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Production of Polimedia by University Professors and Degree of Acceptance in the Dominican Republic

Producción de polimedia por el profesorado universitario y su grado de aceptación en República Dominicana

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Abstract

The use of video in distance education contexts and in virtual training is essential. This study presents the results of an experience with 114 university professors from two universities in the Dominican Republic who carried out training activities on the pedagogical bases of the Polimedia systems. The degree of acceptance of the Polimedia system was measured through an adaptation of the Technology Acceptance Model (TAM) developed by Davis in 1989, and the significance of different sociodemographic variables in the model was analyzed. The results demonstrate the high degree of teacher acceptance of the Polimedia system and its relationship with variables such as experience with ICT, as well as the robustness of the TAM. This strengthens the need to establish training plans that focus less on technological aspects and more on the pedagogical dimension.

Keywords: training of trainers, educational technology, ICT, higher education

Resumen

El uso del video en contextos de formación a distancia y en actividades de formación virtuales se hace imprescindible. El presente estudio expone los resultados de una experiencia llevada a cabo con 114 profesores universitarios de dos universidades de República Dominicana, quienes realizaron actividades formativas sobre las bases pedagógicas de los sistemas Polimedia. Se mide el grado de aceptación del sistema Polimedia a través de una adaptación del Modelo de Aceptación Tecnológica (TAM) formulado por Davis en 1989 y se analiza la significación de diferentes variables sociodemográficas en el modelo. Los resultados demuestran el alto grado de aceptación entre los docentes hacia el sistema Polimedia y su relación con variables como la experiencia con las TIC, así como la robustez del TAM. De esta manera, se afianza la necesidad de establecer planes de formación que no se centran tanto en aspectos tecnológicos, sino en la dimensión pedagógica.

Palabras clave: formación de profesores, tecnología educativa, TIC, enseñanza superior

I. Audiovisual productions in video and Polimedia format

Audiovisual productions in video format are becoming increasingly important in training. On the one hand, this can be explained by the possibilities that this resource offers to present concepts and allow the observation of phenomena, and the wide range of functions that it can perform in teaching, the lack of required maintenance, etc. On the other hand, thanks to digitization, these productions can be used in different media, thus becoming a "transmedia" resource as they are stored in specific repositories for constant viewing (Chien et al., 2020). These possibilities make this resource a very valid means to promote learning and create new scenarios for teaching (Brame, 2016; Cooley et al., 2020). At the same time, its multimedia capacity facilitates the transfer of information to long-term memory (Mayer, 2003; Zhang et al., 2019). Lastly, it favors the development of attention in the student (Arroyo-Barrigüete et al., 2019).

The use of video productions in distance training contexts and as part of virtual training actions is essential because of the audiovisual culture in which we live. This has also been shown by a number of different studies, which have made it clear that they boost student satisfaction and motivation, improving learning (Arroyo-Barrigüete et al., 2019; Liu et al., 2019; Rodríguez-Ardura & Meseguer-Artola, 2017).

One type of educational resource in video format is Polimedia. A Polimedia production can be defined as a virtual multimedia presentation in which a video recorded by the speaker is integrated into a virtual set and presents resources that the teacher requires. This involves different technologies such as presentations, videos, animations, writing on an electronic whiteboard, and working on applications in real time (Figure 1).

Figure 1. Recording studio for Polimedia resources

Visually, a Polimedia production is made up of two distinct parts. On the one hand, the teacher appears in a part of the screen. The rest of the screen is occupied by the presentation to which the teacher refers during his or her speech. Thus, the phases of a Polimedia production are presentation design, choice of virtual setting, and recording (Cabero, 2018).

A Polimedia production is considered a learning object to support teaching, with multimedia content created to strengthen and complement teaching. The Polimedia management and creation system (Figure 2) is designed for the production of teaching materials aimed at students who will have access to them through different distribution channels. These may include DVDs, fixed devices, mobile devices, and social networks.

