

# Projection of the *Flipped Learning* Methodology in the Teaching Staff of Cross-Border Contexts

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## ABSTRACT

Technological impact and immigration have resulted in ICT playing a significant role in educational adaptation to multicultural environments. This study focuses on flipped learning as an innovative teaching method. The overall objectives of this research are, on the one hand, to carry out a review of the scientific literature about flipped learning, and, on the other hand, to know the extent of its scope amongst teaching staff in cross-border regions.

To achieve these objectives, a quantitative method has been developed through a descriptive model. 316 teachers from different educational centres of the Spanish Autonomous City of Ceuta (Spain) were selected as a sample, and an ad hoc questionnaire was used as an instrument for collecting personal data. Statistical procedures were performed through SPSS software, using location and scattering parameters (median and standard deviation), measurements (Pearson's asymmetry coefficient and Fisher's pointing coefficient) and association tasks between variables. The results show that teachers claim to have the necessary knowledge to implement flipped learning in their programmes, but they still have certain deficiencies in their specific training. A significant number of these teachers do not use it because they lack training and digital assets, and also because of a certain apprehension towards innovative practices. The main benefits include the improvement in the student's autonomy, their participation, interaction and motivation, as well as the teachers' satisfaction. Regarding the teachers' perception, it therefore follows that flipped learning contributes to the attention towards diversity created by the multicultural environments, which in this case is a result of the migration phenomenon.

**Keywords** INFORMATION AND COMMUNICATION TECHNOLOGIES, EDUCATIONAL INNOVATION, LEARNING STRATEGY, STUDENT INTEGRATION, INTERCULTURAL EDUCATION.

## 1 INTRODUCTION

The information society requires the incorporation and deployment of technologies in all areas of knowledge in current reality. In the field of education, technology has led to a



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transformation process in the ways of passing on knowledge, resulting in various changes, upgrades and innovations in the channels and means of transmission of information (Fernández, Fernández, & Rodríguez, 2018; Fuentes, López, & Pozo, 2019)

We live in an era marked by diversity, multiculturalism and inclusiveness of an entire social group with its own singularities, both in the educational system and in society. Ultimately, the path towards social justice is being sought so that everyone has access to information, knowledge, and equal opportunities. Information and Communication Technologies (henceforth, ICT) play a significant role in this aspect and can contribute to improving the situation of these people (Tello & Cascales, 2015).

One aspect to take into consideration is the effectiveness of ICTs when it comes to diversity within the students in the context of learning spaces, so as to achieve an improvement in the educational process, and promoting the inclusiveness of the alumni, regardless of their singularities (Fernández-Batanero & Rodríguez-Martín, 2017). Likewise, educational technology allows for the abolishment of exclusionary practices, making the access to information and communication possible (Cabero & Ruiz-Palmero, 2018), and for this reason it is important for teaching staff, according to Cabero, Roig-Vila, and Mengual (2017), to acquire the competences framed in the TPACK model (technological pedagogical and content knowledge).

There are an increasing number of education professionals who rely on ICT in order to achieve an inclusive education, with the aim of meeting the specific needs and responding to the different profiles of students that can be found nowadays in the learning spaces (Maestre, Nail, & Rodríguez, 2017).

Multiculturalism within learning spaces has become a reality in Spain, due to the strong migratory phenomenon that is endured. Authors like (Garrote, Arenas, & Jiménez-Fernández, 2018) consider that ICTs are essential tools to educate students and make them develop intercultural competences that will contribute to the learning environment, in terms of cultural individualities, awareness and teamwork. This is one of the reasons why this research is carried out in a cross-border context.

Within the broad spectrum of techno-pedagogical teaching models of the millennium, the flipped learning approach is a methodology that is becoming very popular (Dusenbury & Olson, 2019).

In this study, a review on the methodological approach under consideration will be carried out, as well as the verification of the scope of the objectives stated in the research, while answering the subsequent interrogations.

