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Analysis of Prospective Teachers' Perceptions of the Flipped Classroom as a Classroom Methodology

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Abstract: In order for students to be the protagonists of the teaching and learning process, teachers must change their role in the classroom. A successful alternative is the flipped classroom methodology, where educational technology is integrated into a reorganisation and optimisation of class time. Based on this alternative, this paper aims to analyse the perceptions of future teachers about the FC as an active methodology. A quantitative longitudinal panel design was carried out with pre-test and post-test measures, with a descriptive, inferential and predictive approach. The sample consisted of 284 prospective teachers from the University of Malaga (Spain), who were asked about their perceptions of the FC using an ad hoc questionnaire. The results reflect positive perceptions of the FC methodology on the part of the future teachers, with significant differences by gender in favour of men. The variables gender, re-watching videos, digital competence and autonomous learning were predictors of the participants' perceptions. In conclusion, it is important to highlight the importance of implementing active methodologies such as the FC with future teachers that they can use when carrying out their work.

Keywords: information and communication technologies; flipped classroom; teacher training; digital competence



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1. Introduction

The implementation of information and communication technology (ICT) in education is a challenge that needs to be addressed [1]. In the 21st century, with an increasingly digitalised society, where people need technological competences and skills, education must promote the acquisition of relevant knowledge and skills.

In this sense, despite technological and pedagogical advances, the traditional expository methodology continues to predominate [2]. The problem translates into students' reduced motivation and a failure to effectively promote the exercising and development of the students' skills and competences [3]. In the face of this passive role [4], it is necessary to opt for methodological proposals and strategies that place the student at the centre of the process and give them a leading role. There are already a large number of online training courses open that are oriented towards the assimilation and reproduction of content with hardly any influence from the teacher [5], so the methodology developed in the classroom must be adapted to the needs and interests of the students. It is a question of rethinking how we use class time, opting for proposals that manage to solve the problems posed [6]. One of the options is for students to investigate and research content outside the classroom, leaving class time to apply this knowledge to practical issues. This approach increases the non-face-to-face work of university students, thus better adjusting them to the legal workload linked to the value of ECTS credits [7]. Therefore, we are committed to an active

methodology that prioritises class time in practical work over content that has already been worked on by students. This study will therefore focus on the flipped classroom.

The flipped classroom (FC), also known as reverse instruction or reverse teaching [8], has time as its central axis. The novel contribution focuses on a restructuring of time in the learning process, reversing the usual practices in search of its greater optimisation and use [9,10]. The fundamental change consists of students working on more theoretical content outside of class time [11]. To do this, they make use of a multitude of digital resources (videos, readings, online presentations, among others) that have been created, modified or selected by the teacher [12]. In this way, class time is devoted to resolving doubts, posing problems and solving them, generating debates or proposing work in which to apply what has been learnt theoretically in a meaningful way. In this sense, the importance of viewing and working on the learning materials provided before class is directly linked to the success of the FC methodology [13]. Thanks to this, the student can better manage the learning of the contents [14,15] by having videos at their disposal that facilitate knowledge and make them active participants during classroom practice [16]. In addition, classroom time becomes eminently practical in nature with the application of what has been learnt, and proposals can be put forward that promote the development of creativity or reflection [17,18]. Inverting the usual class structure brings about an adaptation to the rhythms and interests of the students in the classroom [1,12,19,20]. The presence, guidance and experience of the teacher is essential, as the time is used to enhance and facilitate other processes of knowledge acquisition and practice, developing creative ways of participating and applying content, answering questions and solving problems [21]. It is therefore a pedagogical strategy that entails the rethinking of both learning processes and learning times.

Now that the characteristics of the flipped classroom methodology are known, it is essential that future teachers receive theoretical and practical training in it. It is not only a matter of knowing what it consists of, but also of experiencing the benefits and difficulties of this approach on a personal level. This is what Romero et al. [22] questioned, asking whether it was possible to understand a model without the future teacher experiencing it. On this basis, the following research objectives were set out.

O1. To analyse the perception of the FC methodology of future primary school teachers, in the pre-test and post-test.

O2. To check if there are significant differences in the students' perceptions, depending on the moment of application of the FC methodology (pre-test vs. post-test), for each gender.

O3. To identify significant predictors that affect student perceptions of the FC once the methodology has been completed (post-test).

The Implementation of the Flipped Classroom in the University Context

As an active methodology, the flipped classroom is defined by a series of characteristics that are linked to this type of pedagogical strategy, where the student is the protagonist of his or her learning process [23]. Thus, different studies have highlighted the benefits of the FC, such as its impact on improving academic performance [24–29], the increase in the number of interactions between the participating agents [30–33] or the motivation inherent in the implementation of this proposal [34–36].

Taking into account the objectives of this work, a review of the main studies that are most relevant to this proposal was carried out. The study by Kim et al. [37] analysed 112 university students' perceptions of the FC and its impact on creativity. The results indicated a positive perception of the method and the students' commitment to it, and their creativity was improved. Along the same lines, the work of Jang and Myoung-sook [38] examined the perceptions of 271 university students on the FC methodology, showing a positive perception without differences related to the gender of the participants. Chen et al. [39], with 62 first-year university students, found that gender was not a determining factor for perceptions and learning performance when implementing the FC. The work of Zainuddin and Perera [40], with 61 university students, found better peer

interaction and a greater control of self-regulated learning through the implementation of the FC. In relation to the perception of autonomy, the study by Tsai [41] also stands out, where a sample of 124 university students, through a comparison between the control and experimental groups, showed significant differences in favour of the group that used the FC. In Spain, Mengual et al. [42] studied the factors that influenced the FC in a sample of 607 students from the faculties of education, economics and technology of Ceuta. Aspects such as motivation and self-esteem showed a higher efficacy, while gender was not a factor affecting the results.

Focusing on future teachers, in this case in secondary education, the work of Romero et al. [22] addressed the effects of the FC on the performance and satisfaction of 222 master's degree students in Spain. The results indicated that incorporating the FC improved the motivation, performance and level of engagement with the methodology, and the interactions between the students and with the teacher. Meanwhile, the research by Sosa and Palau [18] included 30 future primary and early childhood teachers, reflecting a perception of positive reciprocity between the FC and the development of digital competence in teaching. An initial study with future primary school teachers was carried out by Martín and Tourón [17] with 110 students, applying the FC methodology in an experimental group versus a traditional methodology for the control group. The findings indicated a positive perception of the FC with significant differences in respect of the traditional classroom model. The work of Gómez-Carrasco et al. [43,44] analysed the impact of gamification and the flipped classroom on the academic performance, motivation and perceptions of 210 prospective primary school teachers. The results indicated a positive perception, with women's perceptions being better than those of men. Additionally, with a sample of prospective primary school teachers, the studies by Campillo and Miralles [45,46], analysed the perceptions of 179 students with a pre-test and post-test, with the year 2021 placed in the context of the pandemic caused by COVID-19. The results reflected a positive perception, with higher results for students who had previous experience with the FC methodology and who had a better level of digital competence. In addition, it was also found that the FC favoured greater autonomy in learning, as well as a positive assessment of the most frequent interactions that occurred when implementing the FC.

2. Materials and Methods

2.1. Design

This research followed a quantitative, ex post facto, pre-experimental design with a longitudinal panel design with pre-test and post-test measures. Data were collected through a questionnaire on perceptions of FC in a pre-specified group of subjects at two separate points in time (pre-test and post-test). Following data collection from participants at both time points, descriptive and inferential analyses were performed for the sample as a whole and according to the gender variable.