Figure 2. Polimedia production

1.1 Educational uses of video in teaching

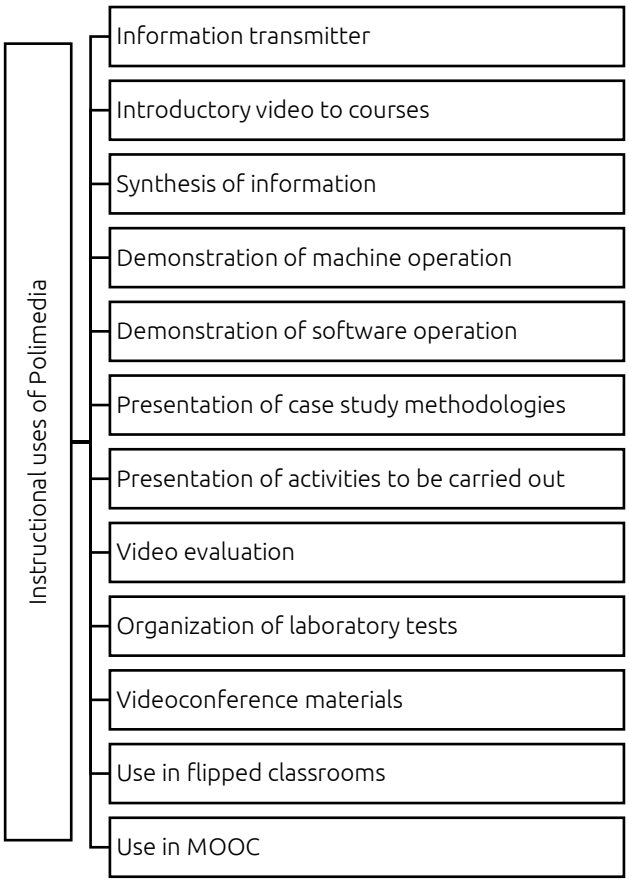
Video is one of the most widespread educational media in teaching, across all levels of the educational system, and has been further promoted in recent times by events like digitization, the existence of different repositories of educational and didactic videos on the Internet, both institutional and personal, the significance that tools such as YouTube have acquired in today's culture and specifically for younger generations, and the transmedia nature of video, allowing videos to be viewed on different technological media such as televisions, computers, smartphones, and tablets.

The use of video in education has been explored by different authors (Cabero, 2007; Cabero & Barroso, 2016; Cabero & Llorente, 2011; Ballesteros, 2013; Bartolomé, 2008; de Benito et al., 2015; Monedero & Monedero, 2013). Their research has made it possible to draw a series of conclusions that highlight the range of possibilities that video offers for teaching and the many ways it can be used.

1.2 Uses of Polimedia productions in university education

According to Cabero (2018), the uses of Polimedia can be divided into two main groups: instructional uses and institutional uses. Our research focuses on the former, as presented in Figure 3.

Figure 3. Instructional uses of Polimedia productions



The information transmitter is one of the most frequent Polimedia productions, used by teachers to transmit the contents of their course to students and for discussion in the classroom. Students can also watch these productions later to clear up any questions or to further their learning experience.

Guo et al. (2014) offer a series of recommendations for the production of MOOCs, which may be helpful in video lessons. Specifically, the recommendations they make are as follows:

1. Short videos are much more attractive.

2. Videos that intersperse an instructor's talking head with PowerPoint slides are more interesting than showing just the slides.

3. Videos produced with a more personal feel might be more attractive than high-fidelity studio recordings.

4. Khan-style tablet drawing tutorials are more attractive than PowerPoint slides or code recordings.

5. Even high-quality prerecorded classroom classes are not as interesting as when they are cut into short segments.

6. Videos where instructors speak fairly quickly and with great enthusiasm are more interesting.

7. Students participate differently with lectures and video tutorials.

The recommended duration initially depends on the intended purpose of the document. Even so, two recommendations are provided:

1. As a general principle, to work with the idea that the duration should be as short as possible (López-Bonilla & López-Bonilla, 2011).

