



Virtual Campuses with Social Learning Environments: A Future Alternative for Traditional Campuses

Dario Liberona¹(✉), Aravind Kumaresan², Lionel Valenzuela³, Giovanni Tarazona⁴,
and Meija Lonhino⁵

¹ Seinajoki University of Applied Sciences, Seinäjoe Ammattikorkeakoulu, Seinajoki, Finland

Dario.liberona@seamk.fi

² University of Vaasa, Vaasa, Finland

³ Department of Business Administration, Universidad Tecnica Federico Santa Maria, Santiago,
Chile

Lionel.valenzuela@usm.cl

⁴ Universidad Distrital Francisco Jose de Caldas, Bogota, Colombia

gtarazona@udistrital.edu.co

⁵ Oulu University of Applied Sciences, Oulu, Finland

Abstract. Covid 19 has been a tremendous impact on all the modern society, the 21st century has been shaped by its implication, digital transformation of all business have been accelerated and stress, but what is the Higher Education reactions and how its processes will be transform.

It has been more than two decades since the concept of distance learning was implemented, there have been several online Universities in the world.

A few year ago, there were big arguments about the credibility and quality of remote education with systems. E learning platforms were on the rise, and MOOCs, Massive online Courses were given all over the place, then some sort of disbelief and other factors were slowing the advocacy of this emerging educational technologies.

Then Covid came, and suddenly all Higher Education in the World is remote, with e-learning platforms and has been for the last two years, half of the education of all professionals has been remote.

One of the aspects of distance learning is their more isolated learning mode and little social interaction, an experiment of three different student exchange programs were conducted making groups of students from different universities work together on a virtual campus with avatars.

The results were a very positive response to having virtual social interaction tools and activities, the level of technology has advance enough to use these virtual worlds and students satisfaction is very high, however big efforts on customization of programs and environments must be made.

Keywords: Virtual Campuses · Virtual Worlds · Avatars · virtual exchange programs · virtual learning

1 Introduction

Distance Universities are a reality, early attempts were made back in 1728 when Celeb Phillips develop a weekly mailed lesson program, by 1840 Sir Isaac Pitman, using post-cards has the remote media channel for the courses, forming the Sir Isaac Pitman College with a similar initiative in 1873 in the USA denominated the Society to Encourage Studies at Home, and in 1894 the Wolsey Hall in Oxford was the first distance college learning in the United Kingdom (Kett 1994), by 1906 more than 900,000 distance students were in the US (J.J. Clark 1906), they have just changed the technique of sending one short content episode at a time (paper-covered pamphlets) into full volumes of the courses and give them the opportunity go with the course paste of their own paste, by that time they have already recognized that the self-learning text book and manuals could not be the same has the text uses for presence students, this change on the process technology for teaching plus direct sales an interviews growth considerably the amount of distance students, especially for the International Correspondence School, more than one hundred years ago, the types of education with traditional regular technical school or college with a more broad education; versus this distance schools that on the contrary wanted to educate students along some particular specific knowledge or skill, this approach has continue in some countries like Finland, German and Netherland that have applied science Universities versus traditional universities.

At the beginning of the 19th century, it was hard to go to universities in presence mode, this was the way to do adult education and technical education in the world. University of Chicago had some sort of blended programs where you did some parts on presence mode and the others in correspondence mode.

The correspondence mode was the methodology applied for many decades until the creation of the open universities.

In 1969, the Open University (OU) was established has a British public research university that was devoted mainly to distance learning students and with time has become the largest University in England in terms of number of students; it provides many programs both undergraduate and postgraduate, based in London and initially using the television studios and editing facilities which had been vacated by the BBC, it has grown over the year and now has around 175,000 students, it uses TV broadcast has a new technology for education and digital distance education advanced.

Soon after the University of Hagen was founded in Germany in 1974, also now the biggest university in Germany by enrollment (around 80,000 students), founded with the idea to provide higher and continuing education opportunities through a distance education system in Germany, but started to develop a virtual university plan since 1996 addressing the problems of social interaction and group awareness.

