

Functionality of the learning platform and its effect on the satisfaction of students in the online teaching environment

Omar Freddy Chamorro-Atalaya¹, Guillermo Morales-Romero², César León-Velarde³,
Lourdes Quevedo-Sánchez⁴, Yurfa Medina-Bedón², Abel Tasayco-Jala⁵, Maritte Fierro-Bravo⁶

¹Facultad de Ingeniería y Gestión, Universidad Nacional Tecnológica de Lima Sur, Lima, Perú

²Facultad de Ciencias, Universidad Nacional de Educación Enrique Guzmán y Valle, Lima, Perú

³Departamento de Humanidades, Universidad Tecnológica del Perú, Lima, Perú

⁴Facultad de Formación Humanista, Universidad César Vallejo, Lima, Perú

⁵Facultad de Ciencias de la Comunicación y Ciencias Administrativas, Universidad Privada San Juan Bautista, Lima, Perú

⁶Facultad de Ciencias Económicas, Universidad Nacional Federico Villarreal, Lima, Perú

Article Info

Article history:

Received Nov 14, 2021

Revised Feb 14, 2022

Accepted Mar 7, 2022

Keywords:

Functionality
Learning platform
Online teaching
Satisfaction
Students

ABSTRACT

The objective of this article is to identify the results of the functionality of the learning platform and its effect on the satisfaction of mechanical and electrical engineering students. The results will serve as a basis for the continuous improvement of teaching-learning online from the higher institution. The research findings indicate that the indicators that present a better perception regarding the functionality of the learning platform are related to the design and ease of navigation. However, 21.4% of the students are not entirely satisfied with its functionality due to the technical problems presented when downloading the study material. According to the results, we can point out that the functionality of the learning platform generates an effect of 70.87% on student satisfaction, the relationship was validated through the Chi-square test, in which it is determined that the indicators that generate a Greater satisfaction in students refers to the design, availability (connectivity) and the ease of communication and interaction with the teacher and classmates.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Omar Freddy Chamorro-Atalaya

Facultad de Ingeniería y Gestión, Universidad Nacional Tecnológica de Lima Sur

Jr. Los Damascos, Los Olivos, Lima, Perú

Email: ochamorro@untels.edu.pe

1. INTRODUCTION

Technology is a factor that plays a very important role within society, since, in this time of pandemic, in which we find ourselves; it allows us to guarantee the continuity of the educational service [1], [2]. For this reason, the use of virtual tools has become a key element for economic, social and technological development, whose relevance gains greater strength in the education sector, since it increases competitiveness and generates positive effects from the perspective of quality of education university service [3], [4]. Since the quality of a higher institution represents a determining factor in relation to the service offered to the student, although quality is associated with teaching and research, the infrastructure linked to the development of the teaching-learning process is also important [5], [6]. The technological infrastructure is one in which the entire process of educational and learning management is supported, this infrastructure must cover the main functions, such as: managing users (in their different roles as teachers, facilitators, students), educational resources required (presentations, bibliographies, information, and educational resources), and training activities, through collaborative work and communication tools, enrollment, access management and

security, control and monitoring of the learning process, evaluations, generation of reports, management of communication services such as discussion forums, videoconferences, chat, emails, among others [7], [8].

Likewise, the conditions and expectations of the students who take courses in the virtual modality of distance education require university institutions to develop a mechanism that is oriented towards the quality of the university service [9], [10]. Okoyeigbo *et al.* [11] indicates that one of the quality measures to take into account are online learning platforms, which contribute to pedagogical strategies. Web-based instruction is essential for career education linked to interaction with technology [12]. A learning platform can be defined as software that allows the creation and management of online learning environments in an easy and automated way. These platforms offer great possibilities for communication and collaboration between the different actors in the learning process [13]. Mokhtar and Nurulhuda [14] pointed out that a learning platform is a computerized and telematics tool that is organized according to the training objectives, in an integral way associated with the principles of psycho-pedagogical and organizational intervention. In addition, they are designed to support the teaching-learning process in a virtual environment through a set of tools that allow interaction and collaboration between the actors in the process: students, teachers, and content [15]-[17].

Given what has been described, learning platforms owe their scalability, usability and functionality [18], [19]. Moreover, if teachers and researchers understand it as a facilitator of the teaching-learning process, it is worth asking what role it plays for the student [20]. Sheikh *et al.* noted in [21], the sudden shift from the traditional approach to distance presential learning due to the coronavirus pandemic greatly affected everyone involved, particularly students. For this reason, it is essential to identify the students' perception of their satisfaction with distance learning and the interactive tools that have been adapted during this change. The evaluation of the functionality of the learning platform in online teaching is necessary, because it represents the degree of acceptance and level of use of said technological tool, by the main entity of the educational environment [22], [23]. The justification regarding the identification of these results is indicated [24], since knowing the opinions of the students guarantees a better use of technology as a resource that helps to stimulate the learning processes, inserting improvements in the characteristics displayed by the learning platform.