2. If necessary, to fragment the production into different sub-productions that can be viewed individually.

One other use of Polimedia productions is to provide a brief introduction to the course or to a set of didactic units, wherein the teacher explains the objectives and skills to be attained, the content to be developed, the materials the student will work with, the activities to be carried out and delivery deadlines, the evaluation, etc. These productions can also serve to remind students of the prerequisite knowledge for the course. Websites or documents can also be presented to enable students to find information about a specific topic. Finally, Polimedia can serve to connect new content with that already acquired by students. Consequently, meaningful and non-rote learning is favored (Ausubel, 1978).

One possible teaching activity is the explanation of the operation of a machine or technological instrument in a laboratory. Polimedia productions can be very useful for this. Not only do they make it possible to enlarge objects that need to be observed, and enable more precise sequencing of the information to be presented to students, but they also provide a document that can be reviewed many times by students. This category includes productions that are specially conceived as explanatory video tutorials on the operation of a program.

Case studies are a great help in connecting the concepts and information presented with real-life contexts where they should be applied. In this sense, case studies should include different contexts to favor the transfer of knowledge to different real-life situations. It must not be forgotten that it is increasingly frequent to find case studies being used as a methodological resource to develop competences, but also as a learning or evaluation activity.

As already noted, one of the ways in which video can be used in teaching is to assess the knowledge and skills acquired by students, by presenting them with specific situations, both real and simulated. This provides teachers with insight into the knowledge, skills, competences and abilities acquired by students. Video is therefore another instrument for student evaluation. The construction of the video can take different forms: description of a sequence to be evaluated by the students; presentation in a process of a series of errors to be identified by the students; presentation of a document for students to make a text comment on it, answering a series of questions previously provided by the teacher; and the presentation of activities as performed by first-year students so that upper-level students can identify the mistakes made.

In different curricular disciplines, students must learn the processes of organizing laboratory tests and preparing diagnostic tests. This requires the application of a standardized protocol to which students must adapt for perfect mastery. Polimedia productions can be of great help not only because of the perfect sequencing of the processes, but also because the teacher can indicate the most common errors made by students in executing the processes, and the precautions to be taken in this regard.

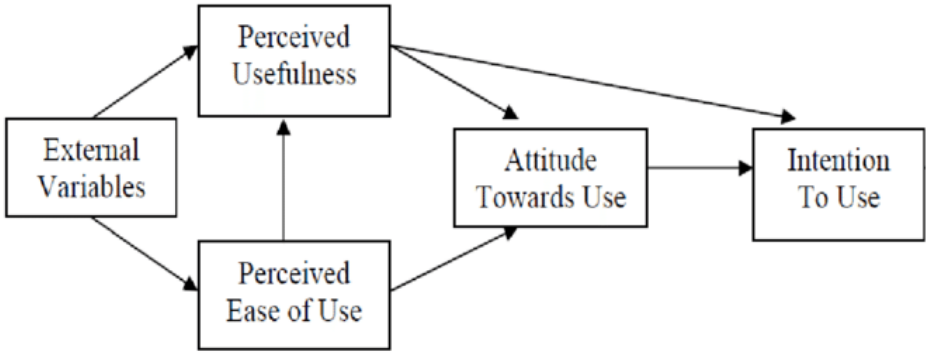
One methodology that is currently gaining traction in the context of university education is the so-called “flipped classroom”, developed by Bretzmann (2007). In essence, this consists in reversing the traditional division of time in teaching, such that the content of the course is delivered outside the school setting and school hours, while tasks traditionally performed at home are done so in class (Bergmann & Sams, 2014; Prieto, 2017; Santiago et al., 2017).

Finally, we note the importance of videos in Massive Online Open Courses (MOOCs), of which there are three types: xMOOCs, cMOOCs, and tMOOCs (Vázquez et al., 2015). Videos play a key role in all of these.