In the last two decades many online open Universities have been appearing all over the world, but now, what will the next stage of distance learning, over the past years tools like gamification have been incorporated (Hericko 2021), video conferencing platforms have growth fast and quickly became very important for all universities, the quality of learning with distance universities was some how question for a while just like at their time was mail learning degrees, but now online open universities have incorporated many academic evaluation tools (Gaytan 2004, Kaplan 2021, Lassoued 2020).

During the last decades and thanks to the advances of the education technologies (broadband internet, digital platforms, moodle and others), with the Internet penetration and advances in media communications, bandwidth, online learning has become a new important trend in higher education, the need to mitigate the expansion of COVID virus has force higher education all over the world to move into distance and online learning (Tam 2019).

Many Universities have adopted blended teaching modes, with presence courses programs and online programs, but this is not necessarily distance university teaching, the main difference between online and distance learning is the intention of the teaching strategy, online learning uses technologies such has e-learning to complement the class learning experience, basically all universities in the world provide online learning since 2010, but distance education learning is a method for delivering instruction solely online, not as a variation in your teaching style, giving lectures in video calls through any current platform is not distance learning but rather replicating the regular classroom class using another technology mean, in the case of distance education the learning experience is design to be solely remote.

In Table 1 we can review the evolution of distance learning in universities through the years, there is a Covid 19 stage regarding the two years of the pandemic where the distance learning and online learning where force by protection government measures to be massively use by schools and universities, some effects were the reduce time for studying in online learning, parents expend more time with students, universities improved their technological infrastructure, mobile learning accelerated adoption by students, multiple related training for university professor in order to impart online learning courses or hybrid courses, increased adoption of supporting technologies for online learning and distance learning, program were adapted to fit new teachings formats (Gomez L., Velez R. Lopez L. 2022; Ghada R. El Said 2021; Gorey J. 2021).

At Table 1 we can estimated that by 2019 at least around 33% of Higher Education students were involved in some form of distance learning, before the pandemic, with around seventy five million students around the world and close to twenty million were already in full distance learning programs, this virtualization or online learning adoption process accelerated during the pandemic, and number rise to around two hundred million higher education students enrolled in some form of distance learning in a dramatic fast adoption of new technologies.

Table 1. Evolution of higher education formats. (Own elaboration, multiple sources, Statista, CB insights, Knoema, getapp.com, Thinkimpact, Education data, World economic forum)

