

Evaluation of the functionality of the virtual platform in the teaching process: analysis based on the usability factor

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ABSTRACT

The use of virtual platforms has been increasing exponentially during the context of distance education, however, there are still limitations to innovate in pedagogical proposals. This can hinder the assurance of student learning, either due to the little planning that occurred in its incorporation, the little knowledge of teachers and students in the educational use or the lack of use of the functionalities that they have incorporated for communication. The purpose of the research is to evaluate the operability of the virtual platform in the teaching-learning process through analysis based on the usability factor, the results will allow us to continue improving the tools linked to distance higher education. At the development of the investigation, a reliability value of 0.985 was obtained by means of Cronbach's Alpha. It was found as findings that 73.8% perceive an improvement in communication and in the exchange of information. Regarding the usability factor, 73.9% fully agree with the information available on the virtual platform and its accessibility. From what was determined, it is concluded that 65.98% of students consider that the functionality of the virtual platform with respect to the usability factor positively influences the teaching-learning process.

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1. INTRODUCTION

In these times, a greater demand for technological infrastructure is perceived in the educational processes of university learning [1]. In the presence of a pandemic scenario and with the strong need to move from a presence mode to a virtual mode of learning, this demand showed greater growth as educational institutions sought to continue the academic service [2]. However, by massively and permanently including this type of technological tools in the day-to-day learning process, it has meant that both students and teachers can adapt to achieve better interaction virtually [3], [4]. Under this reality, the teacher is assuming a preponderant role since they are the ones who initially transmit the characteristics and functionalities of these new learning environments to the students [5]-[7].

Currently, there is talk of synchronous and asynchronous sessions, and that is where the use of virtual platforms becomes relevant, since they are part of the teacher's teaching strategies, which helped some

educational institutions to modify their curricular design as well as methodological aspects [8], [9]. The use of technological tools, as well as their resources, have allowed the creation of virtual spaces in which an interactive environment is evident that encourages collaborative work between students and teachers [10]. Other aspects, which show the benefits and advantages of working with virtual platforms, is the generation of permanent reflection and criticism in order to promote significant learning experiences [11]. To determine the quality of the service provided to students through virtual platforms, one of the indicators to monitor is availability, a relevant aspect that must be guaranteed in order to ensure that students have efficient learning [12], [13].

Based on what has been pointed out, there is an expectation about how the performance and operability indicators of virtual platforms are measured or monitored in the context of university learning [14], [15]. There are several studies focused on evaluating the functionality of virtual platforms through the opinions of the students themselves, through a questionnaire that seeks to obtain their perception regarding the satisfaction of the virtual environment [16]-[18]. The virtual tools offered by universities should always be optimized seeking to improve student satisfaction [19]-[21]. Based on these assessments, the study of the quality of the technological tools that allowed the continuity of the university academic service is considered relevant [22], [23].

With which it is necessary to measure which aspects are necessary to improve or aspects in which there is a greater dissatisfaction of the students [24], [25]. Educational institutions must focus full attention on permanently evaluating the infrastructure used for virtual teaching, but focusing mainly on the perception of students [26]-[28]. By virtue of the above, the research focuses on evaluating the functionality of the platform in the teaching-learning process through analysis based on the usability factor; the results will allow us to continue improving the tools linked to distance higher education. It should be noted that this research stems from a study conducted in [29].

2. LITERARY REVIEW

Educational institutions need to evaluate the role played by educational platforms in the development of the quality of education, because it is the central axis that requires focusing on the mode of teacher and student interaction, through an interactive work model in a digital environment that increases the interaction of the teacher with his classroom. Currently the platforms are the visible face of educational institutions and the perception of the student public is to characterize virtual education as a cold education and lack of motivation [30]. On the other hand, it is essential to ensure access to learning and its forms of evaluation in times of pandemic, to overcome certain barriers that are still accentuated in the current contexts related to access to information and communication technologies (ICT), to socio-emotional well-being, to the characteristics of learning and apprentice on forms and styles, and to the socioeconomic reality of each student.

In this sense, it is vital that educational institutions and government bodies focus on the way in which teaching-learning strategies are significant to achieve inclusion, comprehensiveness, interest, and motivation in students [31]. Following the line of research in Castro *et al.* [32], the new information and communication technologies (NTICs) and their incorporation into the educational world is a challenge that still needs to be analyzed and debated. Picón *et al.* [33] admits that adequate pedagogical training in digital methodologies is crucial to provide significant data for the evaluation of the performance of both the teacher and the technological tools used in teaching. Badia *et al.* [34], the experiences of teachers and students in terms of virtual environments during classes were explored, referring to the teacher-student interaction, the ways of teaching, as well as the needs and the necessary support to cope with this educational modality. In this research, it was found that the students, in general, demonstrated an adequate level of satisfaction with the face-to-face courses, based on a degree equivalent to the face-to-face courses of the faculty and the university as a whole.

