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Research Article

An Analysis of the Variables Influencing the Selection of Active Methodologies

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ABSTRACT

Transferring a pedagogical proposal from a face-to-face environment to a virtual one is not an automatic conversion. It requires a thorough instructional design and the appropriate methodology. The main purpose of this study is to analyze the variables that influence the selection of an active methodology mediated by information and communication technologies for the design of a didactic sequence developed in a digital environment. We have worked with a sample of teachers who have participated in a training experience in which they have built a didactic proposal for a digital environment, selecting an active methodology from a reflective dynamic based on objective criteria. The study shows that there is a positive association between the year the course was taken, the sex of the participants and the stage where the participants work, and the chosen methodology. Finally, the area of knowledge taught is not a determining factor. It is concluded that regardless of the methodological selection, teachers tend to value the didactic component training over the instrumental one, although it is decisive that the training deals with technology, but from a techno pedagogical perspective.

Keywords: methodology, ICT, didactic sequence, teachers

INTRODUCTION

In recent years, schools have decided to incorporate new technologies into teaching practices in order to modernize teaching methods, advocating active learning methodologies such as flipped classroom, project-based learning (PBL), and gamification (Area & Adell, 2021). The pandemic originated by COVID-19 transformed teaching from models based on the transmissive conception of training and face-to-face to a situation mediated by information and communication technologies (ICT) (Cabero-Almenara & Llorente-Cejudo, 2020). This change implies the acceleration of trends and methodologies that were to be developed in the near future. The learning resulting from the pandemic entails the transformation of the social and academic imaginary of the educational sectors on virtual training, in which the beliefs of pre-service teachers play a fundamental role in the implementation of new digital tools (Cabero-Almenara & Valencia, 2020).

In the post-COVID-19 era, it is necessary to advocate for an approach to new technologies that encourage divergent, practical, and applied problem-solving thinking on the part of students, which requires the

implementation of these active methodologies in order to promote cross-cutting and integrated learning spaces (Aguaded et al., 2021). Competence area 5, problem solving, included in the common framework for digital competence in teaching (INTEF, 2022, p. 66) contemplates the use of active methodologies based on the use of ICT, changing the roles of educational agents both in the center and in the classroom, which contributes to the development of the digital competence of pre-service teachers. Digital competence levels of teachers in Spain are at intermediate levels in terms of skills to communicate and collaborate with other teachers (Cabero-Almenara et al., 2020; Garzón Artacho et al., 2021).

The need arises for teachers, both active and in training, to adapt and have the necessary training to transfer a didactic sequence from a physical to a digital environment in order to adapt to these new times. In response, the National Institute of Educational Technologies and Teacher Training (INTEF) presents an educational experience whose main objective is to reflect on pedagogical approaches mediated by technology and their impact on teaching practice, so as to subsequently design didactic sequences with methodologies adapted to the digital environment, in "online" and "blended" modalities. For this reason, teachers need to adapt their methodologies to this new context, reflect on them and make decisions about the most suitable methodologies for the group of students. These decisions should be based on a series of parameters that help teachers to observe the context of their practice, and configure a proposal that considers variables such as technological availability, the teaching role, and the student's level of autonomy (INTEF, 2020),

Areas and Sanabria (2014) point out that a large number of teachers state that ICTs are causing innovations in their teaching practice, such as the development of new teaching methods and strategies (PBL, cooperative learning, classroom research, inter-center projects, etc.), the change in the way they organize their students, as well as class time. However, the formative base is essential since teachers report that they do not integrate digital resources into their pedagogical practice due to a lack of education (Kalman & Guerrero, 2013). They also point out that they need more specific training to use them critically (Zimmer et al., 2021). INTEF's program invites teachers to reflect on the methodologies that are best suited to their conditions. All this is connected in a practical way with the mastery of digital educational tools, and with the design of thoughtful, complete, and coherent educational interventions.

