the phenomenon, fact or characteristic present in society that, by definition, would affect all its members equally" (2021a, para. 1). It emphasizes that "university classrooms are full of students from different conditions: from diverse populations from the surrounding area, or even from abroad, such as students; of different faiths, with diverse economic situations, elite athletes, students with student representation and also with different health conditions" (2021b, para. 1).

In line with this assessment, it is added that "in society, there are people with diverse or different abilities or functionalities" (2021a, para. 1). It indicates that functional diversity "is not an alternative term to 'disability' or 'impairment', but a term for exclusions or discrimination" (2021a, para. 2). It points out that "in today's society, there is a tendency to adapt the environment and public spaces to the needs of persons with disabilities, in order to avoid social exclusion, since a disability is perceived as such when the person is unable to interact with his or her own environment by him or herself" (2021a, para. 3).

The term functional diversity is often linked to the universal right to inclusion. Network Learning (2021), an organization of management volunteers in the Netherlands elaborates on the meaning of inclusion as:

> ...the recognition of our universal "oneness" and interdependence. Inclusion is the recognition that we are "one" even though we are not the "same". The act of inclusion means the struggle against exclusion and all the social ills that exclusion gives birth to, racism, sexism, and so on. The struggle for inclusion also involves ensuring that all support systems are available to those who need such support - as a civic responsibility, not a favor (paras. 2-3).

Parallel to this line of thought, the United Nations Educational, Scientific and Cultural Organization (UNESCO) states that for education to be inclusive, it must "remove barriers to the participation and achievement of all learners, take into account the diversity of their needs, abilities and particularities, and eliminate all forms of discrimination in learning" (n.d., para. 4). According to the Inclusive Education page (2006), inclusion means "enabling all students to participate fully in the life and work of communities, regardless of their

needs. It is the process of increasing student participation...and reducing exclusion from cultures, curriculum and community" (para. 10).

In relation to reasonable accommodation, Article 2 of the Comprehensive Educational Services for Persons with Disabilities Act of June 7, 1996 (Puerto Rico) states that it "consists of the modification or adjustment to the educational or work process or setting that allows the person with disabilities to participate and perform in that environment" (para. 2). Some examples of reasonable accommodations -many pre-pandemic- are: seating location, a recess, the company of an assistant (tutors, readers or interpreters) and a service dog, tape recorders, technological assistance and differentiated assessment. During these times of virtual education, some of the accommodations have evolved. Among these, we can list: documents with the ability to be read by screen readers (preferably, in the original format in which they were generated), the description of images (both in online classes and in documents that are placed on educational platforms), videos must contain closed captions, and the programming of educational platforms to provide additional time for exams.

Another term linked to this work is universal design. In its initial meaning for architecture and for construction, universal design stipulates the following principles (which have gradually been incorporated into other areas): equality of use; flexibility; simple and functional use; understandable information; tolerance for error; low physical effort; and space and size for approach and use (Accessible City Corporation, 2012, paras. 7-13). Within the field of education, there are several approaches to universal design that, with all their similarities and differences, coincide in the same purpose -education for all- since regardless of whether it is universal design for learning, universal design for instruction, instructional universal design or universal design in education...measures based on universal design are being implemented in the university community, and these are beneficial for students with disabilities, but also for those students who do not present, a priori, any difficulty in their teaching and learning process. It is, therefore, the task of educational administrations, universities, and professors themselves, to rethink their teaching practices from a proactive paradigm such as universal design applied to higher education (Sánchez Fuentes, 2016, p. 29).

After having provided the historical framework and relevant terminology, the advantages and difficulties of virtual education for students with functional diversity will be examined. First, studies of the last years around the topic will be reviewed to move on later with the questionnaire administered to the students with their corresponding results.

2. Materials and methods

2.1 Literature review

Since before the pandemic, the following benefits of virtual education were mentioned: saving time and money; flexibility; being able to take the class from anywhere, continuous access to course materials, and the use of information and communication technologies (e.g. educational platforms, videos, chats, blogs and e-mails). Regarding potential students with disabilities, Cortés Díaz (2020) stated in the article Educación virtual, una alternativa para población en discapacidad in the newspaper El Tiempo that "the virtual process would be an alternative to address the problem of access to education for people with disabilities, since their condition often prevents them from going to educational centers" (para. 4). Now, in the midst of the pandemic, there is an added merit and the fundamental reason for going virtual: to prevent covid-19 from continuing to spread and claiming lives. Even so, it is not the same to choose virtual education after careful reflection as to be suddenly plunged into a world like the one anticipated by Hanna Barbera's The Jetsons almost sixty years ago. Martínez Uribe (2008) points out that "for the development of virtual education, one must

consider: time, place, space, interaction, technology and self-control" (p. 25). It is evident that, for the most part, those teachers and students in the face-to-face modality did not have a transition period to take the necessary steps to enter fully into virtual education. While virtual education can be of enormous benefit to some individuals, there are many elements that need to come together to make it flow as smoothly as possible. Online courses are not without their stumbling blocks and frustrations for both teachers and students. Among the difficulties of virtual education that were already present prior to the pandemic are: the absence of an adequate technological infrastructure (equipment and a robust Internet connection); the lack of technological skills; the demand for discipline and planning; distractions; and limited interaction (teacher-student and student-student).