3. METHOD

The methodology is of a descriptive level, initially the evaluation of the functionality will be analyzed based on the usability factor of the virtual platform. The evaluation is determined by the satisfaction of 756 students. The Chi-square test was used, as well as cross tables to determine the association of the indicators. The instrument used is a questionnaire, whose validation has been carried out in [6]. Through the SPSS v.25 software, Cronbach's Alpha was determined, whose value obtained was 0.985. Table 1 shows the indicators used in the evaluation of the functionality of the virtual platform. Table 2 details the indicators used in the analysis of the usability of the virtual platform.

Table 1. Evaluation of the virtual platform indicators

Indicators	Evaluation of the virtual platform
F1	The virtual platform offers resources that contribute to the viability of the learning process
F2	The virtual platform provided support to teachers and students
F3	After the class session, the platform provides exchange of information between the student and the teacher
F4	The platform helped group learning
F5	The platform contributed to optimizing communication between teachers and students.
F6	The platform contributes to the social link and teamwork
F7	The platform contributed to improving the safety of the teaching-learning process

Table 2. Usability of the virtual platform indicators

Indicators	Usability of the virtual platform
M1	Access at all times to the information uploaded on the virtual platform
M2	The platform enhances meaningful learning in students
M3	The platform offers an individualized learning space
M4	The platform provides benefits that meet the expectations of the teaching process
M5	The platform provides educational materials that complement the teaching-learning process
M6	The evaluation on the platform allows to achieve the competences defined in the subject
M7	Possesses the main skills to drive the platform

Figure 1 shows the interaction architecture of the usability factor of the virtual platform with respect to collaborative learning based on student-teacher and student-student interaction, with the purpose of achieving the development of skills and abilities linked to the contents of the subject. Likewise, it is highlighted that among the relevant factors in the evaluation of the platform, accessibility to content, personalized learning, the development of synchronous and asynchronous activities, the ease of uploading and downloading data in different formats (for example, if the the platform accepts specific formats of engineering software such as MATLAB, Fluid Sim, Logo Soft Comfort), and finally the resources for student evaluation.

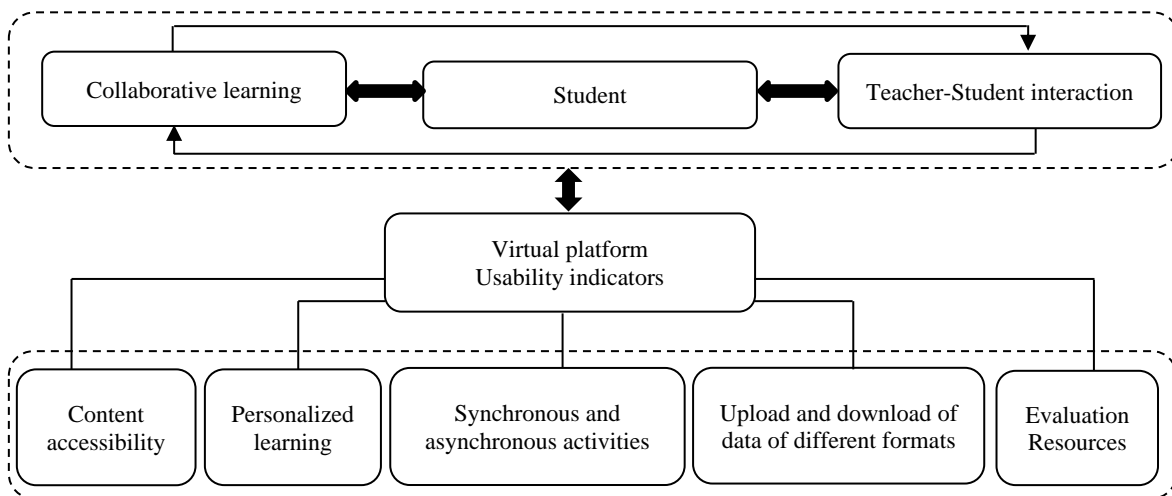


Figure 1. Interaction architecture of the virtual platform with student learning

4. RESULTS AND DISCUSSION

It can be established from Figure 2 that 73.8% of the students totally agree and agree with the perception of an improvement in the transfer of information (F5). Likewise, 71.4% "totally agree" and "agree" with the perception that its use made the activities of the teaching process more efficient and safer (F7). While 21.4% indicated that they neither agree nor disagree that the platform helped group learning (F4) and that the use of the platform favored social relations by promoting teamwork (F6). In this regard, the research in Lagunas *et al.* [27] specifies that 3.44% of students specify that virtual tools did not allow them the necessary communication with their fellow students and teachers, for which they establish as inadequate for virtual learning while 47% totally agree.

