

Disruptive Strategies in the Use of Digital Tools in Public Universities of the Amazon in the Time of COVID - 19

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Abstract

The educational scenario of current university higher education is challenging. It is in this context that public universities have been experiencing changes of great importance in the educational system, moving from attendance to the new form of virtuality. This reality shows that universities are adopting the intensive use of digital tools in teachers and students, in the case of teachers, this process goes from planning to the evaluation of student learning achievements, allowing active participation. In this whole process. In this context, the research problem arises: How are disruptive strategies related to the use of digital tools in public universities in the Amazon in times of COVID - 19?, and as a general objective: Determine how relates the disruptive strategies in the use of digital tools in public universities in the Amazon in the time of COVID - 19. In this sense, the disruptive strategy based on the use of digital tools is of great relevance to develop learning. The implementation of disruptive strategies in university education as a paradigm from the teacher's actions is conceived with a critical view of innovative practices in the new context of virtuality, making use of digital tools and seeking new solutions to the pedagogical problems reflected. in teaching practices. The use of digital tools in the university educational field allows the development of the virtual meeting between teachers and students; Likewise, it facilitates a series of daily tasks because they can be simultaneously connected to various technological devices and access virtual platforms to present the sessions or topics to be discussed in a selected manner, schedule videoconferences, forums, tasks, surveys, digital whiteboards, assistance, online evaluations. line, share screen, schedule videos and other activities in the virtual environment interweaving synchronous and asynchronous communication. The results show that there is a significant relationship between the study variables; that is, that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of digital tools (Y) in the public universities of the Amazon in times of COVID-19; which indicates that there is a frequency association between the two variables.

Keywords

Virtual education, digital tools, disruptive strategies, asynchronous, synchronous

1. Introduction

The situation in the social sphere has been affected by the appearance of a new virus, a fact that has the consequence of adapting to a different context that affects the health sector and impacts the educational sphere. The appearance of this pandemic has generated challenges in the academic and administrative activities of the university, causing face-to-face activities to be relocated to virtuality, in most cases in their entirety. Even the subjects that, due to the nature

of the study programs, require practical field work have to adapt to the new scenario. It is precisely in this new scenario that the use of digital tools is gravitating towards virtual education to keep the university educational system dynamic.

Along these lines, Altbach and De Wit (2020) highlight that, as a consequence of the pandemic, higher education institutions have been forced to move to remote or distance education quickly, and there is a strong need to guarantee that they are offering a high quality education. The majority of teachers globally are not trained to offer distance courses or do not have the necessary technology for teaching, which makes it difficult to create an interactive and effective environment in the online classroom.

In this regard, Acosta (2021) points out that although universities have virtualized their academic offer, the health emergency did not allow them to incorporate virtual teaching methodologies, and this has been reflected in the predominance of synchronous online classes. Thus, university institutions found it necessary to adopt a series of measures in order to adapt more quickly to the new trend that virtuality demanded, both in services and in research, that represented challenges and opportunities for institutional positioning and visibility.

At present, the virtuality of the educational service has an advantage over attendance, especially when the pedagogical design is appropriate, so that virtual learning is more efficient and, in many cases, it surpasses the face-to-face form of the service. In this line of events, it prolongs its continuity and deepens the break with traditional technologies. The permanent updating of teachers in the use of ICT is very necessary, which leads to an improvement in the use of digital tools.

The new scenario of virtuality has become a space to motivate students to continue their university education without interference, making it more attractive and with a high degree of acceptance by the student population. The contexts that use virtuality to carry out learning have come to be a completely innovative form of educational technology, which offers many possibilities for university teaching. Therefore, it is necessary for teachers to constantly update themselves on its implementation in their daily practice. (López et al. 2021).

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1.1 Objectives

- Determine how disruptive strategies are related to the use of digital tools in public universities in the Amazon in the time of COVID-19.
- Describe how disruptive strategies are related to interactive digital pedagogy in public universities in the Amazon in the time of COVID-19.
- Describe how disruptive strategies are related to the use of the virtual platform in public universities in the Amazon in the time of COVID-19.

2. Literature Review

2.1 University higher education strategies, innovation, and disruptive technologies

New scientific and technological advances are marked by geometric progression, giving impetus to the appearance of digitization in the development and creation of knowledge, leaving behind obsolete technologies and giving way to new innovations in information and communication technologies (ICT). Sánchez (2016) points out that during the transformation process from an industrial society to an information society, a rapid development and growing use of ICTs is perceived, which has a great impact on all aspects of life. This paradigm shift gave way to the generation of an ever-increasing volume of information, thereby opening a wide spectrum of new methods and techniques for the management of information and processes.

