

Emerging learning environments due to the COVID 19 pandemic and digital supports for teaching

Entornos de aprendizaje emergentes por pandemia ante la COVID 19 y apoyos digitales para la enseñanza

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Abstract

Study on Learning Environments, non-experimental, quantitative cross-section applied to upper secondary level students and qualitative data in field research of teaching experiences taught to 18 subjects of undergraduate, master's and doctorate (2020 - 2021), with digital tools and hybrid synchronous and asynchronous online learning modalities. The analysis refers to characteristics of face-to-face and virtual learning environments, indicated by students as support in a different and necessary teaching of digital and hybrid learning. The sample is of 300 random students, analyzed in signal readings of percentages, measures of central tendency, factorial with the method of Communalities. In the results, the students prefer clean face-to-face classrooms, with space and organized, with didactic support and teacher motivation. Digital classrooms need the use of different spaces for collaboration, communication and exchange, with diverse and motivating didactic and mathematical activities, combining talks of virtual synchrony of social and emotional support and the teacher's guide, they prefer methodologies such as: flipped classroom, case method, problem solving, virtual debates, asynchronous tasks, playful tools, formative evaluation and collaborative development of social projects with virtual social impact. Virtual tools that apply to online classes are listed to achieve collaborative, dynamic and motivating environments for learning.

Adaptations, COVID-19, Digital tools

Resumen

Estudio sobre Ambientes de Aprendizaje, no experimental, cuantitativa de corte transversal aplicada a estudiantes de nivel medio superior y datos cualitativos en investigación de campo de experiencias docentes impartidas a 18 asignaturas de licenciatura, maestría y doctorado (2020 - 2021), con herramientas digitales y modalidades de aprendizaje en línea en forma híbrida sincrónica y asincrónica. El análisis refiere a características de ambientes de aprendizaje presenciales y virtuales, señaladas por los estudiantes como apoyo en una diferente y necesaria enseñanza aprendizaje digital e híbrido. La muestra es de 300 estudiantes al azar, analizada en lecturas señalíticas de porcentajes, medidas de tendencia central, factorial con método de Comunalidades. En los resultados, los estudiantes prefieren aulas presenciales limpias, con espacio y organizadas, con el apoyo didáctico y motivación docente. Las aulas digitales necesitan el uso de diferentes espacios de colaboración, comunicación e intercambio, con actividades didáctico matemáticas diversas y motivantes, combinando charlas de sincronía virtual de apoyo social, emocional y la guía del docente, prefieren metodologías como: aula invertida, método del caso, resolución de problemas, debates virtuales, tareas asincrónicas, herramientas lúdicas, evaluación formativa y desarrollo colaborativo de proyectos sociales de impacto virtual social. Se enumeran herramientas virtuales que aplican a clases en línea, para lograr ambientes colaborativos, dinámicos y motivantes para el aprendizaje.

Adaptaciones, COVID-19, Herramientas digitales

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Introducción

After the events that occurred in March 2020 by the COVID-19 pandemic, humanity was transformed, despite the fact that many were betting to return to a normality previously experienced, the world is transformed without going back and the way of life of people changes irretrievably towards new paradigms in science, technology and life forms.

Formal education was abruptly forced to new educational and pedagogical models and schemes to fulfill the necessary duties in student learning. Formal education migrated to digitized learning and forced online didactic-mathematic methodologies.

When the government closed educational institutions, more than one billion students were affected. 52% of graduate students in the USA affirmed that online college education is superior to classroom learning and 39% of college students consider online classes better than classroom ones, Colman H. (2021)

“Students come to universities to meet great people, have inspiring conversations with academic staff, collaborate with researchers in the lab, and experience social life on campus. To remain relevant, universities will have to reinvent the 2 learning environments so that digitization expands and complements, but does not replace, the student-teacher and student-student relationship” OECD (2020), Impact of COVID-19 on education. Education at a Glance. Universities have opted for a hybrid mode online model that includes the combination of synchronous and asynchronous teaching activities. Teachers have been trained in virtual and online learning tools, to adapt to a new way of teaching classes through institutional platforms and the Internet, using common electronic devices such as computers, tablets, smart phones to respond to these new learning demands.

This information is based on experiences of a teacher of undergraduate, master's and doctorate degrees and the scientific bases of a non-experimental, quantitative, cross-sectional investigation of "Quality of school life", based on a complex variable of the study analysis called Learning environments.

Ospina (1999), mentions that the learning environment is conceived as a daily construction, daily reflection, permanent singularity that ensures the diversity and richness of life.

For Naranjo and Torres (1996), the educational or learning environment is "the subject" that acts with the human being and transforms him, thus promoting personal development in the different settings in which he lives and the social aspect with whom one interacts: in the street, school, family, neighborhood, peer groups, among others.

