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## JOURNAL OF LANGUAGE AND LINGUISTIC STUDIES

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ISSN: 1305-578X

*Journal of Language and Linguistic Studies*, 18(1), 1026-1036; 2022

# Work-Based Virtual Learning: Analysis of the Perceptions of Vocational Training Teachers and Trainers

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### APA Citation:

Avendaño, W.R., Gamboa, A.A., & Prada, R. (2020). Aprendizaje Virtual Basado en el Trabajo: Análisis de las Percepciones de Profesores y Formadores de Formación Profesional. *Journal of Language and Linguistic Studies*, 18(1), 1026-1036.

Submission Date: 20/10/2021

Acceptance Date: 25/01/2022

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### Abstract

The objective was to analyze the perceptions of teachers and trainers of professional training belonging to the Universidad Francisco de Paula Santander's faculty of business sciences on work-based e-learning. Methodologically, the research was quantitative, descriptive and cross-sectional. The sample consisted of 71 teachers. The instrument used was a Likert-type questionnaire with several alternatives. The results determined that the formative actions for virtual learning (knowledge, exploration and immersion) increase the teachers' work time for planning and monitoring, considering the training workload, development of synchronous and asynchronous activities, and group and individual activities. It was concluded that establishing a system of virtual learning strategies and tutoring the teaching work is the key to providing a viable approach that allows students to acquire knowledge in a safe environment while solving real-world problems.

*Palabras claves:* Aprendizaje Virtual; Aprendizaje Basado en el Trabajo; Formación Profesional.

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## 1. Introduction

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In Colombia, regulations require undergraduate university students to complete a semester of internship as a graduation requirement to learn the essential practices needed to succeed in a work environment. This provides students with the skills they need for work, and personal development and helps them adapt to the labor market. In addition, according to Sábala et al. (2021), Law 2043 of 2020, which recognizes work practices as professional experience and Decree 616 of June 2021, regulates professional experience and contributes to academic validation by reflecting their recognition.

Hence, work-based learning experiences are a crucial aspect of preparing all students for life after university studies. Moreover, theoretically, work practice as a technical, pedagogical strategy is the transmission to its students of general and systematic knowledge for professional performance (García et al., 2020); therefore, they are the fundamental scenario where theory is articulated with practice in higher education (García et al., 2022; Gamboa, 2019).

On the other hand, the Universidad Francisco de Paula Santander (2021) in Resolution 150 (2021), typifies that the professional practice in its academic and formative dimensions promotes the development of training spaces to carry out the exercise of their profession, duly accompanied by the Institution through the integration of professionals in various disciplines in work environments. It is sought that the student strengthens creativity, entrepreneurial spirit and the ability to make decisions inspired by solid ethical principles.

The literature review on professional practice (Cejas et al., 2019) points out that professional training is a key instrument of competencies in the labor field, as they are continuously created and recreated in professional practice, which contains a solid reflective and ethical component related to the professional performance to which it is linked. Hence, professional practices are considered to mean sustained interactions with contractors or community professionals in natural work environments, to the extent possible, or simulated environments that foster a deep and first-hand engagement with the required tasks of a given professional field that are aligned with the curriculum, instruction and standards of the program.

Rizzari (2014) emphasizes that work-based learning is based on three foundations of academic institutions: learning as an individual cognitive process in the external environment and visible and measurable learning outcomes. In other words, learning that first strengthens thinking is the most valuable for subsequent application in action and produces explicit (not tacit) knowledge. On the contrary, learning in the work context is described as a process of action that occurs not only in the learner's cognition but also in his or her reference environment. In this regard, the European Centre for the Development of Vocational Training (Cedefop) defines work-based learning (WBL) as the "acquisition of knowledge and skills through the performance of tasks (followed by reflection) in a vocational context, either in the workplace ... or in a vocational training center" (European Centre for the Development of Vocational Training [Cedefop], 2014, p. 294).

For Bates (2017), Internship learning is not only about learning to do (active learning) but also requires an understanding of the contexts in which the learning will be applied since there is a social and cultural element to learning, which is the understanding and incorporation of accepted practices. Furthermore, the author argues that the internship model can work face-to-face and online. There is an online component, although it works best in a hybrid format. This allows interns to study when they are not working and saves employers time.