II. TAM: Technology Acceptance Model

The Technology Acceptance Model (TAM), initially formulated by Davis (1989), suggests that attitude towards the use of an ICT is based on two previous variables: perceived usefulness and perceived ease of use (Figure 4). According to Fishbein and Azjen (1975, p.216), attitude is "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object." The perceived usefulness is considered a motivation that is extrinsic to the user and is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.320), while perceived ease of use can be understood as the "degree to which a person believes that using a certain system will be effortless" (Davis, 1989, p.320).

Figure 4. TAM of Davis (1989)



As suggested by Yong et al. (2010), to determine if a technology will be used optimally, it is necessary to identify different external variables that may affect the usefulness and ease of use perceived by users of ICT. Various studies have identified and proposed such variables: type of user, gender, age, experience in technology management, level of training, career level, and personal tendency towards innovation (Hsiao & Yang, 2011; Kumar & Kumar, 2013; López-Bonilla & López-Bonilla, 2011; Teo & Noyes, 2011).

Different studies and meta-analyses in research have shown that TAM is a valid and robust model to explain the intention to use any technology and is notable for its simplicity (He & King, 2008; López-Bonilla & López-Bonilla, 2011). This has led to research on different technologies: portfolios (Wai-tsz et al., 2014), mobile devices (Kim et al., 2016), virtual libraries (Chen & Chengalur, 2015), e-learning (Cabero et al., 2016; Urquidi et al., 2019), m-learning (Iqbal & Ahmed, 2015), cloud computing (Jou & Wang, 2013), e-learning platforms (Alharbi & Drew, 2014), YouTube (Lee & Lehto, 2013), video games (Cheng et al., 2013; Huang, 2019), social networks (Lorenzo et al., 2011), and augmented reality (Martínez & Fernández, 2018).

Also important to bear in mind is the criticism raised in relation to the TAM: the instrument itself relies on the subject's self-report, the results may be determined by context, the conceptual simplicity of the model, and the difficulty of obtaining objective measurements with the TAM (Yousafzai et al., 2007).

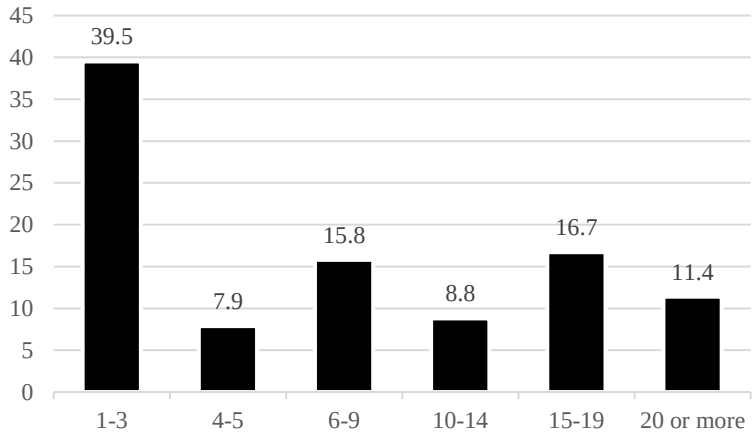
III. Methodology

This research was carried out with faculty belonging to two universities in the Dominican Republic: Universidad Federico Henríquez y Carvajal (UFHEC) and Universidad Eugenio María de Hostos (UNIREMHOS). The diagnostic instruments were administered once the course "Pedagogical Bases of Virtual Training" was completed (25 contact hours and 25 virtual hours). The following content was developed: pedagogical bases for e-learning; content creation for network training; content production programs for the network; and virtual training activities, techniques and strategies.

Objectives. The main research objective was to analyze the degree of acceptance by teachers of Polimedia video systems. In addition, we intended to explore the significance of different sociodemographic variables in the model.