In this sense, the objective of the research is to identify the results of the perception of the functionality of the learning platform and its effect on the satisfaction of mechanical and electrical engineering students, the results will serve as a basis for the continuous improvement of the online teaching-learning of the higher institution, because the learning platform is a virtual tool, which has the purpose of improving the performance and retention of the student in the online teaching process.

2. METHOD

2.1. Level of investigation

The research is descriptive-correlational level, descriptive because it will identify the results of the perception of the functionality of the learning platform and its effect on the satisfaction of mechanical and electrical engineering students. Likewise, it is correlational because it is intended to determine the cause-effect relationship between the perception of the functionality of the learning platform and the satisfaction of the mechanical and electrical engineering students who take the automatic process control course. The cause-effect relationship will be carried out through Chi square and crossed tables through SPSS.

2.2. Technique and validation of the collected data

In this research, a qualitative methodology has been used, making use of the survey technique, in which, through a virtual questionnaire, of 12 questions, the perception was obtained during the 2020 academic year of 112 mechanical engineering students and that carry the automatic process control course. For the processing of the data collected through the questionnaire, the 5-level Likert scale was used, with the following parameters: disagree (1), disagree (2), neither agree nor disagree (3), agree (4), and strongly agree (5). The instrument responds to the "distance higher education quality service" (DIHEQS) model, in which the variable functionality of the learning platform (FP) was used, whose indicators were modeled to the current research context, in the following Table 1 shows the indicators and their respective coding.

Table 1. Indicators of the functionality of the learning platform

| Code | Learning platform functionality |
|------|--|
| FP1 | The learning platform features an attractive design |
| FP2 | The learning platform keeps updated information on everything related to the subject |
| FP3 | The learning platform never presents a problem downloading study material |
| FP4 | The learning platform is easy to use |
| FP5 | The learning platform is always available (optimal connectivity) |
| FP6 | The learning platform facilitates communication between students and teacher |

Likewise, Table 2 shows the indicators that make up the variable satisfaction of mechanical and electrical engineering students in the online teaching environment. It should be noted that the instrument of the model used "DIHEQS" was validated in [25], while the reliability of the data collected from the present investigation was validated through Cronbach's alpha, whose consistency result is 0.868. In Figure 1, the indicators of the functionality of the learning platform that generate an effect on student satisfaction in the online teaching environment are shown.

Table 2. Indicators that measure student satisfaction

| Code | Student satisfaction in online teaching |
|------|---|
| IS1 | I feel good when I interact with other classmates through the learning platform |
| IS2 | Visualizing the design of the learning platform gives me satisfaction |
| IS3 | I am satisfied with the information I find from the learning platform |
| IS4 | I feel relaxed when browsing the learning platform |
| IS5 | The learning platform generates security for me because my private information is not shared with other people who also enter |
| IS6 | I feel greater satisfaction when the teacher and students participate simultaneously in the learning platform |

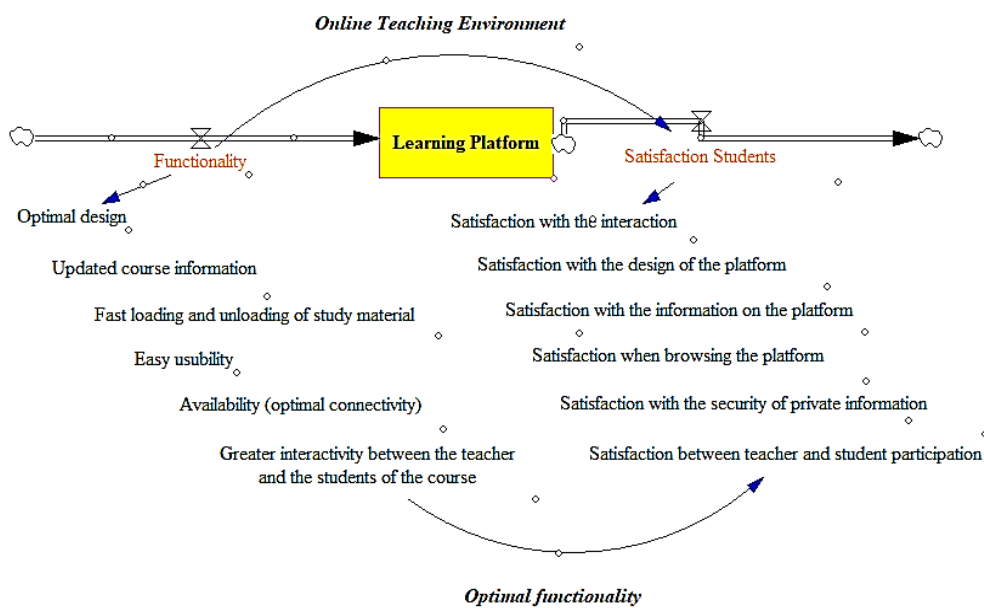


Figure 1. Relationship of the functionality of the learning platform and its effect on student satisfaction