2.2. Sample

A non-probabilistic sample (by convenience) was taken from 314 students of the degree in Primary Education of the Faculty of Education Sciences at the University of Malaga during the first half of the academic year 2021/2022. These students studied the subject "Communication and Information Technologies Applied to Education" in groups B, C, D, E and F. The students enrolled in this subject were in the first year of the educational degree. The final sample consisted of 284 students, representing 90.45% of the total number of students. In terms of gender, 54.58% (155) were female and 45.42% (129) were male, with a mean age of 18.87 ± 1.176 years. For data collection, a survey was used in digital format through google forms.

2.3. Instrument

To measure the perception of FC, an ad hoc questionnaire was developed based on the proposals of Colomo et al. [47,48]. The instrument consisted of three dimensions (com-

municative, instrumental and pedagogical) with a total of 15 items. The communicative dimension (DIM. C) was made up of items that focus on the transmission and understanding of information, as well as the skills and abilities needed to foster constructive interactions and dialogues between the participating agents, being relevant in FC [49]. The intellectual dimension (DIM. I) focused on how cognitive skills are developed when implementing the FC methodology and on factors that directly affect them. Thus, aspects such as attention, critical thinking, creativity and motivation are considered for their impact on FC [50]. Finally, the pedagogical dimension (DIM. P) included items referring to aspects that have an impact on learning processes with FC, such as assessment, distribution during the work process or the development of other competences—elements already considered in other studies [40]. A seven-point Likert scale was used to measure perceptions, with a value of 1 indicating “strongly disagree” and 7 indicating “strongly agree”.

The psychometric properties of the created questionnaire were tested. For this purpose, construct validity was tested through exploratory factor analysis (EFA) and then confirmatory factor analysis (CFA). Once the model was validated, the reliability of the instrument was tested through different coefficients. For this purpose, SPSS V.24 and AMOS V.24 software were used.

Regarding the analysis of the internal and latent structure of the instrument, the maximum likelihood method with oblimin rotation was used for the AFE, understanding the relationship of the dimensions. The Kaiser–Meyer measure of sampling adequacy ($KMO = 0.768$) as well as Bartlett’s test of sphericity ($\chi^2 = 490.404$; $gl = 66$; $sig. = 0.001$) evidenced the dimensionality of the instrument. The model revealed the presence of three latent factors where X was greater than 1 (Figure 1). This model explained 48.13% of the true variance in the instrument scores. Specifically, the I dimension explained 21.21% of the true scores, the C dimension explained 14.47% of the variance, while the P dimension explained 12.45%. Those items with weights greater than 0.40 were considered suitable to make up the final instrument for this study, eliminating those with lower values. Thus, the refined version of the instrument after PFA consisted of 12 items.

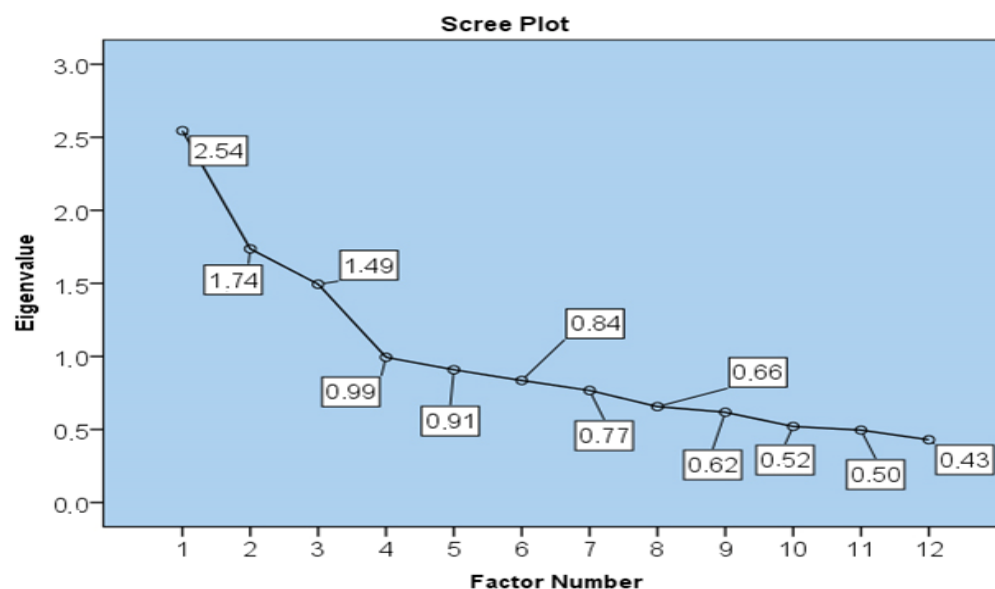


Figure 1. Sedimentation values. Source: own elaboration.

The theoretical and latent proposition provided by the AFE was tested through structural equation modelling (SEM). The maximum likelihood method was again used, using the fit thresholds recommended by Hu and Bentler [51]: minimum discrepancy (CMIN), chi-square fit statistics/degree of freedom (CMIN/DF), the goodness-of-fit index (GFI), the parsimony goodness-of-fit index (PGFI), the normed fit Index (NFI), the parsimony normalized fit index (PNFI), the incremental index of fit (IFI), the Tucker–Lewis index (TLI),

root mean square error of approximation (RMSEA), comparative fit index (CFI) and root mean squared residual (SRMR). The model proposed by the AFE was neither significant nor satisfactory, so we had to revise the model and adjust it until we found the final one. The final model was composed of a total of 12 items and three correlated latent dimensions (Appendix A), which showed the factorial structure formulated in the AFE. Table 1 shows the coefficients provided by the last satisfactory model, together with the recommendations of Hu and Bentler [51]. Table 2 includes the final items structured in their reference dimensions. The annex to the manuscript contains the structural equation model, showing the correlations found between the items and the dimensions.

Table 1. Coefficients of the AFC model and recommended values.

Indexes	Model Coefficients	Hu and Bentler's Recommendations [46]
CMIN	92.552	<500
CMIN/DF	1.815	<3
GFI	0.950	>0.7
PGFI	0.721	>0.7
NFI	0.814	>0.7
PNFI	0.729	>0.7
IFI	0.907	>0.9
TLI	0.916	>0.9
RMESEA	0.054	<0.070
CFI	0.961	>0.950
SRMR	0.054	<0.080

Source: own elaboration.

Table 2. Dimensions and items of the instrument.

Dimension	Item	Code
Communicative (DIM. C)	Contributes to the transmission of ideas and content	C2
	Encourages the raising and resolution of doubts	C3
	Promotes social interaction and dialogue	C4
	Promotes understanding of information	C5
Intellectual (DIM. I)	Promotes attentional capacity	I2
	Promotes motivation for learning	I3
	Contributes to the development of critical thinking	I4
	Contributes to the development of creativity	I5
Pedagogical (DIM. P)	Encourages feedback (formative assessment and personalised feedback)	P1
	Enhances the development of digital competence	P2
	Promotes autonomous learning	P3
	Promotes group work	P4

Source: own elaboration.

The analysis of the internal consistency of the final version of the instrument and its corresponding dimensions were calculated using Cronbach's alpha and Spearman–Brown coefficients (even length), with values above 0.7 (Table 3). Once the analyses had been carried out, it was found that all the coefficients were satisfactory. In addition, the internal consistency of each factor was also assessed using composite reliability (CR), with values above 0.7, as recommended by Hu and Bentler [51].

