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Feedback and ICT tools used by university professors

Retroalimentación y herramientas TIC utilizadas por profesores universitarios

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Abstract

Feedback is the act that aims to transmit to students a set of considerations and evaluations on the development of academic activities. There are several types of feedback according to the pedagogical intentionality of this and in a virtual learning context, teachers have to use technological tools to transmit feedback. This research aims to: 1) describe the type of feedback that teachers develop, and 2) explore the technological tools they use and recommend. A descriptive-explanatory quantitative research was designed, applying an instrument to 28 teachers which consisted of 25 items distributed in 4 dimensions: 1) information about the participants, 2) the feedback developed by the teachers, 3) technological tools used to transmit feedback and 4) the tools recommended to transmit feedback. Among the results, the following stand out: a) the predominant type of feedback is that of failures and successes for the achievement of learning objectives b) e-mail and discussion forum are the main tools used and recommended, c) the more technological training, the more teachers will diversify the technological tools. The conclusions confirm the hypotheses put forward: teachers give feedback to transmit failures and successes, basically use the discussion forum and e-mail, and tend to recommend the same technological tools while claiming to need more technological training.

Keywords: feedback, educational technology, electronic learning, academic teaching personnel, higher education institutions, information technology.

Resumen

la retroalimentación es aquel acto que tiene por objeto transmitir a los estudiantes un conjunto de consideraciones y valoraciones sobre el desarrollo de las actividades académicas. Existen varios tipos según la intencionalidad pedagógica de esta y en un contexto virtual de aprendizaje los docentes han de utilizar herramientas tecnológicas para transmitirla. Esta investigación tiene por objetivo: 1) describir el tipo de retroalimentación que desarrollan los docentes, y 2) explorar las herramientas tecnológicas que usan y recomiendan. Se diseñó una investigación cuantitativa de tipo descriptivo-explicativo, aplicando un instrumento a 28 profesores el cual se conformó por 25 ítems distribuidos en 4 dimensiones: 1) información sobre los participantes, 2) la retroalimentación desarrollada por los profesores, 3) herramientas tecnológicas utilizadas al transmitir la retroalimentación y 4) las herramientas recomendadas para transmitir la retroalimentación. Entre los resultados se destacan: a) el tipo predominante es la de fallos y aciertos para el logro de los objetivos de aprendizaje b) el correo electrónico y el foro de discusión son las principales herramientas que se usan y recomiendan, c) a mayor formación tecnológica, los profesores diversificarán las herramientas tecnológicas. Las conclusiones confirman las hipótesis planteadas: los docentes retroalimentan para transmitir fallos y aciertos, utilizan básicamente el foro de discusión y el correo, y suelen recomendar las mismas herramientas tecnológicas mientras afirman necesitar más formación tecnológica.

Palabras clave: retroalimentación, tecnología educativa, aprendizaje en línea, personal académico docente, universidad, tecnología de la comunicación.

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1. Introduction

Teaching at the university acquires a new meaning when it is carried out in a virtual learning context under what is commonly known as virtual education. Thus, this virtual context has a set of elements that accompany the pedagogical process in which, among other aspects, there is what is called feedback. In this sense, several types are identified depending on the pedagogical intentionality, since not all forms of feedback are the same, nor do they pursue the same objectives. On the other hand, since it is a virtual learning context, it is not enough for teachers to be experts in their disciplines or fields of study, but they must also have a training process that allows them to recognize and use various technological tools that can enrich the experience of transmitting feedback to their students, since the fact of managing a virtual campus or a virtual classroom, for example, does not usually guarantee a variety in the use of technological tools with pedagogical intentionality.

In short, on the one hand it is a matter of investigating the pedagogical connotation that accompanies the intentionality when transmitting feedback and its types by a group of university teachers, and on the other hand, it is necessary to identify those technological tools that are used and recommended when sharing it with students. Since, a process of digital transformation as an institutional objective assumed by the university institution will imply, in its case, the promotion of a digital culture that by means of the Information and Communication Technologies, allows both enriching the teaching experience, improving the pedagogical process of the students and promoting the vision that virtuality does not necessarily imply the feeling of remoteness or distance between the active actors of the pedagogical process.