Period	Type of University	Distance Learning Virtualization Stage	Examples of Universities	Characteristics	Technologies	Estimated number of Students
1100 - 1299	Old Kingdom Universities	None	University of Bologna, University of Salamanca, University of Oxford, University of Cambridge, University of Lleida, University of Paris, University of Padua, University of Montpellier	Establish mainly by Kings, mostly for rich young people, woman were not part of the learning	Libraries, Books, Many Religious professors	10 000
1300 - 1799	Old Traditional Universities	None	University of Harvard, University of Milan, University of Chile, University of Buenos Aires, University of Lyon, University of Barcelona, University of Madrid, Yale University, University of Notre Dame, Princeton University, University of Pisa, University of Prague, University of Dublin, University of Vienna, University of Glasgow, Royal Academi of Abo	Many Religious professor	Libraries, Books, Laboratories, Industrial Workshops, Guide Books	300 000
1800 - 1949	Traditional Modern Universities	Basic distance learning	Oslo University, University of Berlin, University of Maryland, Ghent University, Saint Louis University, Saint Petersburg University, University of Buenos Aires, University of Toronto, Zurich University, Athens University, Boston University, University of Notre Dame, Manchester University, Penn State University, MIT, Amsterdam University, Stockholm University, Stanford University, Wales University, Federico Santa Maria Technical University, ETH Zurich, Munich Technical University,	Woman join Higher Education, in some Universities since 1830 and in many universities by 1890	Libraries, Books, Laboratories, Industrial Workshops, Guide Books	5 000 000
1950 - 1999	New Universities	New Universities Very little distance learning, some pilot programs with distance learning characteristics, many experiments and trials.	University of Salzburg, Aalborg University, University of Oulu, University of Tampere, University of Vaasa, University of Angers, University of Nantes, Tech. University of Berlin, University of Bremen, University of Essen, University of Flensburg, University of Seinajoki, University of Piraeus, Cork Institute of Technology, University of Brescia, University of Verona, Polytechnic University of Bari, Maastrich University, Eindhoven University of Technology, University of Zilina, University of Navarre, University of Alicante, University of Leon, Umea University, University of Sussex, Lancaster University	Many Religious professors, new carriers, new skills, mostly traditional teaching practices.	Libraries, Books, Many Laboratories, Industrial Workshops, Guide Books	10 000 000
1840 - 1960	By mail educational Institutions	Mailing distance Universities	Sir Isaac Pitman College. The International Correspondence School, University of Queensland, University of South Africa.	More vocational type of schools. Very specific or narrow courses programs	Mailing assignments, postcards, other by mail school material such as program books or some pamphlet type prints	100 000
1969 - 1989	Distance and open Universities	Distance Learning basic platforms and Beginning of Virtualization	University of Hagen (83.000 Students), England Open University (175.000 Students)	Are the largest Universities in Germany and England by number of students. Have evolve into online programs	Mailing assignments, Books and Material by mail. Also TV studios and broadcasted their programs.	300 000
2005-2019	New online e-learning/distance Universities	Midium level of Virtualization	Open University of Caluna (OPC), Open UK University (150,000), University of Phnits Arizona (15,000), WV Tech Community College, American Public University, Liberty University, . National Bangladesh Open University (650,000), Pakistan Open University (1,400,000), Indonesia University Terbuka (646,000), Nigeria National Open University (515,000), India Ambedkar Open University (450,000), University of Hagen (76,000), Pakistan Virtual University (100,000), University of People (117,000), National Centre for distance Education (120,000), India Madhya open University (150,000), South Korea National Open University (210,000), UNIR International University of Ia Riota, the university in Internet (45,000).	Follows open-door academic policy, with minimal to no entry requirements. Offers Flexible programs, a 3 year program could be finish in 6 years. Use of technology is a must. Internet allow this Universities to operate internationally has never before.	Internet main Access, Personal Computers use at home, Basic e-learning Platforms, Moodle or equivalent platforms, digital avoaks, youtube videos, basic simulation games, Use of Cases	20 000 000
2010-2019	Blended Teaching Universities	Blended Universities embracing distance Learning , Higher level of Virtualization /	Miami Dade College (99,000), Indira Gandhi National Open University (7,140,000), National , Turkey Anadolu University (1,974,000), United States Laureate University (875,000), South Africa University (420,000), Iran Payame University (400,000), Spain National University of Distance Education (260,000), United Kingdom Open University (173,000), Sapienza University (147,000), Norte do Parana University (130,000), UniMinuto System (117,000), Liberty University (110,000), University du Quebec (101,000)	This blended way of teaching does not have specific characteristics, there are universities of all types, but mostly universities founded after 1950, but a few cases like University of Sapienza founded in 1300.	Internet, e-learning platforms, content management systems, mobile learning, youtube and other videos streaming, simulation platforms, digital Labs, MOOC technologies	75 000 000
2020 - 2022	Universities during pandemic. Covid forces masive Full Online programs	Virtualization becomes an emergency norm	75% to 85% of all Higher Education institutions in the World were in Oline Mode. Most of the Universities in the world become online/distance universities.	All universities in the world affected by Covid 19 switch learning mode to distance learning and then incorporate technology to do support their programs, speally online meetings and break out room.	High speed internet access, e-learning platforms (advanced such as Moodle, Black board), virtual meetings technologies (Zoom, Google Teams, Microsoft), Virtual Campuses, Avatars, Virtual Reality, Simulation Games, Youtube content, Digital Books, break out rooms, virtual campuses, digital avatars, mobile learning and applications	200 000 000
Since 2040 or 2050	Universities of the Future	Many new technologies/ Full Virtualization	in previous version of higher education content like (Coursera, LinkedIn Learning, Udacity, Google University (youtube), Cloud Academy, Edx, CBT Nugget, Skillsoft, and initiatives from Stanford, MIT and other universities.	Not clear characteristics in the making process	Many new technologies, Virtual Reality, Augmented Reality, Virtual Campuses, Immersive technologies	500 000 000