In this sense, Restrepo (2018) considers that addressing digital transformation in organizations, and particularly in universities, requires being assumed from a cultural perspective that includes the adoption of a shared vision inside and outside the organization, the carrying out of diagnoses to clearly understand where the university is today from a digital perspective, and the construction and consolidation of a mentality of change, where the pedagogical approaches, teaching-learning processes, and educational roles change, stimulated through the deepening of innovation. Likewise, it is required to generate leadership from the decision makers, where the different levels of the organizational structures are articulated. It must also be taken into account that the bet is not only in the area of ICT, and that, as such, it must link all areas of the institution. Likewise, the reading of best practices must be assumed in a coherent manner in the relationship of the organization with its context. Human talent and the user must be placed at the center of the process. There must be an orderly collection of the accumulated material built in the university to place it on the platform that will serve as a boost for digital transformation; an adoption of processes that are supported by artificial intelligence; and finally, quality of the data and the ethical use of information are key.

From this perspective, higher education has to make a collective effort, incorporating technology and digital programs for teaching-learning processes, but always placing the person at the center of their development process and exercising purposeful citizenship in society. In this sense, it is up to the university to evolve immersed in the process of digital transformation to maintain leadership and permanently assume the challenges of the knowledge society, hand in hand with all its actors and the educational community. Precisely within this framework of trends, challenges, tensions, and developments, reflections should be advanced, strategies should be proposed, and actions carried out by means of which the digital transformation process will be implemented.

For Rodriguez (2018), technological changes are a social recognition of the impacts that will be generated in organizational development as a product of the fourth industrial revolution, specifically in its digital component. This process includes the intensive use of technologies through mobile devices; the new technological developments derived from the fourth industrial revolution; deepening of digitization; development of digital reputation through networks; new digital infrastructure developments; and the configuration of technological ecosystems.

Technology is a tool that allows us to connect and live better lives. For this reason, digital transformation also implies university leadership challenging the traditional way of doing things, identifying and investing in technologies and promoting change in organizations to put digital innovation into practice. The introduction of these digital strategies comes to enrich museum cultural dissemination activities, with augmented reality being at the forefront of the dissemination of cultural content (Ruiz Torres and Bellido Gant, 2017).

Febles (2018) states that education, and especially higher education, is forced to find teaching approaches, methods, and strategies that guarantee the training of specialists demanded by contemporary society. This has led to conceiving disruptive education as a resource for the introduction of advances and innovations in educational processes through emerging technologies and new uses that open up in the communicative field. When we talk about disruptive technology, we mean any technology or innovation that makes previous technology obsolete. The term "disruptive" is used because it produces a sudden rupture, sometimes causing profound changes in our way of life and in the results obtained in any production or service process. Disruption happens when new technologies or innovative business ideas are introduced to the market that surpass in acceptance those that were previously offered.

For UNESCO, digital higher education arises with the development of educational programs, study plans, and new and innovative learning processes, as well as access routes to higher education. All of the aforementioned are propitiated by the existence of models for delivery of online, distance, open, coeducational, and short-course learning services, as well as curricula and curricula that emphasize the development of new types of learning modalities both in the field and online. Teachers and professors must be trained to adapt to and develop the traditional modalities of higher online, distance, and blended learning.

In the university educational field, teachers are required to integrate information and communication technologies as part of their performance and learn how to execute the teaching-learning processes remotely. In this sense, technology is incorporated into the pedagogical process as an interaction tool at the service of knowledge, a context, a subject and a specific purpose. In this way, teachers will have configured their identity with this aspect as a distinctive feature of their performance.

Universities have seen the need to create online academic offers, similar to the face-to-face ones, in order to remain active over time and not be left behind by technological changes.

These adaptations in education, which travel from face-to-face education to virtual education, are achieved thanks to the fact that those who have the function of managing these educational institutions have opted for new ways of carrying out learning and managing academic processes to stay up to date. On a par with technological advances, which entails making necessary updates in virtual learning platforms, high-speed connections, storage spaces, and preparation of both administrative and student staff, as well as the teaching staff who join the new paradigms of education.

As Vidal, Carnota, and Rodriguez (2019) point out in their article on disruptive technologies and innovations, disruptive technology is one that fosters profound changes in processes, products, or services and generally entails a strategy of introduction, penetration, and use that consolidates and displaces previous technology, becoming a disruptive innovation.