3. RESULTS AND DISCUSSION

The results of the perception of the functionality of the learning platform of the mechanical and electrical engineering students belonging to the automatic process control course are shown in Figure 2. Regarding the functionality of the learning platform, Figure 2 shows that the FP2 and FP4 indicators are the ones that have been best evaluated, with 89.3% of the total number of students indicating that they are satisfied (strongly agree and agree), with the updated information found on the virtual platform about the automatic process control course and with the ease of navigating the platform. Next is the FP1 indicator with 75% of students satisfied (strongly agree and agree) with the design presented by the learning platform. However, regarding the FP3 indicator, it should be taken into account that 14.3% of the students disagree and 21.4% state that they do not agree or disagree with the technical problems that the learning platform presents when downloading the study material.

As can be seen in the results, the disagreement with respect to the learning platform is related to technical problems, in this regard, in [26] it is indicated that 72.5% of users give a low qualification to the level of functionality of the platform. Because they consider that the platform has technical problems related to uploading and downloading files. In addition, as pointed out in [27], the main characteristics that make the learning platform accepted by students and teachers are usability, functionality and flexibility. In the same line in [28] it is determined that the students surveyed have responded that it is of vital importance that the tool used works quickly and efficiently, thus obtaining 60% who consider it essential that the learning platform meets this requirement.

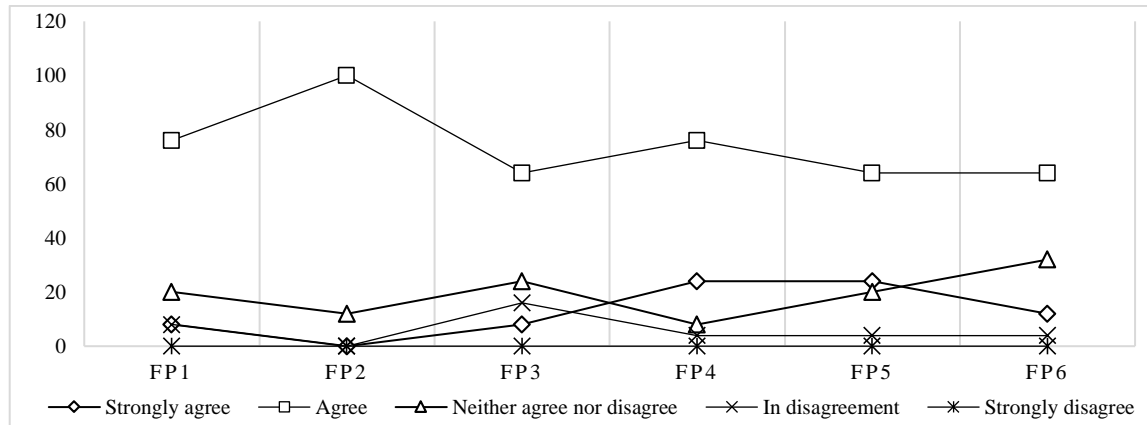


Figure 2. Perception of the functionality of the learning platform

Regarding the optimal functionality of the virtual platform in [29], it is pointed out that the satisfactory evaluation of the quality of the learning platform arises from its good infrastructure. Finding the students more satisfied with the characteristics of accessibility and interactivity of the virtual platform [30]. Al-Omar [31] indicated that a correct functionality of the learning platform causes in the user the certainty and reliability that everything he needs will be found in said virtual environment. Figure 3 shows the results of the satisfaction of mechanical and electrical engineering students belonging to the automatic process control course, with the online teaching environment.