The proposal starts from an initial instructional design that contemplates the reflection on the methodological approach of the teacher in a physical environment and the configuration of how they consider it should be in a digital environment. From this initial framework, they are presented with four methodological approaches that, depending on what is expressed in their design, can be adapted with greater guarantees to their pedagogical style. These approaches are PBL, flipped classroom, digital learning framework (DLF), and BreakOutEdu. The importance of this study lies in indicating which ICT-mediated active methodologies are most relevant, in order to create more effective and better adapted learning sequences or itineraries, since there are not many studies on this subject.

THEORICAL FRAMEWORK

PBL is an active methodology that has gained importance in recent years in education (Hou et al., 2016; Seman et al., 2018), due to its positive effect on student's performance (Chen & Yang, 2019; Sánchez-Romero et al., 2019). It is a model in which learning revolves around real-world problems of importance to students, to which they have to offer a solution through collaborative work (Alonso, 2020). Flipped classroom is a methodology in which the theoretical aspect is presented in pills that are consumed in the moments in which the student is out of the classroom, to address the practical aspect inside the classroom. DeLozier and Rhodes (2017) state that the application of this methodology has a positive effect on the development of students, improving important aspects such as motivation. DLF is a digital resource whose central features are interactivity, as well as gamification. Gamification is an active methodology with an impact on education, which fosters student motivation towards learning (Ortega-Sánchez & Gómez-Trigueros, 2019; Ozdener, 2018). From a practical perspective, an interactive image is used as a video game screen, and from it all the activities and resources of the content or topic to be addressed are linked (Soto-Varela et al., 2021). Finally, BreakOutEdu also has a direct relationship with gamification, Negre (2017) defines it as a game in which the objective has to do with opening a locked box with padlocks. To get the necessary codes, problems, quizzes, and riddles must be solved.

METHODS

Design

A quantitative approach was used to develop the study by means of an instrumental study with a descriptive sectional design. The sample is made up of teachers working in Spain, through the course design of learning experiences for distance education, provided by INTEF, throughout the editions of the years 2020, 2021, and 2022.

Participants

The population consisted of a total of 309 people, of which 106 were male (34.30%) and 203 were female (65.69%). In 2020, 2021, and 2022 there were 180 (58.,3%), 54 (17.5%), and 75 (24.3) participants, respectively.

In terms of the educational stage at which they teach, 20 at the high school (6.5%), six at the conservatory (1.9%), 18 at the official language school (5.8%), middle school 129 (41.7%), VET 64 (20.7%), nursery three (1%), and primary 69 (22.3%).

Objectives

The objective of this research is to determine the most relevant variables in the selection of active methodologies mediated by ICT, for the design of a didactic sequence developed in a digital environment.

In order to achieve this, the following variables have been selected: year, sex, educational stage, knowledge area, chosen methodology: PBL, BreakOutEdu, flipped classroom, DLF, mixed and none; in order to identify which variables are associated with these chosen methodologies.

With this preliminary approach, a set of hypotheses to be tested are proposed, as follows:

1. *$H1_0$: Chosen methodology is independent of year.*
2. *$H1_1$: Chosen methodology depends on year.*
3. *$H2_0$: Chosen methodology is independent of sex.*
4. *$H2_1$: Chosen methodology depends on sex.*
5. *$H3_0$: Chosen methodology is independent of the educational stage.*
6. *$H3_1$: Chosen methodology depends on the educational stage.*
7. *$H4_0$: Chosen methodology is independent of the knowledge area.*
8. *$H4_1$: Chosen methodology depends on the knowledge area.*

Data Collection Procedure

All the information was collected from the course held in its various editions. Either through sociological questions, to find out their educational stage and gender, or through the final deliverable where they had to design a didactic sequence using some active methodology(s).