## 1.1 The State-of-the-Art in Flipped Learning in Scientific Literature

The transformation of society is a constant process due to the effect of various factors, such as the technological phenomenon. In people's daily life education is one of the areas which is absorbing a significant proportion of this digital technology (Rotellar & Cain, 2016).

López and Bernal (2019) consider that this impact made by ICT has enabled a change in the way of accessing information, content, and knowledge in general. As (McCarthy, 2016) has stated, teaching and learning processes are being renewed and adapted to the

peculiarities of the era in which they are carried out. Consequently, there is a strong trend towards technological and virtual adaptations.

Other authors like [Area, Hernández, and Sosa \(2016\)](#) argue that for some years now, educational policies have set their primary focus on the promotion, integration and development of educational technology in schools. In turn, [Fernández et al. \(2018\)](#) state that these educational institutions are performing a huge task in adapting learning spaces, and also with their innovation-oriented plans and educational policies.

Following these innovative changes in educational centres, a lead and active role in students is being encouraged, as stated by [Jovanović, Gašević, Dawson, Pardo, and Mirriahi \(2017\)](#), with the purpose of allowing the students the possibility to take control of their own apprenticeship, by being a knowledge-building agent, guided by the teaching activity in an effective educational process adapted to modern times and digital resources ([Martín, García, & Muñoz, 2014](#)).

As a result of this new educational paradigm characterised by a social and constructivist perspective of learning, and the inclusion and development of technology in schools, different techno-pedagogical models have emerged to meet the demands of a learning digitally native collective ([R. M. Hernández, 2017](#)). This study puts special emphasis on flipped learning, a methodological approach that, thanks to its technological nature, has achieved a great development in the last few years as can be seen in recent studies ([Seery, 2015](#); [Zainuddin, Habiburrahim, Muluk, & Keumala, 2019](#)).

Flipped learning is a teaching-learning approach that manages to reverse the roles that were traditionally assigned in educational centres by the main agents (teachers and students) involved in the process ([Mortensen & Nicholson, 2015](#)). In this way, the student is the one who takes the first step towards the acquisition of knowledge outside the classroom. This is radically opposed to the traditional ways of education, where the only possible learning space was the classroom. In this case, the students view the contents (previously prepared by the teachers) in different places, during their spare time, in informal environments ([Pereira, Fillol, & Moura, 2019](#)) using mobile devices connected to the Internet ([Long, Cummins, & Waugh, 2017](#)). This promotes a learning process facilitated by the use of technology ([Froehlich, 2018](#)) and encourages flexibility, both of time (contents can be viewed as many times as necessary and at any occasion), and space (they can be viewed anywhere), in contrast with other more traditional and conservative methodologies ([Boelens, Voet, & Wever, 2018](#)).

However, the process does not end outside the school environment, but continues inside it, in order to reinforce and deepen the contents ([Miedany, 2019](#)) and encourage collaborative work, starting from the interaction between students to incentivize the knowledge construction. This stems from the basis of problem solving, working and improving different social aspects ([MacLeod, Yang, Zhu, & Shi, 2017](#)), resulting in a mixed approach ([Lee, Lim, & Kim, 2017](#)), that combines both the work done inside and outside the educational area. This favours its educational potential and effectiveness ([He, Holton, Farkas, & Warschauer, 2016](#)).

Experts in this area of knowledge such as Lee, Park, and Davis (2018) consider that all the singularities that flipped learning embraces, signify a great motivational incentive among students, as they have to play new roles and accomplish technology-based tasks. This leads to a proactive mind-set towards the learning process, enhancing enthusiasm and motivation levels in the students' daily chores (Shih & Tsai, 2017; Tse, Choi, & Tang, 2019), especially in those students who are used to a traditional methodological approach Huan (2016).

