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The use of ICT as a tool for strengthening and developing Virtual Education

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Abstract

A documentary review was carried out on the production and publication of research papers on the study of the ICT variable and its use as a tool for strengthening virtual education in Latin America. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2016-2021 in Latin American countries, achieving the identification of 162 publications. The information provided by the said platform was organized through tables and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge, and Type of Publication. Once these characteristics were described, the position of different authors regarding the proposed topic was referenced by employing a qualitative analysis. Among the main findings of this research, it is found that Colombia, with 46 publications, is the Latin American country with the highest production. The area of knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of ICT and its use as a tool for strengthening virtual education was social sciences with 142 published documents, and the type of publication that was most used during the period mentioned above was the journal article, which represents 55% of the total scientific production.

Keywords: TIC, Virtual Education.

1. INTRODUCTION

Among the different methodologies that exist to carry out the teaching-learning process is the virtual modality, which relies on the use of technological tools to fulfill the different purposes of academic training. Students today have the possibility of choosing the modality through which they will be trained in the different levels of training, and this decision will depend on multiple factors, such as preferences and tastes, socioeconomic factors, accessibility, and educational coverage, among others.

Online or virtual education comes as a response to the increase in educational demand, to give greater scope to institutions and provide greater opportunity for students to enter a training program, whether in basic, secondary, professional, or postgraduate education, relying on the use of Information and Communication Technologies (ICT) and the necessary skills that teachers must have to use as efficiently as possible, all the resources provided by

technological advances (Bustos & Gómez, 2018).

The above is one of the main objectives of the Academic Management, which aims to maintain the motivation within the virtual training of both students and teachers, the latter acquire these skills through continuous training and constant training in support of the process of virtualization of academic content (Artavia & Castro, 2019) which translates into great support to teachers to implement within their strategies, the use of ICT as a complement in case of managing the face-to-face mode, as support in blended learning, and as the main resource within online education.

Currently, multiple social sectors have been in difficult situations, thanks to the appearance in the world of the virus called Covid-19, which according to the World Health Organization (WHO) represents a threat to the health of humanity, so it was decreed pandemic because of the rapid transmission and impact generated by this virus in countries worldwide since its origin in China, This generated great uncertainty in all economic sectors, mainly trade, tourism and of course education (Inter-American Development Bank, 2020), which was forced to migrate its training strategies, solely and exclusively to the virtual modality or remote access (Miguel Medina et al, 2021a).

Educational institutions have relied on strategies such as the one proposed by Dave Cormier and Bryan Alexander in Canada in 2008 called MOOCs (Massive Open Online Course) (Lopez-Meneses & Vazques, 2020), whose foundation was to meet the demand for education by students who for various reasons could not attend classrooms in person, relying on programs designed to meet academic commitments without the need to attend the institution in person.

Because of this, the response of the student body was positive, so since then, a whole effort has been made by the scientific community to measure the effects of virtuality in the classroom, as well as the study opportunities for improvement and feedback in the online training processes, and the study of all the variables involved in the measurement of quality in virtual education. Therefore, the development of the present research has been proposed, to answer the question: How has been the production and publication of research papers, concerning the study of ICT as a tool for strengthening and developing virtual education in Latin America during the period 2016-2021??

2. General objective

To analyze from a bibliometric and bibliographic perspective, the production of high impact research papers on the ICT variable and its use as a tool for strengthening virtual education in Latin America during the period 2017-2021.

3. Methodology

A quantitative analysis of the information provided by Scopus under a bibliometric approach on the scientific production related to the study of ICT and its use as a tool for strengthening virtual education in Latin America is carried out. Also, from a qualitative perspective, examples of some research papers published in the area of study mentioned above are analyzed from a bibliographic approach to describe the position of different authors on the proposed topic.

The search is performed using the tool provided by Scopus and the parameters listed in Table 1 are established.