1.1 Feedback and its pedagogical meaning

At the university level, the follow-up carried out by the teacher towards his students involves recognizing the importance of the formative evaluative process, i.e., the teacher must accompany the student during the process. The action exercised by the teacher to transmit his evaluations regarding the performance of his students is called feedback (Trejo, 2021), which is a fact associated with the achievement of learning and is part of formative evaluation (Mollo and Deroncele, 2022), being catalogued as the main action in the transmission of evaluations regarding a given achievement. The meaning of this action has deep pedagogical roots, since it is the teacher who initiates the communication in order for the student to perceive those elements, that in his case may be strengths or challenges to overcome.

Regardless of the fact that the result of a given academic activity is not the expected one (Valdivia, 2014), the message to be transmitted when developing such action has to originate from the idea that, indeed, it has to exercise a self-regulating power of the student's own learning (Parra Martínez et al., 2022), from the type of feedback that the teacher assumes as a pedagogical practice. Therefore, such action must be linked to the pedagogical processes so that the feedback exercise itself is a learning resource, in this case for higher education.

A review of the scientific literature confirms its importance in multiple areas of university teaching. Thus, it allows students to recognize their level of performance and the aspects that need improvement (Valdivia, 2014), encourages the development of critical thinking (León-Warthon, 2021), allows students to activate internal processes for the self-regulation of their own learning (García et al., 2021), fosters non-linear interpersonal communication between teacher and student (Sepúlveda-Romero, 2019), has to be comprehensible, relevant, objective and constructive (Espinoza Freire, 2021) and can also encourage the emergence of preventive actions focused on a process of continuous improvement (Veytia Bucheli and Rodríguez Serrano, 2021). All of the above is framed in the role of the teacher and his position in the pedagogical exercise of his training function, which means that the action of transmitting evaluations and considerations to the student focuses on the teaching function.

Several types of feedback are identified, which will respond to the pedagogical intentionality of whoever exercises it. Its typification does not represent absolute concepts, however, it presents indicators that allow to outline a certain type from the dominant element of this one. Thus, and according to Espinoza Freire (2021), four types are identified: the first corresponds to one based on the communication of achievements and limitations by the

student in the development of an academic activity. This type includes the communication of evaluation criteria and the indication of actions established to try to solve possible difficulties. This is called «feedback oriented to the results of the academic activity».

The second type has to do with procedures that are developed at the time of performing the academic activity: the level of understanding, the learning strategies that are conducted in the pedagogical process, the resources used, and the critical and reflective process carried out by the student (Sepúlveda-Romero, 2019). This is called «process-oriented feedback».

A third type corresponds to transmitting to the students skills that have intervened so that these serve as guidance when performing academic activities to promote autonomous thinking, self-regulation of learning and self-evaluation of the process (García et al., 2021). This is known as «self-learning oriented feedback».

The fourth type is more linked to the person, i.e., information is transmitted about the student's own personal competencies so that he/she can identify his/her own achievements and strengths and how these help him/her in the development of his/her studies and in carrying out an academic activity (León-Warthon, 2021). This includes personal exchange of experiences that have determined the learning process of both the teacher and the student, the value of involvement in studies and responsibility. This type of feedback is called «person-oriented feedback».

Although it is true that throughout the scientific review, the value of such action in the development of the students' learning process is confirmed, it is necessary to develop studies that evidence the practices deployed by university teachers. It is a matter of exposing findings on current trends in the way teachers configure their practice and what they usually transmit to their students. This would make it possible to identify, for example, to

what extent teachers orient their teaching towards processes, results, self-learning or personal development, considering that these approaches imply a reflective dialogue «about learning challenges and opportunities» (León-Warthon, 2021, p. 564), as well as «a systematic, systemic, participatory and reflective process» (García et al., 2021, p. 47).

