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Improving the Quality of Teaching Internships with the Help of the Platforms

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Abstract: This article presents an empirical study on the perceptions of university students toward the development of the teaching practicum, using the CourseSites platform as a communication and support tool for their training. The opinions of the students were collected through a questionnaire. The sample consisted of 1500 students who were registered in the degrees of Early Childhood Education, Primary Education and Pedagogy (2008-2018). A descriptive, inferential and multi-level analysis was conducted, which confirmed that future teachers had activated their professional competences, as they had the chance to share their internship experiences with their faculty members and with their own classmates.

Keywords: *Teaching internship, platforms, motivation, collaboration, higher education.*

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Introduction

Nowadays, when education is transforming due to the incorporation of new Information and Communication Technologies (ICT), we cannot ignore the role of future teacher training. In this sense, educational internships acquire a fundamental role. What novel aspects have been incorporated in the practicum subjects to respond to this new educational context, in which there is a mixed learning, and reality and the virtual world coexist? What do universities do to respond to this challenge? Here is where an educational proposal is drawn. The new way of seeing the training of future teachers cannot leave out the variables of space and time. We want to support our students at all times and everywhere. What digital tool allows us to achieve this objective? Undoubtedly, we work with a broad range of digital tools that promote the original learning of students (blogs, instagram, youtube, etc.). However, the present study is focused on the CourseSites platform.

We want this digital support to provide a real interaction with our students throughout the entire process, foster participation, and stimulate creativity, self-directed learning and advanced thinking skills. In the latter aspect we want to delve into the feelings of the students as a key element in the motivation and evaluation of their learnings.

What does our study contribute to this scope of teacher training? We reviewed the specific literature and found that there is an increasing need for attractive and motivating educational actions connected to reality. In this sense, we propose a training experience in educational centres (reality) and the design of a new learning environment (digital training). The students had the opportunity to self-evaluate and redirect their learning, thus breaking down the traditional practices, formal and informal, in this field.

The present work is of scientific interest in the field of future teacher training, for several reasons. Firstly, it is a meta-analysis, as it covers a period of ten years. Secondly, the methodology used was the creation of an “eco-environment”, which granted the interdisciplinary participation of different educational agents. The novelty of this study is the training structure created and the use of space and time variables. This aspect was very significant for participation (in the Whatsapp group) and for the use of new technologies. Lastly, the aim of all educators is to create a playful and motivating environment. In this sense, our results show that the professional skills of future teachers were activated.

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The future of professional development, in this century, is becoming an exciting adventure thanks to technology (Adams et al., 2017). Traditionally, external internships have been considered as learning processes in which the students integrated the basic concepts and principles of the disciplines that made up the curricula of the future teachers and the real experiences that they acquire in educational centres (Johnson et al., 2016). They constitute, therefore, a key moment in the professional development of future teachers (Ballet & Kelchtermans, 2009), who will be shaping their critical thinking on the real teaching practice.

In this experience, we have reinforced this training process with the CourseSites platform so that, in addition to sharing their dilemmas and feelings (Manwaring, Larsen, Graham, Henrie& Halverson, 2017; Davis, 2013), students (from early childhood education, primary education and pedagogy) could also perform interdisciplinary work (Nilsson, 2009) with the help of academic tutors specialized in different academic disciplines (Lin, Hou, Wang & Chang, 2013).

In this way, we aimed to develop teaching internship as a research process (Smith & Sela, 2005), in which, apart from dipping into the educational reality through their direct participation in the classroom, the future teachers could understand this in a critical and vital way (Smith, Hodson &, Brown, 2013), analysing their messages, questioning their own beliefs and thoughts, contrasting their interpretations and participating in the constant reconstruction of school reality (Rodriguez-Gomez, 2015). This critical and vital development cannot take place without a key element: motivation (Keller, 2010), guidance and support (Kali Soyer & Kirkkanat, 2019).

Motivation is the force that initiates and directs behaviour. Therefore, it can be asserted that motivation provides the source of energy that drives students to make an effort and connect with activities, regardless of the difficulty level (Rost, 2010; Di Serio, Ibanez, & Delgado-Kloos, 2013). Motivation is also the desire of a student to participate in a learning environment (Keller & Litchfield, 2002; MacFarlane, 2012).