3.1 Methodological design

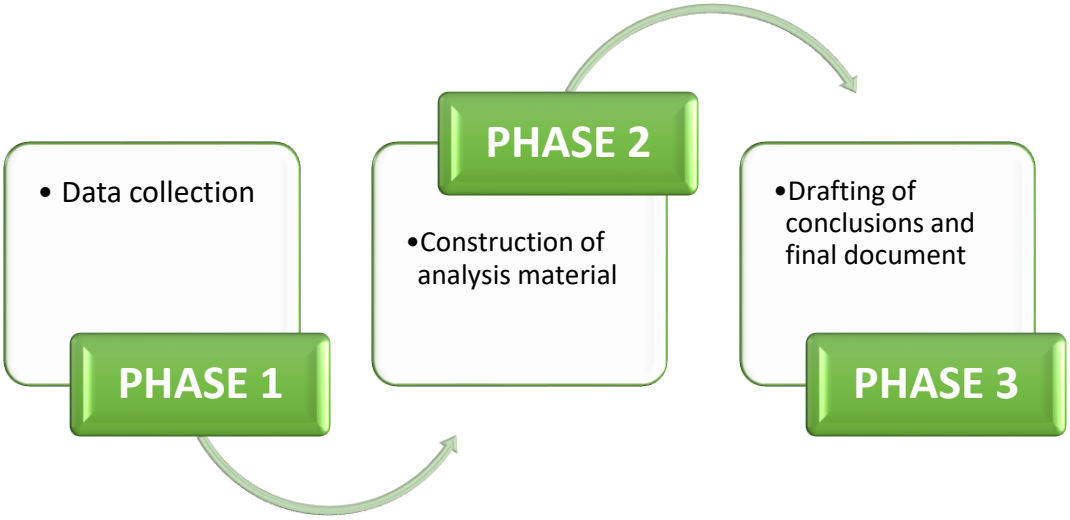

Figure 1. *Methodological design*

Source: Own elaboration

Phase 1: Data collection

The data collection was carried out using the Scopus web page search tool, through which a total of 162 publications were identified. For this purpose, search filters were established, consisting of:

- Published documents whose study variables are related to ICT and their use as a tool for strengthening virtual education.
- Imitated Latin American countries
- Without distinction of the area of knowledge.
- Without distinction of the type of publication.

Phase 2: Construction of analysis material

The information identified in the previous phase is organized. The classification will be done through graphs, figures, and tables based on data provided by Scopus.

- Co-occurrence of words.
- Year of publication
- Country of origin of the publication.
- Area of knowledge.
- Type of publication.

Phase 3: Drafting of conclusions and final document.

After the analysis carried out in the previous phase, the conclusions are drawn up and the final document is prepared.

4. Results

4.1 Co-occurrence of words

Figure 1 shows the co-occurrence of keywords within the publications identified in the Scopus database.

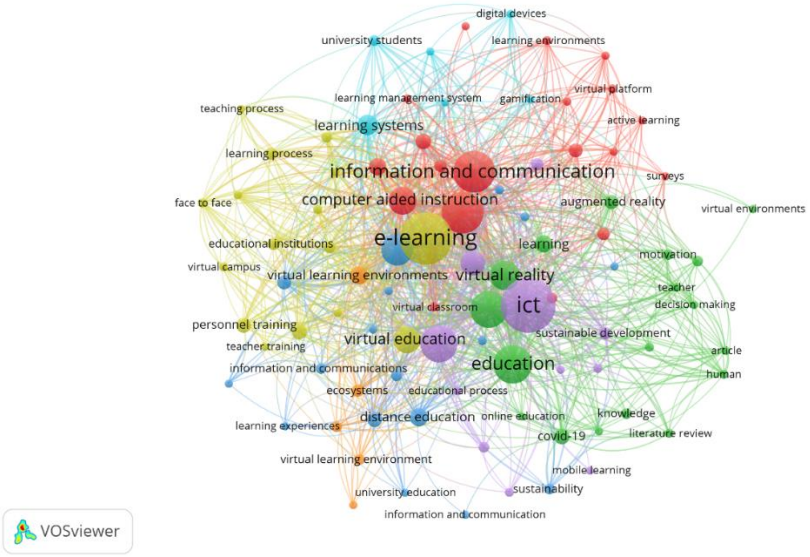

Figure 1. *Co-occurrence of words*

Source: Own elaboration (2022); based on data provided by Scopus.

The keywords most frequently used in the research identified through the execution of Phase 1 of the Methodological Design are recorded in Figure 1 through subsets headed by study variables such as E-learning, Information, and Communication, ICT, Learning, Teaching, Learning Systems, among others, which confirm the relevance of the studies identified, with the objective of this article.

It should be noted that the studies related to the keywords mentioned above are also closely related to research developed around Virtual Reality, Virtual Education, Educational Management, Motivation, Teacher Training, Continuing Education, and even Covid-19, which as mentioned above, represented a determining factor in the change of methodology to carry out the teaching-learning process worldwide, turning to virtuality the academic training at all levels, from preschool to postgraduate. It is also important to emphasize that the authors put efforts in the investigation of the motivation of the individual when facing such an important change and nothing expected by the educational community, since the development of skills or digital competences turned out to be more important than teachers ever thought, so the institutions tried to keep teachers trained and updated in the use of technological tools for the generation of new knowledge.

4.2 Distribution of scientific production by year of publication.

Figure 2 shows how the scientific production is distributed according to the year of publication, taking into account the period from 2017 to 2021.