Disruptive innovation has revolutionized different business sectors, and among them is the educational sector. In this sense, in the university environment, it breaks with the curriculum, the methodologies, and the modalities of knowledge transmission, opening new learning alternatives. This defines disruptive education.

In the last decade, university teachers have experienced the transformation and evolution of traditional methods for teaching classes. In addition to being first-line witnesses and active participants in the birth of new forms of teaching, they also know the different modalities of studies and some of the digital resources available today, all generated by the technological evolution of recent years. Starting from this premise, new concepts are used, such as: virtual classrooms, peer interaction (teachers with their students and vice versa), e-learning, and student-centered teaching models (Rodriguez 2021).

Undoubtedly, the Knowledge Society implies changes in the way people act and think. The biggest challenge is to create social-environmental awareness and professional ethics to use these technological advances in order to achieve a better quality of life for people. Medina and Rodriguez (2020).

Today's students must be prepared for the new dynamics that we are experiencing, such as the exercise and implementation of critical thinking, which means that they must have a series of skills and abilities that allow them to be competitive and adapt to the constant changes we have. Some of these skills are the ability to solve complex

problems, teamwork, communication, adaptability, emotional intelligence, critical thinking, and computational thinking.

The role of the teacher also changes in an ICT-rich environment. The teacher ceases to be the source of all knowledge and begins to act as a guide for the students, facilitating the use of the resources and tools they need to explore and develop new knowledge and skills; he begins to act as a manager of the plethora of learning resources and to accentuate his role as a guide and mediator.

Disruptive technologies offer educational opportunities different from those currently known. The conjunction between the climate of human relations, internal processes, relational goals, and open systems begins to cause changes in educational policy, learning theories, curricula, and educational values (Bolat and Baş 2018).

2.2 Digital tools in university education in the times of COVID-19

The current health emergency situation due to the COVID-19 pandemic has caused changes in educational interaction. The teaching and learning contexts have changed considerably, and the new scenario requires a process of reflection and strengthening of university education with the integration of educational models and resources that promote its continuity and quality of learning (UNESCO IESALC 2020).

In the university educational context at the UNSM in the year 2020, the programming of the 2020-I academic semester was originally planned to be carried out in person, with face-to-face meetings, with the publication of the supreme decree in which the university declared a health emergency. Due to the COVID-19 crisis, which has resulted in the university campus's closure since March 2020, it was decided that academic activities would quickly adapt to the distance education model.

The effect of COVID-19 on teaching and learning means, in general terms, the search for non-face-to-face digital alternatives (Marinoni et al. 2020). As a proposal to this new modality in the UNSM, training was organized for teachers, students, and administrators to develop skills that allow the university community to become an engine of change, based on its own capabilities and digital possibilities for learning. That is why the methodological approach is based on implementing the virtual platform as a proposal for teachers to schedule their academic activities using synchronous and asynchronous digital tools, based on the proposal of learning contexts starting with the construction of the digital portfolio of the student. teaching and project-based learning. The resolution of problems that the technical teams of the universities must face when facing this new technological scenario within a university community that possibly, due to its youth or digital literacy conditions, is not at the recommended level for implementation of a non-face-to-face education system based on the intensive use of technology as digital learners and digital teachers (Gisbert et al. 2016).

With this new scenario of virtuality, the new technologies of the 21st century have developed experimentation and innovation when it comes to thinking, planning, and putting into practice the teaching and learning processes. This proposal is based on constructivist and constructionist pedagogy, giving way to the emergence of new forms of education such as virtual or online.

It is noteworthy that, according to the characteristics of the contexts, the digital gaps of access, connectivity, appropriation, and knowledge, the use of ICTs in education is marked by inequality. Therefore, it is necessary to strengthen the increase in the educational offer within the framework of the virtual modality and promote interactive and collaborative methodologies for active and experiential learning with the purpose of increasing digital skills in both teachers and students. students.

Currently, for example, the main universities in the country promote the use of software (such as Moodle and Blackboard) to support the management and development of virtual classes, as well as those that combine face-to-face and virtual classes in hybrid modalities (Galvis et al. 2016; Acevedo-Rincón and Flórez-Pabón 2020).

As Umaa-Mata (2020) indicates, among the main challenges of distance education is the development of continuing education programs to strengthen the digital skills of the teaching staff. This task must be seen in a flexible, variable, and changeable rhythm as the social context demands and advances in technological development.