Among the predictor variables, the perception of the level of digital competence (DC) was considered, using the Digital Competence Questionnaire for Future Teachers (CCDFM) [52]. This is an instrument with five dimensions (technological literacy; communication and collaboration; information search and processing; digital citizenship; creativity and innovation) and 20 items, assessed on an 11-point Likert scale (0 to 10, both inclusive), with excellent reliability ($\alpha = 0.931$) and psychometric validity in the confirmatory factor analysis (CMIN = 176.88; GFI = 0.944; PGFI = 0.758; NFI = 0.993; PNFI = 0.836). The

criterion validity between both instruments was fulfilled for the study sample, as reflected by the high relationship obtained in the Spearman correlation ($r = 0.738$).

Table 3. Reliability coefficients.

Dimension	DIM. C	DIM. P	DIM. I	Total
Cronbach's alpha	0.705	0.793	0.772	0.775
Spearman–Brown coefficient	0.769	0.773	0.790	0.807
RC	0.704	0.714	0.744	-

Source: own elaboration.

2.4. Procedure and Data Analysis

The subject “Communication and Information Technologies Applied to Education” was taught using the FC methodology. Students were provided with videos and a range of digital resources on the theoretical content of the subject on the Virtual Campus where it was taught, which was to be viewed and worked on before the synchronous sessions. During class hours, teachers resolved doubts about the content and proposed application activities (individual and collective) that allowed the theoretical content worked on before class to be put into practice. Considering the purpose of finding out the students' perception of the FC methodology, it was decided to analyse their assessment at three points in time: at the presentation of the subject at the beginning of the semester of the academic year 2021, before the start of the content blocks and after the end of the course, in order to find out how their perceptions had evolved. The responses were collected using a digital questionnaire (Google Forms), administered electronically.

Regarding statistical techniques:

- First, the descriptive statistics of the pre-test and post-test were examined. The Wilcoxon test was applied to check the existence of significant differences between the two moments, as the normality criteria were not met (Kolmogorov–Smirnov, $p > 0.05$).
- Second, for the statistical contrast between the moments of application (pre-test and post-test), the Wilcoxon test was used, where Pallant [53] states that the effect size of the significant differences found can be interpreted as: small effect ($r = 0.1$), medium effect ($r = 0.3$) and large effect ($r = 0.5$).
- Third, for the contrast analysis on the gender variable, the Mann–Whitney test was applied. To calculate significant difference sizes, Rosenthal's r [54] was calculated, where values of approximately 0.2, 0.5 and 0.8 indicate small, medium and large effects, respectively.
- Fourth, in order to find out whether predictors significantly affect the perception of FC, a multiple linear regression (MLR) was performed focusing on the total score of the post-test (sum of all dimensions). In addition, we studied the non-violation of the assumptions that allow this type of technique.

3. Results

This section is divided as follows: the next section analyses and contrasts student perceptions between the pre-test and post-test; in the second section, a comparative statistical contrast is made between the beginning and the end of the study (pre-test vs. post-test), for each gender; and in the third section, significant predictors are identified that affect students' perceptions of the FC after the end of the study (post-test).

3.1. Students' Perceptions before and after Completion of the FC Methodology

We began by reviewing the students' perceptions of the flipped classroom before the intervention (pre-test) and after the intervention (post-test). For this purpose, a descriptive and inferential analysis was carried out by dimensions and of the total questionnaire according to the time. As can be seen, there was an increase in the scores of all the dimensions and, consequently, in the questionnaire between the pre-test and the post-test, increasing the means between 2.23 and 2.30 points in the dimensions and in the total

of the questionnaire (Figure 2). This shows that the perception of the communicative, instrumental and pedagogical potential of the flipped classroom improved significantly after its implementation. The pedagogical dimension was the best considered at both times, with a positive perception in the pre-test ($M = 4.15$) to quite positive in the post-test ($M = 6.38$), while the communicative dimension was on the opposite side, being barely acceptable in the pre-test ($M = 3.75$) but reaching a quite positive evaluation in the post-test ($M = 6.05$). At the questionnaire level, the assessment also went from acceptable ($M = 3.98$) to quite positive ($M = 6.24$).

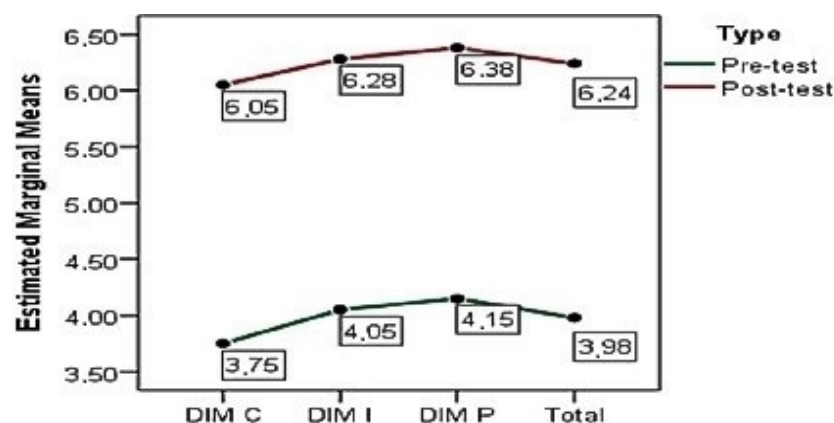


Figure 2. Students' perceptions before and after applying the FC methodology. Source: own elaboration.

The data confirmed the existence of significant differences between the pre-test and post-test scores in all dimensions and in the total questionnaire. For the communicative ($Z = 14.597$, $p < 0.05$), instrumental ($Z = -14.594$, $p < 0.05$) and pedagogical ($Z = -14.627$, $p < 0.05$) dimensions, as well as for the total questionnaire ($Z = -14.613$, $p < 0.05$), a significant increase in the perceptions of the student sample was observed between their assessment before incorporating the FC methodology and after the end of its implementation.

3.2. Statistical Contrast in Students' Perceptions by Gender and Time of Application of the Methodology

Figure 3 shows the results through measures of central tendency (mean), for each dimension of the instrument, as well as for the overall score, classified according to: gender and time of application of the test (pre and post).

In relation to the pre-test, it was observed that the students' perception of the communicative dimension of the FC was acceptable, being slightly higher in males ($M = 3.77$) compared to females ($M = 3.74$), although there were no significant differences between genders ($U = 9684.5$; $Z = -0.049$; $p > 0.05$). Students' perceptions in the instrumental dimension were slightly higher than in the communicative dimension, both for males ($M = 4.19$) and females ($M = 3.95$), and significant differences were found between their scores ($U = 8214$; $Z = -2.230$; $p < 0.05$) with a small effect size ($r = 0.135$). The students' perception of the pedagogical dimension was perceived as positive, achieving a slightly better score in the pre-test by males ($M = 4.28$) compared to females ($M = 4.07$), although there were no significant differences ($U = 8462$; $Z = -1.864$; $p > 0.05$). Finally, in the students' global perception of the FC, a higher score was observed in the male gender ($M = 4.08$) than in the female gender ($M = 3.92$), although there were no significant differences between their scores ($U = 8461$; $Z = -1.852$; $p > 0.05$).