In this particular, it is necessary to note that because of the Covid-19 pandemic, social isolation and the paralysis of face-to-face education, many students were unable to complete their work-based learning due to the closure of companies and universities (Urbina & Pérez, 2020). During the pandemic and post-pandemic work-based learning, university professors were conducted in a virtual environment (Osorio & Hernandez, 2020). This entails, on the one hand, that teachers offered multiple options to continue exercising their educational work during social distancing (Rueda et al., 2021a) adaptation when using ICT (Avendaño et al., 2021), as well as challenges and challenges in virtual teaching (Luna et al., 2021).

In that direction, implementing teaching and evaluation methods associated with ICT requires ICT competencies of the teaching professional (Hernández et al., 2017) and appropriation of ICT from a pedagogical dimension (Valencia et al., 2016). In this regard, Luna et al. (2021) adduce that the

challenge is to adopt and adapt technology to the formative needs and foster communication, collaboration and interaction among students, which addresses planning in: (a) Management/organization, which defines the basic rules of teaching for each thematic unit, support and feedback; (b) Learning community building, suitable for the design of activities and student collaboration, (c) Communication, which promote interactions among the actors and; (d) Teaching strategies, which accounts for the approach of synchronous and asynchronous activities, group and individual activities, etc.

According to Hernández et al. (2022), all this required a transition from traditional teaching to distance and virtual teaching during the educational emergency, in which a transposition took place that, to a certain extent, allowed the continuity of pedagogical practices but was necessary for digital learning that demands autonomy, self-regulation and motivation.

Thus, didactic planning, in the words of Rueda et al. (2021b) not only in the training objectives but a didactic based on skills and competencies that support the teaching work, which makes practical use of the multiplicity and diversity of elements during the development of the course for virtual learning, among them, the interactions mediated by technology (Prada et al., 2022), where elements such as content, peers and teachers are incorporated with a system of appropriate tools that provide formative and summative evaluation, including self-evaluation and peer evaluation, with synchronous and asynchronous methods.

According to Díaz (2006), evaluation is a process that includes qualitative or quantitative assessment activities. In addition, "...are the evidence produced or manifested by the students on which the evaluation is performed that inform about the learning results achieved by the students" (Rodríguez & Ibarra, 2011). Based on constructivism, evaluation is based on students' understanding, peer feedback processes and self-evaluation. Therefore, they lead to a degree of harmony between educators and students in teaching mediated by ICT.

Therefore, this work provides an advance in the scientific field concerning the acquisition of knowledge and skills through the realization and reflection of tasks in real work situations, either in learning in the workplace or competencies in vocational training as "a process of training and training that only generates a certain knowledge; however, these training processes in the professional and educational field while generating an added value to the person who reviews their training ..." (Cejas et al., 2019). In particular, in working, as its name indicates, in practical classes, adapting learning strategies for distance learning, involving both students and teachers, and improving teaching methods, especially with the most difficult parts/topics to teach at a distance.

In the practical, to know the perceptions of teachers in the university context about formal education with work-based learning that will allow students to build employability skills (Quiroz, 2007) and the ongoing inquiry of the problems of the reality of virtual learning in the university community, where teachers and students can use the tools and technology for learning, communication and evaluation (Prada et al., 2019). Therefore, the objective of the study is to provide an analysis of the perceptions of teachers and trainers of vocational training belonging to the Universidad Francisco de Paula Santander to the faculty of business sciences on work-based virtual learning.

## **2. Method**

The inquiry was conducted under a quantitative approach at a descriptive level because it seeks to describe, according to (Hernández et al., 2014), properties, characteristics and profiles of people, groups, communities, processes, objects or any other phenomenon that is subjected to analysis. In addition, this research is cross-sectional, where information is collected at a specific time that identifies work-based e-learning from the appreciation of teachers and trainers of professional training; in turn, the research was developed in three phases: 1) research design, 2) data collection, and 3) analysis and development.