1.2 Artificial Intelligence (AI) and learning analytics

The modifications inherent to the university show that the presence of technologies has allowed the rediscovery of new logics of understanding, in this case from the field of action between university teachers and students. In this sense, the global dynamics has imposed the need to manage certain technological tools that will allow a better personalization of learning, always counting on the active pedagogical actors. Now, with regard to AI, it is necessary to remember that it consists of a computer system that can imitate human reasoning with respect to the processing of external data, which can be transformed into information (Toledo Lara, 2024).

This means that we are dealing with a powerful tool that can process a high volume of data in a very short time, which can be translated into improved attention to the student and, therefore, in the personalization of such attention (Menacho et al., 2024). For example: it can be used for the adaptation of learning experiences based on their needs, favoring the generation of accurate and timely feedback (González, 2023). Also for the design of intelligent tutoring systems (López et al., 2024) without losing sight of learning as the epicenter (Moreno-Olivos, 2021), in addition to the fact that it will help identify students' problems and those elements that may affect or interfere with their academic progress (Valencia and Figueroa, 2014).

Thus, four types can be identified in virtual education at the moment, which have been synthesized as follows according to Contreras Bravo et al. (2021): the first is known as «e-learning» and includes non-face-to-face and asynchronous learning. The next is called «b-learning», focused on the combination of face-to-face and virtual learning. Next, the «m-learning» that revolves around online learning through mobile devices. Finally the «g-learning» that has to do with the development of e-learning, but with the presence of the gamification element or component linked from a didactic perspective applied for this purpose.

This typification allows to identify the areas in which the action to be applied from the learning analytics in virtual education can be located and, as a result of the linkage and the use of various tools, it can be used in the analysis of the pedagogical process

developed. Therefore, the professor will be able to profile and personalize the way in which he transmits his considerations to his students as an opportunity to show the evaluations regarding the learning evidences. All of the above is not exempt from challenges to overcome, for example, it is necessary to work from technoethics as an essential root for a rational, honest and balanced use of this set of tools (Norman- Acevedo, 2023) since students must be insisted on from the critical and analytical (De Souza & Rocha, 2025), given the risks posed by the misuse of technological tools regarding the transit through university studies. In addition, the ideological biases present in the algorithms require a trained criterion to be able to determine to what extent the answer generated by this type of tools is technologically the most accurate.

As stated by Lonn et al. (2015) and Li et al. (2020), analytics is used in higher education in order to handle large volumes of data, which must be transformed into information related to academic performance and, if necessary, to establish both a diagnosis and the trends that can be identified at a given moment of curriculum development. Thus, two ways of application of analytics are identified: the so-called learning analytics that allows visualizing the flow of interaction between users and the elements that are present in virtual learning environments and the other known as academic analytics which works with the prediction of the academic performance of a group of students in a classroom.

Therefore, learning analytics focuses on the collection, analysis and interpretation of data about students and their contexts, in order to deepen the understanding of the educational experience and improve the factors that influence their development and the learning environment (Contreras-Bravo et al., 2021, Wong et al., 2019). All this also involves identifying who are the people who generate the data to be analyzed, the management of Big Data when processing data from different moments (past, present and trying to predict the future behavior of students), without failing to recognize that the above will favor the interpretation of the data transformed into information, to subsequently establish lines of action based on the results. Hence, it is *machine learning*, *data mining*, or *natural language processing* (González, 2023; Rivero Panaqué & Beltrán Castañón, 2024).

The new didactic panorama that is shown to university teaching demands to take the step from technological literacy to digital culture. This means that the use of technological tools by professors should be assumed as a strategic and privileged opportunity for improving the teaching, therefore, resistance to change under the subterfuge of tradition (Cajamarca-Correa et al., 2024), should be far from the activity of the university.