In relation to the post-test, the scores of the male gender were again higher in the communicative dimension, with a slightly more positive perception ($M = 6.13$) compared to the female gender ($M = 5.99$), producing significant differences between both evaluations ($U = 7994$; $Z = -2.575$; $p < 0.05$) with a low effect size ($r = 0.158$). In relation to the students' perceptions of the instrumental dimension, it is observed that the scores were also slightly higher in the male gender ($M = 6.39$) compared to the female gender ($M = 6.21$), with

significant differences ($U = 7423$; $Z = -3.420$; $p < 0.05$), with a small effect size ($r = 0.190$). In relation to the final dimension, the pedagogical dimension, it was found that the perceptions of the male gender were also slightly higher ($M = 6.47$) compared to the female gender ($M = 6.32$), producing significant differences ($U = 7647$; $Z = -3.114$; $p < 0.05$) between the two with a low effect ($r = 0.174$). Finally, in the total score, the perception of the male gender was higher ($M = 6.33$) than that of the female gender ($M = 6.17$), with a fairly positive evaluation for both genres, producing significant differences in the evaluations ($U = 7115.5$; $Z = -3.844$; $p < 0.05$) with a small effect ($r = 0.252$).

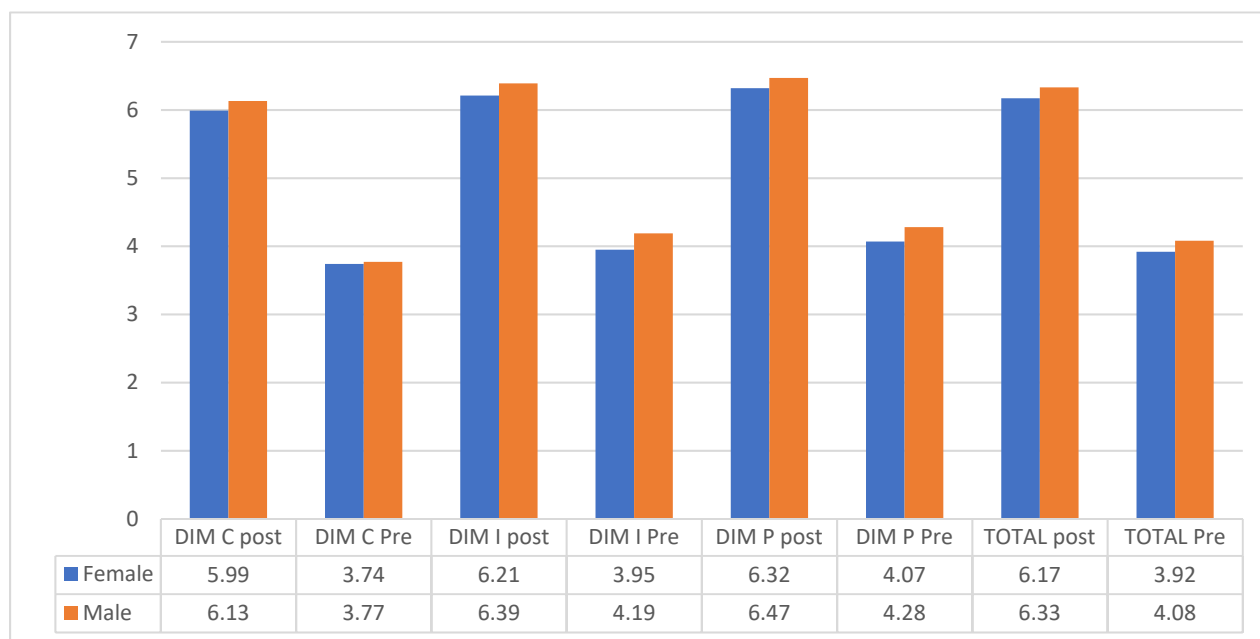


Figure 3. Pre-test and post-test descriptive statistics according to the gender and design variables. Source: own elaboration.

Finally, Table 4 shows the results of the statistical contrast between the pre-test and post-test, for each dimension of the instrument and for each gender. It is observed that, in both genders, there are significant differences between the pre-test and the post-test, with large effect sizes for each dimension of the instrument, as well as for the overall score of the instrument.

Table 4. Wilcoxon test between pre-test and post-test perceptions.

Dimension	Male			Female		
	Z	p	r	Z	p	r
DIM. C	−9.318	0.001 *	0.869	−11.254	0.001 *	−0.866
DIM. I	−9.318	0.001 *	−0.717	−11.251	0.001 *	−0.865
DIM. P	−9.321	0.001 *	−0.717	−11.290	0.001 *	−0.868
TOTAL	−9.314	0.001 *	−0.716	−11.279	0.001 *	−0.868

Source: own elaboration. * Significance level at 0.05.

3.3. Predictive Analytics in the Perception of FC

In response to objective 2, we identified those variables that influence students' perception of the FC by means of a multiple linear regression (MLR). The regression focuses on the total score of the post-test on the students' perception of the FC (sum of all dimensions). The ordinary least squares method was used with the forward method, in which each variable enters a new model if it achieves the established significance level ($p > 0.05$) after

removing the influence of the other variables that have already entered the model (principle of parsimony).

For the assumptions of normality and independence, Figure 4 shows the histogram and the normal probability P–P plot of the typed residuals. Although normality was not reached for the total post-test result through Kolmogorov–Smirnov ($KS = 0.111$; $p < 0.05$), Srivastava [55] states that non-normality would not have a serious effect on the distribution of the data in large samples. In our study, the sample corresponds to 284 subjects, so continuing the test would not present any issues. The Durbin–Watson statistic indicated independence of the residuals ($D.W. = 1.833$) as the statistic was close to the value 2 [56]. Multicollinearity was tested through the tolerance values (above 0.6) and the variance inflation factor (VIF), with values below 10, indicating no collinearity [57,58].

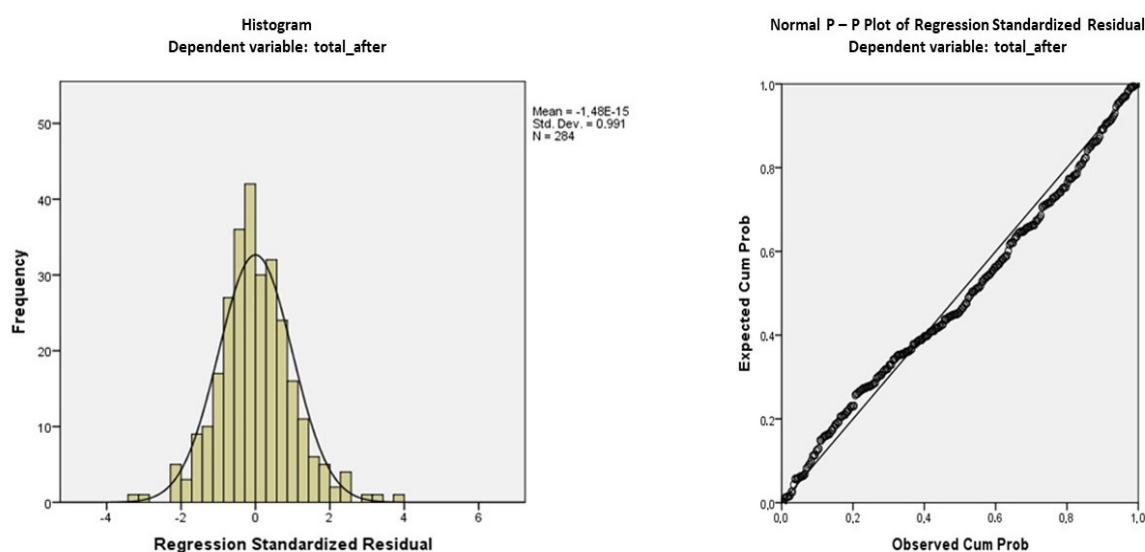


Figure 4. Histogram (left side) and P–P graphic of standardized residuals (right side). Source: own elaboration.