### *2.1. Research design*

The population, according to Arias (2012), "is a finite or infinite set of elements with common characteristics for which the conclusions of the research are extensive. It is delimited by the problem and the objectives of the stud" (p. 82). Population data were achieved through an online survey for

vocational teachers and trainers. A total of 115 educators responded to the questionnaire and 85 of those who applied the instruments were valid. For the calculation of the sample, a sampling error of  $\pm 5$  was considered with a confidence level of 95%, and a probability of success and failure of 50%. The result was a sample of 71, composed of 40 women (56.3%) and 31 men (43.7%). The population selection criterion was based on whether the teacher was teaching with digital learning between 2020 and 2022.

The mean age of the respondents was 42 years ( $SD = 27.1$ ) and the sample was divided into four groups: under 30 years (5.6%), 31 to 40 years (32.4), 41 to 50 years (35.2%), 51 to 60 years (22.5%) and over 60 years (4.2%). The sample is also structured according to the Faculty where the respondents teach, with four groups of Business Faculty: Public Accounting (45.1%), Business Administration (33.8%), and International Commerce (21.1%). In any case, all those surveyed provide university education in vocational training. It was also found that 80.3% of those surveyed have a master's degree, while 9.9% indicated that they have a doctorate. The rest, others (9.9%), refer to having a specialization. Similarly, 47.9% (34 teachers) have been teaching university education and vocational training for more than 10 years. The rest have worked between one to five years (28.2) and between six to 10 years (23.9%).

## 2.2. Collection of information

A questionnaire was developed for the collection of information. The instrument was self-administered online and structured with 20 questions with several answer options and multiple-choice questions. It was thought favorable to organize it in blocks that would show all the aspects related to the objectives of work-based e-learning. Therefore, the first block is to obtain generally. The second block is about technical knowledge and skills. The third block is about teaching in e-learning and learning activities. The fourth is about assessment methods, and finally, the fifth block is about teaching work during the pandemic and post-pandemic.

## Analysis and development

The data collected were organized and tabulated in Excel spreadsheets. From there, descriptive statistics were applied to the questionnaire as the frequency for the analysis and interpretation of the data.

## 3. Results and discussion

The following is a description of the results obtained with the application of the questionnaire on work-based e-learning in vocational teachers of the Faculty of Business Sciences.

### 3.1. Knowledge and skills in digital technology

**Table 1.** Planning and organization of learning-by-doing

Item	options					
		Very good	Good	Satisfactory	Deficient	No knowledge/skills
<b>6. Indicate the degree of knowledge and skills in digital technologies (multiple options)</b>	fr	13	8	0	0	0
	%	61,9%	38,1%	0,0%	0,0%	0,0%
Computer use	fr	6	13	2	0	0
	%	28,6%	61,9%	9,5%	0,0%	0,0%
Office software	fr	9	10	2	0	0
	%	42,9%	47,6%	9,5%	0,0%	0,0%
Social networks	fr	6	13	1	1	0
	%	28,6%	61,9%	4,8%	4,8%	0,0%
Learning Platforms (LMS Moodle)]	fr	3	13	5	0	0
	%	14,3%	61,9%	23,8%	0,0%	0,0%
Web 2.0 tools (video, audio, maps and interactive graphics, etc.)	fr	2	7	10	1	1
	%	9,5%	33,3%	47,6%	4,8%	4,8%
Creation of learning materials (OVA)	fr					
	%					

Table 1 shows the results on knowledge and skills in digital technologies of the professional training teachers of the Faculty of Business Sciences. For item 7, it was found that the degree of knowledge and skills in digital technologies that these teachers have between the very good and good alternatives are the following: use of desktop or laptop computers (100.0%); office software (90.5%); social networks (90.5%); learning platforms or LMS in Moodle (90.4%); web 2.0 tools with the use of video, audio, maps and interactive graphics, among others (76.2%) and creation of learning materials and OVA (42.8%).

These results, expressed in item 6, show that professors in Business Sciences at the Universidad Francisco de Paula Santander have acquired the knowledge and skills in digital technologies to present it for pedagogical and communicative use, which demonstrates that these professors have adopted and adapted the technology to the training and communication needs proposed by Luna et al. (2021) for the quality of virtual teaching and therefore, in virtual learning of students.