2 Evolution of Distance Technologies

Clearly the distance learning technology in 1800s and beginning of 1900s was the mail and postcards. There were some experiments with TV and radio broadcast on the 1960s and 1980s, E-learning in the 1990s.

Even though sending emails was possible in the 1980s, they were not very use for distance learning, and the internet got a quick development during the 1990s, during this period the internet became part of everyday life in higher education institutions, however the dial up confections were very limited.

The 2000s years were e-learning and most of the current distance online educational learning technologies were develop, By 1999, one of the first fully online universities—Jones International University—was able to get full accreditation from the Higher Learning Commission (HLC). The technologies use here were video conferencing, phone calls, and other online education e-learning tools available at the time.

The e-learning term was first mentioned in professional context by Elliott Masie during the TechLearn conference at Disneyworld in 1999, soon after e-learning platforms became available during 2000s, with many new concepts, Content Management Systems, Intranet platforms, use of online videos, video streaming, Moodle 1.0 was released on in 2002, Moodle 1.9 was released in 2008 with 20 million users already.

In 2008 a new technology concept was developed the MOOC learning; Massive Open Courses were implemented all over the world by many Universities.

2010s was the year of the Social Media technologies applied to education, many new technologies were applied to online learning such as serious games, mobile learning, wearable education technology, artificial intelligence, analytics technologies, next generation LMS, blockchain in education, robotics and Virtual reality.

By 2012 “The year of the MOOC” (Pappano 2012) companies like Coursera a main online learning platforms was founded by Andrew NG and Daphne Koller from Stanford University, at this stage MIT has a long history of e-learning projects and two other successful online learning platforms were founded, Udacity and edX, two years earlier UdeMy was founded.

2020s has been the years of COVID pandemic and has forced and accelerated the adoption of online distance learning technologies and has ignited the transformation of distance learning.

Most of the learning technologies matured during this time and a new concept was develop the Virtual World/Virtual Campus concept.

This technology allows companies and Universities to develop virtual environments that will resemble entire campuses with avatars and physical world characteristics.

Before 2020, the growth of distance learning was gradual and on pace with technological advancements, there were still concerns about the quality of the learning, but with the pandemic situation all educational systems across the world had to make rapid implementations of online learning for their students, this has been implemented for the last two and a half years and now Universities have to decide on how they will go on next semester.

In this period video conferences technologies like Zoom, Google Meet and Microsoft Teams were widely incorporated and perfected across the World.

3 Virtual Campuses

During 2010s many companies were already developing virtual world technologies, Virbela was one of this platforms among others like.

A virtual Campus, or Virtual space or World, is a computer-simulated environment which may be populated by many users who can create a personal avatar and move around the virtual area, often with many places and virtual buildings, all this people or participants avatars can move and communicate with each other freely in this virtual campuses. This avatars can have different clothing, movements and communications abilities, direct speech, text, signs and other options.

The avatars can manipulate elements of the modeled world and thus experience a degree of presence. In the professional Virtual Campuses like Virbela, most of the rules of the real world apply, you can seat, walk and talk to people that is close to you, turn around and see them move stand or leave (Virbela.com 2022).