Table 5 shows the different independent variables analysed in the RLM model. An ID code is associated with each predictor and the type of variable it represents, a level of measurement is provided and the possible categories it encompasses are described. The nominal variables were recoded into dummy variables.

Table 5. Description of variables.

Code	Variable	Type	Measurement Scale	Categories
IV1	Gender	Qualitative	Nominal	0: Male 1: Female
IV2	Rewind videos	Qualitative	Nominal	0: No 1: Yes
IV3	Autonomous learning	Quantitative	Ordinal	Likert 10 points
IV4	Test CD	Quantitative	Ordinal	Likert 10 points
IV5	Age	Quantitative	Reason	

Source: own elaboration.

Table 6 shows how the RLM model introduced, step by step, the different variables that were significant and that, at the same time, explained the highest percentage of variance. For example, it can be seen that in the first model only the variable IV4 (Digital Competence) explained 54.50% of the true scores of the FC instrument. It is in the fourth model where a higher percentage of variance, explained through the participants' true scores, is achieved (65.10%). Furthermore, this model was statistically significant, $F(4279) = 132.854$; $p < 0.05$.

Table 6. RLM predictive model.

N = 284			R ² = 65.10%		
Model	Variables	R	R ²	R ² Adjusted	Std. Error
1°	IV4	0.738	0.545	0.543	0.21427
2°	IV4 + IV2	0.773	0.598	0.595	0.20171
3°	IV4 + IV2 + IV3	0.798	0.637	0.634	0.19194
4°	IV4 + IV2 + IV3 + IV1	0.810	0.656	0.651	0.18737

Source: own elaboration.

Table 7 shows the predictors that were significant in the model under number 4 described above. It can be seen that the significant variables were student gender ($t = -3.849$; $p < 0.05$), autonomous learning ($t = 5.163$; $p < 0.05$), re-watching the videos ($t = 6.146$; $p < 0.05$) and the CD test ($t = 7.630$; $p < 0.05$), with the gender variable having a negative weight and the remaining variables having a positive weight (Table 6). The resulting equation was as follows:

$$\text{Perception FC} = 5.069 + 0.006 \times \text{Test CD} + 0.225 \times \text{Rewind video} + 0.028 \times \text{Autonomous learning} - 0.88 \times \text{Gender}$$

Table 7. Model coefficients.

	Standardized Coefficients R	t	p	Tolerance	VIF
Constant	5.069	46.076	0.000		
IV4	0.006	7.630	0.000	0.683	2.614
IV2	0.225	6.146	0.000	0.782	2.616
IV3	0.028	5.163	0.000	0.976	1.024
IV1	-0.088	-3.849	0.000	0.973	1.027

Source: own elaboration.

As the model comprises two dichotomous variables, which are categorised with 0 and 1, depending on the type of subject, the education line will change. Regarding gender, when talking about male students, the predicted score on the FC is that displayed under number 1, whereas for female students, the score is shown in number 2. As to whether the students do not watch the FC videos again, the education line is number 3, but if they do watch them, the line is number 4.

1. **Perception FC** = $5.069 + 0.006 \times \text{Test CD} + 0.225 \times \text{Rewind video} + 0.028 \times \text{Autonomous learning} - 0 \times 0.88$
2. **Perception FC** = $5.069 + 0.006 \times \text{Test CD} + 0.225 \times \text{Rewind video} + 0.028 \times \text{Autonomous learning} - 1 \times 0.88$
3. **Perception FC** = $5.069 + 0.006 \times \text{Test CD} + 0.225 \times 0 + 0.028 \times \text{Autonomous learning} - 0.88 \times \text{Gender}$
4. **Perception FC** = $5.069 + 0.006 \times \text{Test CD} + 0.225 \times 1 + 0.028 \times \text{Autonomous learning} - 0.88 \times \text{Gender}$.

4. Discussion

In full expansion of the technological field in the educational sector, the incorporation of different digital resources cannot be carried out aside from pedagogical strategies and methodologies placing the student at the centre of the process and making them the protagonist of it. Proposals such as the flipped classroom are a highly effective alternative due to the benefits they bring to the educational process. Therefore, it is necessary for future teachers not only to be familiar with these proposals, but also to experience first-hand the strengths and the aspects of improvement that need to be considered for their implementation. For this reason, this study focused on the perceptions of future primary school teachers on the implementation of an FC methodology, through a pre-test and post-test, considering the gender variable and the existence of predictors that could affect their perceptions.

In terms of the results of the analysis of prospective teachers' perceptions of the FC methodology, in general, a high positive perception was reached after applying the FC methodology to the training process. These positive perceptions coincide with those of different studies [17,37,44,59–62], while other studies indicate that the evaluations were not always positive [63]. In detail, it should be noted that the pedagogical category was the most highly rated at both times, in contrast to the communicative category, which was the lowest rated. The best perception of the pedagogical dimension is based on how the FC enhances certain elements relevant to educational processes. Thus, the development of digital competence thanks to the FC has been reflected in different studies, where a higher level of digital competence was linked to better perceptions of this methodology [46]. Likewise, this strategy also has a special relevance in the promotion of feedback, autonomous learning and group work, as has already occurred in another research [45,64,65]. Conversely, the lower consideration of the communicative dimension is linked to the difficulty in understanding the information, contrary to the findings of Romero et al. [22], where future teachers who worked with the FC reflected the improvement in the presentation and clarity of the contents. This is also due to the reduced social interaction with this strategy, a finding that contradicts several studies [34,40,45], where the development of more frequent interactions between students and with the teacher was positively valued thanks to the use of the FC.

In terms of gender differences, men had a better perception of the FC methodology than women, with significant differences occurring predominantly in the post-test. These results are similar to those of several studies [66], being the opposite of others where no gender differences were found [38,39,42] or where women's scores were higher than men's [43,44,48].

The focus on the identification of two predictive factors: gender and re-watching the videos (both qualitative variables) had an impact on the perception of the FC, together with the students' level of digital competence and the assessment of their capacity for autonomous learning.

Gender had a negative impact as a predictor. In the case of men, it had no value, while in the case of women it had an impact that detracted from the consideration of perception. This fact is interpreted on the basis of men's better assessment of the FC methodology than that of women, which is similar to what happened in Aljaraideh's work [66] and contradicts the findings of other studies [43,44,48].

The factor of re-watching videos, if this is completed, has a positive impact on the perception of future teachers since not reviewing the learning materials would mean that the FC would not be as successful as expected [13]. This factor goes hand in hand with the protagonism that students acquire for the success of their learning, linking this practice to an increase in their commitment to the subject, as in the work of Romero et al. [22].

The capacity for autonomous learning and self-regulation was also a predictor affecting the improvement of perception, an aspect reaffirmed in different studies [40,41,45,67]. Finally, the level of digital competence also has an impact on perception, which increases as the level improves, as was the case in the work of Campillo and Miralles [46]. This is due to the reciprocity that is generated between the FC and digital competence, as reflected in the work of Sosa and Palau [18]. As to the fact that for both genres the level of digital competence affects their perception, this may be explained by their status as future teachers since several studies [52,68] indicate that the younger the teachers are, the better technological mastery they have. This assumption can also be made for students in training.