The coronavirus brought additional complications to the already existing ones (which were aggravated) such as the lack of differentiation between home and educational spaces; exposure to long working days with electronic devices; sedentary lifestyles; and understanding the new paradigms of virtual education (it is not a matter of implementing face-to-face dynamics through digital platforms). One of the many situations exacerbated by the pandemic was the lack of appropriate infrastructure, since "remote students and students with disabilities tend to be more disconnected than the rest of the student body" (Mas, 2020, paras. 9-10). Such disparity has resulted in online education not reaching all students. However, even the most modern of equipment and the healthiest of connections can break down at any time and ruin a class.

2.1 Methodology

Faced with this novel topic, the researcher undertook the task of reviewing the scarce literature available. She detected frequent coincidences among the articles examined, as raw material for a perception questionnaire, regarding the series of advantages and obstacles of virtual education. To write this paper, the most repeated ones were contextualized within the framework of the covid-19 pandemic. The research was developed with a descriptive methodology since it delineates the population, situation or phenomenon around which it is centered. It contains both quantitative and qualitative aspects. Regarding the quantitative aspect, the percentages obtained from several of the questions are analyzed through comparison and contrast (e.g. the level of preparedness of teachers to face virtual education in March 2020 versus the same line in September 2020). The qualitative aspect lies in obtaining both data from the participants and the information gathered through the open-ended questions. The study was carried out with the purpose of orienting the university community on the advantages and difficulties of virtual education in general and for students with functional diversity in these times of covid-19 pandemic.

2.3 The questionnaire

To ascertain the validity of the advantages and disadvantages of virtual education during the pandemic and its impact on the inclusion of students with functional diversity, the researcher drafted a questionnaire - on Google Forms - with 17 questions. Of the 17 questions, 12 were multiple choice and the remaining five were open-ended. Five of these asked students to provide information about their year of study, time spent in virtual education, the source of their Internet service for online courses (without probing the reliability of their connection), whether they had any type of impairment and whether they were given any reasonable accommodation. The rest was aimed at ascertaining the following: the level of preparedness - in March 2020 and at present - of various components of virtual education (teachers, students and educational institutions); the experience of students identified with impairments with online versus face-to-face courses; students' perceptions of what they consider to be the greatest advantages and challenges of virtual education; their views on how e-learning impacts the inclusion of students with functional diversity and the rationale for their response and their preferred mode of delivery.

The instrument, entitled Questionnaire on the advantages and difficulties of virtual education during the covid-19 pandemic, was administered freely and voluntarily to 133 students from three different courses at the School of General Studies of the Río Piedras Campus of the University of Puerto Rico. There were four sections of Espa 3101 (Basic Spanish I), one of Espa 3102 (Basic Spanish II) and one of Espa 3036 (Ficción e historia en la novela hispanoamericana de fines de siglo XX).

3. Results

Throughout the second week of September 2021, participants completed the questionnaire. 69.2% of the students are in their first (34.6%) or second year (34.6%) of study. More than half of the students (51.1%) have been taking online courses for a period of one and a half years versus 39.8% who have been taking online courses for over two years.

Concerning the level of preparedness of teachers, students and educational institutions for the sudden shift to virtual education forced by the covid-19 pandemic in March 2020, 81.2% felt that they were not adequately prepared versus 18.8% who disagreed. A year and a half later, 55.6% of mentees felt that these components were adequately prepared for virtual education compared to 44.4% who said the opposite. A year and a half into the pandemic, the perception has improved by 25.6%. An overwhelming majority of respondents - 95.5% - indicated that the Internet service they use for their courses belongs to their residence, which may or may not be located in the same city as the university. Others use the Internet at the university, at a store/shopping center, at a friend's house, at work, or other.

When asked about the greatest advantage of online courses, 36.8% gave preeminence to flexibility. In second place, 31.6% favored the possibility of taking the class from any location. Third, 17.3% agreed that virtual education saves time and money. Fourth, 12.8% recognized the benefit of round-the-clock access to course materials. Fifth, only 1.5% welcomed the use of information and communication technologies (ICT) as beneficial. The next question in the questionnaire explored the flip side of the coin: the pitfalls of this type of education. Among the major difficulties of virtual education, 54.1% encountered many distractions; 37.6% said that interaction with the teacher and classmates was very limited; and the remaining 8.3% - in descending order - faced problems with both discipline and planning, did not have adequate technological infrastructure or lacked technological skills.