The learning environment is a dynamic and active conception that involves the human being and therefore contains pedagogical actions in which those who are subjects of learning are in a position to reflect on the actions of their own behavior and that of others, in relation to the environment and context in which it takes place.

The learning environment is not limited to the material conditions necessary for the implementation of the curriculum, whatever its conception, or to the basic interpersonal relationships between teachers and students. On the contrary, they constitute the educational processes and involve actions, experiences and attitudes, material and socio-affective conditions, multiple relationships with the environment and the necessary infrastructure for the realization of the cultural purposes that are made explicit in every educational proposal.

The general objective of all the research is to identify the variables related to the quality of school life of the students in: quality of life, academic performance and learning environments. The article only refers to the third topic and the influence for hybrid synchronous and asynchronous learning applied online. The specific objective of this complex variable refers to identifying the essential attributes of the different learning environments according to the opinion of the upper secondary level students, both face-to-face and digital. In addition, as a complement, teaching experiences are included with 18 classes of 4 semesters of undergraduate, master's and doctoral subjects during March 2020 to October 2021.

The development of online learning is urgent as a necessary and emerging instrument of resilient adaptation to face a new universal digitized education for a different autonomous and teacher-oriented learning, with the student as a citizen of the universal world as a central figure. Emergent refers to the fact that “it is born, it leaves, it has a beginning in something else and it substitutes”, Association of Academies of the Spanish Language. Royal Spanish Academy (2021).

Methodology to be developed

The research design of the complex variable School learning environments is non-experimental, quantitative, cross-sectional applied to a sample of 300 students in the data collection, randomly selected, of upper secondary level from four public high schools in the University Autonomous of Coahuila. An opinion measurement instrument was developed with a decimal scale, which contains 13 signal variables and 71 simple ordinal variables on the axis of learning environments. The instrument was validated in reliability with a pilot test, which presented 0.89 in a Cronbach's Alpha.

The analysis of results was carried out at two levels: descriptive and multivariate with the Communalities method.

The reading of data from the descriptive analysis is performed for the characterization of the pilot sample through percentages and analysis of central tendency variability. The multivariate study is prepared by Communalities with normalized Varimax rotation, with a probability of error of 0.01 and an $r^2 = 0.60$.

For the qualitative analysis of information, evidence is collected from March 2020 to October 2021, through the virtual classrooms of Teams and the recordings of classes and academic and training activities, including tasks, evidence of projects carried out in virtual collaborative spaces such as videos, debates, projects and synchronous class expositions.

Results

Descriptive analysis

The sample of research students refers to 70% women with a representative age of 16 years, from the 2nd and 3rd semester of 4 UAdeC high schools. The significant results in the descriptive study show that students read between 1 and 2 books per year per year, 97% have the Internet, 93% belong to a middle-class socioeconomic level. The important characteristics of the learning environments axis are: learn better in the classroom, in a clean, organized, fresh and comfortable study place, it is convenient to take notes and learning is enhanced when students are motivated to attend class or connect online to synchronous sessions. Other variables that support learning, but to a lesser extent, are: learning by consulting trustworthy digital library platforms, learning is enhanced with the support of advisers, good relationship with prefects, the institution's psychologist, close relatives such as siblings, friends' contacts from social networks and the relationship, as well as classmates. The didactic support is achieved using virtual simulators and taking notes of the key points of the class topic.

School and classroom learning environments are essential for student learning, whether in person or online. It is important to attend face-to-face and / or distance classes. Respondents consider interpersonal relationships both inside and outside the institution are not immersed in the formal teaching-learning process. They believe that learning is achieved despite not having high monetary resources or having sufficient technological tools.

Factorial analysis

When applying the method of Communalities with normalized Varimax rotation, 20 factors appear from all the research, of which 2 factors correspond to the topic of Learning Environments, the one with the highest representativeness is factor four that refers to the “Ideal place of study for learn”. This factor 4 has 16 simple variables, which reflect 7.77% of the 79.13% of the total explanation of the phenomenon.

The axis of learning environments has 9 attributes: the study place is clean ($r = 0.75$), organized ($r = 0.71$), comfortable ($r = 0.37$), colorful ($r = 0.37$), I learn when I am motivated by the teacher ($r = 0.34$), wide table ($r = 0.33$), I learn better from teachers ($r = 0.30$) and in school ($r = 0.30$), instead of wide study ($r = 0.26$), school performance depends on understanding written texts ($r = 0.24$), if you have determination ($r = 0.20$), when you go to take an exam your stomach hurts ($r = 0.15$), you get nervous with people you don't know ($r = 0.14$) and you like school ($r = 0.14$).