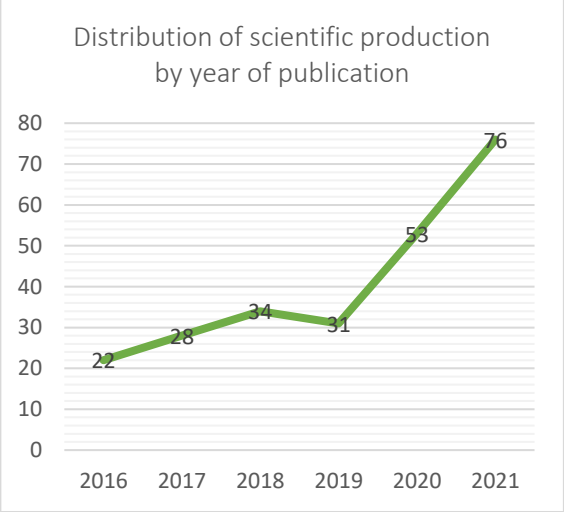

Figure 2. *Distribution of scientific production by year of publication.*

Source: Own elaboration (2022); based on data provided by Scopus.

As shown in Figure 2, the volume of scientific production related to the study of ICT as a tool for strengthening virtual education has been growing steadily but very slowly in the first three years of analysis, in 2016, 2017, and 2018 the total number of research papers registered in Scopus was 22, 28 and 34 in total, experiencing a slight drop in 2019 with 31 publications. However, after registering this number of publications, the scientific production increased in 2020 to 53 and in 2021 to 76, the latter year being the period in which the largest number of publications from Latin American institutions in high-impact journals indexed in Scopus were carried out.

One of the main reasons why this research identifies such growth is precisely due to the appearance of the Covid-19 virus and the declaration of a pandemic, to which governments around the world responded by decreeing mandatory restrictive quarantine, avoiding the formation of agglomerations that would increase contagions and deaths due to the aforementioned disease. Therefore, the scientific community associated much of its research efforts to understand the consequences of migrating an entire educational system, only to the virtual model, encouraging the creation and design of specialized programs to ensure quality education for an undetermined time because of the uncertainty generated by the disease, which at that time was not yet remotely close to a vaccine or definitive cure.

An example of the above is the article entitled “Applications used and recommendations provided by university teachers for self-regulation of learning in the context of the covid-19 pandemic” (Infante-Villagrán et al., 2021), whose objective was to investigate which digital applications are used and recommended by Chilean higher education teachers to promote self-regulated learning in the context of virtual education. The study was conducted through the application of a data collection tool in three focus groups with a purposive sample of 17 teachers, through which it was possible to identify 27 relevant digital applications to facilitate self-regulated learning, 16 useful for the preparation phase, 19 for the execution phase, 11 for the self-reflection phase and 8 for the three phases of Zimmerman's cyclical model. For self-regulation of learning, WhatsApp and Google Calendar were found to be the two most useful applications.

4.3 Distribution of scientific production by country of origin.

Figure 3 shows the distribution of scientific production according to the nationality of the authors.

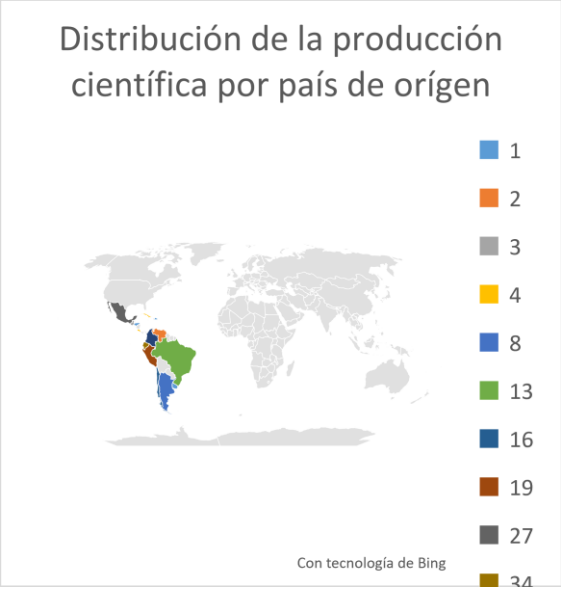

Figure 3. *Distribution of scientific production by country of origin.*
Source: Own elaboration (2022); based on data provided by Scopus.

Figure 3 shows how scientific production is distributed among the countries that make up the Latin American community, placing Colombia as the country with the highest number of Scopus records of research papers related to the study of ICT as a tool for strengthening Virtual Education with a total of 46 publications, among which stands out the conference article entitled “Plataforma Virtual de la Institución Universitaria Digital de Antioquia-Colombia” (Manrique-Losada & Arango-Vasquez, 2020) whose purpose is to present a Virtual Platform for IUDigital, focusing on the processes of creation and production of open digital educational resources (ODER), being the first virtual higher education institution in Colombia, in response to the boom of online programs and the acceptance by the student community, as well

as the guarantee of quality education that allows it to enjoy such recognition. As a result of the research, the products and artifacts involved in the teaching-learning process based on the use of ICT were presented.