1.3 *Feedback and virtual learning environment from the University*

In distance education and in a virtual learning environment, the evaluative process has had a particular observation, since it is not always associated with a real sense because it is usually compared with the evaluative process that is developed in a face-to-face modality. According to Bañuelos Márquez and Montero Montiel (2017), educational quality does not depend on the modality but on the quality of the processes associated with the learning experience. On the other hand, the studies developed by García et al. (2021) state that in the virtual modality there is a tendency to use an evaluation procedure associated with a traditional style and with few variations, for example: written exams, short works with a structure more typical of a modality that does not correspond to the virtual, among others.

For the purposes of this research, it is understood that a virtual learning environment is that educational environment, which is constituted as a form of distance education and is developed through the use of Information and Communication Technologies (hereinafter, ICT) (Sepúlveda-Romero, 2019). In this sense, the teaching that takes place in the virtual learning environment must have a specific teaching methodology that tries to create a formative environment of interaction and interactivity adapted to the virtual context (Tanevich et al., 2021). Therefore, the attitude of teachers towards the use of technologies (Sánchez Prieto et al., 2017) can serve to infer the possible impact on the pedagogical process already seen from the teaching perspective.

A critical view is put forward by García Peñalvo (2021) when he states that «technology advances at a different pace than its acceptance and legal adequacy» (p. 3). This confirms the idea that an eventual use of ICT, unplanned and lacking pedagogical intentio-

nality, cannot be assumed as a practice corresponding to an online teaching, basically because those ICT are used with a more instrumentalist sense than as a tool that serves to digitize the processes, besides ICT alone will not operate any change without the critical and formative process that comes with its use (Toledo Lara, 2021).

The above allows inferring the need to transcend the centralized vision in the teaching willingness before the use of some tools, to give way to a deep process of digital transformation within the university with the objective that in the case of feedback, the use of technological tools is not a limitation to achieve what Sepúlveda-Romero (2019, p. 95) calls as «humanization of the act of feedback in virtual education», since ICT will favor the interactive processes of learning (Mollo & Deroncele, 2022).

University planning and teacher training must be developed under pedagogical criteria compatible with the changes that are generated at the university level. In this sense, it is necessary to talk about what García-Peñalvo (2018) calls «university technological ecosystem» which is understood as the interaction and integration of various programs and software components that allow building a digital sense of university animation, in order to progress in this case, in the use that is made of ICT from the conviction that these are no longer mere tools that are used in case of pedagogical emergencies, but can receive a treatment and a pedagogical intentionality that can favor the work of technological competence and thus, be in harmony with the information society.

All of the above must be observed from the perspective of the digital transformation of the University in order to prevent the use of technology from being limited to introducing technological novelties while continuing with the same practices (García-Peñalvo & Corell, 2020). Regarding the tools that can be used to transmit it, there is agreement among the authors consulted on the fact that having such tools, does not automatically ensure that students can learn (Ferrada-Bustamante et al., 2021). Therefore, in addition to the university teacher's willingness to know tools in terms of transmitting their comments or evaluations, it is also necessary to have the institutional willingness (Avendaño-Castro et al., 2021).

The scientific literature refers to technological tools contextualized in virtual learning environments, which have been applied when transmitting to students feedback on their contributions and on the way in which they carry out academic activities. Thus, the «formative pills» (Crespo Miguel et al., 2020), the podcast (Andrade and Páez, 2021), e-mail, debate and discussion forum, shared boards and the use of educational platforms (Avendaño-Castro et al., 2021; Montiel, 2020; Sepúlveda-Romero, 2019; Veytia Bucheli &Rodríguez Serrano), video (Segovia-Chamorro & Guerra-Zúñiga, 2020) are recognized. Not all technological tools are used indistinctly to transmit it by teachers, i.e., there are tools whose use is more inclined to respond to queries or clarifications such as email, while there are other tools whose use is more favorable when transmitting different types of comments such as the discussion forum.