According to the students surveyed, the space dedicated to the assimilation of the school's own content is extremely important. For this, it is necessary to plan and systematize the elements of the environment that give tranquility, through a place with a large desk that is clean, organized, colorful and that motivates learning. They like school and learning is best achieved in the classroom with teachers who encourage them to study, with didactic-mathematic activities, text comprehension exercises and tasks, and learning in problem-solving activities for decision-making. Students say they don't like raising their voices. In addition, when answering tests and not being able to remember what was studied, they reported presenting an upset stomach. They mention feeling intimidated by unknown people outside the environment that surrounds them, either in person or remotely.

Qualitative analysis of teaching experiences

As of the health contingency that occurred in March 2020, we immediately switched to teaching online, first, the teachers gave classes in the same way as in person, only through electronic devices, in addition to this, teachers and students with a emotional load of fear and confusion within the confinement forced by the health authorities, surrounded by alarming news and later when the infections arrived in Mexico with the certainty of danger of death when seeing countless deaths of strangers and friends so close. Surrounded by this environment of anxiety, the teachers were able to compensate with immediate online training and at the same time with great efforts to emotionally support the situation, which scared us on the inside.

The pandemic forced the migration to virtual classrooms and synchronous and asynchronous learning modalities, to make online classes motivating. Field evidence was collected in Teams virtual classrooms.

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Conclusions

The COVID-19 pandemic achieved a crisis and put humanity to the test. We learned to face and make decisions with sudden, urgent and large-scale transformations. Changing the perspective of everything and transmuting society into learning and attitudes of resilience and spirituality.

Highlighting the indisputable need of students for the support of teachers, classmates and family. But, looking at the essential importance for the teaching-learning process of the environments that surround and accompany the development of the students, whether in a clean, orderly, and motivating face-to-face way, as well as virtual learning environments, both "a doc" the needs of the students.

Among the digital tools that teachers have been trained for in online classes are the collaborative ones for the preparation of documents and project planning: For the work environment: Office 365, ZOHO, Google and Edmodo. To communicate, discuss and collaborate: Blogger, Symbaloo, Wikispaces, Padlet, Remind wikia, Mindmeister, Stromboard, Marqueed and Voxopop. To share files: Dropbox, Jumpshare, Transfer and Google Drive. To organize work: Work Flowy, Symphonical and Highttrack. For word processing and spreadsheets: OppenOffice, Google, ZOHO Writer, Ability, Papyrus, XLS, Excel, Kspread and Calc. For diagrams and mind maps design: Power point, Smartdraw, draw.io, Padlet, Visio, Mindomo, Mind, Popplet, Swey and Coggle. As bibliographic managers: EndNote, Zotero, Words, Citeulike, JabRef, Reference Manager, RefWorks, Labmeeting, Connotea and Mendeley.

For research and platforms for data collection: INEGI, Scopus, PNAS, Java, public statistics, Google / Office Forms, etc. Typeform, QuestionPro, Survey Monkey, Qualtrics, Encuesta.com and Survio. For distribution and publication of data; Facebook, What's app, For statistical treatment: Statistica, NCSS, IBM SPSS, Excel, SAS and Puthon. Online emails, Twitter, Instagram, Linkedin, etc. For exams and surveys: Google / Office Forms, Survey Monkey and Kahoot. For market analysis and qualitative research: Atlas.it, Google Analytics, Google Triends, QDA Miner, Wordstat, Maxqda and NVIVO. To present projects and work results: Power point, Office 365 Sway, Prezi, Emaze, Knovia, Google Sides, Swipe, etc. To send and save documentation: Adobe Acrobat, Onenote, Onedrive, Share point, Wondershare, What's app, CS and Uniconverter. To share, manage and collaborate: Share point, Flipgrid (Educational Tic-Toc), Automate and Teams. Drawings and structures in Autocar and Corel draw.

These virtual tools are studied and some of them used by current teachers in a hybrid learning model where synchronous and asynchronous classes are combined with videos, recordings, group work in Breakout rooms, virtual whiteboards such as Whiteboard, subgroups of topics or teams in Teams channels, etc. The new techniques of Gamification (Escape Rooms) and ludic virtual laboratories, to program and elaborate interactive and collaborative virtual material for online classes. Online tools are being created to detect student emotions such as Office 365 Reflect.

The programming and didactic direction of motivating online learning requires dynamic classrooms, with virtual recreational resources and teaching support, a digital space that is designated for learning with diverse and motivating mathematical didactic methodologies such as: flipped classroom, case method, resolution of real problems, spaces for collaboration and simultaneous exchange, with debates, analysis, propositional critiques, carrying out projects in synchronous collaboration, academic talks and reflections, tutorials, emotional support and accompaniment. Do not forget the importance of the teacher now as a support and guide in the different forms of learning.

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