Higher education faces a hopeful scenario, but one that requires revolutionizing its teaching models and, consequently, its initial and continuing training programs from a competency perspective. In the case of non-face-to-face digital

teaching and learning contexts, they require strengthening the university educational model and rethinking the teaching task to respond to functions of the digital age and collaboration on the network (Guitert and Romeu 2019), and the development of digital teaching competence (DTC) supposes a safe and critical use of information and communication technologies (ICT), related to basic competences such as obtaining, evaluating, storing, producing, presenting and exchanging information, communicating and participating in networks of collaboration (Cabero-Almenara et al. 2020).

Along the same lines, Herrera (2020) points out that the traditional pedagogy used to carry out this transfer from face-to-face to remote, although it has allowed an immediate response, has wasted the potential of interaction and virtual activities for learning. Likewise, in the transfer from face-to-face to virtual education, considerations of the new teaching environment were omitted, where it is key that the design and development of content and activities serve the objective of facilitating processes, both cognitive and social and didactic, further evidencing the limitations of traditional teaching.

In this sense, this new context requires higher education institutions to promote digital transformation within themselves, which implies organizational changes in their processes, where technologies are tools that generate greater value, since the adoption and incorporation of these will allow them to have a two-dimensional existence, both in physical and virtual space, in addition to being configured as a Digital University (Bilyalova et al. 2020). Likewise, it will be necessary not only to integrate ICT but also to modify, renew, and adapt methodologies to improve learning processes in the virtual environment (Hurtado 2020).

On the other hand, Altbach and De Wit (2020) argue that student mobility is experiencing a temporary decline that, although significant, will tend to be more modest in the long term as a result of COVID-19. There will be a restructuring of mobility patterns, and the trend towards shorter mobility periods (less than eight weeks), which will contribute to reducing the carbon footprint of student mobility, is more likely to increase and there will be a preference towards other countries.

With the establishment of virtual mobility, the analysis and access components tend to be different, and they have become more flexible since students who wish to access this type of exchange do not have to meet so many requirements and can make it compatible with their lives. personal and labor, a situation that is difficult under the traditional modality. Exchange costs tend to be lower, and even students who are in the first few cycles can access them. In other words, with virtualization, it is possible to expand the income profiles, in addition to making the exchange possibilities more flexible (Passarini 2021). At the same time, it is a tool for moving towards a more inclusive and sustainable model, for which higher education institutions must implement actions that allow online teaching to be transformed into a digitally enhanced exchange (Dorothy 2021). Therefore, promoting virtual exchange through digital platforms, in addition to positioning it as an institutional policy, not only guarantees access to training for a greater number of students, but also promotes a more intercultural and interdisciplinary environment (Alves 2021).

Teaching competencies in the digital world define the teacher as: (a) generator and manager of emerging pedagogical practices, who enriches their didactic action with ICT and who is capable of proposing new methodological models; (b) expert in digital content, skilled in the use of technology to develop different content; (c) increased reflective practitioner, who launches research processes on their own practice with ICT; (d) expert in enriched personal and organizational learning environments; (e) sensitive to the use of technology from the perspective of social commitment; and (f) able to use technology to expand their relationship with families and the student's environment (Esteve et al. 2018).

3. Methods

The approach in which the research is contextualized is of an explanatory and descriptive nature since it considers theoretical methods, induction, deduction, comparison, analysis, synthesis, measurement, and statistical methods, as well as individual survey techniques aimed at teachers. The type of research was basic, as the design used was analytical, which relied on observation to describe and explain the phenomena that affect the current educational field, such as the low level of mastery in the use of digital tools. in virtual education in both synchronous and asynchronous ways.

The research analyzes the results obtained by teachers in a survey applied at the UNSM, from which a baseline was established, which in a pandemic situation means that they have virtually participated in training aimed at developing skills in the use of digital tools in order to continue the academic service at the university, despite the health emergency. Based on what has been evidenced to have been obtained in the diagnostic phase: the weaknesses, domains of the use of digital tools and connectivity, a training process aimed at teachers and students was proposed. The training phase, which was preferably aimed at teachers to develop digital skills in teaching from the planning to the execution of non-face-to-face classes in a health emergency situation due to COVID-19, made use of resources and activities (forums, videoconferences, tasks, surveys, evaluations, hyperlinks, among others) typical of the platform considered in the UNSM virtual campus, whose objective was focused on improving teaching and student capacity in a context of synchronous and asynchronous communication.