The European commission defines Virtual campus in an extended way has a Cooperation between higher education institutions in the field of e-learning, considering aspects such as: design of joint curricula development by several universities, agreements for the evaluation (Erasmus 2022), validation and recognition of acquired competences, subject to national procedures; large-scale experiments of virtual mobility in addition to physical mobility and development of innovative dual mode curricula, based on both traditional and on-line learning methods.

This is a very broad definition and today with virtuality at the next stage post covid, the possibility of having join campuses with students from many universities in the same courses and interacting with each other is also a real possibility, now universities can merge or work closely together without having to merge their physical campuses or resources, this EU broad definition helps to develop collaborative projects and activities considering e-learning platforms, which is different than a virtual campus.

In the middle of the pandemic, most of the exchange students programs in the world were severely reduce due to the complicated aspects of travelling and getting special documents during this period. In this scenario a serious of virtual exchange program were conducted by the University.

The needs of a virtual exchange program required more than attending the same e-learning class, it required special spaces for the students to share with each other, to meet at will, to sit to talk or to join social events just has well has classes, a digital platform virtual campus world was set up for this purpose on a collaboration among universities during three consecutive terms. The first period with four universities from Europe, the second one with seven universities and the third one with twelve universities from three continents.



Fig. 1. Examples of different virtual world rooms and avatars.

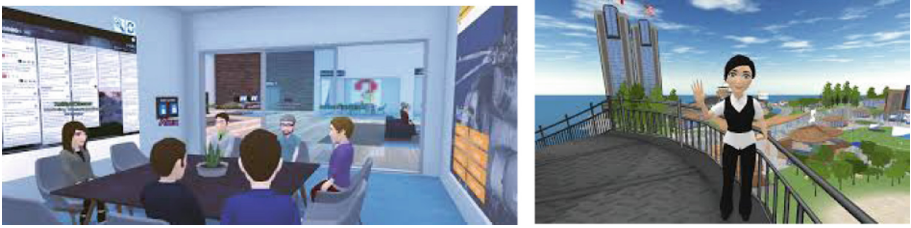


Fig. 2. Examples of avatars and the interaction

Virbela campus environment use in the programs, defines itself has the first virtual world platform built specifically to solve the challenges of remote collaboration. Meet, host events, hold classes, and service your entire remote workforce all in an immersive and engaging 3D world (Virbela 2022). In Figs. 1, 2, 3, 4, 5 and 6 we can see examples of different views of the remote learning virtual campus platform.

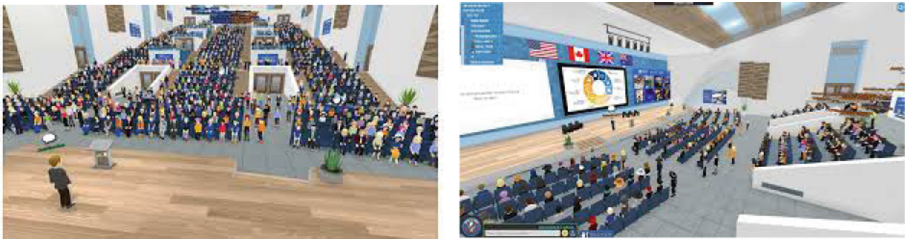


Fig. 3. Examples of big auditorium events with hundreds of participants.



Fig. 4. Example of teacher giving presentation to Student's avatars

4 Methodology

During the pandemic three pilot programs with virtual exchange courses were conducted with students from multiple universities.

The programs were conducted during one year from October 2020 to October 2021.

The three programs consisted mainly in the use of a Virtual Campus with auditoriums for the students, and multiple meetings rooms assigned to groups of four students usually from at least three or four different universities. The students working in groups with task related to a circular economy simulation game with multiple levels of complexity and on a competing environment.

Every new pilot program incorporated more learning modules and learning aspects from the previous experiences, but the class contents were very similar.

Since the second pilot sharing activities were develop on the virtual world with contest and gathering activities.

Table 2. Characteristics of the Virtual exchange programs.