Fifteen students (11.3%) revealed that they had some impediment and 9.8% (13 students) were provided with one or more reasonable accommodations. Six of these (40%) judged their experience with virtual courses to be worse as opposed to face-to-face courses versus 13.3% who stated the opposite. Three students (20%) found no difference between the two

practices and the remaining 26.7% were unsure. While several students with attention deficit hyperactivity disorder (ADHD) and specific learning disabilities (SLD) denounced the lack of concentration and difficulty in understanding concepts in contrast to the face-to-face context, another - with diabetes (type 1) - defended it. He said: "Being virtual has been a great help because I am at home and I can eat at the right times and have a more balanced diet to control my glucose". Many students responded to the open-ended question about the greatest advantage of virtual education by appealing to almost all of the alternatives in the multiple choice above (e.g. saving time and money; flexibility; taking classes from anywhere; and continuous access to course materials). Some have been able to start their business and work more. There was one case who testified that he benefits from "...the limited social interaction as I suffer from social anxiety. Even, not having to transport myself allows me to sleep more and have more energy." Other young people emphasized that virtual education is a necessary evil for those who want to study without taking risks and "stop the chain of contagion". This quote from one of the respondents shares this sentiment:

> I understand that given the situation we are facing, virtual education has allowed students to continue acquiring knowledge. In other words, the teaching process is not paralyzed. Also, virtual education allows students to do their educational work from their homes so they can save money on transportation. The most important thing is that each student continues to learn and does not fall behind academically.

In referring to the most significant challenges of virtual education in the open-ended question, many of the students resorted to the options in the question about the difficulties of virtual education (e.g., inadequate technological infrastructure, lack of technological skills, distractions, planning-discipline, limited interaction between students and the teacher). They mentioned others such as "drastic change", "self-teaching", competing for study spaces with their siblings with online classes, noise, constant blackouts, poor Internet connection and "distinguishing the educational environment from the familiar one under the same roof". After inquiring about these items, students were asked their opinion on whether virtual education promoted or hindered the inclusion of students with functional diversity in the classroom. In addition, they were asked for their reason for this. A total of 72.9% (97 students) claimed that it sometimes favors and sometimes hinders inclusion of these students. The following is a quote that exemplifies this opinion:

> I think it depends on what type of functional diversity the student has. For example, if it is a matter of a person who needs a wheelchair, the online modality favors him/her because he/she does not have to move or worry about whether there are ramps. However, there are students with functional diversity who need to be face-to-face in order to learn. It all depends on the individual.

10.5% (14 students) considered that virtual education is detrimental to inclusion versus 6.8% (nine students) that it promotes it. Detractors insisted on distractions, technical problems, boredom and the difficulty of virtual education regardless of whether or not they have a handicap. Proponents emphasized the freedom that virtual education offers, the extra time for homework and "how it helps shy people communicate more easily. Thirteen students - 9.8% - agreed that virtual education does not impact inclusion in any direction.

The last question of the questionnaire revolved around teaching modality preferences: face-to-face, virtual, hybrid or indifferent. Fifty-seven students (42.9%) favored face-to-face versus fifty-two (39.1%) hybrid education. Sixteen university students (12%) showed a predilection for virtual education and the rest (eight students for 8%) were indifferent. After so many months of confinement, students have been able to compare to the point of assuring "that they learn more in face-to-face courses", "they are more accustomed to them", "that virtual education will not be able to replace the benefits provided by face-to-face education and that "there are experiences that require one to be face-to-face to take advantage of them". Of course, others would not hesitate to stay online because "it fits my schedule perfectly" and "I find it more convenient" and because of "security concerns about COVID-19". A good number of them want to combine the best of both worlds - face-to-face and online - to enjoy the face-to-face interaction of the university experience without sacrificing flexibility, even if conditions are not yet ideal.

4. Discusión

4.1 Recomendations

Both multiple studies and learner experiences have shown that virtual education is not a panacea for educational institutions nor is it for everyone regardless of their functional diversity. Scott (2021) provides as an example Coursera's change of modality for most

corporate training degree courses and professional certificates (para. 15). Scott (2021) confirms that "the experience of companies offering MOOCs (Massive Open Online Courses) is also sobering" (para. 15). Online courses require the discipline and attention of students. Hence, according to Scott (2021), "a large number of those who enrolled did not complete them" (para. 15). Scott (2021) notes that "when the pandemic required universities to resort to remote teaching and learning, online instruction proved that it could work well when faculty are prepared and both institutions and students are equipped for it" (para. 14). Those instances were the exceptions rather than the rules. The expert insists that

> faculty needed to be trained, unless they had experience in distance learning; equipment needed to be upgraded and course design and graphics improved, unless the campus already had a strong online presence; and students needed to have the equipment, Internet and broadband access, and a quiet place to study in a non-campus location (Scott, 2021. para. 14).