In the context of the public universities of the Amazon, specifically at the UNSM, teachers, students, and administrators took on the challenge of adapting to changes in disruptive innovation as a proposal design for disruptive strategies, having as a product the implementation of technological platforms and applications to carry out the teaching-learning process, in order to strengthen skills in the management of technological tools to attend to the academic activity of teachers and students, and consequently, face the new demands of virtual education. The university, in the development of the application of the disruptive strategy, has scheduled training workshops aimed at teachers and students in the use of digital tools as shown in figure 1:

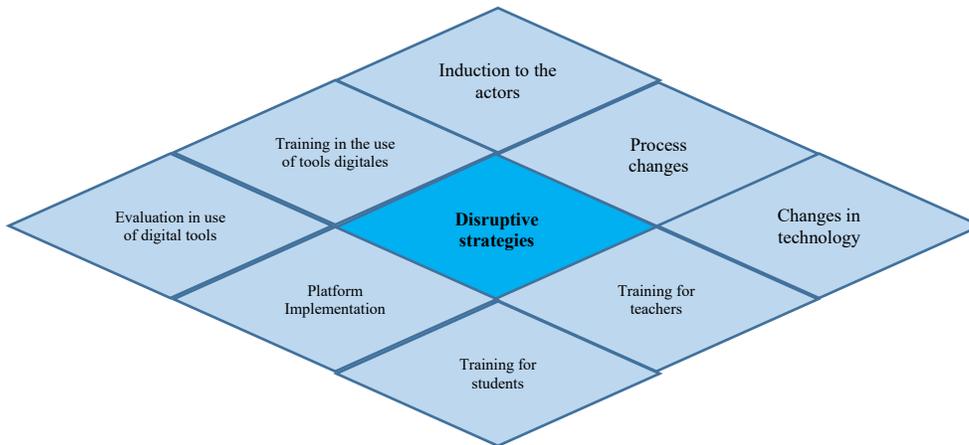


Figure 1. Execution processes of disruptive strategies

Source: self-made

4. Data Collection

Results obtained from the application of the instrument as shown in Table 1

Table 1. Distribution of frequencies according to disruptive strategies (X) the use of digital tools (Y) in public universities in the Amazon in times of COVID-19.

Variable	Never	Ocasional	Frequently	Generally	Always	Total
<i>X</i>	90	189	365	460	696	1800
<i>Y</i>	40	190	350	450	770	1800

Results obtained from the application of the instrument as shown in Table 2

Table 2. Distribution of frequencies according to disruptive strategies (X) the use of interactive digital pedagogy (Y1) in public universities in the Amazon in the time of COVID-19.

Variable	Never	Occasionally	Frequently	Generally	Always	Total
<i>X</i>	90	189	365	460	696	1800
<i>Y₁</i>	30	90	168	225	387	900

Results obtained from the application of the instrument as shown in Table 3

Table 3. Distribution of frequencies according to disruptive strategies (X) the use of the virtual platform (Y2) in public universities of the Amazon in times of COVID-19.

Variable	Never	Occasionally	Frequently	Generally	Always	Total
X	90	189	365	460	696	1800
Y ₂	20	89	168	225	398	900

5. Results and Discussion

5.1 Numerical Results (11 font)

Results obtained from the application of the instrument as shown in Table 4

Table 4. Percentage distribution according to disruptive strategies (X) the use of digital tools (Y) in public universities of the Amazon in times of COVID-19.

Variable	Never	Occasionally	Frequently	Generally	Always	Total
X	5.00%	10.50%	20.28%	25.56%	38.67%	100.00%
Y	2.22%	10.56%	19.44%	25.00%	42.78%	100.00%

According to Table 4, we observe that the categories "almost always" and "always" are the ones that add the highest percentages in the distribution of both variables. That is, the frequency assessment in the relationship of both variables is very significant.

Results obtained from the application of the instrument as shown in Table 5

Table 5. Percentage distribution according to disruptive strategies (X) and the use of interactive digital pedagogy (Y1) in public universities in the Amazon in COVID-19.

Variable	Never	Occasionally	Frequently	Generally	Always	Total
X	5.00%	10.50%	20.28%	25.56%	38.67%	100.00%
Y ₁	3.33%	10.00%	18.67%	25.00%	43.00%	100.00%

According to Table 5, we observe that the categories "almost always" and "always" are the ones that add percentages greater than 60% in the distribution of both variables. That is, the assessment of frequency in relation to disruptive strategies and the use of interactive digital pedagogy is significant.

Results obtained from the application of the instrument as shown in Table 6

Table 6. In COVID-19, the percentage distribution according to disruptive strategies (X) and the use of the virtual platform (Y2) in public universities in Amazon.