Sample. A total of 114 university professors – 64 women and 50 men – participated in this study. The majority were between 30 and 49 years old (73.7%). The distribution by branch of knowledge was as follows: 10.5% were in art and humanities, 18.4% sciences, 25.4% health sciences, 28.1% social and legal sciences, and 17.5% engineering and architecture. Figure 5 shows the percentages of participants by number of years of teaching experience.

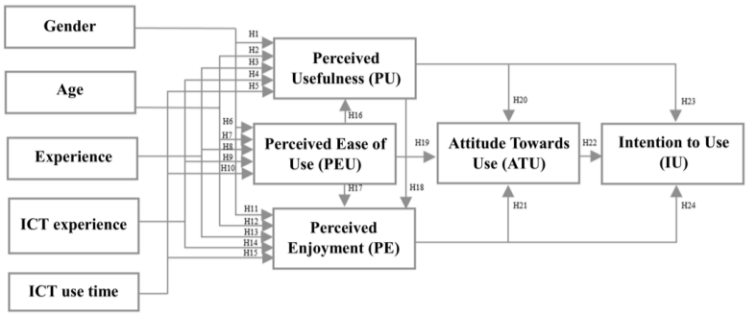
Figure 5. Years of teaching experience



As can be seen, most teachers have from 1 to 5 years of experience.

Study model, hypothesis, and instrument. Figure 6 represents the adaptation of the TAM formulated by Davis (1989) for this study.

Figure 6. TAM used in the study



This model is an adaptation of the one used by Cabero et al. (2016) in other work. It assumes that the teacher's perception of ease of use of virtual training determines the perceived usefulness.

We considered five variables that could predict the interactions of the system: gender, age, teaching experience, experience in the use of ICT, and percentage of time spent on ICT in classes.

Consequently, the following hypotheses were formulated:

- H1-H2-H3-H4-H5: There are significant differences between the contrast variable (gender, age, experience, ICT use time or use of ICT in class) and the perceived usefulness (PU) of the Polimedia system.

- H6-H7-H8-H9-H10: There are significant differences between the contrast variable (gender, age, experience, ICT use time or use of ICT in class) and the perceived ease of use (PEU) of the Polimedia system.

- H11-H12-H13-H14-H15: There are significant differences between the contrast variable (gender, age, experience, ICT use time or use of ICT in class) and the perceived enjoyment (PE) of the Polimedia system.

- H16-H17-H18-H19-H20-H21-H22-H23-H24: There is a positive influence between the dimensions of the TAM model (according to the direction of the arrows in Figure 6).

The instrument used was a questionnaire made up of two main sections: the first one collects information on the sociodemographic variables and the second assesses the degree of acceptance of the Polimedia system. Regarding the TAM, the instrument was made up of 17 items (Table 3) on a 7-point Likert scale:

- 1 = Extremely unlikely / disagree

- 2 = Quite unlikely / disagree

- 3 = Slightly unlikely / disagree

- 4 = Neither unlikely nor likely / neither disagree nor agree

- 5 = Slightly likely / agree

- 6 = Fairly likely / agree

- 7 = Extremely likely / agree.

The questionnaire was administered via the Internet with Google Forms and can be viewed at https://bit.ly/3bT0NyS

Before the production of the Polimedia materials, a double training procedure was followed. The first stage focused on how to make effective and attractive PowerPoint presentations. The second stage was to make contact with the Polimedia production room. For the first stage, all teachers were provided a document coordinated by Cabero (2018) called "The Incorporation of Polimedia Productions into University Education," a chapter of which is devoted to producing presentations. A face-to-face session was held with teachers at the same time to clear up questions and present important examples. For the second stage, visits were made with small groups of teachers to the recording room, where an explanation was given on the types of shots that would be used, and they were shown where the microphone was set and given recommendations on items of clothing to be worn or avoided on the day of the recording.