After the findings obtained from the review of the scientific literature, it is necessary to try to answer the following questions: 1) Is it true that professors give feedback to their students, so that they can identify both failures and successes in order to achieve the learning objectives? 2) Do professors usually use e-mail and the discussion forum as the main tools when transmitting it to their students? 3) When professors feel that they need more technological training, do they agree on the technological tools they use and recommend when transmitting their comments or evaluations? In view of these questions, the following hypotheses were raised in this research:

> *H1*: Professors perform feedback so that students can identify failures and successes for achieving learning objectives.
>
> *H2*: Professors who teach in virtual education use e-mail and the discussion forum as the main tools.
>
> *H3*: Professors who claim to need more technological training, tend to use and recommend the same tools they use to transmit their comments and assessments.

2. Methodology

Design and procedure: this is a quantitative research with descriptive-explanatory type (Lafuente & Marín, 2008; Huber et al., 2018), conducted confidentially and voluntarily for research purposes of this study.

Participants: the sample was composed of 28 professors of the Official Degree in Early Childhood Education Teacher, blended mode, in a private university located in Madrid. Of these 28 teachers, 78.6 % have a PhD (n=22), and 21.4 % have a Master's degree (n=6). On the other hand, 60.7 % (n=17) are in the range of 36-46 years, 25 % (n=7) in the range of 47-58 years, 10.7 % (n=3) between 25 and 35 years and 3.6 % (n=1) are in the range of 59-69 years. Regarding accreditation, 50 % (n=14) have at least one accreditation while the remaining 50 % (n=14) are not accredited at the time of responding to the survey. Among these 28 professors, 42.9% (n=12) have between 5-10 years of teaching experience in university education, and 42.9% (n=12) have 10-15 years of experience. Other data are those professors with 20-30 years of experience (10.7% n=3) and 3.6% (n=1) with 15-20 years of experience.

Instrument: a specific instrument was designed for this study, adapting it from research conducted by Espinoza Freire (2021); Narváez and Verdezoto (2021); Garcés Bustamante et al. (2020); Sepúlveda-Romero (2019); Veytia Bucheli and Rodríguez Serrano, (2021); Montiel (2020); Segovia-Chamorro and Guerra-Zúñiga (2020); and Andrade and Páez (2021), with the validation of two experts. The final instrument consisted of a questionnaire made up of 25 items distributed in 4 dimensions: 1) information about the survey participant (4 items), 2) the feedback that teachers develop with their students (11 items), 3) the technological tools that teachers use to provide feedback (5 items) and 4) the tools that these teachers recommend to share feedback to students (5 items). Dimensions 2 and 3 were adjusted to the Lickert scale (Rositas, 2014) with 5 items (1=never and 5=always), while dimension 4 was adjusted to the same Lickert scale but modifying the nomenclature (1=not at all recommended and 5=very recommended).

Data analysis: the SPSS Statistics program (version 26, IBM International Business Machines Corporation) was used for data analysis, taking the data generated for the mean (M), standard deviation (SD) and Pearson's r for the correlation of the variables (Hernández et al., 2018).

3. Results

When reviewing the results related to the profile of the participants, it is observed that at the global level, it is a university professor with a doctoral degree (M=2.79; SD=0.418), accredited (M=0.50; SD=0.509) whose age range is between 36-47 years (M=2.21; SD= 0.686), and who has approximately between 5 and 15 years of experience in university teaching (M=1.82; SD=0.945). The results obtained on the feedback given by the teachers consulted indicate that all of them do it (100 %) and of this percentage, 60.7 % (M=4.57; SD= 0.573) indicate that they always give feedback on the learning results (Resapren) (M=4.25; SD=0.928). Thus, it is observed that it is a constant practice; however, the rest of the items that make up dimension 2 present results that are mostly in the mean of each one of them, but the concentration of the responses in some cases allows inferring a certain dispersion (see Table 1).