Variable	Never	Occasionally	Frequently	Generally	Always	Total
X	5.00%	10.50%	20.28%	25.56%	38.67%	100.00%
Y ₂	2.22%	9.89%	18.67%	25.00%	44.22%	100.00%

According to Table 6, we observe that the categories "almost always" and "always" are the ones that add percentages greater than 65% in the distribution of both variables. That is, the assessment of frequency in relation to disruptive strategies and the use of the virtual platform is significant.

5.2 Graphical Results

Results obtained from the application of the instrument as shown in figure 2

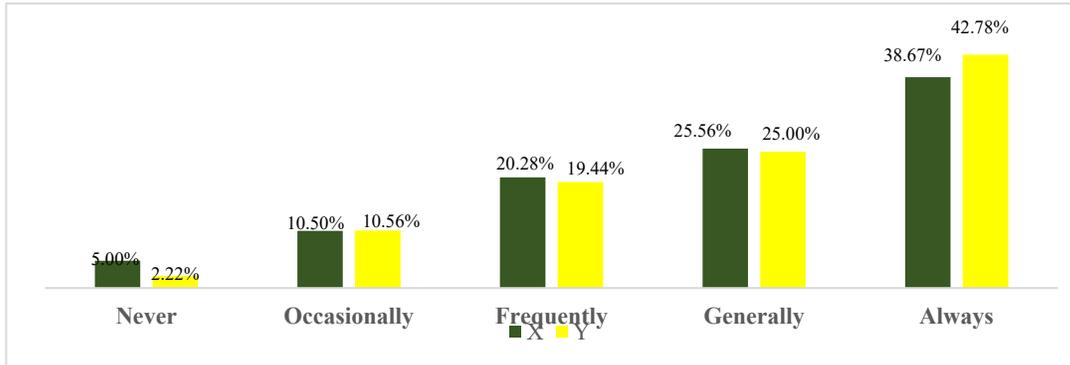


Figure 2. Percentage distribution according to disruptive strategies (X) and the use of digital tools (Y).

In Figure 2, we observe that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of digital tools (Y) in public universities in the Amazon in the COVID-19 period, which indicates that there is a frequency association between the two variables.

Results obtained from the application of the instrument as shown in figure 3

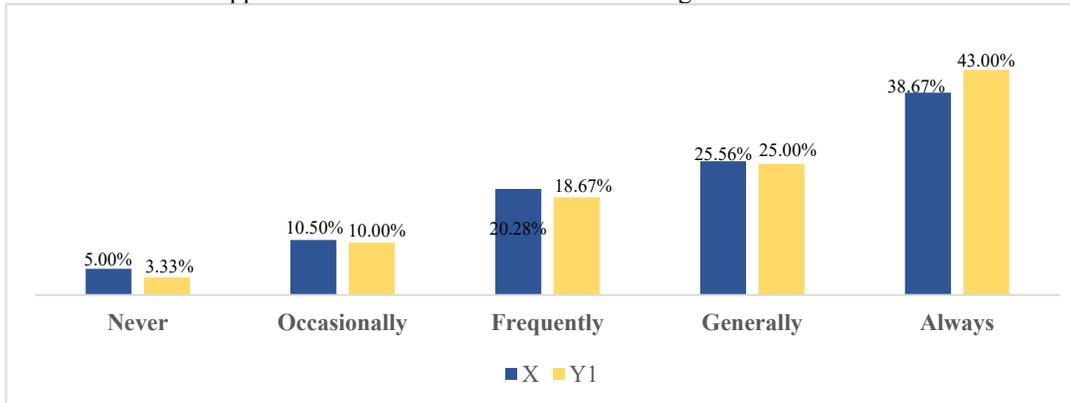


Figure 3. Percentage distribution according to disruptive strategies (X) and the use of interactive digital pedagogy (Y1).

In Figure 3, we observe that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of interactive digital pedagogy (Y1) in public universities in the Amazon in the time of COVID-19. That indicates that there is a frequency association between the two variables.