The impact of the motivation and the academic achievements of students are two key factors of the self-regulation of learning (Pintrich, 1999; Dabbagh & Kitsantas, 2012). Without a doubt, motivation is the academic ideal for the achievement of the objectives that have been analyzed throughout the 20th century (Zimmerman, Bandura, & Martinez-Pons, 1992).

The effort of the students, combined with their knowledge, abilities and skills to carry out their tasks, determines their performance. In the motivation and involvement of the student, therefore, the evaluation will become a key piece (Zanfrillo & Diaz-Noguera, 2015) that cannot be reduced only to examining student performance. On the contrary, the elements involved in the practical training of students should be extended to "all" and contribute to their improvement by establishing the appropriate measures in each case (Molina, 2004).

In the opinion of Bartolome-Pina et al. (2015), the use of collaborative work tools and appropriate technological applications could contribute to this. In addition to the evaluation (understood as an educational process), its combination with gamification processes or augmented reality will also contribute to the motivation of the students (Prensky, 2001; Ibanez, Di Serio, Villaran-Molina, & Delgado-Kloos, 2015), since the use of digital tools and environments stimulates the concentration of students and the development of their critical thinking (Yang & Chang, 2013). This, in turn, offers great opportunities to implement learning processes that can contribute to the development of all their potential. In recent times, numerous experiences have proliferated, in which the students are the leaders of their training itinerary, solving problems collaboratively with the use of information and communication technologies and, therefore, combining the individual and social development on which the basic elements of the social-constructivist learning theory are based.

The time has come, therefore, to enhance the design of personalized learning processes focused on the specific characteristics of the students that provide the opportunity to connect, integrate, build or deconstruct their own meanings with those of their practical experiences (Peng, Su, Chou & Tsai, 2009).

Research problem

The purpose of this study was to identify the potential for motivation, critical analysis, reflection and collaboration of internships in educational centres focused on the design of new learning environments, in which the students shared their barriers and searched for solutions in a collaborative manner, obtained sensory stimulation, and became capable of self-evaluating their experience, thus transcending the limits between formal and informal internships.

The aim of the study was to verify whether it is possible to make a change in teaching internships toward other intelligent learning practices, using new training environments.

More specifically, the study was focused on the following objectives:

a) To identify the perceptions of future teachers with the inclusion of digital tools, in this case the CourseSites platform as a gathering point of participation.

b) To analyse the degree of motivation of the students with the didactic proposal and their degree of involvement in specific intervention proposals applied in the classroom.

c) To delve into the influence of factors related to age, gender and academic year on their perceptions.

Based on the literature, we set the following research questions:

a) Are "training eco-environments" key in the motivation and change of attitude of students in internships?

b) Do the personal characteristics of students condition their perspectives about the use of collaborative environments in teaching internships?

Research Methodology

This study consisted of two major phases. The first one was a diagnostic phase, in which the students had to complete specific tests to know their perceptions toward the internships they were going to carry out; to this end, we performed a quantitative analysis with the SPSS software. The second phase consisted of their conversations in the forum, which required a content and speech analysis. In order to carry out this task, we used the qualitative analysis software ATLAS.TI.

To incorporate the participants into teaching and to carry out this study, we followed a methodology through which we analysed the aspects that facilitated their learning and the attainment of the objectives of the practicum subject of the degrees of early childhood education, primary education and pedagogy, when using the CourseSites platform.

General Research Background

We used the mixed approach (Tashakkori & Teddlie, 2010) and the possibility of triangulating qualitative and quantitative data (Shadish, Cook & Campbell, 2002; Cronbach & Meehl, 1955). The study is based on a design that aims to determine the possible relationships between the variables of a phenomenon, using statistical correlation for two or more variables (Field, 2009), considering also the interconnection between both analytical formulas (Hair, Anderson, Tatham & Black, 1998).

Research Sample

The participants were 1500 Spanish university students of the degrees of early childhood education, primary education and pedagogy (from 2008 to 2018), with a greater proportion of students from early childhood education (51%), followed by students of pedagogy (28%). The age of the majority (72%) was in the range of 20-24 years. The profile of the participants was mostly that of a woman who works at home on the platform, although 12% also worked from the university.