### 3.2. Teaching in e-learning and learning activities

Related findings on teaching in e-learning and learning activities highlight the planning and organization of learning by doing and strategies used for work-based learning, learning methods for digital learning and pedagogical skills for mediation in the distance and virtual education.

**Table 1.** Planning and organization of learning-by-doing

Item	options					
	Always	Almos t always	Somet imes	Alm ost neve r	Never	
<b>7. How did you plan the teaching in the learning-by-doing?</b>						
Study planning based on the lesson plan.	fr	44	14	13	0	0
	%	62,0%	19,7%	18,3%	0,0%	0,0%
Planning by objective	fr	43	20	20	0	0
	%	60,6%	28,2%	28,2%	0,0%	0,0%
Day-to-day planning (daily or for daily use)	fr	27	25	15	2	2
	%	38,0%	35,2%	21,1%	2,8%	2,8%
Task planning by level	fr	27	27	4	0	3
	%	38,0%	38,0%	5,6%	0,0%	4,2%
Individual study plans for students	fr	24	14	30	0	3
	%	33,8%	19,7%	42,3%	0,0%	4,2%

Item 7 of Table 2 shows the data obtained on planning and organization of practical learning of vocational teachers, in which it was identified among the alternatives always and almost always that the surveyed teachers consider common planning by objective in 88.8%. In comparison, planning based on the lesson plan is used in 81.7%, as well as planning tasks by level (76.0%) and planning for daily use (73.2%). However, the least used are individual study plans for students (53.5%).

These results found show that teachers seek to establish links with their students in the action planning stage, as they use different forms of organization of the educational process and its relationship with the development between cognitive activity and pedagogical activities (García et al., 2020), in order to develop knowledge and skills both in independent work and its instrumentation in the understanding of

the contents of the programs. This allows pedagogical planning and management of training activities (Rizzari, 2014) to enhance the student's competencies and skills.

**Table 3.** Planning and organization of learning-by-doing

Item	Options	fr	%
8. What are the strategies used by you, in work-based learning forms? (multiple choice)	On-the-job training	7	33,3 %
	Workplace-based learning	10	47,6 %
	Workplace observation	4	19,0 %
	Hands-on learning in the workplace	7	33,3 %
	Project-based learning.	9	42,9 %
	Problem-based learning.	15	71,4 %

In Table 3, it was found in item 8 that the surveyed teachers most frequently adopt problem-based learning (e 71.4%) along with workplace-based learning (47.6%), project-based learning (42.9%) and on-the-job learning (33.3%), as well as, on-the-job training (33.3%) and on-the-job observation (19.0%), to plan and execute during pandemic and post-pandemic the strategies used for work-based learning.

Observing these results of item 8, it can be deduced that vocational training is given by the use of training actions that provide students with theoretical and practical knowledge to learn to work (knowledge, exploration and immersion). In this way, it provides the skills demanded in certain professions or the labor market (Cedefop, 2014). Therefore, it combines classroom learning (physical or virtual) with work interaction in hands-on learning in the workplace to help students create a direct link between their learning and future careers. This is consistent with the opinion of Sábala et al. (2021) that this constitutes an academic training force for understanding and analyzing the world of work and employability since training is conducted in the workplace.

**Table 4.** Planning and organization of learning-by-doing

Item	options					
	Always	Almost always	Sometimes	Almost never	Never	
9. Which of the following learning methods do you use in your daily work?						
Independent (individual) work	fr 20 % 28,2%	fr 31 % 43,7%	fr 20 % 28,2%	fr 0 % 0,0%	fr 0 % 0,0%	
Teamwork (cooperative)	fr 31 % 43,7%	fr 27 % 38,0%	fr 13 % 18,3%	fr 0 % 0,0%	fr 0 % 0,0%	
Reading and critical analysis	fr 47 % 66,2%	fr 17 % 23,9%	fr 7 % 9,9%	fr 0 % 0,0%	fr 0 % 0,0%	
Project work	fr 34 % 47,9%	fr 27 % 38,0%	fr 7 % 9,9%	fr 3 % 4,2%	fr 0 % 0,0%	
Work as a couple	fr 3 % 4,2%	fr 24 % 33,8%	fr 44 % 62,0%	fr 0 % 0,0%	fr 0 % 0,0%	

The data recorded in Table 4 show the methods for digital learning. In this, it was found that among the alternatives always and almost always (item 9), the technique most used by the teachers surveyed in their daily work to promote digital learning is reading and critical analysis (90.1%). Also, they stated that apart they use project work in 85.9%, followed by teamwork (cooperative) in 81.7%, while independent work (individual) is applied in 71.9% and less used is pair work in 38.0%.