Results obtained from the application of the instrument as shown in figure 4

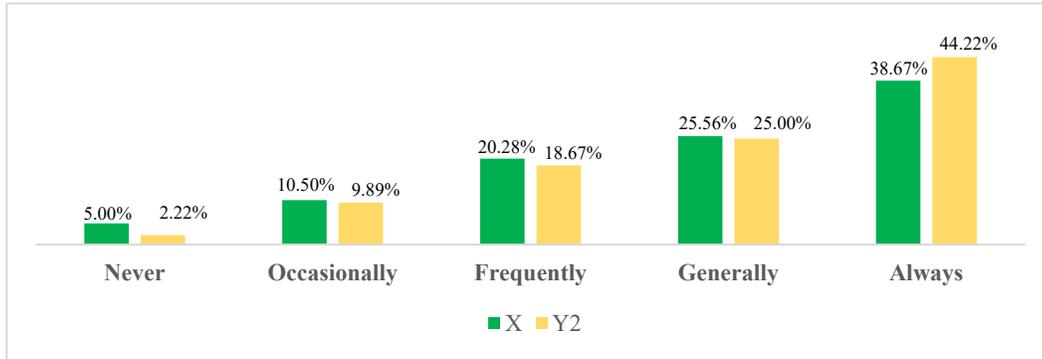


Figure 4. Percentage distribution according to disruptive strategies (X) and the use of the virtual platform (Y2).

In Figure 4, we observe that the use of the virtual platform (X) corresponds in proportion in each of the five categories with the use of the virtual platform (Y2) in public universities in the Amazon in times of COVID-19. That indicates that there is a frequency association between the two variables.

5.3 Proposed Improvements

In Figure 2, we observe that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of digital tools (Y) in public universities in the Amazon in the COVID-19 period, which indicates that there is a frequency association between the two variables. In this sense, Ramos, Aldude, Estrada, Seas, and Andrade (2020) point out that the different universities must first carefully analyze all the factors and situations presented by those who are involved in virtual education, so they can have better control of the activities such as evaluation, homework, forums, correct use of the middle platform, and zoom videoconferences that will be held, implementing different methodological systems in teacher training, from the central approach that must be taken into account for the correct virtual education, advice to teachers and students, to teach them the proper use and implementation of the different tools that can be established in their classes, and be able to give a good evaluation with the use of these tools.

In Figure 3, we observe that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of interactive digital pedagogy (Y1) in public universities in the Amazon in the time of COVID-19, which indicates that there is a frequency association between the two variables. From this perspective, Hidalgo Benites, Villalba-Condori, Arias-Chávez, Berrios-Espezuza, and Cano (2021) establish that in the application of the inverted classroom strategy with the use of a virtual platform, it is very effective with students who prefer responsible protagonist learning, sure of the objectives and goals that they hope to achieve, as is the case of the development of investigative skills, which are not only necessary in academic life but in working life, demanding effective problem-solving performance. In addition, the use of virtual technology is typical of this educational time and must be integrated into educational processes in a natural way to respond to the demands of society and the learning needs of students.

In Figure 4, we observe that the disruptive strategies (X) correspond in proportion in each of the five categories with the use of the virtual platform (Y2) in public universities in the Amazon in the time of COVID-19, which indicates that there is a frequency association between the two variables. This is supported by Prat, Llorens, Salvador, Alier, and Amo (2021). when they point out that an effort has been made to structure the data of a university Moodle platform. The data was intended to be useful for extracting information on teacher education at the subject level, at the school level, and at the university level in a general context, but the description is complex. The data that we believe to be most meaningful, especially in an online teaching environment, we have called key indicators, some of which have recently been defined at the thematic activity level. These are not the only indicators, and others may arise. Any university with a virtual platform (especially, but not always, a Moodle) can access similar data and replicate the study. In addition, to define and organize the data, it has been designed how it can be analyzed: guidelines have been given on types of graphs and how to make data comparisons between terms, schools, colleges, and universities.

5.4 Validation

Prueba Chi Cuadrado (X²) para la hipótesis general

H₀: Las estrategias disruptivas no se relacionan de manera significativa en el uso de las herramientas digitales en universidades públicas de la amazonia en tiempo de COVID – 19.

H_a: Las estrategias disruptivas se relacionan de manera significativa en el uso de las herramientas digitales en universidades públicas de la amazonia en tiempo de COVID – 19.

Results obtained from the application of the instrument as shown in Table 7

Table 7. Chi Square Test

Chi Square test		
<i>X-squared</i>	DF	P-Value
23.39	4	0.0001057

Given that the value of $p = \text{Sig. Asymptotic} = 0.0001057 < \alpha = 0.05$, H₀ is rejected and H_a is accepted, it is concluded that disruptive strategies and the use of digital tools in public universities of the Amazon in times of COVID - 19 they are dependent and have a significant relationship.

Chi Square Test (X²) for the specific hypothesis 1

H₀: Disruptive strategies are not significantly related to the use of interactive digital pedagogy in public universities in the Amazon in the time of COVID - 19.