Continuing with the potentialities and benefits of flipped learning, indicators that make reference to the academic performance and resulting motivation of this techno-pedagogical approach have been found in specialised literature to be above other innovative methods, such as e-learning (Thai, Wever, & Valcke, 2017). Consequently, as a result of a recent study by Sánchez, Jimeno, Pertegal, and Mora (2019) it can be stated that flipped learning not only achieves a greater success when compared to conservative learning methods, but also in comparison with other innovative approaches.

Along the same lines, Chaves, Trujillo, and López (2016) agree that flipped learning also contributes to improving students' autonomy, as they have to perform part of the learning process in a self-regulating way. This aspect is one of the key pillars of this innovative trend. According to Miño, Domingo, and Sancho (2018); Hinojo, Aznar, Romero, and Marín (2019), it turns the student into an active and independent agent, and the main actor of his/her own knowledge construction, as he/she has to perform observational, cognitive and higher-order tasks (Cabero & Llorente, 2015; Cerezo, Bernardo, Esteban, Sánchez, & Tuero, 2015).

An important factor in this approach is the student's self-esteem, as it can have a great impact in the results, the achievement of objectives, and consequently, in the quality of the learning process (Cabanach, Souto, Freire, & Ferradás, 2015; Esquivel, 2018). If the self-esteem is adequate, flipped learning can facilitate the attainment of the educational objectives (Awidi & Paynter, 2019; Nortvig, Petersen, & Hattesen, 2018) and consequently, the students' qualifications (Karabulut, Jaramillo, & Hassall, 2018; O'Flaherty & Phillips, 2015), including those that usually display a poor academic performance (Gross, Pietri, Anderson, Moyano-Camihort, & Graham, 2015).

After presenting and analyzing the literature of the state-of-the-art, the study moves on to the empirical process that will determine the relevance of this methodological approach in order to reach the desired outcomes.

## 1.2 Objectives and research questions

The main objective of this study is to know the scope of the innovative learning approach flipped learning among the teaching staff who work in cross-border areas and multicultural environments.

The following objectives derive from this general statement, with different levels of specification:

- To determine the level of knowledge of the teaching staff about flipped learning.

- To know the state of specific training of the teaching staff in this techno-pedagogical approach.
- To find out the usability level of flipped learning in teaching and learning processes.
- To specify the arguments and the reasoning of those teachers who are not willing to incorporate this method into their programmes.
- To discover the benefits perceived by those teachers who incorporated this method into their programmes.
- To know the level of satisfaction of the teachers that used this innovative method.
- To figure out the level of difficulty encountered by these professionals during the execution of flipped learning and the time spent on its methodological development.
- To determine the level of relevance of flipped learning regarding the attention to diversity within the classroom, to encourage inclusiveness and the capacity of adapting to the students' individualities.
- To know the legitimacy of the approach to promote communication within the peer group.
- To find out the adequacy level of the innovative approach to multicultural environments.

After the formulation of these objectives, the following questions are also raised in order to investigate the study variables at an associative level:

1. Does the knowledge of the teaching staff have an influence on the use of the methodology?
2. Does the specific training of the teaching staff affect the use of the innovative approach?

## 2 METHOD

In order to develop this study, a descriptive and correlational research design has been used, based on a quantitative approach and following the guidelines of [R. Hernández, Fernández, and Baptista \(2016\)](#).

### 2.1 Participants

The study sample subjects are teachers ( $n=316$ ), out of whom 45,6% are men and 54,4% are women, all of them between the ages of 27 and 62 ( $M=45.02$ ;  $SD=10.25$ ). They belong to different educational centres in the Autonomous City of Ceuta (Spain). These participants were chosen by stratified random sampling. The following selection criteria were followed: a) to obtain a representative sample of both genders; b) to choose representative teaching staff of different age groups; c) to gather teachers from different educational centres of the abovementioned city.