Data Analysis

In order to analyze the data, it was chosen to use SPSS v.25 for the descriptive analysis of the data obtained throughout the course and for the inferential analysis, where the use of contingency tables was used together with the chi-squared test to check the association between variables and the magnitude and direction of the same, justifying this as follows:

> "When we consider the analysis of the relationship between two qualitative variables in a contingency table, the first thing we have to establish is, substantively, the directionality, which variable is the dependent variable, which I want to explain. This means formulating a hypothesis to be tested in a contingency table analysis. Depending on the hypothesis, and the directionality asserted, the reading of the table and the comparison of the percentages involved will be different: we will either compare percentages or conditional distributions by row or by column" (López-Roldán & Fachelli, 2015, p. 13).

In relation with Chi-square test:

> "To test the hypothesis of association between variables, we will perform the so-called chi-square test of independence. As in any statistical test of hypothesis testing, we can distinguish 4 steps in its performance:
>
> 1. Formulation of the null and alternative hypotheses, in this case.
> 2. Calculation of the value of the statistic, in this case, the chi-square.
> 3. The probability associated with the statistic is determined.
> 4. The decision is made to accept or reject the null hypothesis" (López-Roldán & Fachelli, 2015, p. 16).

RESULTS

To calculate the association between variables, as mentioned in previous sections, contingency tables were used together with the Chi-square, to check the magnitude and direction of the variables, relevant symmetrical measures were used (contingency coefficient) for each table.

The alternative hypothesis H1 is accepted, since the observed differences can be qualified as statistically significant, i.e., there is an association between chosen methodology and year, $X^2(10)=20.200$; $p<0.05$; and this association was found to be directly proportional and low (contingency coefficient=0.248; $p<0.05$) (**Table 1**).

Table 1. Chosen methodology-year

			Chosen methodology						Total
			PBL	BreakOutEdu	Flipped classroom	DLF	Mixed	None	
Year	2020	Count	24	29	31	54	31	11	180
		% Within year	13.3%	16.1%	17.2%	30.0%	17.2%	6.1%	100.0%
		Residual	-1.0	1.0	1.9	5.7	-9.8	2.3	
	2021	Count	5	6	12	9	18	4	54
		% Within year	9.3%	11.1%	22.2%	16.7%	33.3%	7.4%	100.0%
		Residual	-2.5	-2.4	3.3	-5.5	5.8	1.4	
	2022	Count	14	13	7	20	21	0	75
		% Within year	18.7%	17.3%	9.3%	26.7%	28.0%	0.0%	100.0%
		Residual	3.6	1.3	-5.1	-.1	4.0	-3.6	
Total		Count	43	48	50	83	70	15	309
		% Within year	13.9%	15.5%	16.2%	26.9%	22.7%	4.9%	100.0%

The alternative hypothesis H2 is accepted since the observed differences can be qualified as statistically significant, that is, there is an association between the chosen methodology and sex, $X^2(5)=12.689$; $p<0.05$; and it was found that, although there is a directly proportional association between the two, this association is moderate (contingency coefficient=0.199; $p<0.05$) (**Table 2**).

Table 2. Chosen methodology-sex

			Chosen methodology						Total
			PBL	BreakOutEdu	Flipped classroom	DLF	Mixed	None	
Sex	Male	Count	20	12	13	24	28	9	106
		% Within sex	18.9%	11.3%	12.3%	22.6%	26.4%	8.5%	100.0%
		Residual	5.2	-4.5	-4.2	-4.5	4.0	3.9	
	Female	Count	23	36	37	59	42	6	203
		% Within sex	11.3%	17.7%	18.2%	29.1%	20.7%	3.0%	100.0%
		Residual	-5.2	4.5	4.2	4.5	-4.0	-3.9	
Total		Count	43	48	50	83	70	15	309
		% Within sex	13.9%	15.5%	16.2%	26.9%	22.7%	4.9%	100.0%

The alternative hypothesis H3 is accepted, since the observed differences can be qualified as statistically significant, i.e., there is an association between the chosen methodology and the educational stage, $X^2(30)=58.361$; $p<0.05$; and this association was found to be directly proportional and moderate (contingency coefficient=0.399; $p<0.05$) (**Table 3**).