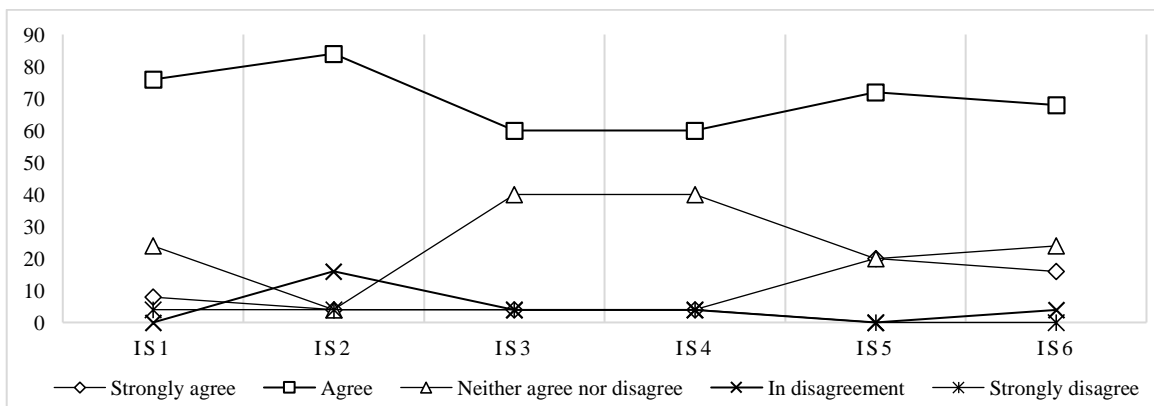


Figure 3. Student satisfaction in the online teaching environment

According to Figure 2 IS5, it is the indicator that presents the highest rating with 82.2% of the total number of students who are satisfied (strongly agree and agree), with the security that the learning platform provides with their private information. Next is the IS2 indicator with 78.6% of the total number of students who are satisfied (strongly agree and agree) with the design of the learning platform. Likewise, they are the IS1 and IS6 indicators, both with 75% of the total satisfied students (strongly agree and agree), when interacting with other classmates and with the teacher through the learning platform.

In general, it can be said that the optimal functionality of the learning platform generates a positive effect on the satisfaction of mechanical and electrical engineering students, with 70.87% being satisfied with the development of the automatic process control course during the course. Context of online teaching. The results are similar to those obtained in [32] where it is pointed out that students who reflect a moderately positive attitude towards the use of the virtual platform show a good perception of the pedagogical design applied in virtual classrooms, because they perceive the activities implemented in the platform as beneficial for their learning. The students value the contribution of the learning platform in the monitoring and teaching of the subjects, when they understand that the teaching proposal helps them personally to have a better organization and to work more autonomously [17].

Finally, by means of the Chi-square test through the SPSS. The cause and effect relationship between the perception of the functionality of the learning platform on the satisfaction of mechanical and electrical engineering students who take the control course is validated automatic processes. Table 3 shows the results obtained, also due to the qualitative methodology the Spearman correlation coefficient is used to measure the level of relationship of the variables under analysis.

Table 3. Chi-square correlation test

| | Value | Asymptotic significance (bilateral) | Spearman correlation |
|---------------------|---------|-------------------------------------|----------------------|
| Spearman Chi-square | 193.136 | 0.000 | 0.602 |

Being the level of significance of 0.05, according to Table 3, the value of the asymptotic significance is 0.000, being this value less than 0.05 (level of significance), the relationship between the perception of the functionality of the learning platform on student satisfaction. In addition, by means of the Spearman coefficient, a high level of relationship (0.602) is determined. As indicated in [17], in a total of 108 association relationships in the form of contingency tables, including the "chi-square" statistic as a test of dependence or independence between variables, significance was found that 33 of them are related to the design of the learning platform, the availability of its use and the usefulness of the interaction tools and the training proposals offered by these platforms. Next, it will be analyzed which of the indicators that make up the variable perception of the functionality of the learning platform, are those that have the greatest relationship with student satisfaction, this analysis will be carried out using the Spearman coefficient. Table 4 shows the results.

Table 4. Spearman correlation test

| | FP1 | FP2 | FP3 | FP4 | FP5 | FP6 |
|----------------------|-------|-------|-------|-------|-------|-------|
| Spearman correlation | 0.640 | 0.414 | 0.336 | 0.400 | 0.419 | 0.617 |

According to the results of Table 4, it is determined that the indicators of the variable perception of the functionality of the learning platform that have a greater relationship with student satisfaction refer to the design and ease of communication and interaction with the teacher and with his colleagues from the automatic process control course. Regarding the interaction, there is a coincidence of the present study with what is expressed in [32], in the understanding that the learning platform is an instrument that facilitates the exchange between teachers and students. In this regard, our results are consistent with those expressed by [10], who posit a positive perception of the learning platform as an instrument of student-teacher exchange and not so much between students. Once it has been determined in Table 5 that the FP6 indicator is the one that presents a greater relationship with the satisfaction of mechanical and electrical engineering students, through the cross-table test, we will state the relationship existing in both indicators. These results are shown in the following Table 5.