The distinctive geographic feature of the city is determined by its administrative insularity, since its only land union involves crossing a new country (Morocco) and a new continent

(Africa). The economy in the north region of this African country is heavily marked by its proximity to Ceuta, which leads to an important segment of the population trying to cross the border (in a legal or illegal way) on a daily basis, in order to meet their economic needs and employment (Trinidad, Soriano, & Barros, 2018). In some cases, these daily population movements have exceeded 40000 crossings a day (García, 2018). As a result, there is a multicultural population in Ceuta, with different cultures and religions, such as Christian, Muslim, Hebrew and Hindu (Amador, Mateos, & Esteban, 2017). This peculiarity has resulted in multicultural learning spaces characterised by the presence of students with functional diversity.

## 2.2 Instrument

The data collection process was carried out by an ad-hoc questionnaire, which consisted of 28 questions, and followed, to a large extent, the Likert rating scale (from 1 to 4). It also had some open response and closed questions.

Prior to its implementation in the field, the instrument was subjected to the validation of contents by expert judgement. This consisted in eight Doctors in Educational Technology from various Spanish universities, who gave necessary feedback to improve the questionnaire. Their judgement was also evaluated at a statistic level (Kappa from Fleiss, and W from Kendall) to determine the degree of agreement and the scope of relevant values ( $K=.834$ ;  $W=.872$ ), according to McMillan and Schumacher (2005).

Once the recommendations were applied to the questionnaire, the reliability of the instrument was tested through the statistical Cronbach's Alpha. The outcome was appropriate, according to Bisquerra (2004), in the entire tool ( $\alpha=.868$ ).

Finally, the submitted questions are classified into these three dimensions: a) Social (6 items); b) Innovative methodology (14 items); c) Specific training (8 items).

## 2.3 Process

The research process started in November 2018, when the researchers contacted different professionals from educational centres in the Autonomous City of Ceuta.

All the information concerning the educational institutions that took part in the research was consulted in the database provided by the Ministry of Education and Professional Training<sup>1</sup>.

After the initial approach, a collaboration agreement was reached. Thereupon, printed versions of the questionnaire were handed over, to facilitate and guarantee its fulfilment by the teachers with an underdeveloped digital competence.

A limit of three weeks was set to respond to all questions raised. After this time, the questionnaires were gathered and the data was exported in order to be entered in the statistic programme.

<sup>1</sup><https://bit.ly/2TzPFiY>

## 2.4 Variables used

The variables used in the study are listed below, with their Spanish abbreviations, in order to make the reading and understanding easier.

Level of knowledge of the teaching staff on flipped learning methodology (KNOW)

1. Specific training of the teaching staff in flipped learning (TRAIN).
2. Use of flipped learning as an innovative methodology (USE).
3. Reasons why flipped learning is not being implemented in the teaching and learning processes (REASONS).
4. Benefits perceived among the students after the implementation of flipped learning (BENE).
5. Established variables on the perception of the teachers within the subgroup that uses flipped learning (YESUSE):
  - Level of satisfaction achieved after the methodological implementation (SATIS).
  - Degree of difficulties found in the methodological deployment (DIFFIC).
  - Time spent in the creation of teaching materials (TIME).
  - Relevance of flipped learning in the treatment of diversity (DIVER).
  - Level of adaptation of flipped learning to multicultural environments (MULTI).
  - Promotion of inclusion through innovative methodology (INCLU).
  - Adaptive capacity of flipped learning to the individual characteristics of the students (ADAP).

## 2.5 Data analysis

Statistical data such as the mean (M), the Standard Deviation (SD), Pearson's asymmetry coefficient (PACP) and Fisher's correlation coefficient (FCC) have been used for the deployment of this research. Additionally, Pearson's chi-squared test ( $\chi^2$ ) has been used for the comparison among the different variables, and also Cramer's V (V) test to specify the strength of association among them.

The computer software Statistical Package for the Social Sciences (SPSS) v. 22 has been used for the statistical processing of data, considering  $p < .05$  as a statistically significant difference.