Program	Universities	Number of Students	Level	Continents	Virtual Campus	Other Technologies	Observations	Duration of program (weeks)
First Exchange	4	35	Undergraduate	Europe	Virbela	Circular Economy Simulation tool	Circular Economy basic program	4
Second Exchange	11	75	Undergraduate	Europe, America	Virbela	Circular Economy Simulation tool	Circular economy program with grades	8
Global Master Exchange	3	35	Graduate (MBA)	Europe, America	Virbela	Circular Economy Simulation tool	Time difference, Circular economy and Entrepreneurship program	2
Total	14	145						14

After the program questionnaires and personal interviews were conducted in order to obtain freedback from the 147 students. The questionnaires consisted in 17 questions using survey monkey tool and 14 personal interviews.

The experience of the students is somehow similar to other virtual worlds created in the pass, Club Pinguin was very popular until 2018 and Second life is still use by millions of users, but this more academic or event virtual world campuses are more controlled, more stable and with functionalities that are develop for academic or conference events.

5 Students Experience in Virtual Campuses Findings and Discussion

In Table 2 we can see that the use of the Virtual Campus was done on three separate events considering a total of 145 students, from which 72% answered the surveys.

The use of a Virtual Campus was appreciated by students in general, we were able to learn from the experiences and have implemented the following upgrades in the program:

- Virtual social events were implemented during the program (Welcome event, social activity, closing event).
- There was a session of training on the platform with coaches

- An activity was develop where attendants were encouraged to find information on the other exchange students.
- Virtual prices for social activities were incorporated.
- Tour around the campus was implemented (Other activities like going to a Virtual Island, Virtual beach, roof of buildings, and walking around other areas).
- Personalization of rooms with real pictures of group members
- Digital banners in public spaces
- An information Kiosk during some activities
- Permanent videos related displays in some sections
- Activities that will interchange members of the groups
- Logos, signs and clear writing indications

The third experience with the Virtual Campus was for the Master Global MBA program which is an exchange program with MBA students from the United States, Germany and Finland who shared for over a week a thematic program regarding Entrepreneurship and Circular Economy, every year they all meet in a different country, since COVID was a main issue in 2021 the program was done virtually utilizing a campus simulation Platform call Virbela, with a digital simulation program related to Circular Economy and other entrepreneurial innovation matters, the students were able to participate in activities in the Virtual platform and complete a program of six simulations rounds.

This was the most successful implementation using all the feedback suggestions from feedback from previous sessions.

The results of the Virtual Campus platform were very positive, most of the students liked the program with a final 88% positive response to the use of the platform, declaring that it was a good learning experience.

71,43% declared that the virtual campus helped in many levels to the learning process.

Regarding the credits, many students declared that 3 credits are not enough for the amount of work necessary for the programs, but having credits was very important (Table 3).

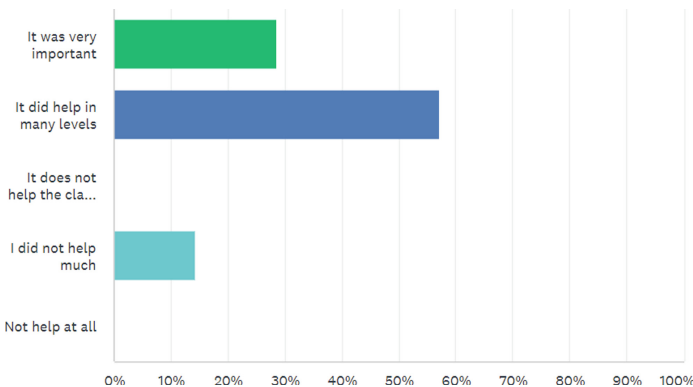


Fig. 5. How much did the Virtual Campus helped the realization of the course (85.71% positive)