A cluster analysis was used to define the main groups. Then, a logit model was created to explain which aspects influenced the qualification regarding the student profile and the didactic and technical aspects related to the CourseSites platform.

The CourseSites platform was developed by the Blackboard Company. It is a free resource for teachers who wish to create support courses for their students, enriched with all sorts of multimedia material. It is a complete system that includes an e-learning platform (LMS, Learning Management System), collaborative virtual classrooms, mobile apps (for iPhone, iPad, Blackberry, Android), and high-quality contents (with the possibility of uploading videos to Youtube or Slideshare presentations). The platform is accessed through the URL https://coursesites.com/, where the new user must register as "teacher/trainer". Thus, we can create up to 5 courses, free of charge. Once the course has been created, we can upload contents (SCORM, or directly create texts, documents, tests, quizzes, assessments, etc.) or we can introduce external contents (e.g., images).

Instruments

A scale was used to evaluate the experience of the users of the educational platform with 44 items, grouped into 8 categories: student profile, motivation, critical analysis, self-responsibility, comparison with traditional methods, cooperation, functionality and general valuation. The degree of agreement was established with five possible answers, ordered from "totally disagree" (1) to "totally agree" (5). To select the items and the scoring of the scale, we followed the work of other authors cited in the literature review, such as Keller (2010), Dabbagh & Kisantas (2012), Manfra & Spires (2013) and Molina (2004), creating a questionnaire adapted to the objectives of the present study. All the information gathered through the questionnaire was related to the academic record of the students regarding the practicum subject in the last 9 years and the level of the internship carried out.

With respect to the student profile, four questions were asked to gather information about the main characteristics (gender, age, degree and work areas). The rest of the questions were valued according to the 1-5 scale previously mentioned. Table 1 shows the final structure of the questionnaire.

We carried out an exploratory analysis to determine the structure of the factors, using the Barlett's sphericity test and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy.

Table 1. Dimensions and categories of the questionnaire:

Dimensions and categories of the questionnaire
Profile
1. Gender.
2. Age.
3. Degree and internship.
4. What areas did you usually worked on with the platform?
Motivation
5. It increased my motivation toward the subject.
6. It improved my opinion about the development of the subject.
7. It improved my involvement in the subject, unlike the traditional way.
8. In general, I think that this type of activity increases the interest of the teacher toward this profession.
9. I believe that the generalization of this type of initiative improves the development of the teaching internships.
Critical analysis, reflection, collaboration and exchange
10. It helped me to relate the information we receive through the different experiences with my previous knowledge.
11. It encouraged me to formulate questions and share-exchange ideas, answers and interpretations about the activities and experiences with my classmates.
12. I used the ideas and information I had to understand-propose-conduct something new.
13. It made me develop other cognitive skills.
Self-responsibility of the student and follow-up
14. It helped me to progressively create the final practicum report.
15. It made me develop responsibility to hand in the different assignments within the deadlines and I learned not to interrupt my colleagues' work.
16. It favoured a continuous feedback of the tasks conducted by my peers.
17. It helped me to follow up the entire work process of the students.
Comparison with the traditional methods of follow-up/tutorship
18. It increased my motivation.
19. It stimulated my involvement.
20. It made me feel accompanied.
21. It improved my productivity.
22. It improved the quality of my work.
23. It made me feel less embarrassed.
24. It improved my communication with other colleagues.
25. It improved my participation.
26. I found it more dynamic.
27. I learned more and better.
Cooperation: individual learning vs group learning
28. The experience of sharing the individual experiences in a group.
29. The help received from the colleagues.
30. The cooperation between colleagues.
31. The competitiveness between colleagues.
32. The communication between colleagues.
Functionality of the platform
33. Previous technical information about its access and use.
34. Ease of access.
35. Methodological guidelines for the development of the experience in the platform.
36. Ease of use to carry out the activities of the subject.
37. Indicate the aspects of the experience with the platform that you liked the MOST.
38. Indicate the aspects of the experience with the platform that you liked the LEAST.
General valuation and suggestions for improvement
39. General rating of the platform.
40. How much time did you allocate weekly to the development of the different activities carried out in the platform?
41. Rate the degree of difficulty that you felt when working with the platform.
42. General rating of the internship experience with the platform.
43. Rate the degree of difficulty of the work carried out throughout the internship experience using the platform.
44. Indicate some suggestions and proposals to improve the internship experience with the platform.