## 3 RESULTS

The results found in this research are presented below.

Starting with the study of the knowledge of the teaching staff about flipped learning, as well as their specific training and their use of the methodology (Table 1), the participants demonstrated that they have the necessary knowledge to undertake innovative practices through this emergent methodological approach. However, their degree of knowledge contrasts with their training and application in the learning spaces, given that they had

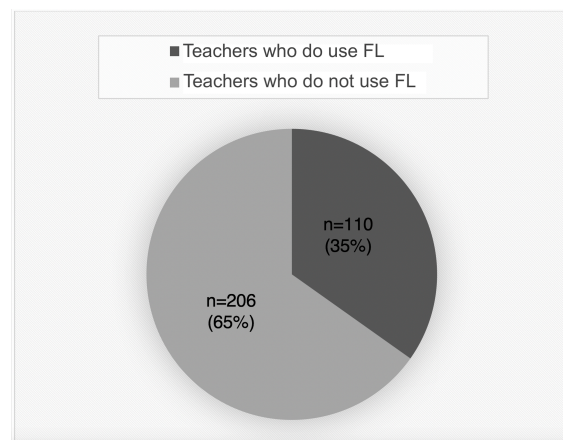
not received any specific continuous training on the methodology under consideration, which revealed the difficulty to improve their teaching and learning process. Regarding the asymmetry and kurtosis statistics, the analysed variables show an asymmetrical distribution tending to the right and a platykurtic kurtosis, except for the USE variable, which has shown leptokurtic values.

**Table 1** Results obtained in KNOW, TRAIN and USE

	Likert scale <i>n</i> (%)				Parameters			
	Nothing	Little bit	Quite	Totally	M	SD	PAC	FCC
KNOW	21 (6.64)	72 (22.78)	108 (34.17)	115 (36.39)	3.01	.926	2.163	-.742
TRAIN	193 (61.07)	50 (15.82)	32 (10.12)	41 (12.97)	1.75	1.081	.694	-.241
USE	206 (65.19)	48 (15.19)	34 (10.76)	28 (8.86)	1.63	.989	.639	.405

Source: Self made

Regarding the use of flipped learning as an innovative methodology in the learning spaces, Figure 1 shows how almost three-quarters of the analysed teachers do not benefit from the advantages and potentialities that this innovative approach offers, in opposition to the remaining number of professionals who make use of them.



**Figure 1** Dichotomous version of USE

In order to specify the determination of the dichotomy between the use or not of flipped learning and its influence on the knowledge and specific training of the teaching staff (Table 2), the Pearson’s Chi-squared test has been carried out, which has shown some significant values in the statistical level, both in the KNOW variable ( $\chi^2(3) = 116.75, p < .05$ ) and in the TRAIN one ( $\chi^2(3) = 220.6, p < .05$ ). Additionally, the Cramer’s V test has revealed a powerful strength of association ( $V_{Cramer} > 6$ ) among the correlated variables. Consequently, the use of flipped learning is influenced by the knowledge and the training of the teachers.

Figure 2 shows the arguments given by the teachers for not implementing this innovative methodology. The reasons that professionals give for rejecting it are mostly based on the