At this point, it should be noted that the production of scientific publications, when classified by country of origin, presents a special characteristic and that is the collaboration between authors with different affiliations to both public and private institutions, and these institutions can be from the same country or from different nationalities, so that the production of an article co-authored by different authors from different countries of origin allows each of the countries to add up as a unit in the overall publications. This is best explained in Figure 4, which shows the flow of collaborative work from different countries.

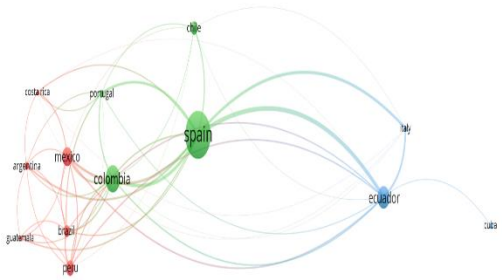

Figure 4. *Co-citations between countries.*

Source: Own elaboration (2022); based on data provided by Scopus.

As shown in Figure 4, Spanish institutions were the main allies of Latin American institutions when carrying out research projects related to the topic under study, and authors affiliated with institutions in Colombia, Chile, Ecuador, and Cuba have participated in them. While a close relationship is observed in the research reported by Mexico, Brazil, Argentina, Guatemala, Costa Rica, and Peru.

An example of the above is the conference article entitled "Digital competence, role stress, and commitment: towards positive mental health in Latin American teachers" (Deroncele-Acosta et al., 2021), with the participation of authors affiliated with institutions in Colombia, Peru, Ecuador and Mexico, whose objective was to evaluate role stress (ambiguity, conflict, and overload), engagement (vigor, dedication, and absorption) and digital competencies of 300 teachers from six Latin American countries: Peru, Colombia, Chile, Brazil, Mexico, and Ecuador.

The above, under the analysis required by the educational management, on the performance of teachers, as well as their physical and mental integrity within the adaptation to virtuality and digitization of the contents forced by the measures imposed to face the difficult health situation that the whole world has gone through in recent years. In this way, it is possible to determine that a good level of digital competencies, the commitment to the teaching role, and the absorption of knowledge and skills for the management of ICT, considerably reduces the stress in the development of their functions and increases the adherence to it.

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.

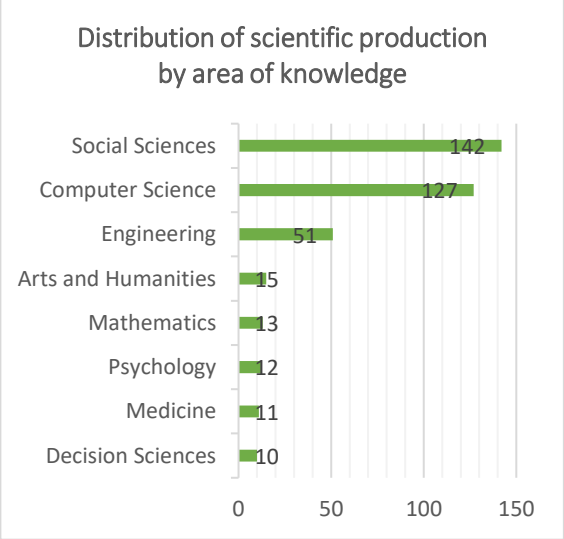

Figure 5. *Distribution of scientific production by area of knowledge.*

Source: Own elaboration (2022); based on data provided by Scopus.

Due to the nature of the variables studied in the proposal made in this article, the area of knowledge that has the greatest influence on the study of ICT as a fundamental tool in the development of Virtual Education is Social Sciences, due to the measurement of the impact generated in the different interest groups, the methodological proposal of some Latin American educational institutions to virtualize academic contents to carry out the training of students in compliance with the academic calendars (Miguel Medina et al, 2021b).

Secondly, and in accordance with the proposed thematic, the area of Computer Science, supports to a great extent the study of these variables since it involves the analysis, design, evaluation and even feedback of the devices involved in the development of academic activities through virtual media.

However, it is important to highlight the interdisciplinarity that exists within each research work registered in Scopus, and how its impact can be measured in different aspects, such as the article entitled "Pedagogical model to develop virtual learning objects for people with hearing impairment" (Martinez-Zambrano et al., 2021) which involves theories associated with social impact and the design of programs and technological tools based on Computer Science, and whose objective was to propose an approach to the conceptual design of a model of technological, pedagogical and cognitive articulation that can be implemented in the construction of a Virtual Learning Object (VLO) in attention to the special needs of the population referred to in the title of the article.

4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the type of publication chosen by the authors.