Table 3. Chosen methodology-educational stage

			Chosen methodology						Total
			PBL	BreakOutEdu	Flipped classroom	DLF	Mixed	None	
ES	HS	Count	7	1	1	4	6	1	20
		% Within stage	35.0%	5.0%	5.0%	20.0%	30.0%	5.0%	100.0%
		Residual	4.2	-2.1	-2.2	-1.4	1.5	.0	
	C	Count	1	1	0	4	0	0	6
		% Within stage	16.7%	16.7%	0.0%	66.7%	0.0%	0.0%	100.0%
		Residual	.2	.1	-1.0	2.4	-1.4	-.3	
	OLS	Count	0	2	1	10	5	0	18
		% Within stage	0.0%	11.1%	5.6%	55.6%	27.8%	0.0%	100.0%
		Residual	-2.5	-.8	-1.9	5.2	.9	-.9	
	MS	Count	14	18	24	27	37	9	129
		% Within stage	10.9%	14.0%	18.6%	20.9%	28.7%	7.0%	100.0%
		Residual	-4.0	-2.0	3.1	-7.7	7.8	2.7	
	VET	Count	12	7	18	15	11	1	64
		% Within stage	18.8%	10.9%	28.1%	23.4%	17.2%	1.6%	100.0%
		Residual	3.1	-2.9	7.6	-2.2	-3.5	-2.1	
	N	Count	0	0	0	2	1	0	3
		% Within stage	0.0%	0.0%	0.0%	66.7%	33.3%	0.0%	100.0%
		Residual	-.4	-.5	-.5	1.2	.3	-.1	
	P	Count	9	19	6	21	10	4	69
		% Within stage	13.0%	27.5%	8.7%	30.4%	14.5%	5.8%	100.0%
		Residual	-.6	8.3	-5.2	2.5	-5.6	.7	
Total		Count	43	48	50	83	70	15	309
		% Within stage	13.9%	15.5%	16.2%	26.9%	22.7%	4.9%	100.0%

Note. ES: Educational stage; HS: High school; C: Conservatory; OLS: Official language school; MS: Middle school; N: Nursery; & P: Primary

The null hypothesis H4 is accepted, as the differences observed cannot be qualified as statistically significant between the chosen methodology and the knowledge area, $X^2(72)=92.553$; $p>0.05$, where $p=0.056$ (**Table 4**).

Table 4. Chosen methodology-knowledge area

			Chosen methodology						Total
			PBL	BreakOutEdu	Flipped classroom	DLF	Mixed	None	
KA	A	Count	3	2	2	8	6	0	21
		% Within area	14.3%	9.5%	9.5%	38.1%	28.6%	0.0%	100.0%
		Residual	.1	-.8	-.9	1.2	.7	-1.1	
	S	Count	6	3	10	9	9	4	41
		% Within area	14.6%	7.3%	24.4%	22.0%	22.0%	9.8%	100.0%
		Residual	.1	-1.6	1.5	-.8	-.1	1.6	
	SS	Count	7	7	2	14	3	3	36
		% Within area	19.4%	19.4%	5.6%	38.9%	8.3%	8.3%	100.0%
		Residual	1.0	.7	-1.8	1.7	-2.2	1.0	
	TR	Count	3	1	8	8	3	0	23
		% Within area	13.0%	4.3%	34.8%	34.8%	13.0%	0.0%	100.0%
		Residual	-.1	-1.5	2.5	.9	-1.1	-1.1	
	PE	Count	2	4	1	2	1	1	11
		% Within area	18.2%	36.4%	9.1%	18.2%	9.1%	9.1%	100.0%
		Residual	.4	1.9	-.7	-.7	-1.1	.7	
	E	Count	0	2	0	1	0	0	3
		% Within area	0.0%	66.7%	0.0%	33.3%	0.0%	0.0%	100.0%
		Residual	-.7	2.5	-.8	.3	-.9	-.4	
	L	Count	2	7	2	15	14	2	42
		% Within area	4.8%	16.7%	4.8%	35.7%	33.3%	4.8%	100.0%
		Residual	-1.8	.2	-2.2	1.4	1.8	.0	
	C	Count	6	3	9	3	11	1	33
		% Within area	18.2%	9.1%	27.3%	9.1%	33.3%	3.0%	100.0%
		Residual	.7	-1.1	1.8	-2.4	1.6	-.5	