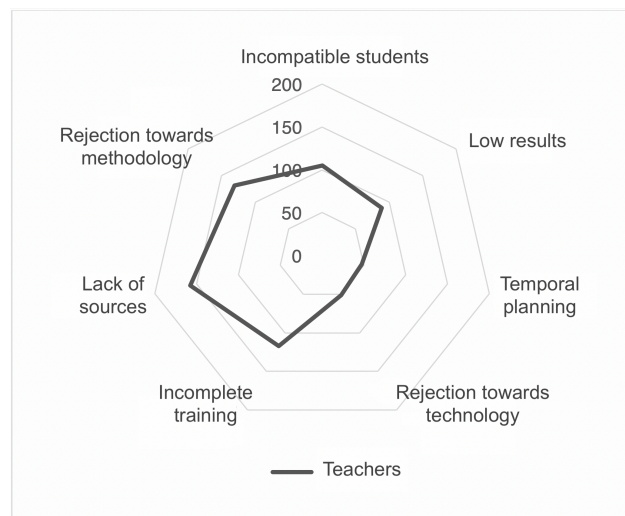


**Table 2** Association among the dichotomous version of USE with regard to KNOW and TRAIN

	Likert scale <i>n</i> (%)				Parameters		
	Nothing	Little bit	Quite	Totally	$\chi^2$ (df)	<i>p</i> -value	<i>V</i>
<b>KNOW</b>					116.75(3)	<.001	.608
YesUSE	0 (0)	2 (.63)	26 (8.22)	82 (25.95)			
NoUSE	21 (6.64)	70 (22.15)	82 (25.95)	33 (10.44)			
<b>TRAIN</b>					220.6(3)	<.001	.836
YesUSE	6 (1.89)	40 (12.65)	27 (8.54)	37 (11.71)			
NoUSE	187 (59.17)	10 (3.16)	5 (1.58)	4 (1.26)			

Source: Self made

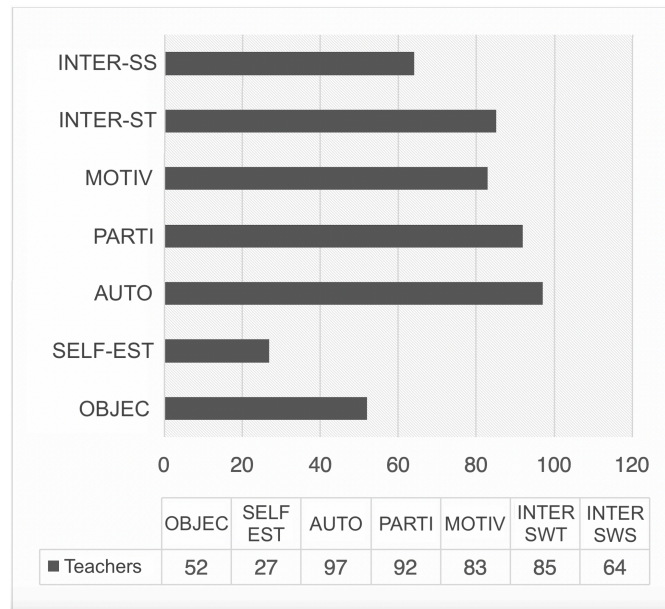
lack of technological resources (n=158), fear or apprehension towards innovation (n=131), lack of specific training (n=117), opposing students (n=105), poor results obtained in previous implementations (n=89) and, in a smaller extent, other reasons like aversion towards ICTs (n=51), and the difficulties found when planning the creation of contents with this innovative approach (n=47).



**Figure 2** Reasons mentioned by the subgroup NOUSE for not using flipped learning.

Regarding the benefits obtained after the implementation of flipped learning as a methodological approach (Figure 3), teachers have expressed that after this educational innovation, they have achieved improvements regarding the students’ autonomy. The most remarkable achievements were the increase in their participation, the interaction among those involved in the teaching and learning process, and the motivation. They also mentioned others such as an improvement in interaction among the students, the scope of the established objectives and students’ self-esteem.

Regarding the different established variables used to develop the teachers’ perception about the use of flipped learning (Table 3), the results show an overall positive opinion of



**Figure 3** Benefits achieved among students concerning the YES<sub>USE</sub> subgroup

those professionals. The most prominent variable is the teachers’ overall satisfaction, closely followed by the communication exchange between the students, which was made possible by the use of flipped learning, using the data produced by the learning analytics and offered by the content management platform.