Procedure

The data were gathered on-line through the questionnaire described above, which was sent to the participants. They were asked to participate and they gave their consent for their data to be used in the study. We guaranteed the confidentiality of the data obtained through the questionnaire.

Firstly, a course was designed and created in the CourseSites platform, called Practicum Forum, through which the students would write their practicum report. This forum was designed to provide the students with an online communication space that allowed them to know and exchange the different activities, experiences and personal opinions that they developed in their respective internship centres or institutions.

The work dynamics in the Forum were developed according to the following methodological guidelines. First, a specific forum was opened for each week of the internship. At the end of each of them, and individually, the students had to describe, value and share with their peers both the activities carried out and the experiences lived during that week. To that end, two different tasks were proposed. The first task was to describe all the activities performed in the week, highlighting their most significant aspects, considering, among others, the following: experiences within the classroom/centre/institution (relationships with the teacher/tutor, students/staff, activity plan, situations, tasks, organization of spaces and schedules, etc.), experiences outside of the classroom/centre/institution (secretary's office, tutorials, contact with the parents, libraries, talks, courses, surveys, visits, etc.), and an intervention proposal (intervention program and/or research). The second task was write a personal reflection on the activities described in the previous section. In this second task, the student had to include personal comments and opinions about the different feelings and consequences of the work conducted throughout the week. These could refer both to positive aspects and other elements that could be improved, related to the work in progress and the process that was followed in each centre/institution. The content of these reflections-opinions could be enriched by comparing them with other previous personal/professional experiences, and also with references to the different bibliographic documents on which they based their opinions. At the beginning of each week, all the contributions made in the forum would be revised, and then each student would write a comment about the content of the contributions of three classmates. The forums of each week of the practicum were closed fifteen days after their opening. In the forum of the last week of the internship, the students would make a final valuation of the whole experience of practical training, which would be related to the following aspects: a synthesis of the most relevant aspects, a description of new lines and personal-professional expectations derived from the work conducted, a revision of all the final valuations shared in the forum, and a final comment on the contribution of three classmates.

Once these tasks were completed, coinciding with the end of the practicum period, the students completed an individual online questionnaire, created through the Google Forms tool, which had been uploaded to the CourseSites platform.

The use of the CourseSites platform influences the different dimensions of the questionnaire, since we can highlight, among others, the following characteristics: a calendar, where the different deadlines for submitting the activities are specified; debates or discussion forums for both teachers and students; a grade book, where the marks of the activities are recorded as they are evaluated; a messaging tool, which allows the users to address specific students or groups; and the announcements option, through which the users can inform the students when an activity is assigned.

The people in charge of the internships in the last 9 years were asked to provide information related to the academic record of the students.

Data analysis

The data obtained through the questionnaires were descriptively analysed through statistical univariate techniques (mean, standard deviation and frequency) using the statistical software SPSS v.23.

The internal consistency of the set of items was analysed for each scale of the studied categories, with Cronbach's alpha, obtaining values close to 0.9. Then, we obtained the interrelationships between the variables through independence and correlation tests, which were used for the consequent cluster and logit analyses.

It is important to highlight that the average valuation of the participants about the platform, regarding motivation, critical analysis, self-responsibility, cooperation, functionality and general valuation, was above 4, in a 1-5 scale. In the specific case of cooperation, the confidence interval at 95% is still high, although the lowest point of the interval is 3.75, as can be observed in Figure 1.