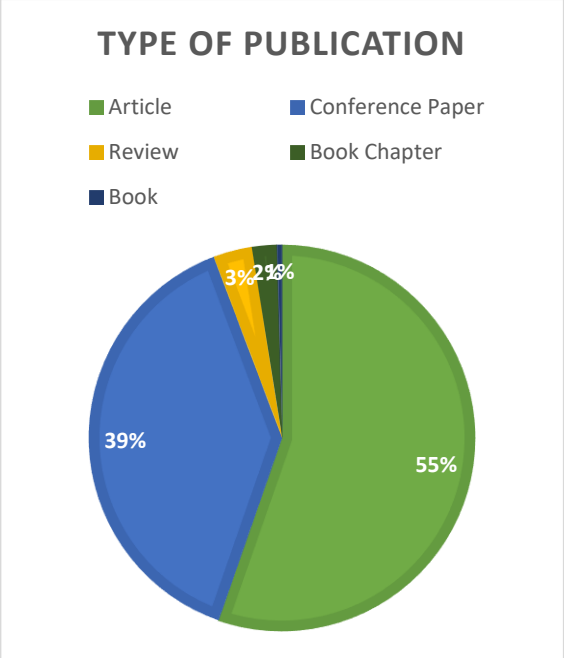

Figure 6. *Type of publication*

Source: Own elaboration (2022); based on data provided by Scopus.

Within the analysis of the characteristics of scientific publications related to the study of ICT as a fundamental tool in the development of strategies for virtual education, it is important to mention the type of publication used by the different authors to make known their findings on the aforementioned topic. For this reason, Figure 6 clearly explains this distribution, and it is possible to highlight that 55% of the documents identified in Scopus through the execution of Phase 1 of the Methodological Design proposed for this article, correspond precisely to Journal Articles, 39% to Conference Articles, 3% to Reviews, 2% to Book Chapters, among which is the one entitled "Web applications for intercultural competences and sustainable development: A case study in higher education" (Ricardo-Barreto et al., 2021) whose objective was to design, develop and evaluate the application to promote the development of intercultural competencies and ICT skills in higher education teachers for the creation of virtual learning environments. This last aspect is one of the most important and relevant for the authors in recent years since educational management needs to keep the teaching staff updated and trained in the use of technological

tools for the design of virtual training strategies.

5. Conclusions

Thanks to the bibliometric analysis carried out in the development of this article, it is possible to determine that, within the classification of scientific production by country of origin, Colombia is the Latin American country with the highest number of records in Scopus during the period 2016-2020 with a total of 46 publications related to the study of ICT as a tool in the development of Virtual Education.

It is important to highlight, the increase in scientific publications from 2019 when a total of 31 documents were registered, to 2020 with a total of 53 studies and 76 in 2021. It is possible to establish that this increase in the level of scientific production is due to the appearance in the world of the pandemic decreed by the WHO because of the accelerated number of infections and deaths in different countries, due to the COVID-19 virus, which forced governments to decree restrictive quarantine and prohibition of agglomerations mainly in sporting, cultural, commercial and of course educational events. Some of them implemented the strategy of remote assistance, that is to say, classes in real time, from digital platforms where there was a synchronous interaction between students and teachers.

Similarly, the asynchronous virtual resource was implemented, through the assignment of tasks and activities related to the subjects taught in the classroom, but in the absence of real-time support. This has marked an important moment in recent history and has even determined the affinity of teachers and students with the use of ICT to complement or even carry out an entire training course at different levels, whether preschool, primary, secondary, undergraduate and graduate, as well as the development of digital skills among teachers through shared training by the educational management.

It is important to highlight that aspects such as quality, accessibility, coverage, satisfaction, and other determinants to institutionalize virtual strategies within an educational institution, are measured from the perception of all stakeholders, namely families, students, teachers, administrative staff, and government actors, among others. For this purpose, tools have also been designed to measure the perception of these stakeholders, which generate a series of data that are processed by the competent bodies inside and outside the educational centers, and from which a whole series of strategies are designed based on feedback, in favor of the search for quality in virtual education.

Therefore, it is evident that ICT is not only used in the teaching and learning process but also the measurement of the quality of virtual education. Learning, but also in the measurement of the quality of the educational processes by technological means, which allows the academic management to evaluate at all times, the requirements of both students and teachers.

This article concludes by reaffirming the importance of knowing the current state of the published bibliography related to the study of ICT in terms of virtual education, and how the use of technological advances allows a quality, inclusive, and easily accessible education to comply with one of the fundamental rights defended in each political constitution of each state, not only in Latin America but also in the whole world. It is expected that the results obtained in the development of this research, constitute raw material in the development of new knowledge related to the proposed topic, expecting more and more, new and better strategies for virtual education.

References

[1] Artavia, K., & Castro, A. (2019). Implementación de herramientas tecnológicas en la educación superior universitaria a distancia. Educacion Superior. 13-30.

[2] Banco Interamericano de Desarrollo. (2020). La Educacion Superior en los Tiempos del Covid-19. Washington, D.C.