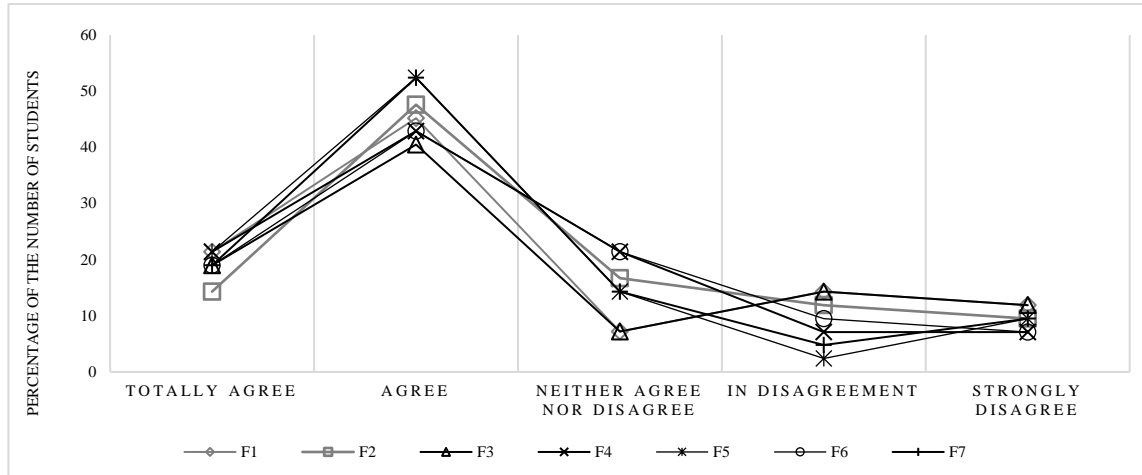


Figure 2. Evaluation of the functionality of the virtual platform

Figure 3 shows the findings regarding the analysis based on usability. The results indicate that 73.9% "totally agree" and "agree" with the information available on the platform and its accessibility (U1). Likewise, 73.8% "totally agree" and "agree" that they perceive they have relevant information to manage the platform (U7). On the other hand, 16.7% responded that they "totally disagree" with the available functionalities (U2) and that the platform provides aspects that complement the teaching process (U5). In the same line of opinion in [28], 72.5% of the respondents specify a "low" weighting for the use of the platform, stating that this resource does not satisfy the student's requirement.

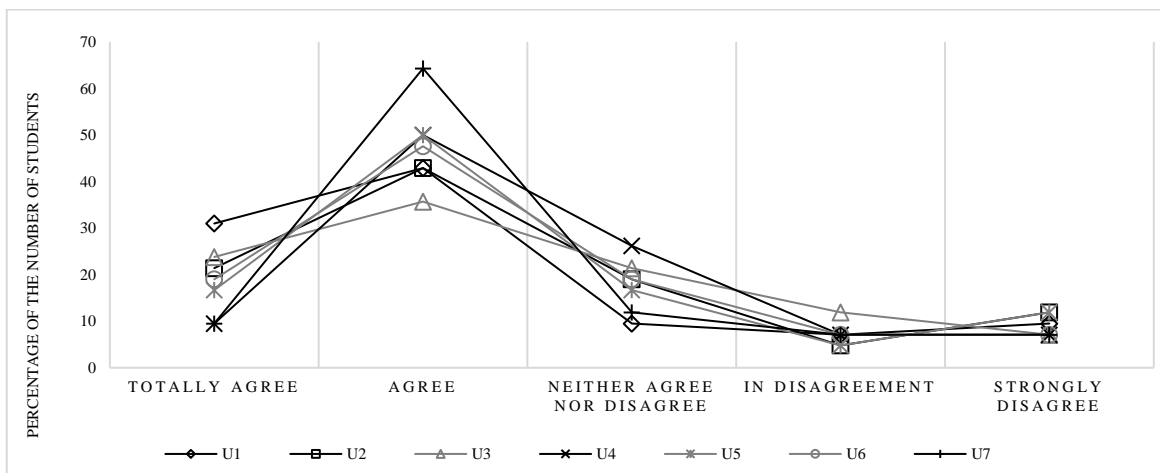


Figure 3. Analysis based on the usability of the virtual platform

Guerrero *et al.* [35] specified that virtual educational tools that operate efficiently are relevant, in this regard 60% of the sample affirms that the application of these resources allows the teaching process to lead to the development of sessions with greater security of knowledge learning. On the other hand, 65.98% are "very satisfied" with the operation of the platform and affirm that it has a positive influence on educational processes. In relation to the results in [36], it is specified that 62% stated that they prefer their teaching through ICT, since it improves their learning, 62.5% indicated that ICT contributed to the development of the acquired capacities and 59% stated that they agree that ICT contributed positively in class sessions. Likewise, it was found that there is an association between the study indicators, for which the Chi-Square statistic was used. As can be seen in Table 3, for all cases the asymptotic significance turned out to have a value of zero, which establishes that there is an association between the variables.