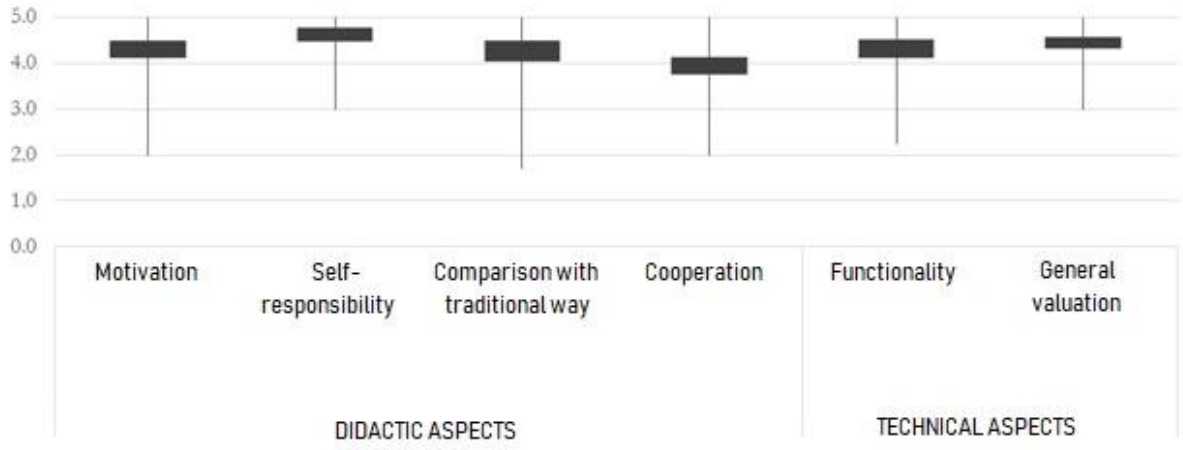

Figure 1. Valuation of the participants about their experience with the platform in the teaching internship

Results

To determine the effect of the platform on the teaching of the practicum subject, we conducted a longitudinal study of 9 years, during which we gathered questionnaires from the participants, obtaining positive results in the rating (see Table 2). There was also a rating improvement in the questionnaires obtained in pedagogy. This improvement can be corroborated by contrasting the difference of mean values, with a p-value of 0.03, which demonstrates that the rating obtained in pedagogy was higher after the participants used the platform.

Table 2. Rating of the participants of pedagogy about the internship before and after using the platform

Rating obtained	Mean	Standard deviation	Standard error of the mean	p-value of the similarity contrast
Before using the platform	8.5426	2.51264	.36651	0.03
After using the platform	9.3750	.31079	.08972	

Once the descriptive analysis was conducted, we verified the relationship between the different variables studied in order to establish the different student profiles according to the eight categories. To this end, different multivariate analysis techniques were applied, such as factor analysis, discriminant analysis and principal component analysis, which guided the selection of variables for the cluster analysis. Indicators were previously created, which reflected an average of the ratings given for the main six categories above mentioned (see Table 3).

Table 3. Indicators of the average rating for the six main categories

Aspects
Didactic aspects
Indicator of average motivation (mean value of questions 5 to 9).
Indicator of average critical analysis, reflection, collaboration and exchange (mean value of questions 10 to 13).
Indicator of average student self-responsibility and follow-up (mean value of questions 14 to 17).
Indicator of average comparison with traditional methods of follow-up/tutorship (mean value of questions 18 to 27).
Indicator of average cooperation: individual learning vs group learning (mean value of questions 28 to 32).
Technical aspects
Indicator of average functionality of the platform (mean value of questions 33 to 38).
Indicator of average general valuation (mean value of questions 39 to 44).

Of the 44 initial variables, we selected 7 variables, which helped to obtain 2 clusters (see Table 4), with significant differences between the latter. Thus, we obtained two groups of student profiles that were well-differentiated in terms of motivation, critical analysis, functionality, rating, self-responsibility, cooperation and general valuation with respect to the platform.

Table 4. Descriptive statistics of the groups obtained in the cluster analysis

	CLUSTER 1		CLUSTER 2	
	Mean	**Standard deviation**	**Mean**	**Standard deviation**
Motivation	3.8300	.60966	4.6519	0.3620
Critical analysis	3.9875	.77151	4.6296	.35606
Self-responsibility	4.4000	.43980	4.8056	.44035
Comparison	3.6900	.82136	4.6852	.32899
Cooperation	3.6500	.68633	4.1481	.47908
Funcionality	3.8125	.64825	4.7037	.28620
General valuation	3.8500	.36634	5.0000	0.0000
Rating	8.3230	.97875	8.7133	1.1065

The first group, which gave a lower score in the abovementioned indicators, showed the lowest rating and general valuation for the platform. On the other hand, the second group of students presented high values in the same indicators, as well as high rating and general valuation for the platform.