Another variable that has been analysed is the difficulty encountered and the time spent in performing such an innovative method. This revealed that some teachers found difficulties and, consequently, had to spend a considerable amount of time on the deployment of flipped learning in the teaching and learning process in which they participate on a daily basis

However, in spite of the contingencies, they expressed positive opinions regarding the variables relating to attention, inclusion and methodological adaptation towards the diversity of learning spaces.

Regarding the asymmetry and the values that were achieved in the distribution, as can be seen in the following chart, the variables represented form an asymmetric distribution, tending to the right and a degree of pointing generally platykurtic, except for the variables concerning the satisfaction among teachers and the communication among learners, which obtain a leptokurtic value.

#### 4 DISCUSSION AND CONCLUSIONS

As has been discussed in the section related to the state-of-the-art of this article, we live in a digital era, with quick access to information and the ease to establish communicative and interactive processes with our environment (Fernández et al., 2018; Fuentes et al., 2019).

**Table 3** Benefits achieved among the students concerning the YesUSE subgroup

	Likert scale <i>n</i> (%)				Parameters			
	Nothing	Little bit	Quite	Totally	M	SD	PAC	FCC
SATIS	3 (2.72)	14 (12.72)	40 (36.36)	53 (48.18)	3.3	.792	2.901	.155
DIFFIC	12 (10.9)	24 (21.81)	58 (52.72)	16 (14.54)	2.71	.845	2.021	-.276
TIME	8 (7.27)	37 (33.63)	36 (32.72)	29 (26.36)	2.78	.918	1.941	-.975
DIVER	20 (18.18)	32 (29.09)	29 (26.36)	29 (26.36)	2.61	1.062	1.514	-1.233
MULTI	14 (12.72)	21 (19.09)	51 (46.36)	24 (21.81)	2.72	.931	1.904	-.574
INCLU	21 (19.09)	39 (35.45)	27 (24.54)	23 (20.91)	2.47	1.024	1.437	-1.117
ADAP	20 (18.18)	46 (41.81)	23 (20.91)	21 (19.09)	2.41	.993	1.418	-.971
COMMU	2 (1.81)	17 (15.45)	76 (69.09)	15 (13.63)	2.94	.601	3.239	1.248

Source: Self made

Furthermore, today's society is characterized by its plurality, as it brings together different cultures, religions and nationalities. The main reason behind this phenomenon is the migration crisis that is taking place in those countries with the greatest social and economic difficulties, in their struggle to find viable alternatives and new solutions to the precarious situation of their home countries (Trinidad et al., 2018).

These peculiarities have had an impact on the field of education, since –on the one hand– the educational technology has facilitated the training and learning process, thanks to a multitude of digital resources that can be used for teaching purposes (Viñals & Cuenca, 2016). On the other hand, the migratory phenomenon has given rise to a wide cultural fusion of profiles within a single place of learning, which means that educational professionals are required to pay attention to the diverse communities that can be found today within learning spaces (Rivero, 2017).

Therefore, terms such as diversity, inclusion, multiculturalism and interculturality have a strong presence in the current educational system. These concepts can be effectively addressed through the ICTs, as previously established by other authors (Fernández-Batanero & Rodríguez-Martín, 2017; Garrote et al., 2018; Maestre et al., 2017; Tello & Cascales, 2015).

As recently stated by Hinojo et al. (2019), in a systematic review of specialized impact literature on flipped learning, many studies (Scopus=274; WOS=285) have focused on this pedagogical innovation, but none of them have analysed the topic from a multicultural and cross-border context such as the one presented in this study, acquiring a differentiating nuance over previous publications.

Focusing on the findings encountered, it has been proved that teachers have the necessary competences and knowledge to carry out innovative methodologies such as flipped learning, with similar results to those presented by Cabero et al. (2017), in reference to the TPACK model. However, even though the teachers have the ICT knowledge and skills, they agree that the innovative continuous training is scarce and insufficient, as well as the use of this techno-pedagogical approach.