Table 3. Correlational analysis

Spearman	Chi-square				0.000			
	U1	U2	U3	U4	U5	U6	U7	
F1	0.839	0.693	0.755	0.723	0.752	0.696	0.635	
F2	0.763	0.755	0.836	0.733	0.789	0.763	0.670	
F3	0.807	0.803	0.859	0.704	0.734	0.754	0.665	
F4	0.731	0.715	0.715	0.864	0.832	0.760	0.796	
F5	0.798	0.861	0.794	0.663	0.742	0.698	0.710	
F6	0.815	0.797	0.816	0.810	0.781	0.834	0.738	
F7	0.681	0.707	0.685	0.687	0.788	0.813	0.849	

Regarding Table 3, it is evident that there is a significant level of association between the indicators. Tabassum [37] a moderate and significant relationship between the indicators of technological tools and collaborative learning is specified. Through the analysis of crossed tables, the findings related to the perception of the students will be described. Table 4 shows the association of the students' perception of indicators F4 and U4.

Table 4. Cross tables F4 and U4

Indicator	Parameter	U4					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
F4	Strongly disagree	100%	0.0%	0.0%	0.0%	0.0%	100%
	Disagree	0.0%	100%	0.0%	0.0%	0.0%	100%
	Neither agree nor disagree	0.0%	0.0%	88.9%	11.1%	0.0%	100%
	Agree	0.0%	0.0%	16.7%	83.3%	0.0%	100%
	Strongly agree	0.0%	0.0%	0.0%	55.6%	44.4%	100%
	Total	7.1%	7.1%	26.2%	50.0%	9.5%	100%

Table 4 shows that of the total sample under analysis, 7.1% said they "totally disagree" with indicators F4 and U4, 16.7% agree that the platform contributed to collaborative learning (F4) stating that they neither "agree" nor "disagree" that the platform provides multiple benefits that satisfy the teaching-learning process (U4). In [38] it is stated that the indicators of communication modalities and virtual learning environments show excellent internal consistency with relational values of 0.88 and 0.84. In Table 5, the results show that 75% of the students indicated that they totally disagree with indicators F5 and U2, 18.2% that they "agree" that the platform improved communication by exchanging information between teachers and teachers students (F5).

Table 6 shows the association between F3 and U3. In addition, it can be seen that 7.1% indicated that they "totally disagree" with F3 and U3, 11.8% that they "agree" that for asynchronous sessions the virtual platform contributed to communication between teachers and students. (F3), as well as indicating that they neither agree nor disagree with the platform offering a private learning environment (U3).

Table 5. Cross tables F5 and U2

Indicator	Parameter	U2					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
F5	Strongly disagree	75.0%	25.0%	0.0%	0.0%	0.0%	100%
	Disagree	0.0%	100.0%	0.0%	0.0%	0.0%	100%
	Neither agree nor disagree	33.3%	0.0%	66.7%	0.0%	0.0%	100%
	Agree	0.0%	0.0%	18.2%	72.7%	9.1%	100%
	Strongly agree	0.0%	0.0%	0.0%	22.2%	77.8%	100%
	Total	11.9%	4.8%	19.0%	42.9%	21.4%	100%

Table 6. Cross tables F3 and U3

Indicator	Parameter	U3					Total
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
F3	Strongly disagree	100%	0.0%	0.0%	0.0%	0.0%	100%
	Disagree	0.0%	100%	0.0%	0.0%	0.0%	100%
	Neither agree nor disagree	0.0%	10%	70%	20%	0.0%	100%
	Agree	0.0%	0.0%	11.8%	64.7%	23.5%	100%
	Strongly agree	0.0%	0.0%	0.0%	25.0%	75%	100%
	Total	7.1%	11.9%	21.4%	35.7%	23.8%	100%

5. CONCLUSION

From the results it can be concluded that there is a higher percentage of students who are very satisfied with the functionality of the platform and the resources it provides to students. Thus, it was also possible to identify that students significantly consider that it positively influences the teaching-learning process, since they perceive an improvement in communication and in the exchange of learning resources between classmates. They also agree that this type of technological tools applied to the teaching process made the activities more efficient and safer, since the accessibility to the contents is permanent. On the other hand, 16.6% of the population under study are dissatisfied with the functionality of the platform since it did not allow them to improve the teaching-learning process, in terms of the usability factor, it is linked to the material and resources available on the platform virtual that does not enhance meaningful learning.

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