It should also be noted that, before the recordings were made, the presentations were reviewed by a member of the research team. Criteria were used to assess the quality of presentations and offer a series of recommendations if necessary.

In summary, the procedure followed in the experience included the following stages:

1. Teachers were trained to create presentations and were introduced to the Polimedia room and the way recordings are made.

2. Teachers produced the presentations used in the Polimedia production.

3. Review of the presentations made by teachers.

4. Recording of the Polimedia material by the teacher.

5. Teachers completed the TAM instrument to enable analysis of the degree of acceptance of the technology.

6. Analysis of the reliability and validity of the instrument.

To obtain the reliability index, Cronbach's alpha was applied and the values obtained are presented in Table 1, both overall and for the different dimensions that make up the instrument.

Table 1. Reliability of the instrument

	Cronbach's alpha
Total	.869
Perceived Usefulness (PU)	.792
Perceived Ease of Use (PEU)	.837
Perceived Enjoyment (PE)	.800
Attitude Towards Use (ATU)	.775
Intention to Use (IU)	.880

The values obtained indicate high levels of reliability according to O'Dwyer and Bernauer (2014). The item-total correlation was also examined, taking into account that the elimination of any item could increase the reliability of the instrument, both globally and in its different dimensions. The values obtained do not suggest the elimination of any item.

Data analysis procedure. The data matrix was modified for operational reasons. New variables were created: total, PU, PEU, PE, ATU, and IU. These variables were calculated from the arithmetic mean of the constituent items. In addition, the response order of item ATU2 "Students have been bored using Polimedia recordings" was reversed, as it was phrased negatively.

At the same time, it was verified that the data were not normally distributed through a descriptive analysis taking into account asymmetry and kurtosis. The Kolmogorov-Smirnov test confirms this verification (Sig = .001).

On the other hand, to test the hypotheses, the Mann-Whitney U test and Kruskal-Wallis H test were used with a post-hoc test (Dunn's test). Furthermore, to calculate the influence of the dimensions of the TAM, Spearman's correlation coefficient was used.

IV. Results

The mean scores obtained in relation to the TAM instrument are presented below (Table 2).

Table 2. Average and standard deviations of the total TAM instrument and its dimensions

	M	SD
Total	5.92	0.68
Perceived Usefulness (PU)	6.20	0.74
Perceived Ease of Use (PEU)	5.79	1.05
Perceived Enjoyment (PE)	5.76	1.07
Attitude Towards Use (ATU)	5.46	0.81
Intention to Use (IU)	6.48	0.74

The mean evaluation scores obtained indicate that the teachers participating in the training action tended to value the different dimensions as "quite likely." In other words, they tend to perceive the Polimedia system as easy to incorporate into university education and quite useful. At the same time, they show a receptive attitude toward using Polimedia. The low standard deviations obtained reveal a degree of uniformity in the teachers' responses.

Table 3 shows the scores of the different items in the TAM diagnostic instrument part.

Table 3. TAM items

Perceived Usefulness (PU)	M	SD
I believe that the use of this Polimedia system will improve my learning and student performance in this subject (PU1)	6.32	0.87
The use of the Polimedia system during classes would facilitate students' understanding of certain concepts (PU2)	5.99	1.13
I think that the Polimedia system is useful for learning (PU3)	6.31	0.98
Using Polimedia recordings will increase student performance (PU4)	6.18	0.78
Perceived Ease of Use (PEU)	**M**	**SD**
I think the Polimedia system is easy to use (PEU1)	5.89	1.03
Learning to use the Polimedia system was not a problem for me (PEU2)	5.57	1.34
Learning to use the Polimedia system is clear and understandable (PEU3)	5.89	1.25
Perceived Enjoyment (PE)	**M**	**SD**
Using the Polimedia system is fun (PE1)	5.82	1.08
I enjoyed using the Polimedia system (PE2)	5.92	1.15
I think the Polimedia system makes it possible to learn by playing (PE3)	5.54	1.53
Attitude Towards Use (ATU)	**M**	**SD**
The use of a Polimedia system makes learning more interesting (ATU1)	6.31	0.83
Students have been bored using Polimedia recordings (ATU2)	4.21	1.84
I think using Polimedia recordings in the classroom is a good idea (ATU3)	6.27	0.84
Intention to Use (IU)	**M**	**SD**
I would like to continue using the Polimedia system in the future if I have the opportunity (IU1)	6.51	0.76
I would like to use the Polimedia system to learn a variety of topics (IU2)	6.46	0.81