The results show that over half of the participants have not implemented flipped learning in their training and learning process. Among the reasons given for justifying their decision the most noteworthy are the lack of digital assets, the concern and reticence that the execution of new teaching practices provokes, and the unsatisfactory specific training in this innovative approach.

Regarding the opinion of teachers who have implemented flipped learning, these state that with this methodology an improvement in the autonomy of the students has been achieved, as obtained in previous studies (Chaves et al., 2016; Hinojo et al., 2019; Miño et al., 2018). Another advantage is the increase in the participation from the student body during the training and learning process, based on this approach, in analogy with the results obtained by Jovanović et al. (2017).

The interaction among the different individuals that take part in the learning process has also improved, which concurs with the findings of MacLeod et al. (2017). Additionally, the motivation of the students and the meeting of the objectives have increased too, as stated in previous studies regarding motivation (Shih & Tsai, 2017; Thai et al., 2017) and the achievement of the aims (Awidi & Paynter, 2019; Nortvig et al., 2018). In the same way, the teaching staff has noticed a development in attitude and self-esteem, which is a very important factor, as previously presented by others researchers (Cabanach et al., 2015; Esquivel, 2018).

Equally, the teachers expressed a positive assessment following the implementation of flipped learning, and expressed their satisfaction with the accomplished results, as well as the effective interaction and communication achieved among their students. Despite this, the professionals explained that the process had not been easy, since they had certain difficulties when deploying the technological methodology in an efficient way, which is an aspect that has an impact in the time spent on its daily development.

Regarding the diversity within the learning spaces, the teaching staff claim that with the implementation of innovative practices, the inclusion and the attention to the different students within the learning spaces improves, thanks to the potential of educational technology to adapt to the individual characteristics of each student.

Therefore, it can be concluded that flipped learning contributes to reducing the differences found within the education centres, providing a stepping stone for inclusion of all individuals in the learning process. Consequently, this approach responds to the needs of students in multicultural environments, as already confirmed in the context in which the present study has been carried out.

Having completed the study, it is possible to respond to the questions which were formulated at the beginning of the research. Regarding the influence of teachers' knowledge and specific training on the use of the methodology under consideration, the results and statistical parameters have revealed that the use –in this case– of flipped learning is conditioned by both the knowledge and the training of the teachers, as has been proved through statistically significant results.

Following this investigation, and for the future, there has been an increase in the literature about studies concerning the use of ICT and –specifically– flipped learning as a

methodological approach of teaching and learning in a society with a more direct and easier access to information and knowledge through technology, in geographical contexts conditioned by immigration, as well as the diversity and multiculturalism of this methodology in the classrooms.

Again, following this study, the foundations have been established to support theories about pedagogical innovation and the importance of using active methodologies based on a digital content, in order to reach all audiences thanks to the teaching potential and adaptability that educational technology shows.

Additionally, a series of relevant implications for the future improvement of teacher training have emerged from this study, including:

- The importance of renewing the methodologies, techniques and tools that teachers use on a daily basis, in order to update the contents in line with the learner's reality and the characteristics of their current situation.
- Advocate for the implementation of technology resources in education centres, in order to increase the inclusion opportunities of students with functional diversity, through methodologies that imply the use of digital means.
- Encourage and raise awareness of educational professionals as regards continuing vocational training to meet the quality standards and requests of a period characterized by continuous changes. One where what was used a few years ago is now out-of-date, due to the fast evolution and development of the society in which we live, a fact that indirectly affects the learning results of the students.

The main limitation found in the process of this investigation lies in the data collection stage, due to some difficulties when gathering information about the training praxis of certain individuals, due to the lack of collaboration in this important stage of the investigation.

As a future line of research, we seek to expand the study sample to a different cross-border region, with similar characteristics to the ones from this research, as is the case of the Autonomous City of Melilla (Spain). In this way, the objective to establish a comparative analysis between both of the Spanish cities that are placed in the north of Africa and which share a similar multicultural situation of their society and, by extension, their learning spaces would be achieved.

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