Next, we describe the logistic regression model obtained, which related a selection of the 44 initial variables to the rating obtained for each student. We evaluated both the suppositions and limitations for the application of this type of regression, such as the multicollinearity of the dependent variables, which was discarded, as there was no significant correlation with the predictor variables (see Table 4).

The logistic regression analysis was established in a way that, for each student (i, with i=1..., n), a (Yi) result was obtained, represented generically by the model shown in Figure 2. The coefficient vector of the independent variables (β1, β2, ... , βn) represents the marginal effect of these in the odds-ratio logarithm.

$$ProbP(Y_i = 1) = \frac{e^{B_0+B_1X_1+\cdots+B_kX_k}}{1+e^{B_0+B_1X_1+\cdots+B_kX_k}} (1)$$

Figure 2. Calculation formula of the logit model

For the fit of the model, the non-significant variables were gradually discarded, following the logit algorithm of the SPSS software. The items selected as independent variables of the model were item 27 (I learn more and better than with traditional methods), item 37 (materials and suggestions provided by colleagues as positive aspects), item 38 (contributions of little relevance, too much time in front of the computer and very few reflections as negative aspects), and the practicum level.

The item referred to whether the student considers materials and suggestions provided by colleagues as a positive aspect is not significant at the individual level, although it contributes to the global fit of the model and provides a better explanation of the variability of the variable “rating”.

The correlation matrix shows that the students who highlighted positive aspects, such as “I learn more and better”, do not consider, as a negative aspect of the platform, that reflections are scarce (see Table 5).

Table 5. Asymptotic correlation matrix

	I learn more and better than with traditional methods	**Materials and suggestions provided by colleagues (positive aspect)**	**Contributions of little relevance (negative aspect)**	**Too much time in front of the computer (negative aspect)**	**Few reflections (negative aspect)**	**Practicum level**
1. I learn more and better than with traditional methods	1	-0.172	0.18	0.017	-0.246	0.09
2. Materials and suggestions provided by colleagues (positive aspect)	-0.172	1	0.03	0.12	-0.13	-0.18
3. Contributions of little relevance (negative aspect)	0.18	0.03	1	0.004	0.12	0.05
4. Too much time in front of the computer (negative aspect)	0.017	0.12	0.004	1	-0.012	0.11
5. Few reflections (negative aspect)	-0.246	-0.13	0.12	-0.012	1	0.16
6. Practicum level	0.095	-0.181	0.052	0.115	0.165	1

The results obtained from the estimated logistic model are gathered in Table 6, which shows that the most significant items are related to the functionality of the platform. Among the positive aspects, the materials and suggestions provided by colleagues stand out. On the other hand, as negative aspects, the participants considered that the contributions are of little relevance and that they spend too much time in front of the computer.

In addition, the item that compares how the participants learn more and better using the platform than with traditional methods also stands out, due to the incorporation of technological resources. The coefficients presented in Table 6 show the type of reverse influence of most of the items related to negative aspects in the rating (contributions of little relevance, few reflections and too much time in front of the computer), and the direct influence of the items related to positive aspects (I learn more and better than with traditional methods, and materials and suggestions provided by colleagues).

The coefficient of the item "too much time in front of the computer" did not obtain a significant value at 95% confidence, although it contributes to justifying the global model.

Table 6. Coefficient matrix

Effect	**Model's fit criteria**	**Likelihood ratio contrast and coefficients of the model**			
	AIC of reduced model	**Wald**	**gl**	**B**	**Sig.**
Interception	94.44		0	44.081	
POSITIVE ASPECTS					
I learn more and better than with traditional methods	87.217	3.62	12	48.48	*
Materials and suggestions provided by colleagues (positive aspect)	99.148	10.86	3	-68.035	***
NEGATIVE ASPECTS					
Contributions of little relevance (negative aspect)	96.073	1.81	3	-40.035	*
Too much time in front of the computer (negative aspect)	91.804	0.374	3	-28.667	0.339
Few reflections (negative aspect)	102.238	15.91	3	-24.121	***
Practicum level	98.025	6.19	12	-83.378	***

Note. *p<0.05; **p<0.01; ***p<0.001, (one-tailed test).