The teachers emphasize that they would like to continue using the Polimedia system in the future, if they have the opportunity, and to use it to learn a variety of topics. The item with the lowest score should be interpreted in a negative sense, and therefore students can be considered not to have been bored using the Polimedia recordings.

Next, we performed an analysis of the hypotheses formulated above, derived from the TAM in Figure 6. First, we checked whether there was a positive influence between the dimensions of the TAM (H16-H17-H18-H19-H20-H21-H22-H23-H24). To do this, Spearman's correlation coefficient was used. The obtained values are shown in Table 4.

Table 4. Correlations between the dimensions of the TAM

	PU	PEU	PE	ATU	IU
PU	1.000	.505**	.460**	.224*	.501**
PEU	.505**	1.000	.595**	.374**	.337**
PE	.460**	.595**	1.000	.469**	.566**
ATU	.224*	.374**	.469**	1.000	.236*
IU	.501**	.337**	.566**	.236*	1.000

Note: * = significant at 95%, ** = significant at 99%.

In all cases, there is a statistically positive relationship.

Finally, we present the data obtained regarding the variables relating to the possible influence of gender, age, experience, ICT use time, and ICT use in class (H1-H2-H3-H4-H5-H6-H7-H8-H9-H10-H11-H12-H13-H14-H15). For the gender variable, Mann-Whitney U tests were used (Table 5). In the rest of the cases, the Kruskal-Wallis H test was used (Table 6) with the post-hoc test for significant results (Table 7).

Table 5. Contrast of the gender variable

	PU	PEU	PE
Mann-Whitney U	1313.000	1597.000	1509.000
Sig.	.098	.986	.600

There are no statistically significant differences regarding gender. Therefore, H1, H6, and H11 are rejected.

Table 6. Level of significance of the Kruskal-Wallis H test

	UP	FUP	DP
Age	.001	.178	.003
Experience	.066	.279	.135
ICT experience	.000	.000	.014
ICT time use	.071	.000	.235

The results allow us to accept H2, H12, H4, H9, H14, and H10. The rest of the hypotheses are rejected: H7, H3, H8, and H15.

In Table 7, each row tests the hypothesis between groups within the same variable. The post-hoc test results are displayed only when statistically significant.

Table 7. Post-hoc test variables: significant differences between groups

Variable	Dimension	Group 1-2 contrast	Dunn	Sig.
Age	UP	60 or more - 25-29	48.375	.001
		30-39 - 25-29	45.075	.000
		40-49 - 25-29	38.693	.000
	DP	40-49 - 30-39	18.633	.009
		40-49 - 60 or more	-27.420	.029
		40-49 - 50-59	-37.966	.001
ICT experience	UP	10-14 - 6-9	38.813	.005
		10-14 - 20 or more	-59.812	.001
		10-14 -15-19	-68.812	.008
		Less than 1 - 1-3	-22.604	.015
		Less than 1 - 6-9	-37.647	.000
		Less than 1 - 20 or more	-58.647	.000
		Less than 1 - 15-19	-67.647	.006
		4-5 - 20 or more	-41.700	.008
		4-5 - 15-19	-50.700	.039
		1-3 - 20 or more	-36.043	.011
	FUP	10-14 - 4-5	37.925	.008
		10-14 - 1-3	38.016	.002
		10-14 - 6-9	41.700	.002
		10-14 - 20 or more	-73.875	.000
		Less than 1 - 4-5	-25.388	.029
		Less than 1 - 1-3	-25.480	.006
		Less than 1 - 6-9	-29.163	.007
		Less than 1 - 20 or more	-61.338	.000
		15-19 - 20 or more	-61.250	.022
		4-5 - 20 or more	-35.950	.023
		1-3 - 20 or more	-35.859	.012
		6-9 - 20 or more	-32.175	.035
	DP	Less than 1 - 1-3	-19.116	.040
		Less than 1 - 20 or more	-57.485	.000
		15-19 - 20 or more	-55.250	.039
		10-14 - 20 or more	-52.187	.003
		1-3 - 20 or more	-38.370	.007
		6-9 - 20 or more	-36.950	.015
ICT time use	FUP	26-50% - 51-75%	-30.487	.000
		26-50% - 11-25%	36.114	.001
		26-50% - 76-100%	-43.322	.000
		0-10% - 51-75%	-26.684	.015
		0-10% - 11-25%	-32.311	.018
		0-10% - 76-100%	-39.519	.004