5. Conclusions

Placing students at the centre of the teaching and learning process, favouring the acquisition of the competences required by the digital society in which we find ourselves, requires a commitment to active methodologies mediated by technologies [64,65]. Based on different digital resources and with an organisation that prioritises interaction between peers and with the teacher, FC is an effective alternative to be developed at different levels

of educational training. It remains to be seen whether the alteration of class time is built on the commitment and protagonism of the student; on the design, elaboration and/or selection of appropriate resources; or on the openness to innovation and meaningful work during their presence in the classroom. However, it is necessary to consider how those who are going to teach in the coming years value its potential, not only in terms of their pedagogical analysis of the theoretical proposal, but also after experiencing it first-hand during their own training as future teachers. Thus, this work focused on the perceptions of future teachers of the FC methodology as a didactic strategy in the classroom.

The results obtained in this study indicate that implementing the FC methodology in the initial training of future teachers improves their perceptions of this teaching strategy, reinforcing the assessment of its pedagogical and instrumental possibilities, while the effect is less clear-cut in terms of its communicative dimension. In this sense, it would be necessary to reinforce the communicative components of the FC in the interventions, favouring the participation and interactions of the students, with practical cases on the theoretical contents that would foster the debate.

It should be noted that there were significant differences according to gender, mainly in the post-test after implementing the FC methodology, with men scoring higher than women, although the effect produced was low. As for the predictors influencing the perception of the FC, the fact of re-watching the videos, the level of digital competence of the future teachers or their ability to learn autonomously were identified as conditioning factors with a positive sign, while the fact of being male or female (the gender variable) was the only predictor with a negative sign. Considering these results, for both genders (with special emphasis on women), interventions with the FC should be preceded by a training program that favours the development of digital skills since technology is a key means in the implementation of this methodology and its better knowledge reports better results. Likewise, it is important to encourage the commitment of the students with the visualization of the videos. To do this, the videos can be enriched with questions that confirm their viewing, as well as incorporating a battery of tests with random questions about it, with unlimited participation, so that the student can check their level of knowledge. With this we can improve their understanding of the content and develop a greater mastery of the technological resources that make up the FC, thus improving the training experience with this methodology.

Limitation and Future Lines of Research

The limitations allow us to be critical of the aspects that could be improved in our research work, enabling us to glimpse future lines and studies in which these aspects can be solved. As for the limitations, it would be interesting to be able to increase the size of the sample, to delocalise it from a single university institution, including other Spanish/European universities in a more advanced stage of research and to carry out a non-intentional sampling of the participants, thus favouring the potential generalisation of the findings. Having validated the instrument, the fact of being able to disseminate this tool and examine, in detail, the aspects collected in each dimension that affect the evaluation of the FC methodology can help us to improve the procedures for applying the questionnaire. In this way, it will be possible to consider factors of the context and of the pedagogical praxis itself for its implementation. Moreover, being able to consider other variables such as academic performance or the study year (potential difference between students in their first and last year, for example) may provide us with relevant information or also be predictors of their perceptions. Another line of research is to incorporate into the self-perception instrument another practical application tool related to the FC methodology, where we can observe and assess with greater objectivity the level of competence with respect to the application of this active methodology as future teachers.

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Appendix A

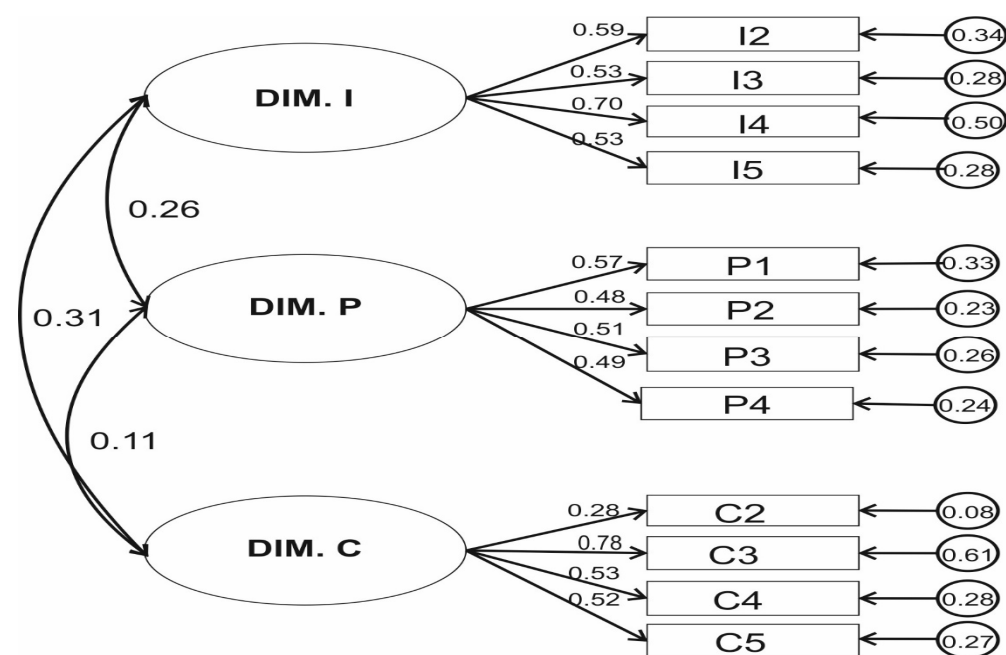


Figure A1. Model CFA.

References

- Blasco, A.C.; Bitrián, I.; Coma, T. La integración de la tecnología digital en la formación inicial docente, desde una perspectiva inclusiva. *Educat. Rev. Electrón. Tecnol. Educ.* **2022**, *79*, 9–29. [\[CrossRef\]](#)
- Prieto, A.; Barbarroja, J.; Álvarez, S.; Corell, A. Eficacia del modelo de aula invertida (flipped classroom) en la enseñanza universitaria: Una síntesis de las mejores evidencias. *Rev. Educ.* **2021**, *391*, 149–177. [\[CrossRef\]](#)
- Mohr, K.A.J.; Mohr, E.S. Understanding Generation Z Students to Promote a Contemporary Learning Environment. *J. Empower. Teach. Excell.* **2017**, *1*, e9. [\[CrossRef\]](#)
- Murillo, L.R.; López, J.A.; Godoy, A.L. How the flipped classroom affects knowledge, skills and engagement in higher education: Effects on students' satisfaction. *Comput. Educ.* **2019**, *141*, e103608. [\[CrossRef\]](#)
- Ruiz, J.; Fernández, J.M.; Sánchez, E.; Colomo, E. The implementation of Small Private Online Courses (SPOC) as a new approach to education. *Int. J. Educ. Technol. High. Educ.* **2020**, *17*, e27. [\[CrossRef\]](#)
- Lai, H.; Hsiao, Y.L.; Hsieh, P.J. The role of motivation ability, and opportunity in university teacher' continuance use intention for flipped teaching. *Comput. Educ.* **2018**, *124*, 37–50. [\[CrossRef\]](#)
- Souto, A.; Baeza, M.T. A probabilistic approach to student workload: Empirical distributions and ECTS. *High. Educ.* **2018**, *76*, 1007–1025. [\[CrossRef\]](#)
- Sánchez, J.; Ruiz, J.; Sánchez, E. Flipped classroom. Claves para su puesta en práctica. *Edmetec* **2017**, *6*, 336–358. [\[CrossRef\]](#)
- Balan, P.; Clark, M.; Restall, G. Preparing students for Flipped or Team-Based Learning methods. *Educ. Train.* **2015**, *57*, 639–657. [\[CrossRef\]](#)
- González, D.; Jeong, J.S.; Airado, D.; Cañada, F. Performance and Perception in the Flipped Learning Model: An Initial Approach to Evaluate the Effectiveness of a New Teaching Methodology in a General Science Classroom. *J. Sci. Educ. Technol.* **2016**, *25*, 450–459. [\[CrossRef\]](#)