Obtenido de https://publications.iadb.org/publications/spanish/document/La-educacion-superior-en-tiempos-de-COVID-19-Aportes-de-la-Segunda-Reunion-del-Di%C3%A1logo-Virtual-con-Rectores-de-Universidades-Lideres-de-America-Latina.pdf

[3] Bustos, L. H., & Gómez, Z. M. (2018). La competencia digital en docentes de preparatoria como medio para la innovación educativa. . CPU-e. Revista de Investigación Educativa, 66-86.

[4] Deroncele-Acosta, A., Medina-Zuta, P., Goni-Cruz, F. F., Ramirez-Garzon, M. I., Fernandez-Aquino, O., Roman-Cao, E., . . . Santiago, E. G. (2021). Digital Competence, Role Stress and Engagement: Towards positive mental health in Latin American teachers. Proceedings - 2021 16th Latin American Conference on Learning Technologies, LACLO 2021Pages 83 - 902021 6th Latin American Conference on Learning Technologies, LACLO 2021Arequipa19 October 2021 through 21 October 2021Code 177612.

[5] Infante-Villagrán, V. A., Pellerano, B. M., Cobo-Rendon, R., López-Angulo, Y., Escobar-Alaniz, B., & Beyle, C. (2021). Applications used and recommendations provided by university professors for self-regulation of learning in the context of covid-19 pandemic. Texto Livre.

[6] Lopez-Meneses, E. G.-G., & Vazques, E. (2020). Fortalezas y Debilidades de los Cursos Masivos Abiertos en Linea (MOOC) frente a otros modelos de enseñanza en contextos socio-educativos. Formacion Universitaria, 77-84.

[7] Manrique-Losada, B., & Arango-Vasquez, S. I. (2020). Virtual Platform for the Institución Universitaria Digital de Antioquia-Colombia. Iberian Conference on Information Systems and Technologies, CISTIVolume 2020-JuneJune 2020 Article number 914106615th Iberian Conference on Information Systems and Technologies, CISTI 2020Seville24 June 2020 through 27 June 2020Code 161865.

[8] Miguel Ángel Medina Romero , Senior-Naveda Alexa, Edgar Salas Luzuriaga, Justina Isabel Prado-Juscamaita, Irene Deza y Falcón, Tomás Aznar Sánchez (2021). REMOTE WORK IN THE COVID-19 ERA: A HOLISTIC APPROACH, Journal of Language and Linguistic Studies, 17(4), 2384-2396.

[9] Miguel Ángel Medina Romero , Darwin Eliecer Solano Bent, Edwar Benjamín Bahoque Flórez, Rubén Jaime Huancapaza Cora , Pablo Ignacio Manrique Oroza , Edgar Salas Luzuriaga. A key to the quality of the educational institution: improvement plans. Journal of Positive Psychology & Wellbeing. 2021, Vol. 5, No. 4, 2390 – 2401.

[10] Martinez-Zambrano, K., Paez, J., & Florez, H. (2021). Pedagogical model to develop virtual learning objects for people with hearing impairment. CEUR Workshop ProceedingsVolume 2992, Pages 62 - 732021 Joint of the 4th International Conference on Applied Informatics Workshops, ICAIW 2021, 2nd International Workshop on Applied Artificial Intelligence, WAAI 2021, 3rd International Workshop on Applied, (págs. 62-73). Buenos Aires.

[11] Ricardo-Barreto, C., Mizuno, J., Jabba, D., Llinás, H., Medina-Rivilla, A., Acevedo, C. A., . . . Villarreal, S. (2021). Web apps for intercultural competences and sustainable development: A case study in higher education. En I. M. Barreto, Handbook of Research on Promoting Social Justice for Immigrants and Refugees Through Active Citizenship and Intercultural Education (págs. 349 - 373). IGI Global.

[12] Armada Pacheco, J. M. (2021). Digital strategies for health education on leishmaniasis. [Estrategias digitales de educación en salud sobre leishmaniasis] Boletin De Malariologia y Salud Ambiental, 61(3), 468-475. doi:10.52808/bmsa.7e5.613.012

[13] Arras-Vota, A. -. G., Bordas-Beltrán, J. -., & Gutierrez-Diez, M. C. (2017). Perceptions of ICT competencies among e-postgraduate students and faculty. [Percepción de estudiantes y docentes de e-posgrado sobre competencias en TIC de educandos] Revista Latina De Comunicacion Social, 72, 1186-1204. doi:10.4185/RLCS-2017-1214

[14] Arteaga, J. V., Gravini-Donado, M. L., & Riva, L. D. Z. (2021). Digital technologies for heritage teaching: Trend analysis in new realities. International Journal of Emerging Technologies in Learning,