Table 5. FP6 and IS6 crosstables

| | | IS6 | | | | | Total |
|-----|----------------------------|-------------------|-----------------|----------------------------|-------|----------------|--------|
| | | Strongly disagree | In disagreement | Neither agree nor disagree | Agree | Strongly agree | |
| FP6 | Strongly disagree | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% |
| | In disagreement | 0.0% | 100.0% | 0.0% | 0.0% | 0.0% | 100.0% |
| | Neither agree nor disagree | 0.0% | 0.0% | 62.5% | 37.5% | 0.0% | 100.0% |
| | Agree | 0.0% | 0.0% | 0.0% | 81.3% | 18.8% | 100.0% |
| | Strongly agree | 0.0% | 0.0% | 33.3% | 33.3% | 33.3% | 100.0% |
| | Total | | 0.0% | 3.6% | 21.4% | 60.7% | 14.3% |

From the results of Table 5, it can be interpreted that the existing relationship in both indicators is expressed as follows: 3.6% of all students who disagree that the learning platform facilitates communication between their classmates and the student teacher (FP6), they are not satisfied that the platform allows them to participate simultaneously with the teacher and students (IS6). On the other hand, 62.5% of students who agree not to agree or disagree with FP6 and IS6, while 33.3% who strongly agree with FP6, state that they do not agree or disagree with IS6.

In addition, the 37.5% who state that they do not agree or disagree with FP6 agree with IS6 and 81.3% who agree with FP6 agree with IS6, in the same way 33.3% agree with both indicators. As indicated in [14], the advantages of the learning platform are very positive, as long as teachers are able to motivate, encourage this process with a successful conduct and involve students, based on the content from which they will be drawn the essentialities according to individual needs based on the established programs, with their instructional and educational objectives, defined for the future graduate. Figure 4 shows the relationship model between the perception of the functionality of the learning platform and the satisfaction of mechanical engineering students who take the automatic process control course in the online teaching environment, as determined there is a 70.87% relationship between the variables in analysis, which was corroborated by the Chi-Square test, therefore the students give a good evaluation when they feel support in their teaching in this case through the online learning platform.

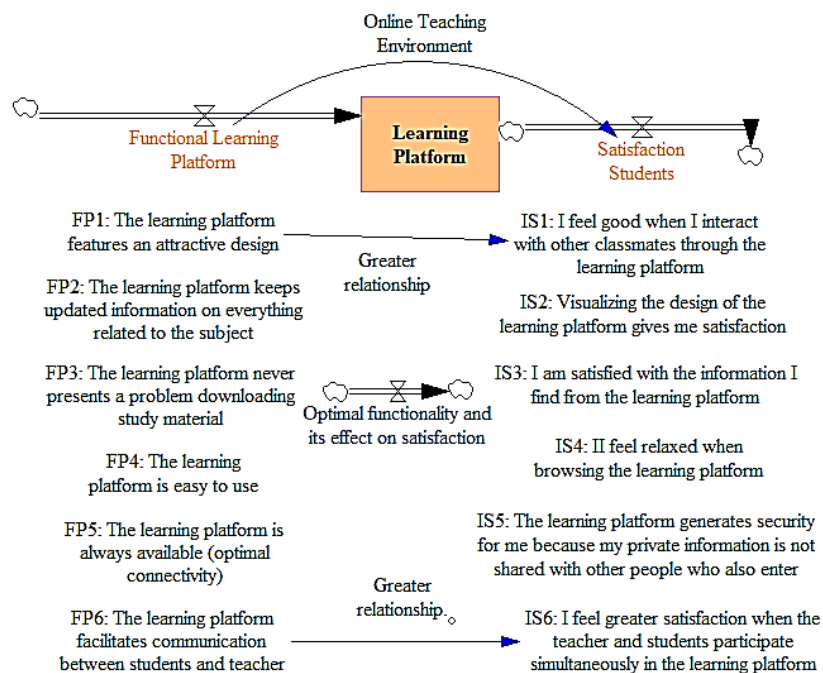


Figure 4. Model of the relationship between the functionality of the learning platform and student satisfaction

4. CONCLUSION

The incorporation of online platforms in higher education is an unquestionable reality today. We find a new teaching system that has both positive aspects and limitations. However, its use implies that the students receiving this resource generate an opinion both towards the tool and towards the platform itself, since this virtual tool must meet the objectives proposed by the higher institution, also meeting the expectations of student satisfaction. Given this, the results of the perception of the functionality of the learning platform, allow to know that the satisfaction of the indicators in analysis, focus on reliability, design, safety, availability, interaction and ease of use. Last indicator should be taken into account that in the digital environment the services offered must be easy to use, friendly and fast, for a good perception of the user experience. In addition, as determined by means of Chi-square, there is a high cause-effect relationship between the perception of the functionality of the learning platform on the satisfaction of mechanical and electrical engineering students of the automatic process control course. In addition, the evaluation of the quality of the platform indicates that the most influential indicators refer to the design, the ease of communication and interaction with the teacher and classmates. Taking into account the indicators that students state that they do not fully agree, it is suggested that the higher institution focus its effort on monitoring and periodic evaluations of the functionality and usability of the learning platform, for the correct provision of its services controlling and verifying that all resources are working properly, thus guaranteeing quality and reliability in all online teaching-learning processes.