Note. KA: Knowledge area; A: Art; S: Science; SS: Social sciences; TR: Trade and restoration; PE: Physical education; E: Electricity; L: Languages; C: Computing; I: Interdisciplinary; SLL: Spanish language and literature; M: Mathematics; LO: Labor orientation; & S: Sanitary

Table 4 (continued). Chosen methodology-knowledge area

			Chosen methodology						Total
			PBL	BreakOutEdu	Flipped classroom	DLF	Mixed	None	
KA	I	Count	6	3	1	5	6	1	22
		% Within area	27.3%	13.6%	4.5%	22.7%	27.3%	4.5%	100.0%
		Residual	1.9	-.3	-1.5	-.5	.5	-.1	
	SLL	Count	4	9	5	10	9	1	38
		% Within area	10.5%	23.7%	13.2%	26.3%	23.7%	2.6%	100.0%
		Residual	-.6	1.5	-.5	-.1	.2	-.7	
	M	Count	1	6	5	4	6	2	24
		% Within area	4.2%	25.0%	20.8%	16.7%	25.0%	8.3%	100.0%
		Residual	-1.4	1.3	.6	-1.2	.3	.8	
	LO	Count	3	1	4	2	0	0	10
		% Within area	30.0%	10.0%	40.0%	20.0%	0.0%	0.0%	100.0%
		Residual	1.5	-.5	2.1	-.5	-1.7	-.7	
	S	Count	0	0	1	2	2	0	5
		% Within area	0.0%	0.0%	20.0%	40.0%	40.0%	0.0%	100.0%
		Residual	-.9	-1.0	.2	.7	.9	-.5	
Total		Count	43	48	50	83	70	15	309
		% Within area	13.9%	15.5%	16.2%	26.9%	22.7%	4.9%	100.0%

Note. KA: Knowledge area; A: Art; S: Science; SS: Social sciences; TR: Trade and restoration; PE: Physical education; E: Electricity; L: Languages; C: Computing; I: Interdisciplinary; SLL: Spanish language and literature; M: Mathematics; LO: Labor orientation; & S: Sanitary

DISCUSSION

One of the main goals of teachers is the incorporation of ICT as a means at the service of pedagogy, which has to do with the mastery of teaching competence for the digital world understood as holistic, situated, oriented towards performance, function, and relationship roles, systemic, trainable and in constant development. A methodological approach that considers that technology is an instrument at the service of educational purposes, but it is also a type of knowledge and relationship with the world, human activity and a source of values (Castañeda et al., 2018). The formative experience that is the subject of this research concerns the design of new learning environments mediated by technology. In this sense, Vaillant (2014) points out as crucial in the training for the development of teacher digital competence, that the teacher designs new learning environments, being fundamental that he or she experiences a variety of modalities and initiatives in their formation.

Skills and competencies that teachers will have to mobilize in order to teach how to learn in the new society are not acquired in training contexts that do not promote them. Therefore, new training contexts are required in a digital environment that is changing at a dizzying pace.

The didactic sequence of the formative experience in question, which has given rise to this research, took Bloom's taxonomy as a reference in its design. Although there are dynamics based on the understanding of contents, most of the proposal revolves around practices oriented to the teacher trainee, who critically analyzes, contrasts, and creates tangible evidence of learning. In this sense, García-Valcárcel et al. (2015) state that an educational system will meet the demands of the knowledge society as long as it is capable of having teachers who design, experiment, and evaluate learning experiences enriched with ICT. The authors add that it is necessary to create a critical awareness in teachers who integrate ICTs in their teaching practice and to promote critical thinking with respect to the available learning resources. In short, as in this training proposal, the authors consider it a priority to guide teachers in the development of new didactic proposals in environments characterized by a high degree of use of technology for the development of informational, communicational, and social competencies in students.