Closing digital divides and adopting the principles of universal design in virtual education can more effectively promote the inclusion of students with functional diversity in these pandemic times. Herrera Nieves and Montes Soldado (2018) ratify that.

> designing virtual learning environments for all involves both minimizing barriers and recognizing different populations, intelligence types and learning styles. In this context, the principles that frame universal design in learning (UDL, called universal design in instruction in the university setting) are: providing multiple ways of representing information and content; providing multiple ways of action and expression of learning; and providing multiple ways of engagement (p. 3).

Some additional recommendations to promote the inclusion of all in virtual education are: simple course navigation, opportunity for interaction (through the chosen platform, e-mail and even telephone, among other means), psychological accessibility, linking students to class material (relevance), availability of materials in different formats (text, graphic, audio and video, among others), balanced use of assistive technologies, providing clear instructions, supplying work rubrics in advance and a - fair and varied - number of evaluations. A curious fact is that, although the SAD does not contemplate the use of technology, "it exhibits relevant features such as versatility, the capacity for transformation, the power to mark and organize, and the potential to generate learning networks" (Rose and Meyer, 2002, p. 64), so fundamental to achieve education for all.

5. Conclusion

These almost two years of covid-19 have brought with them powerful lessons for governments, businesses and the field of education, among others. It was necessary to act quickly and adapt to a new and uncertain scenario. With its obstacles and the need for adjustments for all those involved in the process, the alternative provided by technology through virtual education is emerging, in this world so transmuted by a pandemic, as the most feasible choice for every student -with or without handicap- who wishes to study, survive and feel included. This modality undoubtedly has its merit since it came to the rescue of many educational institutions in times of crisis. Apart from keeping the university community protected, university centers were able to return to their teaching and administrative functions.

From the successes and mistakes of the past months, administrators, professors and students must learn and internalize the urgency of making modifications so that - to the extent possible - virtual education is free of challenges and more effective. First,

administrators must constantly review and amend university policies and regulations regarding online courses. Second, institutions must continually provide training on the use of educational platforms and ICT for the entire university community. Third, institutions should identify, through questionnaires and interviews, the levels of access of individuals - faculty, students and employees - to infrastructure (e.g. computers and Internet access, among others) in order to provide alternatives to those most disadvantaged by distance or socioeconomic status. Fourth, teachers and students should be individually imbued with the management of educational platforms and ICTs. Many students may be very proficient when it comes to social networks (something that looks like fun for them), however, they show great gaps when dealing with an educational platform (something that is a must in this day and age). Fifth, if a teacher or a disciple stays at home to study or to work, he/she should have a conducive environment for the teaching-learning process (quiet, comfortable and uninterrupted) and enlist the cooperation of his/her family for it. Sixth, teachers must be trained in the principles of the SAD in order to embrace the functional diversity of their students in a virtual classroom and make everyone feel included.

Despite the urgency of returning to the university, the desire to socialize with the rest of the components of a campus and the preference for face-to-face education - out of habit or conviction - of many, the coronavirus has not been eradicated and continues to be our daily bread. Although the pandemic's expiration date is looming closer, it has not been specified. A long-awaited end depends on a myriad of factors such as inoculation rates to achieve herd immunity, the ease of obtaining covid-19 tests, the existence of effective outpatient treatments for sufferers, and the responsibility of citizens to curb contagion. Therefore, virtual education-asynchronous or synchronous-should not be demonized or dismissed at this time. After all, it has allowed thousands to be educated within the framework of a new normality, something simply difficult to conceive of in times past.

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Author

CARMEN ÁNGELA LÓPEZ ÁLVAREZ concludes his bachelor's degree in political science at the University of Puerto Rico, Mayagüez Campus (1986). Completed his master's degree in public administration at Syracuse University (1990). Returns to the University of Puerto Rico Mayagüez Campus for his bachelor's degree in Hispanic Studies (1990). Moved to Pennsylvania State University for his M.A. (1991) and Ph.D. in Hispanic Studies (1995). Completed a professional certificate in disability studies at Syracuse University (2007). She has taught at the University of Michigan, the Río Piedras Campus of the University of Puerto Rico and the Pontifical Catholic University of Puerto Rico. She is an arbitrator and conflict mediator. She has a certification in autism.

She has worked as a tutor, translator, editorial coordinator, thesis editor, history teacher and consultant. She teaches in the Spanish Department of the School of General Studies at the University of Puerto Rico (Río Piedras Campus) where she holds the rank of professor. She has given lectures and workshops on various topics in Puerto Rico, the United States, the Dominican Republic, Paraguay, Cuba and Perú**.**