REFERENCES

- [1] S. Mateo, S. Jorge, V. David, and V. Rita, "Assessment of students on the use of Microsoft Teams software," *Minerva Journal of Scientific Research*, vol. 1, no. 2, pp. 13–18, Aug. 2020, doi: 10.47460/minerva.v1i2.7.
- [2] S. Jacques, A. Ouahabi, and T. Lequeu, "Remote knowledge acquisition and assessment during the COVID-19 pandemic," *International Journal of Engineering Pedagogy*, vol. 10, no. 6, pp. 35-42, Dec. 2020, doi: 10.3991/ijep.v10i6.16205.
- [3] K. Gonzáles, N. Berdugo, and A. Rubio, "Incidencia de los entornos virtuales de aprendizaje en la calidad de la educación superior, desde el contexto colombiano," *Revista Interamericana De Investigación Educación Y Pedagogía RIEP*, vol. 10, no. 2, pp. 11-24, Jul. 2017, doi: 10.15332/s1657-107X.2017.0002.01.
- [4] P. Junpeng, et al., "Validation of a digital tool for diagnosing mathematical proficiency," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 9, no. 3, pp. 665-674, Sept. 2020, doi: 10.11591/ijere.v9i3.20503.
- [5] I. A. Hieder, S. M. Abdullah, and R. A. Ali, "Utilizing the ATM technology in e-distance learning," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 20, no. 2, pp. 1016-1029, Nov. 2020, doi: 10.11591/ijeecs.v20.i2.pp1016-1029.
- [6] O. Chamorro-Atalaya, D. Arce-Santillan, J. Castro-Bedriñana, T. Díaz-Leyva, and D. Barrientos, "Comparative analysis of student dissatisfaction of the continuing academic semesters at UNTELS," *Advances in Science, Technology and Engineering Systems Journal*, vol. 4, no. 6, pp. 203-207, Dec. 2019, doi: 10.25046/aj040626.
- [7] N. T. Nada, J. M. Mehdi, and S. G. Khalaf, "Computer control of teaching enhancement by communication networked," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 18, no. 2, pp. 736-744, May. 2020, doi: 10.11591/ijeecs.v18.i2.pp736-744.
- [8] V. Mina, M. Silvestre, and L. Otero, "Self-regulated learning in engineering students: strategies for pedagogical resource," *Anales AFA Journal*, vol. 32, no. 1, pp. 32-38, Jul. 2021, doi: 10.31527/analesafa.2021.32.1.32.
- [9] W. F. W. Yaacob, S. A. M. Nasir, W. F. W. Yaacob, and N. M. Sobri, "Supervised data mining approach for predicting student performance," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 16, no. 3, pp. 1584-1592, Dec. 2019, doi: 10.11591/ijeecs.v16.i3.pp1584-1592.
- [10] R. Majid and J. Hasim, "The effectiveness of frog VLE implementation: Students' perspective," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 14, no. 1, pp. 381-387, Apr. 2019, doi: 10.11591/ijeecs.v14.i1.pp381-387.
- [11] O. Okoyeigbo, E. Agboje, E. Omuabor, U. A. Samson, and A. Orimogunje "Design and implementation of a Java based virtual laboratory for data communication simulation," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 10, no. 6, pp. 5883-5890, Dec. 2020, doi: 10.11591/ijece.v10i6.pp5883-5890.
- [12] C. Henry, N. A. Md Ghani, U. M. Abd, and A. N. Bakar, "Factors contributing towards research productivity in higher education," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 9, no. 1, pp. 203–211, Mar. 2020, doi: 10.11591/ijere.v9i1.20420.
- [13] S. Smirnov and A. Ibatova, "Training on professional foreign language for students of engineering specialties: Implementation of electronic technology," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 18, no. 1, pp. 301-309, Apr. 2019, doi: 10.11591/ijeecs.v18.i1.pp301-309.
- [14] M. A. Mokhtar and N. Nurulhuda, "An exploratory study of industry 4.0 in Malaysia: a case study of higher education institution in Malaysia," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 16, no. 2, pp. 978-987, Nov. 2019, doi: 10.11591/ijeecs.v16.i2.pp978-987.
- [15] B. Kurdi, M. Alshurideh, and S. A. Salloum, "Investigating a theoretical framework for e-learning technology acceptance," *International Journal of Electrical and Computer Engineering (IJECE)*, vol. 10, no. 6, pp. 6484-6496, Dec. 2020, doi: 10.11591/ijece.v10i6.pp6484-6496.
- [16] N. A. Mansor, N. Abdullah, and H. Abd Rahman, "Towards electronic learning features in education 4.0 environment: Literature study," *Indonesian Journal of Electrical Engineering and Computer Science (IJECS)*, vol. 19, no. 1, pp. 442-450, Jul. 2020, doi: 10.11591/ijeecs.v19.i1.pp442-450.
- [17] S. E. Van Nuland and K. A. Rogers, "The anatomy of E-Learning tools: Does software usability influence learning outcomes?," *Anatomical Sciences Education*, vol. 9, no. 4, pp. 378-390, Jul. 2016, doi: 10.1002/ase.1589.
- [18] A. Taufik and Z. Istiarsono, "Perspectives on the challenges of leadership in schools to improve student learning systems," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 9, no. 3, pp. 600-606, Sept. 2020, doi: 10.11591/ijere.v9i3.20485.
- [19] A. I. Gunesequera, Y. Bao, and M. Kibelloh, "The role of usability on elearning user interactions and satisfaction: a literature review," *Journal of Systems and Information Technology*, vol. 21, no. 3, pp. 368-394, Oct. 2019, doi: 10.1108/JSIT-02-2019-0024.
- [20] D. Nofriansyah, Ganefri, and Ridwan, "A new learning model of software engineering in vocational education," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 9, no. 3, pp. 572-582, Sept. 2020, doi: 10.11591/ijere.v9i3.20482.
- [21] M. Sheikh, A. H. Muhammad, and Q. N. H. Naveed, "Enhancing usability of e-learning platform: A case study of khan academy," *Sir Syed Journal of Education & Social Research (SJSER)*, vol. 4, no. 2, pp. 40–50, Jun. 2021, doi: 10.36902/sjservol4-iss2-2021(40-50).
- [22] J. R. S.-Arellana, H. D. P.-Logreira, and A. A. P.-Tovar, "Digital skills of future professionals in times of pandemic," *Utopia and Latin American praxis Journal*, vol. 25, no. 11, pp. 222-232, Nov. 2020, doi: 10.5281/zenodo.4278352.
- [23] W. A.-Salinas, M. de las F.-Lara, A. J.-López, and R. R.-Castellón, "Perception of students about the blended learning in the teaching of the basic engineering sciences. a university case study," *Formación Universitaria*, vol. 12, no. 3, pp. 15-26, Jun. 2019, doi: 10.4067/S0718-50062019000300015.
- [24] O. F. C.-Atalaya, T. N. D.-Leyva, D. Y. A.-Santillan, J. I. C.-Bedriñana, D. M. B. Pichilingue, and A. R.-Gonzales, "Satisfaction of the graduate for the continuous improvement of educational quality in UNTELS," *Advances in Science, Technology and Engineering Systems Journal*, vol. 4, no. 5, pp. 151-157, Sept. 2019, doi: 10.25046/aj040520.
- [25] N. Bedregal-Alpaca, V. Comejo-Aparicio, D. Tupacyupanqui-Jaén, and S. Flores-Silva, "Evaluation of student perception in relation to the use of the Moodle platform from the TAM perspective," *Chilean Journal of Engineering*, vol. 27, no. 4, pp. 707-718, Dec. 2019, doi: 10.4067/S0718-33052019000400707.
- [26] A. Alghafis, A. Alrasheed, and A. Abdulghany, "A study on the usability of Moodle and Blackboard—saudi students perspectives," *International Journal of Interactive Mobile Technologies (IJIM)*, vol. 14, no. 10, pp. 159–165, Jun. 2020, doi: 10.3991/ijim.v14i10.14381.
- [27] B. Isaac, C. Giulianna, L. Emily, and L. David, "Evaluation of student satisfaction about virtual classes," *Minerva Journal of Scientific Research*, vol. 1, no. 2, pp. 5-12, Aug. 2020, doi: 10.47460/minerva.v1i2.6.