16(21), 132-148. doi:10.3991/ijet.v16i21.25149

[15] Atuncar-Prieto, C., & Deroncele-Acosta, A. (2021). Educational virtualization model in initial teacher training. Paper presented at the Proceedings - 2021 16th Latin American Conference on Learning Technologies, LACLO 2021, 490-493. doi:10.1109/LACLO54177.2021.00086 Retrieved from www.scopus.com

[16] Avila, I. Y. C., Escolar, J. H., & Estrada, L. R. A. (2016). Effectiveness of an educational program on childhood tuberculosis supported on information and communication technologies aimed at community mothers from cartagena. Investigacion y Educacion En Enfermeria, 34(3), 465-473. doi:10.17533/udea.iee.v34n3a05

[17] Bardales Mendoza, O., Fernandez Bringas, T., & Saavedra Bendezú, L. (2020). Perspectives of the use of ICT for the teaching-learning process among peruvian university students and lecturers during the COVID-19 pandemic. Paper presented at the ACM International Conference Proceeding Series, 49-53. doi:10.1145/3447490.3447500 Retrieved from www.scopus.com

[18] Basantes, A. V., Naranjo, M. E., & Ojeda, V. (2018). PACIE methodology in virtual education: An experience at técnica del norte university. [Metodología PACIE en la educación virtual: Una experiencia en la universidad técnica del norte] Formacion Universitaria, 11(2), 35-44. doi:10.4067/S0718-50062018000200035

[19] Basantes-Andrade, A., Cabezas-González, M., & Casillas-Martín, S. (2020). Digital competences relationship between gender and generation of university professors. International Journal on Advanced Science, Engineering and Information Technology, (1), 205-211. doi:10.18517/ijaseit.10.1.10806

[20] Basantes-Andrade, A. V., Cabezas-González, M., & Casillas-Martín, S. (2020). Digital competencies in the training of virtual tutors at the universidad técnica del norte, ibarra (ecuador). Formacion Universitaria, 13(5), 1393-1399. doi:10.4067/S0718-50062020000500269

[21] Basso-Aránguiz, M., Bravo-Molina, M., Castro-Riquelme, A., & Moraga-Contreras, C. (2018). Proposal of a technology model for flipped classroom (T-FliC) in higher education. [Propuesta de modelo tecnológico para Flipped Classroom (T-FliC) en educación superior] Revista Electronica Educare, 22(2) doi:10.15359/ree.22-2.2

[22] Battaglia, N., Carlos, N., Martínez, R., & De Vinceni, M. (2019). UAI case: An uCASE-CL model implementation. Journal of Technology and Science Education, 9(1), 96-104. doi:10.3926/jotse.5433

[23] Beltran, J. E. P., Castro, Y. P. C., & Mantilla, M. I. (2018). Video games as an influence in meaningful learning. Paper presented at the Proceedings - 2017 European Conference on Electrical Engineering and Computer Science, EECS 2017, 347-350. doi:10.1109/EECS.2017.71 Retrieved from www.scopus.com

[24] Bravo, L. E. C., Molano, J. I. R., & Trujillo, E. R. (2018). Educational computing resources applied to the teaching of manufacturing doi:10.1007/978-3-319-73450-7_88 Retrieved from www.scopus.com

[25] Bravo-Torres, W. D., Alvarado-Cordero, J. J., Cevallos-Ludeña, C. M., Vintimilla-Tapia, P. E., Bravo-Torres, J. F., & Gallegos-Segovia, P. L. (2017). DentaLAV: A virtual platform for dental multidisciplinary learning. Paper presented at the 2017 IEEE Colombian Conference on Communications and Computing, COLCOM 2017 - Proceedings, doi:10.1109/ColComCon.2017.8088189 Retrieved from www.scopus.com

[26] Buenaño-Fernández, D., Gil, D., & Luján-Mora, S. (2019). Application of machine learning in predicting performance for computer engineering students: A case study. Sustainability (Switzerland), 11(10) doi:10.3390/su11102833

[27] Cano Barrios, J., Dominguez, A., & Ricardo Barreto, C. (2018). Strengthen of digital competence of higher education students in virtual learning environments. [Fortalecimiento de la competencia TIC de estudiantes de educación superior en Ambientes Virtuales de Aprendizaje] Espacios, 39(25) Retrieved from www.scopus.com

[28] Capacho, J. (2016). Teaching and learning methodologies supported by ICT applied in computer science. Turkish Online Journal of Distance Education, 17(2), 59-73. doi:10.17718/tojde.48315

[29] Capacho, J., Jimeno, M., & Salazar, A. (2019). Operational indicators of the learning management system in virtual spaces supported by ict. Turkish Online Journal of Distance Education, 20(3), 103-118. doi:10.17718/tojde.601907