The findings found among items 7, 8, and 9, show that teachers prefer an organization of practical learning by objectives. Thus, they consider at first lesson plans and daily plans, accompanied by learning strategies such as reading and critical analysis and the use of project work to strengthen and ground individual cognitive processes that theoretically support vocational training for project-based, problem-based and practical learning in the workplace. In other words, in a professional practice or internship situation, several learning activities lend themselves to using active teaching strategies, such as problem-solving, project work, case studies, discussions, role-plays, simulation and many others. These are strategies aimed at the learner's active involvement in his or her learning.

This agrees with the approach of Rizzari (2014), who argues that work-based learning is cemented in individual cognitive learning since the student obtains explicit knowledge that, according to Bates (2017) requires an understanding that allows practitioners to study when they are not working in practices or internships. Therefore, teachers based on digital learning work offered varied pedagogical practices to continue exercising their educational work during and after social distancing (Rueda et al., 2021a).

### 3.3. Evaluation

Related findings on assessment in work-based e-learning highlight assessment methods and evaluation of student participation in digital communication channels

#### 3.3.1. Evaluation Methods

**Table 5.** Evaluation Methods

Item	options					
	Always	Almost always	Sometimes	Almost never	Never	
10. Did you evaluate student/team products in a summative manner?	fr	47	21	3	0	0
	%	66,2%	29,6%	4,2%	0,0%	0,0%
11. Did you use formative evaluation	fr	41	30	0	0	0
	%	57,7%	42,3%	0,0%	0,0%	0,0%
12. Did you use peer review (peer review)	fr	3	7	47	14	0
	%	4,2%	9,9%	66,2%	19,7%	0,0%
13. Did you use online tests	fr	37	24	10	0	0
	%	52,1%	33,8%	14,1%	0,0%	0,0%

In Table 5, it was found that in item 10, 95.8% of the surveyed business teachers always evaluated the students/teams' products in a summative manner. While in item 11, it was found that 100.0% of these teachers used formative evaluation. Meanwhile, in item 12, it was determined that 66.2% of the respondents sometimes apply peer evaluation. However, the rest said that they rarely use peer evaluation (19.7%), almost always (9.9%) and always (4.2%). Finally, regarding item 13, respondents always use online testing (85.9%). The rest sometimes in 14.1% assessed through online testing.

The findings in items 10, 11, 12 and 13 evidence that teachers use various methods to evaluate the expected processes of students, as stated by Rodríguez & Ibarra (2011) on the establishment of standards to assess the progress of knowledge, information and skills of students.

## 3.3.2 Evaluation of Student Participation

**Table 6.** Participation in digital communication channels

Item	options					
	Always	Almost always	Sometimes	Almost never	Never	
Participation in digital communication channels	14. How often did students respond when you asked for comments during the video lesson?	fr 30	27	7	0	7
		% 42,3%	38,0%	9,9%	0,0%	9,9%
	15. How often did students respond when you requested feedback through the learning platform?	fr 31	20	14	3	3
		% 43,7%	28,2%	19,7%	4,2%	4,2%
	16. How often did students respond when you asked for feedback at the end of each lesson?	fr 34	30	7	0	0
		% 47,9%	42,3%	9,9%	0,0%	0,0%
	17. How often did students respond when you asked for feedback during the social media conversation?	fr 14	30	10	3	14
		% 19,7%	42,3%	14,1%	4,2%	19,7%

Table 6 shows the results concerning the participation of business students during the years 2020 and 2022, in which the teachers surveyed mentioned that the students responded between the alternatives always and almost always that when asking for comments during the video lesson, the participation of their students was 80.3% (item 14), as well as, the interventions in comments through the learning platform was 71.9% (item 15); when requesting feedback at the end of each lesson was 90.5% (item 16) and feedback during the conversation through social networks was 62.0% (item 17).