Thus, among the items, the teachers' perception that it is useful for their students (Utilest) (M=4.46; SD=0.922) and that it is done so that the student can identify the failures and successes for the achievement of his learning objectives (Objapren) (M=4.39; SD=0.682), in addition to the fact that these professors share their personal opinion from the positive assessments to increase the motivation of their students (Motiv) (M=4.29; SD=0.897) and for these same students to acquire greater autonomy with respect to their studies (Autonom) (M=4.07; SD=0.900).

One of the items in which the greatest variability in the response is observed is that which corresponds to its performance of what is requested as part of the teaching duties. While 100% of the professors consulted claim to do it, 42.9% indicate that they do it as part of what is requested for their teaching duties, although the proportions in this response are consistent with a notable variability (Homework) (M=3.71; SD=1.436). It is also perceived that they sometimes need technological training to improve the way they transmit their comments and assessments (Form_tec) (M=2.61; SD=1.100), although they advocate using technological tools to share it (No_tic) (M=2.18; SD=1.124) and generally transmit it in writing (Written) (M=3.57; SD=0, 879) and mostly discard using a video to share it (Video) (M=1.79; SD=0.917).

Table 1. *Item, label, Mean and SD of dimension 2: the feedback that the professor gives to his/her students*

Item	Label	M	DE
I give it to all my students.	Allest	4.57	0.573
I feel it is useful for my students.	Utilest	4.46	0.922
I perform it on learning outcomes.	Resapren	4.25	0.928
I perform it so that the student himself/herself identifies the failures and successes for the achievement of the learning objectives.	Objapren	4.39	0,.82
I carry it out so that the student acquires greater autonomy with respect to his studies.	Autonomy	4.07	0.900
I carry it out so that each student receives my opinion on a personal level, sharing positive evaluations with the interest of increasing their motivation.	Motiv	4.29	0.897
I perform it because I am asked to do so as part of my teaching duties.	Duties	3.71	1.436
When I do it, I prefer to communicate in writing.	Written	3.57	0.879
I make a video to share it with my students.	Video	1.79	0.917
I feel I may need technology training to improve the way I convey my feedback.	Form_tec	2.61	1.100
I feel that feedback is important, but I would prefer not to use technological tools to share it.	No_ICT	2.18	1.124

Regarding dimension 3 on the technological tools used by the professors surveyed, the results indicate that 96.4 % generally use e-mail to share the feedback (U_mail) (M=3.50; SD=0.923), and in second place they use the forum (U_forum) (M=2.50; SD=1.106). In this case (see Table 2), the tendency is to use e-mail, less frequently the discussion forum, and very sporadically vary the tools used among which are video (U_video) (M=2.00; SD=1.155) and audio file (U_audio) (M=1.82; SD=1.156). With respect to social networks (U_RRSS) (M=1.36; SD=0.621) they have practically never been used them to share comments or ratings. At a general level, there is a certain tendency to combine e-mail and discussion forum as the most common tools. However, in the case of the discussion forum, although a M=2.50 corresponding in this case to «almost never/sometimes» is identified, the dispersion suggests that there is not a very definite concentration, such as to categorically assure that there is a great coincidence in the preference for its use, even though it is in a second position with respect to e-mail.

Table 2. *Item, label, Mean and SD of dimension 3: technological tools used by teachers to transmit feedback*

Item	Label	M	DE
I use e-mail.	U_mail	3.50	0.923
I use the discussion forum.	U_forum	2.0	1.106
I use a video.	U_video	2.00	1.155
I use an audio file.	U_audio	1.82	1.156
I use one or more social networks.	U_RRSS	1.36	0.621

Dimension 4 analyzes the results on the tools that the university teachers consulted recommend for transmitting their comments or evaluations. When evaluating the statistics corresponding to this dimension (see Table 3), a majority percentage is observed with respect to recommending the use of e-mail (R_mail) (M=3.93; SD=0.813), i.e., 96.4% of the professors basically recommend this tool. However, there is no tendency to recommend only one tool in particular, i.e., professors are inclined to recommend several technological tools. Thus, for example, they recommend the discussion forum (R_forum) (M=3.32; SD=1.335), the video (R_video) (M=3.25; SD=1.266) and the audio file (R_audio) (M=3.00; SD=1, 361). On the other hand, regarding the use of social networks, practically all of them consider that it is not recommended or not recommended at all (R_RRSS) (M=2.07; SD=2.07; SD=0.900). Although no single categorically preferred tool is identified, it can be inferred that the university teachers consulted are inclined to recommend several tools, although in practice they are basically inclined to use e-mail and the discussion forum.