[30] Capacho, J., Salazar, A., & Jimeno, M. (2018). A model to assess efficiency in e-training for significant learning (E-TSL). Paper presented at the Proceedings of the LACCEI International Multi-Conference for Engineering, Education and Technology, , 2018-July doi:10.18687/LACCEI2018.1.1.415 Retrieved from www.scopus.com

[31] Cartagena-Beteta, M. A., & Chumpitaz-Campos, L. (2020). Epistemological beliefs on secondary students in the acceptance and use of facebook. [Creencias epistemológicas de estudiantes de secundaria en la aceptación y uso de Facebook] REICE.Revista Iberoamericana Sobre Calidad, Eficacia y Cambio En Educacion, 18(2), 35-55. doi:10.15366/REICE2020.18.2.002

[32] Castro, M., & Aguirre, S. (2020). Flipped classroom in legal education: Achievements and challenges of innovating the teaching of a basic law course. International Journal of Learning, 6(2), 119-124. doi:10.18178/IJLT.6.2.119-124

[33] Cataldi, Z., & Dominighini, C. (2018). Use virtual laboratories and simulations with application of active methodologies in chemistry. Paper presented at the EDUNINE 2018 - 2nd IEEE World Engineering Education Conference: The Role of Professional Associations in Contemporaneous Engineer Careers, Proceedings, doi:10.1109/EDUNINE.2018.8450981 Retrieved from www.scopus.com

[34] Centeno, M. C. E., Franco, M. D. G., & Hueros, A. M. D. (2017). Design of an online multimedia resource based on multiple intelligences. [Diseño de un recurso multimedia on line basado en Inteligencias Múltiples] Campus Virtuales, 6(1), 51-65. Retrieved from www.scopus.com

[35] Cerdá Suárez, L. M. (2016). Investigating website appearance and usability effects on student satisfaction with the website: A descriptive analysis in three countries. International Review on Public and Nonprofit Marketing, 13(3), 223-238. doi:10.1007/s12208-015-0147-2

[36] Chachagua, M. R., & Hnilitze, S. A. (2021). University and ict: A case study of an educational experience in salta (argentina) in the context of a pandemic. [Universidad y TIC: Estudio de caso de una experiencia educativa en Salta, Argentina, en contexto de pandemia] Contratexto, (36), 21-41. doi:10.26439/contratexto2021.n036.5189

[37] Chans, B. C., Mosna, L. G., Moreiro, F. S., & Arduino, G. A. (2020). Teaching strategies for remote teaching implemented in the bachelor's degree in information systems at the universidad nacional del nordeste. Paper presented at the 2020 IEEE Congreso Bienal De Argentina, ARGENCON 2020 - 2020 IEEE Biennial Congress of Argentina, ARGENCON 2020, doi:10.1109/ARGENCON49523.2020.9505419 Retrieved from www.scopus.com

[38] Charbonneau-Gowdy, P., Salinas, D., & Pizarro, J. (2016). Moving away from comfort zones: Working in community with teacher educators to promote e-learning classroom-based research. Paper presented at the Proceedings of the European Conference on e-Learning, ECEL, , 2016-January 129-137. Retrieved from www.scopus.com

[39] Comas-González, Z., Echeverri-Ocampo, I., Zamora-Musa, R., Velez, J., Sarmiento, R., & Orellana, M. (2017). Recent trends in virtual education and its strong connection with the immersive environments. [Tendencias recientes de la educación virtual y su fuerte conexión con los entornos inmersivos] Espacios, 38(15) Retrieved from www.scopus.com

[40] Comas-Gonzalez, Z., Zamora-Musa, R., Soto, O. R., Collazos-Morales, C., Sanchez, C. A., & Hill-Pastor, L. (2021). Achievement of generic and professional competencies through virtual environments doi:10.1007/978-3-030-

68452-5_41 Retrieved from www.scopus.com

[41] Cóndor-Herrera, O., Jadán-Guerrero, J., & Ramos-Galarza, C. (2021). Virtual assistants and its implementation in the teaching-learning process doi:10.1007/978-3-030-58282-1_33 Retrieved from www.scopus.com

[42] Cortés, C. T., Rangel, Y. N., & Tuya, A. S. S. (2017). Use of ICT in teachers' academic practices in the benemérita universidad autónoma de puebla. [El uso de las TIC en las prácticas académicas de los profesores de la Benemérita Universidad Autónoma de Puebla] Revista Electronica De Investigacion Educativa, 19(3), 115-125. doi:10.24320/redie.2017.19.3.1270

[43] Cortez, P., Espinosa, L., Toro, W., & Ramírez, J. (2020). Multiópticas teaching about information and communication technologies in universities of ecuador. [Multiópticas docentes sobre las tecnologías de la información y comunicación en universidades del Ecuador] RISTI - Revista Iberica De Sistemas e Tecnologias De Informacao, 2020(E27), 54-64. Retrieved from www.scopus.com