V. Conclusions

The conclusions drawn from this work point in two directions: one conceptual and scientific, and the other methodological and operational.

Regarding the first of these directions, the study addressed a number of aspects. First, our research examined the validity and consistency of the TAM model formulated by Davis (1989). Secondly, we assessed its significance in determining the future degree of acceptance of the Polimedia system by teachers. In turn, this determines the relevance of virtual training in an educational institution that, in this case, provides higher education. These results are consistent with those obtained by other authors regarding teachers' acceptance of virtual training (Cabero et al., 2016; Teo & Noyes, 2011).

As future lines of research, we propose replicating this study in another context with other teachers. This would confirm if the significant results we found are maintained. Another avenue to explore is the degree of acceptance by students when these materials are used in teaching. The hypothesis is that the results for

students would also be positive. Indeed, research has been conducted with students on videoblogs and the results point in the same direction (Colomo et al., 2020).

Regarding the second direction, the work provides technology with an organizational structure that can be of great help in facilitating the incorporation of ICT in university teaching-learning processes. As different research has shown, the quality of the infrastructure and availability of digital devices and necessary technologies is a variable that hinders the incorporation of ICT by teachers (Cela-Ranilla et al., 2017; Gil-Flores et al., 2017), as does the lack of time available for teachers to invest in the production of technologies (Hilliger et al., 2020). In addition, the ease with which this technology is produced affects the degree of technological acceptance shown by the teachers involved in the study. Its incorporation can serve to eliminate the resistance to change that teachers feel toward the incorporation of ICT in teaching (Córica, 2020; Córica & García, 2018; Mercader, 2019).

On the other hand, the work indicates the viability of establishing educational training activities for teachers in Polimedia systems. According to related research in a Dominican context, the level of digital competence is high in a technological-instrumental dimension and low in educational use (Cabero et al., 2020; Pérez-Díaz, 2019). These activities should focus not so much on the instrumental component – that is, the operation of the video recording and assembly system – but rather on didactic aspects, those related to the design of materials for the network or the strategies and e-activities that can be applied within the network. This suggests different orientations are necessary for institutions wishing to employ this form of virtual learning, because – among other reasons – this will allow them to adopt and modify significant attitudes towards virtual education.

It has also been pointed out that Polimedia recordings can be very useful for teachers in the application of the flipped learning methodology (Bergmann & Sams, 2014). At the same time, these recordings can be turned into interactive videos that incorporate questions about the information presented, where a positive response is required from the students in order to continue viewing the document. This results in active engagement by the student and the investment of more mental effort. These questions can be incorporated with a variety of programs, such as H5P or Camtasia. This topic also opens up a possible future line of research. Finally, this study provides instruments that are easy to administer and exhibit acceptable levels of reliability. For this reason, the relevance of this study lies in gaining insight into the degree of acceptance of technology in virtual training by teachers.

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