- [28] M. Ouadoud, M. Chkouri, A. Nejari, and K. El Kadiri, "Studying and analyzing the evaluation dimensions of e-learning platforms relying on a software engineering approach," *International Journal of Emerging Technologies in Learning (IJET)*, vol. 11, no. 1, pp. 11-20, Feb. 2016, doi: 10.3991/ijet.v11i01.4924.
- [29] P. U. Osadebe and J. F. Osadebe, "Undergraduate business education students' perception on information and communication technology use in teaching and learning," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 9, no. 2, pp. 359-363, Jun. 2020, doi: 10.11591/ijere.v9i2.20326.
- [30] V. M. Díaz, B. E. S. Requena, and E. V. Gea, "Perceptions of university students of learning platforms. A case study," *Studies and Investigations*, vol. 20, no. 1, pp. 283-303, Jan. 2017, doi: 10.5944/ried.20.1.16518.
- [31] K. Al-Omar, "Evaluating the internal and external usability attributes of e-learning websites in Saudi Arabia," *Advanced Computing: An International Journal (ACIJ)*, vol. 8, no. 4, pp. 1-12, Jul. 2017, doi: 10.5121/acij.2017.8401.
- [32] G. Tapia-Repetto, C. Gutierrez, and O. Tremillo-Maldonado, "New technologies in higher education. Perception study in students about the use of WhatsApp and virtual learning environments (Moodle Platform)," *Odontostomatology*, vol. 21, no. 33, pp. 37-43, Jun. 2019, doi: 10.22592/ode2019n33a5.