Table 3. *Item, label, mean and SD of dimension 4: Tools recommended for sharing feedback to students*

Item	Label	M	DE
E-mail.	R_mail	3.93	0.813
Discussion forum.	R_forum	3.32	1.335
Video.	R_video	3.25	1.266
Audio file.	R_audio	3.00	1.361
Social networks.	R_RRSS	2.07	0.900

On the other hand, a statistically significant, moderate (Hernandez et al., 2018) and directly proportional linear correlation was found between using the discussion forum and that this is perceived as useful for students and that the students can identify failures and successes for the achievement of learning objectives , every time it is transmitted to all . This means that the statistical correlation suggests that the use of the forum is more associated with the pedagogical and formative sense of the message transmitted. In contrast, the use of e-mail does not show a statistically significant association. Therefore, although this tool is notably common among the university professors surveyed, the messages transmitted by mail tend predominantly to have a resolutive and consultative nature.

Another noteworthy fact is the significant linear correlation observed between transmitting feedback as part of teaching duties and students receiving it in order to increase their motivation by sharing positive evaluations. In this case it is a moderate and directly proportional correlation, with which it can be inferred that those professors who perform it and transmit it to their students, assume that in addition to being a duty, it will serve to increase the motivation of their students from the positive evaluations of their personal opinion. Therefore, the greater the fulfillment of the teaching duty, the more these professors will perceive that student motivation increases.

With respect to the use and recommendation of certain tools for transmitting comments and evaluations, a moderate/strong and directly proportional correlation between the use of a certain tool and its recommendation is confirmed at a global level. This is a pattern that is repeated fairly uniformly, for example a moderate and direct correlation is observed between the use of email and its recommendation, and a strong and direct correlation between the use of the discussion forum and its recommendation. However, the observed results also reflect a strong and directly proportional correlation between needing technological training to improve the way in which comments are transmitted and using social networks and recommending them. Therefore, the more technological training teachers need, the better training they will have to be able to recommend or use social networks to transmit considerations to their students.

In summary, the use of a given tool will establish the degree to which it is recommended, and in the study observed, the ones that have the greatest implication both in terms of frequency of use and the pedagogical connotation they may have are two: the discussion forum and e-mail. A statistically significant, moderate and directly proportional linear correlation is also observed between these two tools.

4. Discussion and conclusions

The studies conducted by Garcés Bustamante et al. (2020) confirm the fact that the feedback transmitted to university students is useful, since it fosters the improvement of learning and «systematic self-regulation» (p. 39). In this sense, the results obtained support this affirmation since it corroborates the fact that the professors carry out this practice with the belief that it is useful, in addition to the fact that it will serve for the students to visualize the achievements obtained, as a result of the pedagogical process contextualized in the university environment and in this case in a virtual learning context.

Its pedagogical sense is basically focused, according to Narváez and Verdezoto (2021), on transmitting to the student that assessment that the teacher makes in order to contribute to the development of a set of receptive skills in the student, in addition to fostering motivation for achievement and autonomy in studies. It is confirmed that professors assume as their own duty, to carry it out and accor-

ding to Espinoza Freire (2021) the center of interest should be in «the cognitive and procedural processes, more than in the attitudinal» (p. 393).