11. Basso, M.; Bravo, M.; Castro, A.; Moraga, C. Propuesta de modelo tecnológico para flipped Classroom (T-flíC) en educación superior. *Rev. Electrón. Educ.* **2018**, *22*, 20–36. [\[CrossRef\]](#)
12. Guillén-Gámez, F.D.; Colomo, E.; Sánchez, E.; Pérez, R. Efectos sobre la metodología flipped classroom a través de blackboard sobre las actitudes hacia la estadística de estudiantes del Grado de Educación Primaria: Un estudio con ANOVA mixto. *Texto Livre. Ling. E Technol.* **2020**, *13*, 121–139. [\[CrossRef\]](#)
13. Li, C.-T.; Hou, H.-T.; Li, M.-C.; Kuo, C.-C. Comparison of mini-game-based flipped classroom and video-based flipped classroom: An analysis of learning performance, flow and concentration on discussion. *Asia-Pac. Educ. Res.* **2022**, *31*, 321–332. [\[CrossRef\]](#)
14. Salcines, I.; Cifrián, E.; González, N.; Viguri, J.R. Estudio de caso sobre las percepciones de los estudiantes respecto al Flipped Classroom en asignaturas de ingeniería. Diseño e implementación de un cuestionario. *Rev. Complut. Educ.* **2020**, *31*, 25–34. [\[CrossRef\]](#)
15. Sánchez, C.; Sánchez, M.T.; Ruiz, J. Experiencias reales de aula invertida como estrategia metodológica en la educación universitaria española. *Publicaciones* **2019**, *49*, 39–58. [\[CrossRef\]](#)
16. Fung, C.H. How Does Flipping Classroom Foster the STEM Education: A case study of the FPD model. *Technol. Knowl. Learn.* **2020**, *30*, 1945–1969. [\[CrossRef\]](#)
17. Martín, D.; Tourón, J. El enfoque flipped learning en estudios de magisterio: Percepción de los alumnos. *RIED. Rev. Iberoam. Educ. Distancia* **2017**, *20*, 187–211. [\[CrossRef\]](#)
18. Sosa, M.J.; Palau, R.F. Flipped classroom para adquirir la competencia digital docente: Una experiencia didáctica en la Educación Superior. *Pixel-Bit. Rev. Medios Educ.* **2018**, *52*, 37–54. [\[CrossRef\]](#)
19. Limniou, M.; Schermbrucker, I.; Lyons, M. Traditional and flipped classroom approaches delivered by two different teachers: The student perspective. *Educ. Inf. Technol.* **2018**, *23*, 797–817. [\[CrossRef\]](#)
20. Cuevas, N.; Gabarda, V.; Cívico, A.; Colomo, E. Flipped Classroom en tiempos de COVID-19: Una perspectiva transversal. *IJERI* **2021**, *15*, 326–341. [\[CrossRef\]](#)
21. Jeong, J.S.; González-Gómez, D.; Cañada-Cañada, F. How does a flipped classroom course affect the affective domain toward science course? *Interact. Learn. Environ.* **2021**, *29*, 707–719. [\[CrossRef\]](#)
22. Romero, C.; Paz, P.; Buzón, O.; Navarro, E. Evaluación de una formación online basada en Flipped Classroom. *Rev. Educ.* **2021**, *391*, 65–93. [\[CrossRef\]](#)
23. Azevedo, G.T.D.; Maltempi, M.V. The process of learning math in light of active methodologies and computational thinking. *Ciênc. Educ.* **2020**, *26*, 1–18. [\[CrossRef\]](#)
24. Aycicek, B.; Yelken, T.Y. The effect of flipped classroom modelo in students' classroom engagement in teaching English. *Int. J. Instr.* **2018**, *11*, 385–398. [\[CrossRef\]](#)
25. Bulut, C.; Kocoglu, Z. The flipped classroom's effect on EFL learners' grammar knowledge. *Int. J. Mob. Blended Learn.* **2020**, *12*, 69–84. [\[CrossRef\]](#)
26. Cronhjort, M.; Filipsson, L.; Weurlander, M. Improved engagement and learning in flipped-classroom calculus. *Teach. Math. Its Appl. Int. J. IMA* **2018**, *37*, 113–121. [\[CrossRef\]](#)
27. Sola, T.; Aznar, I.; Romero, J.M.; Rodríguez, A.M. Eficacia del método flipped classroom en la universidad: Meta-análisis de la Producción Científica de Impacto. *REICE. Rev. Iberoam. Sobre Calid. Efic. Cambio Educ.* **2019**, *17*, 25–38. [\[CrossRef\]](#)
28. Ng, L.-K.; Lo, C.-K. Flipped classroom and gamification approach: Its impact on performance and academic commitment on sustainable learning in education. *Sustainability* **2022**, *14*, 5428. [\[CrossRef\]](#)
29. Gonda, D.; Pavlovičová, G.; Tírpáková, A.; Ďuriš, V. Setting up a flipped classroom design to reduce student academic procrastination. *Sustainability* **2021**, *13*, 8668. [\[CrossRef\]](#)
30. Tourón, J.; Santiago, R. El modelo Flipped Learning y el desarrollo del talento en la escuela. *Rev. Educ.* **2015**, *368*, 174–195. [\[CrossRef\]](#)
31. Xiao, N.; Thor, D.; Zheng, M. Student preferences impact outcome of flipped classroom in dental education: Students favoring flipped classroom benefited more. *Educ. Sci.* **2021**, *11*, 150. [\[CrossRef\]](#)
32. Madlenák, R.; D'Alessandro, S.P.; Marengo, A.; Pange, J.; Neszemély, G.I. Building on strategic eLearning initiatives of hybrid graduate education a case study approach: MHEI-ME Erasmus+ project. *Sustainability* **2021**, *13*, 7675. [\[CrossRef\]](#)
33. Shin, S.; Kwon, K.; Jung, J. Collaborative learning in the flipped university classroom: Identifying team process factors. *Sustainability* **2022**, *14*, 7173. [\[CrossRef\]](#)
34. Aguilera, C.; Manzano, A.; Martínez, I.; Lozano, M.C.; Casiano, C. El modelo flipped classroom. *Int. J. Dev. Educ. Psychol.* **2017**, *4*, 261–266. [\[CrossRef\]](#)
35. Hinojo, F.J.; Aznar, I.; Romero, J.M.; Marín, J.A. Influencia del aula invertida en el rendimiento académico: Una revisión sistemática. *Campus Virtuales* **2019**, *8*, 9–18.
36. Li, Z.; Li, J. Using the flipped classroom to promote learner engagement for the sustainable development of language skills: A mixed-methods study. *Sustainability* **2022**, *14*, 5983. [\[CrossRef\]](#)
37. Kim, J.-K.; Kim, J.-S.; Yang, M.-S.; Lee, S.-S. The effect of flipped learning based instruction in creativity-personality education of preliminary teachers. *J. Adv. Res. Dyn. Control. Syst.* **2019**, *9*, 124–133.
38. Jang, E.; MYoungsook, C. Analysis on the online-offline learning recognition of college students for university flipped learning lessons. *J. Korean Assoc. Educ. Inf. Media* **2017**, *23*, 891–917. [\[CrossRef\]](#)