BIOGRAPHIES OF AUTHORS






Omar Freddy Chamorro Atalaya    is an electronic engineer, graduated from the National University of Callao (UNAC), with a Master's degree in Systems Engineering and a doctoral student at the Faculty of Administrative Sciences at UNAC. Researcher recognized by CONCYTEC (National Council for Science, Technology and Technological Innovation). Research professor at the Universidad Nacional Tecnológica de Lima Sur (UNTELS), in the Associate category, he teaches courses on automatic process control and industrial automation, and design of control panels and electrical control. He is the author of scientific articles indexed to Scopus and WoS. He is a reviewer for scientific articles for journals indexed to Scopus. He is a speaker at scientific conferences, in areas such as data science, machine learning, Natural Language Processing, and Sentiment Analysis. He can be contacted at email: ochamorro@untels.edu.pe.






Guillermo Morales Romero    External Evaluator in University Higher Education at SINEACE. Doctor in Educational Sciences, master's in systems engineering, Master in Public Management, Master in Educational Management. Bachelor of Mathematics and Computer Science, Lawyer with specialist in computer auditing, computer security, X cycle Systems Engineering of UNFV, Professional with 24 years of experience in University Teaching in the careers of Engineering, Computer Science, Law, Mathematics Education, Statistics. Teacher in the different Postgraduate Schools of Public and Private Universities of the Country. Member of the Scientific Committee of the Scientific Journal: Ciencia & Sociedad Autonomous University Tomás Frías de Bolivia; Member of the Scientific Committee of the Multidisciplinary Magazine Ciencia Latina. Mexico. Member of the Lima Chamber of Commerce and the Lima Bar Association. Former specialist in the AGEBAT Area of UGEL 05 - MINEDU. He can be contacted at email: gmorales@une.edu.pe.






César León Velarde    Doctor in Education, Master in Education: Measurement, Evaluation and Accreditation of Educational Quality, Master in Educational Management, Graduate and Bachelor in Education, Bachelor in Sacred Theology. Professor of Philosophy and CDCSS. With more than 10 years of experience as a teacher in private and national universities in Peru. Recognized by a private university as a teacher of academic excellence and as one of the best teachers in that university. I love e-learning education in which I have been able to specialize over the years and obtain pleasing results and recognition. He can be contacted at email: c19593@utp.edu.pe.






Lourdes del Pilar Quevedo Sánchez    is a research professor at the Faculty of Humanities and Medical Sciences at the Catholic University of Trujillo Benedicto XVI, and a professor at the Academic Program of Humanistic Education at the Cesar Vallejo University. Degree in Initial Education and Special Education. Master is in Education with mention in Educational Management and Accreditation and Doctorate in Education. Advisor for various undergraduate and postgraduate research projects. Also, she work in consultancy for various programs of the Ministry of Education (MINEDU), Ministry of Labor (MTPE), Ministry of Social Inclusion (MIDIS), Ombudsman and Judicial Power. She can be contacted at email: l.quevedo@uct.edu.pe.






Yurfa Carolina Medina Bedón    is a research professor at the National University of Education of Peru, she have a degree in Education, and she teach at the university from 2005 to the present, in the Faculty of Sciences in the Department of Chemistry. she have a Master's degree in Environmental Education and sustainable development and Doctor of Educational Sciences. She can be contacted at email: ymedina@une.edu.pe.



Abel Alejandro Tasayco Jala    is a research professor at the San Juan Bautista Private University of Peru, he have a degree in Administration and Education. He teach at the University from 2016 to the present, in the Faculty of Communication and Administrative Sciences, he have a Master's degree in University Teaching and a Doctorate in Education; he is studying a Master's Degree in Research and University Teaching and a Doctor in Administration. At the university level he carry out research on administration, university education and knowledge management, he is thesis advisor, for international evaluator, International Table Commentator, National and International Speaker, Author and Co-author of books, book chapters and International and National articles. Active Member of International Communities such as CEVAI and ALININ. He is responsible for the Research Seedbeds of the Professional Academic School of Business Administration. He can be contacted at email: abel.tasayco@upsjb.edu.pe.



Maritte Giovanna Fierro Bravo    Research Professor at the Federico Villarreal National University of Peru, she is a engineer and teach at the university from 2020 to the present, in the Faculty of Economic Sciences. She is a Master and Doctor of Administration. At the university level, she carry out research in engineering and management; she carry out audits and consultancies for private and government companies. She can be contacted at email: mfierro@unfv.edu.pe.