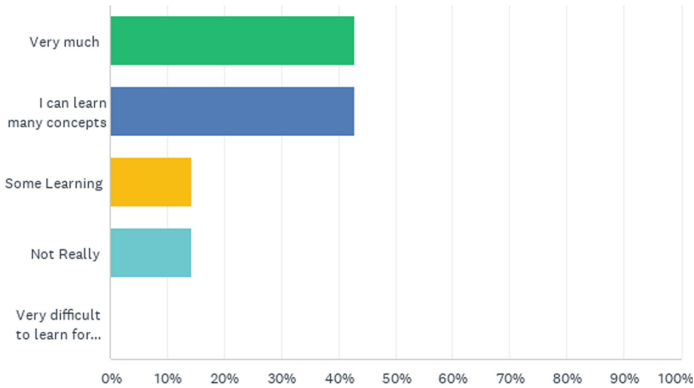


Fig. 6. What was the level of learning provided by the overall experience.

Table 3. Evaluation of the Virtual Campus in every program.

Virtual Exchange Program	How would you grade the Virtual Campus (0 to 100)	The Virtual Campus was Very Important	The Virtual Campus was important	The Campus did not help but was fun	It did not help much	The Virtual campus was Not Help at all	Overall Evaluation of the program (0 to 100)
First Exchange	68	28,57 %	57,14 %	0,00 %	14,29 %	0,00 %	83
Second Exchange	74	9,52 %	71,43 %	14,29 %	0,00 %	4,76 %	85
Global Master Exchange	81	17,1 %	71,4 %	8,6 %	2,9 %	0,00 %	88

The experience was very positive, this platform was use even before the pandemic by Stanford University graduate business school (Burke 2019), after during the lockdown times their students develop another similar initiative call “Club Cardinal” a gamified virtual campus (Matchar 2020), this are examples of the positive reaction of students to virtual campuses.

Our goal for the use of a virtual campus was not only that the participants will get the academic content that could have been delivered by online meetings platforms such as Zoom and Teams, but also to get to know other students from other countries in a more interactive and personal way, to have a better interaction with their peers and connect with other people and have the perception that they went somewhere and meet people there, this objective were clearly achieved with the use of this platform.

6 Conclusions

During the Covid Pandemic, online education had an incredible boost, in a matter of week Universities implemented distance and online programs like never before, 70% to 80% of all students in the world were on distance mode, for some, initially intended to do it for a few months has a palliative measure then it become a norm all over the world since the two-year duration of the pandemic.

During this transition time, Universities embraced online learning, the year 2020 they use basic online tools, by 2021 and 2022 universities tryed and use many new

technological tools, they increased their digital infrastructure and quickly implemented online and distance learning.

One of these solutions was the use of Virtual Campuses that are able to replicate some of the human aspects of being on a campus, the experience is really positive, but it demands to re-format the courses and create additional activities that will benefit from the use of the technology and give opportunity to students to interact and create deeper relationships while walking or talking in virtual places.

Distance universities could benefit of using virtual campus platform by making their academic experience more like a presence mode campus learning. Traditional online and distance teaching methods tended to be isolated, virtual campus could offer a more social experience and some benefits of direct interaction and communication.

Many universities will continue with the blended teaching mode, there is no way back for some institutions, many students have declared that they don't want to go to formal traditional education, many students realized that they do not have to leave their countries in order to have a good education, and many teachers have embraced the comfort of teaching from home and saving many travelling hours a week.

Virtual Campuses are technologies that will support the online education format, their technology is improving very rapidly, the platforms are on the making, immersive learning will continue improving and now the question is how institution will incorporate this technology and at what scale, e-learning took a few decades to become mainstream in higher education, virtual campuses are on their early stage.

Future research could be related to the analysis of technological tools that could enhance the virtual campus experience and the relationship with the concept of metaverse.

The challenge seems clear, democratized higher education, doubling the number of higher education students in the world will require facilities for 200 million additional students, in this scenario, virtual campuses seems like a good support for distance education that will give access to any content/program, anytime, anywhere, anyhow and with an intense use of new technologies that will facilitate the virtual experience, the learning and probably will lower the cost of higher education.

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