Hence, teachers, when evaluating student participation in work-based e-learning (item 18), mention that the level was very high and high with 85.9%. The rest of the students' mediations consider it with a good (9.9%) and medium (4.2%) level (table 7).

**Table 7.** Evaluation of student participation

Item	options					
	Very high	High	Good	Medium	Deficient	
Evaluation of student participation	18. How do you assess the level of student participation in work-based e-learning?	fr 47	14	7	3	0
		% 66,2%	19,7%	9,9%	4,2%	0,0%



In items 14, 15, 16, 17 and 18, it is observed that teachers determine formative activities with different ways to evaluate the participation of students in virtual learning, in which the interaction between student-content, student-teacher and student-student stands out; this type of participation allowed going from the student receiving to participating in his learning, in which formative environments based on the reception to participation and interactivity are encouraged.

This coincides with Cabero-Almenara & Palacios-Rodríguez (2021), who state that the exchange in the community and the support in interactivity move from a summative evaluation to an authentic evaluation with e-activities. It should be remembered that the objectives of the competency-based training process in professional practices should be based on productivity, quality, human resource planning, morale, indirect compensation, health, safety, presence and personal development (Cejas et al., 2019).

### 3.3.3. work of teachers during the pandemic and post-pandemic periods

**Table 8.** Teachers' work during the pandemic and post-pandemic

Item	options					
	A significant increase in	Slightly increased	No change	Decreased slightly	Decreased significantly	
Results of teachers' work	f	27	38	3	3	0
	r	38,0%	53,5%	4,2%	4,2%	0,0%
Work of teachers	f	0	47	24	0	0
	r	0,0%	66,2%	33,8%	0,0%	0,0%

In the results obtained in Table 7, it was found in item 19 that 38.0% of the business science teachers surveyed rated that the results of the teachers' work increased a lot due to the significance of the changes in their work in online learning between 2020 and 2022. However, while another group mentioned that they were slightly increased by 53.5%, others stated that their work was unchanged (4.2%) and the rest were slightly decreased (4.2%).

While when rating the extent of changes in their work in the participation of students in online learning (item 20) it was determined that the work of teachers increased slightly by 66.2%, for the rest of the educators such changes during the pandemic and post-pandemic, were unchanged (33.8%). These findings are consistent with the results found by (Luna et al., 2021), where virtual or ICT-mediated education exercised by teachers increases teachers' work time for planning and accompaniment, taking into account the training workload, development of synchronous and asynchronous activities, group and individual activities.

## 4. Conclusions

Practical learning and practice play a significant role in professional training since it constitutes at least half of the curriculum. Thus, work-based learning does not disdain propositional knowledge since its main interest lies in forming a professional practice that has a unique theoretical status but is

simultaneously put into practice. Its interests circumscribe the interrelationships between various forms of experience, how experience is facilitated and coordinated, the workplace as a place of learning, the assessment of practice-based learning outcomes, and the use of technologies to support distributed virtual learning.

This is an excellent way for teachers and vocational trainers to strengthen teamwork and independent work, practice self-directed study and skills with learning methods used in their daily learning work, or trigger scenarios to define their own learning goals. In other words, this leads students to self-directed virtual learning before returning to group discussions and refining their knowledge. This supports education for practice, encourages prior knowledge, and provides students with a platform to further deepen their knowledge.

Professionals who can absorb change and function accordingly, to accept the challenges of readapting to their environment, must be professionals trained with the needs of the educational and social contexts. Therefore, it is concluded that the establishment of a system of virtual learning strategies and the mentoring form of teaching work is the key to providing a viable approach (workplace-based learning, hands-on workplace learning, project-based learning and problem-based learning) that allows students to acquire knowledge in a safe environment while solving real-world problems. In other words, creating a high-performance virtual learning process enables students to learn on a job- and practice-based, mentoring and apprenticeship basis.

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