When dealing with studies in a virtual learning context, the accompaniment that can be offered to students becomes a determining factor, since the student may experience a sense of loneliness when encountering an online platform (Sepúlveda-Romero, 2019). Therefore, and as confirmed by Parra Martínez et al. (2022), feedback in the form of comments can favor in addition to the acquisition of knowledge, a substantive improvement in learning and affective factors (Narváez and Verdezoto (2021) without failing to recognize that a system must be available in the virtual modality as a formative process (Montiel, 2020). It is possible to confirm the hypothesis that professors perform it basically so that students can identify failures and successes for the achievement of learning objectives, which Espinoza Freire (2021, p. 393) calls «feedback focused on the results of the task».

As confirmed by the studies of Montiel (2020), the forum is presented as one of the most used tools when establishing communication in a virtual learning environment. For their part, Veytia Bucheli and Rodríguez (2021) attribute to the discussion forum a sense of interactive and bidirectional communication based on the mediation of the teacher, so that in these two studies the pedagogical sense of the forum is confirmed in terms of its use with didactic intentionality.

However, in the results obtained in this research, it is identified that professors are more inclined to use e-mail as observed in the studies of Veytia Bucheli and Rodriguez (2021), but with a more consultative and doubt-resolving use, while the discussion forum is focused from a pedagogical perspective, i.e., from accompaniment and mediation. This coincides with the results of Avendaño-Castro et al. (2021) regarding the irrelevant use of social networks. This confirms the hypothesis that professors who teach in virtual education use e-mail and the discussion forum as the main tools to transmit their comments and evaluations.

The research conducted by Montiel (2020) states that the technological knowledge of professors will have a positive impact on the use of technological tools, i.e., the more technological training, the greater the variation in the tools used and recommended when transmitting their evaluations. In this case, there is a notable correspondence between the use and recommendation of e-mail and discussion forum as the main tools, without failing to recognize the value of, for example, an audio or video file to improve the monitoring and accompaniment of students by professors (Andrade and Páez, 2020; Segovia-Chamorro and Guerra-Zúñiga, 2020).

In this sense, by preferentially using and recommending e-mail and the discussion forum, the multidirectional aspect found in both tools is being valued. However, the use of video as a tool for transmitting evaluations and considerations is also being positioned as a recommendation by teachers, as highlighted in the study by Segovia-Chamorro and Guerra-Zúñiga (2020). In this sense, and as future lines of research, several ideas can be identified: 1) the impact of feedback on students under a virtual learning environment, 2) the digital transformation of the University as an institutional policy, 3) teacher training plans and pedagogies of pluripedagogical perspective, 4) studies on the accompaniment of teachers from mentoring, 5) the digitization of teaching practices and 6) the design of e-activities using AI and the improvement of university pedagogical processes.

The implication of the results obtained in this research for the university teaching sphere, allows inferring that it is not enough for teachers to be specialists in their areas or fields of study, so they need to advance in terms of digital culture, leaving behind the initial digital literacy. In other words, the only way to take advantage of technological tools for the improvement of the pedagogical experience at the university is to have the willingness to discover, learn, unlearn and create. In this sense, it becomes more than imperative the need not only to promote curricular and didactic university training, but it must be done from the current context and with an authentic institutional policy that ensures the follow-up, monitoring and continuity of what is expected to be learned in teacher training for and towards the university. The weight of tradition, the teaching references of the past and the resistance to anything related to technology results in the continued use of a certain digital platform as a repository of files and activities, without the greatest didactic use.

In addition, the terms used in some training plans aimed at this educational sector can lead to disinterest and an attitude of forced compliance in certain activities with elements that are not very useful

or not very understandable and applicable to everyday teaching. In short, it is important that professors do not lose the willingness to continue learning in order to improve our training, for the benefit of students and our own personal and professional fulfillment.

Feedback must always ensure that the student can understand the meaning of what he/she is learning. At the same time, the professor can rely on a set of technological tools that, ultimately, will allow him/her to live new experiences. All this from a teaching practice with true vocation, understood as a privileged starting point to, if necessary, take the first step towards a great change at the university.

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