39. Chen, Y.-T.; Liou, S.; Chen, L.-F. The relationships among gender, cognitive styles, learning strategies, and learning performance in the flipped classroom. *Int. J. Hum. Comput. Interact.* **2019**, *35*, 395–403. [\[CrossRef\]](#)
40. Zainuddin, Z.; Perera, C.J. Exploring students' competence, autonomy and relatedness in the flipped classroom pedagogical model. *J. Furth. High. Educ.* **2019**, *43*, 115–126. [\[CrossRef\]](#)
41. Tsai, Y.-R. Promotion of learner autonomy within the framework of a flipped EFL instructional model: Perception and perspectives. *Comput. Assist. Lang. Learn.* **2021**, *34*, 979–1011. [\[CrossRef\]](#)
42. Mengual, S.; López, J.; Fuentes, A.; Pozo, S. Structural model of influential extrinsic factors in flipped learning. *Educ. XXI* **2020**, *23*, 75–101. [\[CrossRef\]](#)
43. Gómez-Carrasco, C.-J.; Monteagudo-Fernández, J.; Moreno-Vera, J.-R.; Sainz-Gómez, M. Effects of a gamification and flipped-classroom program for teachers in training on motivation and learning perception. *Educ. Sci.* **2019**, *9*, e299. [\[CrossRef\]](#)
44. Gómez-Carrasco, C.J.; Monteagudo-Fernández, J.; Moreno-Vera, J.R.; Sainz-Gómez, M. Evaluation of a gamification and flipped-classroom program used in teacher training: Perception of learning and outcome. *PLoS ONE* **2020**, *15*, e0236083. [\[CrossRef\]](#)
45. Campillo, J.M.; Miralles, P. Effectiveness of the flipped classroom model on students' self-reported motivation and learning during the COVID-19 pandemic. *Humanit. Soc. Sci. Commun.* **2021**, *8*, e176. [\[CrossRef\]](#)
46. Campillo, J.M.; Miralles, P. Impact of the flipped classroom model on democratic education of student teachers in Spain. *Educ. Citizsh. Soc. Justice* **2022**. [\[CrossRef\]](#)
47. Colomo, E.; Gabarda, V.; Cívico, A.; Cuevas, N. Percepción de estudiantes sobre el uso del videoblog como recurso digital en educación superior. *Píxel-BIT Rev. Medios Educ.* **2020**, *59*, 7–25. [\[CrossRef\]](#)
48. Colomo-Magaña, E.; Soto-Varela, R.; Ruiz-Palmero, J.; Gómez-García, M. University students' perception of the usefulness of the flipped classroom methodology. *Educ. Sci.* **2020**, *10*, 275. [\[CrossRef\]](#)
49. Haghighi, H.; Jafarigohar, M.; Khoshsim, H.; Vahdany, F. Impact of flipped classroom on EFL learners' appropriate use of refusal: Achievement, participation, perception. *Comput. Assist. Lang. Learn.* **2019**, *32*, 261–293. [\[CrossRef\]](#)
50. Debbağ, M.; Yıldız, S. Effect of the flipped classroom model on academic achievement and motivation in teacher education. *Educ. Inf. Technol.* **2021**, *26*, 3057–3076. [\[CrossRef\]](#)
51. Hu, L.; Bentler, P. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternative. *Struct. Equ. Modeling* **1999**, *6*, 1–55. [\[CrossRef\]](#)
52. Cabero, J.; Barroso, J.; Gutiérrez, J.J.; Palacios, A. Validación del cuestionario de competencia digital para futuros maestros mediante ecuaciones estructurales. *Bordón* **2020**, *72*, 45–63. [\[CrossRef\]](#)
53. Pallant, J. *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*; Routledge: London, UK, 2020; pp. 1–378.
54. Rosenthal, R.; Cooper, H.; Hedges, L. Parametric measures of effect size. In *The Handbook of Research Synthesis*; Russell Sage Foundation: New York, NY, USA, 1994; Volume 621, pp. 231–244.
55. Srivastava, A.B.L. Effect of non-normality on the power of the analysis of variance test. *Biometrika* **1959**, *46*, 114–122. [\[CrossRef\]](#)
56. Chen, Y. Spatial autocorrelation approaches to testing residuals from least squares regression. *PLoS ONE* **2016**, *11*, e0146865. [\[CrossRef\]](#)
57. Chan, Y.H. Biostatistics 201: Linear regression analysis. *Singap. Med. J.* **2004**, *45*, 55–61.
58. Ghani, I.M.M.; Ahmad, S. Stepwise multiple regression method to forecast fish landing. *Procedia-Soc. Behav. Sci.* **2010**, *8*, 549–554. [\[CrossRef\]](#)
59. García-Gil, D.; Cremades-Andreu, R. Flipped classroom en educación superior. Un estudio a través de relatos de alumnos. *Rev. Mex. Investig. Educ.* **2019**, *24*, 101–123.
60. Mendaña, C.; Poy, R.; López, E. Metodología flipped classroom: Percepción de los alumnos de diferentes grados universitarios. *Innoeduca. Int. J. Technol. Educ. Innov.* **2019**, *5*, 178–188. [\[CrossRef\]](#)
61. Samuel, M.L. Flipped pedagogy and student evaluations of teaching. *Act. Learn. High. Educ.* **2021**, *22*, 159–168. [\[CrossRef\]](#)
62. Wang, K.; Zhu, C. MOOC-based flipped learning in higher education: Students' participation, experience and learning performance. *Int. J. Educ. Technol. High Educ.* **2019**, *16*, e33. [\[CrossRef\]](#)
63. Burke, A.; Fedorek, B. Does flipping promote engagement? A comparison of a traditional, online and flipped class. *Act. Learn. High. Educ.* **2017**, *18*, 11–24. [\[CrossRef\]](#)
64. Canales-Ronda, P.; Hernández-Fernández, A. Flipped classroom methodology in university teaching. *Rev. Iberoam. Educ. Super.* **2019**, *10*, 116–130. [\[CrossRef\]](#)
65. Hyypiä, M.; Sointu, E.; Hirsto, L.; Valtonen, T. Key components of learning environments in creating a positive flipped classroom course experience. *Int. J. Learn. Teach. Educ. Res.* **2019**, *18*, 61–86. [\[CrossRef\]](#)
66. Aljaraidh, Y. Students' perception of flipped classroom: A case study for private universities in Jordan. *JOTSE J. Technol. Sci. Educ.* **2019**, *9*, 368–377. [\[CrossRef\]](#)
67. Cerezo, R.; Bernardo, A.; Esteban, M.; Sánchez, M.; Tuero, E. Programas para la promoción de la autorregulación en educación superior: Un estudio de la satisfacción diferencial entre metodología presencial y virtual. *Eur. J. Educ. Psychol.* **2015**, *8*, 30–36. [\[CrossRef\]](#)
68. Llorent, V.J.; Zych, I.; Varo, J.C. University academic personnel's vision of inclusive education in Spanish universities. *Cult. Educ.* **2020**, *32*, 147–181. [\[CrossRef\]](#)