With respect to hypothesis 1, in 2020, 30% chose to present their proposal from a DLF methodology, while in 2021, 33% of the participants chose to combine two or more approaches in their didactic sequences and, finally, in 2022, a mixed methodology (28%) was again predominant. In general, over the three years, the most used approach has been the DLF. In line with this conclusion, Soto-Varela et al. (2021) point out that, from the perspective of technology, it would be a mostly asynchronous approach, where its development would be

solved with little or no real-time connections. This is a decisive factor in educational and training environments. Furthermore, the authors add that from the point of view of the pace of learning, a high degree of personalization could be favored and, as for the teacher, he/she would act as a guide accompanying the student, encouraging his/her autonomy.

García-Peñalvo and Seoane-Pardo (2015) state that eLearning has become a tool at the service of teaching and learning processes, which is integrated in a much more transparent way in educational and self-learning processes, according to the needs of those involved. The DLF approach is a clear evolutionary proposal for distance teaching and learning that seeks to adapt to the training needs of the individual. Following in this line, Engel and Coll (2022) argue that digital technologies can become a good ally to support the systematic tutoring of students and teacher coordination. This is achieved by recording the student's transit through the different spaces and activities, thus making it possible to have a control of the learning achieved. The personalization of an DLF, as this study shows, aims to reach high standards.

Regarding the role of the teacher, Bray and McClaskey (2014) state that "In a learner-centered environment, students are in control and co-design their learning. The teacher is their guide in their personal journey" (p. 14). The DLF fosters an active role of the learner in his or her learning process, establishing an evolutionary dynamic in which the learner is autonomous in the development of the proposal.

It should be noted that there is a low and positive association between the year of the course and the selected approach, which corroborates the alternative hypothesis. Regardless of the time, it has been proven that these training approaches are essential. The application of new methods improves the quality of student learning, in addition to improving teaching production and the development of the didactic act (Hinojo Lucena et al., 2020).

The study shows that there is a moderate and positive association between the sex of the participants and the chosen methodology. The female gender has generally preferred to submit proposals based on the DLF approach (29.1%), while the male gender has mostly opted for the mixed approach (26.4%). In this regard, Lobato-Fraile and Madinabeitia-Ezkurra (2011) found that both women and men demonstrate high intrinsic motivation towards training in active teaching and learning methodologies. However, they find that women show greater teaching enthusiasm compared to men, although with a moderate difference. González-Sanmamed et al. (2021) revealed gender differences in the use of the resources that make up the DLF. Female teachers make greater use of information access, search, and management resources for their professional development than male teachers. In addition, mixed approaches tend to generate space for incorporating methodological dynamics that are not necessarily linked to active methodological approaches. In general terms, they show a more favorable attitude towards the realization of training activities for their updating than do male teachers (Caballero, 2013).

The research reveals that there is a moderate and positive association between the stage where the participants work and the chosen methodology. Of interest is the data on the most used approach in high school. PBL (35%) tends to be a method used more frequently at early ages, and experiences in high school levels, due to the proximity of university entrance exams, tend to be testimonial. This is debatable reasoning, since PBL represents a proven quality alternative to traditional direct teaching. Students are usually more motivated from the outset and can therefore achieve more significant learning (Botella & Adell, 2016; Trujillo, 2012, 2017). Furthermore, Lorente (2017) adds that it not only contributes to establish a more solid and meaningful learning in students, but also promotes the establishment of healthy relationships and a supportive classroom climate, fosters the integration of theory and practice, critical thinking, and negotiation among team members in order to achieve a final product.