H₁: Disruptive strategies are significantly related to the use of interactive digital pedagogy in public universities in the Amazon in the time of COVID – 19

Results obtained from the application of the instrument as shown in Table 8

Table 8. Chi Square Test.

Chi Square test		
<i>X-squared</i>	DF	P-Value
17.014	4	0.001921

Given that the value of $p = \text{Sig. Asymptotic} = 0.001921 < \alpha = 0.05$, H₀ is rejected and H₁ is accepted, it is concluded that disruptive strategies are significantly related to the use of interactive digital pedagogy in public universities of the Amazonia in times of COVID-19 are dependent and have a significant relationship.

Chi Square Test (X²) for the specific hypothesis 2

H₀: Disruptive strategies are not significantly related to the use of the virtual platform in public universities in the Amazon in the time of COVID - 19.

H₂: Disruptive strategies are significantly related to the use of the virtual platform in public universities in the Amazon in the time of COVID - 19.

Results obtained from the application of the instrument as shown in Table 9

Table 9. Chi Square Test

Chi Square test		
<i>X-squared</i>	DF	P-Value
12.808	4	0.01226

Given that the value of $p = \text{Sig. Asymptotic} = 0.01226 < \alpha = 0.05$, H₀ is rejected and H₂ is accepted, it is concluded that disruptive strategies are significantly related to the use of the virtual platform in public universities of the Amazon in times of COVID-19 they are dependent and have a significant relationship.

6. Conclusion

The results have made it possible to determine the relationship between disruptive strategies and the use of digital tools in public universities of the Amazon in the time of COVID - 19, taking as a sample the teachers of the National University of San Martín, given that the value of $p = \text{Sig. Asymptotic} = 0.0001057 < \alpha = 0.05$, H_0 is rejected and H_a is accepted. Regarding the results of the application of the instrument between disruptive strategies and the use of interactive digital pedagogy in teachers, the value of $p = \text{Sig. Asymptotic} = 0.001921 < \alpha = 0.05$; Therefore, H_0 is rejected and H_1 is accepted. Likewise, the results of the application of the instrument referring to disruptive strategies and the use of the digital platform in teachers are evidenced, having the value of $p = \text{Sig. Asymptotic} = 0.01226 < \alpha = 0.05$; consequently, H_0 is rejected and H_2 is accepted; Thus, disruptive strategies are significantly related to the use of interactive digital pedagogy and digital platform in teachers of public universities in the Amazon in times of COVID-19; finally, these are dependent and have a significant relationship.

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Biography

Dr. Mario Chauca is the winner of the "Global Engineering Education Award 2021" by the IEOM International Society, Vice-President and Executive Committee Member of IFEES. Mario Chauca was a Director of the AOTS-Kenshu Kiokay-Peru, a member of the technical committees since 2010, invited by the University of Washington IEEE, in 2010 joined the Steering Committee Member of the IEEE MWSCAS, has participated as speaker in Argentina, Brazil, Canada, Cuba, China, India, Japan, Korea, and Malaysia, Mexico, USA, and Peru, author, advisor, technical committee member and session chair in the European Union, Asia, America and Africa in event with proceedings indexed in Scopus, WoS and Journals. He obtained a scholarship from the Japanese Association of Overseas Technical Scholarships (AOTS), from the National IT Industry Promotion Agency (NIPA), and from the Ministry of Science, ICT, and Planning for the Future of Korea. He was a consultant in ICT for the United Nations Project, Inter-American Development Bank-Congress of the Republic of Peru and the Ministry of the Interior of Peru. He is a Peruvian researcher and the advisor of the first award paper at CONEIMERA 2018. Advisor IEEE-COMSOC, chapter at National University from Callao. Advisor of the first general project prize in the Romero Group foundation contest. First projects in the INTERCON, CONEIMERA congress and was nominated for the Graña y Montero Prize for Research in Peruvian Engineering. Nominated Peruvian Research Southern Prize 2019 and nominated for the

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Dr. Wildoro Ramrez is a Doctor of Educational Sciences at the National University "Pedro Ruiz Gallo", and my thesis was related to brain gymnastics and academic performance. Likewise, I did another doctoral study in Educational Psychology and Tutorial at the National University of Education "Enrique Guzmán y Valle". Currently, he is an associate professor at the National University of San Martín, a professor attached to the Academic Department of Humanities and Social Sciences, and he exercises undergraduate and postgraduate university teaching. The topics in scientific research where he has ventured are: coordinative abilities and cognitive abilities.

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