Similarly, students value positively the contribution of the project to the development of their professional skills: creativity, teamwork, better planning of their time, more effective communication with their peers and, finally, growth in their capacity for autonomous learning (Aguirregabiria-Barturen & García-Olalla, 2020). Moreover, if we look at the early childhood education stage, the opposite happens, no teacher has opted for the PBL approach, a very peculiar situation since it has always been believed to be more widely used at these levels, to undertake the first approach to the rules and socialization with their peers. In middle school, the most used approach is the mixed approach (28.7%); the diversity of disciplines that this stage contemplates may be behind this preference. A hypothesis that could open a future line of development in this research.

Conversely, in primary education we again highlight DLF (30.4%) as the most selected approach. Ng and Lo (2022) note that teachers tend to prefer interactive learning in class to self-regulated study prior to class. The authors found better learning performance in a traditional classroom approach supplemented by gamification, as teacher recognition and feedback in the form of game design elements were valued much higher. In line with this idea, Muntaner-Guasp et al. (2020) emphasize that the use of active methodologies in the primary stage can and should be the driving force for change so that middle school education can make the innovations that it so badly needs. If the students who reach the secondary stage do so with different abilities to those established so far, the teaching-learning process deployed at this stage must change to respond to a new model of student who is more protagonist, more active, more capable, and more able to adapt to current social demands.

As for the Area of Knowledge taught and the chosen methodology, no association is observed. In relation to this premise, Lobato-Fraile and Madinabeitia-Ezkurra (2011) conclude that in terms of preference for training in active methodologies, similar values have been reported in the different areas of knowledge. We can affirm that regardless of the area in which a teacher works, it is essential to work from active methodological approaches mediated by technology. In this regard, Neves et al. (2021) indicate that when implementing innovative teaching-learning methodologies, the challenge encountered by teachers is generally associated with the uncertainty of developing the contents in practice, how to mediate in this new context in which the teacher is involved in both the teaching and learning process. Active learning requires the need for teachers to be highly prepared, both technically and pedagogically.

CONCLUSIONS

To propose a didactic sequence from an active methodological approach mediated by ICT, the teacher must be trained in technological, content, and pedagogical knowledge; consequently, education, teacher development and professional development programs should provide learning opportunities for teachers to develop the three areas contemplated in the TPACK model (Cabero & Barroso, 2016). Among the active methodologies, DLF was the most widely accepted, while PBL, flipped classroom, and BreakOutEdu were less preferred. The latter did form part of a large number of mixed proposals, but they were not considered as basic approaches, but rather as complementary approaches. It should be noted that the combination of different methodologies was the second most used, which implies that for a better approach of the contents to the students, teachers choose to combine different methods for a better understanding. This situation contrasts with the findings of González-Gómez et al. (2016) and Jeong et al. (2018), who were able to demonstrate that trainee teachers have a good perception of the Flipped Classroom methodology, and that it also has a direct impact on performance when comparing these results with those obtained following traditional methodologies.

Definitely, and as a general conclusion, we can highlight the same premise collected by Cabero-Almenara et al. (2018), the authors consider that this type of experience should encourage formative actions for training that focus, not so much on the instrumental and tool handling factor, but rather on didactic components, related to the design of multimedia educational materials. This assumption leads to a modification of significant attitudes towards virtual training. Technologies are seen as means at the service of an educational or training proposal, based on active methodologies that place the learner at the center of the process, giving the teacher the role of guide and mediator between his students and the learning objects.

Further, it is worth mentioning that this study has limitations. First, the study was limited to only 309 teachers. A larger sample will give us a more reliable result that is more representative of reality. A larger sample will give us a more reliable result that is more representative of reality.

Several suggestions for future research based on the findings of this study are recommended. Future research is required to study other variables that may influence the selection of one methodology or another when creating didactic sequences or itineraries. With a larger sample, an analysis could be made by autonomous community of origin, to see if this parameter has any influence.

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