We analysed the Nagelkerke's corrected R2 of the model, and we obtained a value of 0.880, thus 88% of the variation of the dependent variable is explained by the variables included in the model. The Hosmer-Lemeshow test indicated that the model is well-fitted and that the p-value is above 0.05, thus there are no significant differences between the observed and expected values; therefore, the score obtained by the selected items is correctly explained.

To sum up, as can be seen in Table 7, the logit model classifies 87.2% of the cases correctly. Regarding the different categories, the correct classification percentage is 94.4% in the students who got a B in the practicum subject, 87.5% in those whose grade was over B, and 100% in those who got a distinction.

Table 7. Summary of the classification of the model

			Predicted		
Observed	**Below B**	**B**	**A**	**Distinction**	**Correct classification percentage**
Below B	2.1%	4.3%	0.0%	0.0%	33.3%
B	0.0%	36.2%	2.1%	0.0%	94.4%
A	0.0%	6.4%	44.7%	0.0%	87.5%
Distinction	0.0%	0.0%	0.0%	4.3%	100.0%
Global percentage	2.1%	46.8%	46.8%	4.3%	87.2%

Therefore, the students who considered that they learned better through the platform obtained a higher grade. On the other hand, those who gave a negative valuation of aspects of the platform, such as contributions of little relevance, too much time in front of the computer or few reflections, obtained a lower grade. Lastly, it is important to highlight that there were significant differences in the rating between the different degrees and internships, with the practicum of the degree of pedagogy being the one with the most positive effect in the rating of the CourseSites platform.

Of the total sample, 50.5% were studying the degree of early childhood education, 13.5% were in the degree of primary education and 35.9% in pedagogy. Likewise, 20.3% of the students were in the first academic year, 34.4% of the participants were in the second academic year, 3.1% were in the third academic year and 42.2% were in the last

academic year. Most of the participants were women (86.5% women and 13.5% men) between 18 and 24 years of age (85.9% of the participants).

The students in the degree of early childhood education were 7 men (3.5% of the participants) and 90 women (46.9% of the participants), of whom 6 men and 77 women were between 18 and 24 years of age (43.2% of the participants), and the rest were over 24 years of age (7.3% of the participants). The distribution of the students by academic year was the following: 20 students in the first year (18 women and 2 men; one man over 24 years of age), 34 students in the second year (32 women and 2 men; 3 women and one man over 24 years of age), 2 female students in the third year (one of them over 24 years of age), and 40 students in the fourth year (38 women and 2 men; 8 women over 24 years of age).

Discussion

The analysis of the results sheds light on some of the questions we posed in this study. Firstly, we were able to determine which random variables allowed identifying the aspects that facilitate smart learning with the use of the CourseSites platform. The positive aspects were obtained by comparing the differences of mean values with a p-value of 0.03; with these being the extremes of confidence intervals, we can infer that there were no significant differences. In this sense, to fit the model, the non-significant variables were eliminated, following the Logit algorithm, e.g., item 27 (I learn more and better than with traditional methods) and item 38 (the contributions are of little relevance, too much time in front of the computer). Undoubtedly, this type of contradictions, which make us think about the profile and needs of the students, must be taken into account in future studies.

Another item to be considered is item 37 (one of the most positive aspects is the materials and suggestions contributed by the classmates). In this case, there were solutions to the questions posed in this study.

It is worth mentioning that, in the correlation matrix, there were positive aspects highlighted by the students, such as learning more and better, and more significant and meaningful reflections. Likewise, the data show how the grades of the students varied through the use of the "training eco environments", thus, in 87.2% of the cases, the students got a "very good", with 94.4% of correct marking; therefore, the students who were marked with "very good" and higher were correctly classified in more than 87.5% of the cases, and in 100% for those who obtained an "excellent".

Thus, of the 44 items, we obtained interrelations between the variables that we would like to highlight as aspects for debate; for example, the relationship between opinions is more significant, from a positive perspective, in the degree of pedagogy.

The first aspect we tackled in the analysis of the obtained results was the following: why did we obtain lower results in the individual perceptions? We consider that it is very important to design the learning experiences, in order to get good advice about the learning objects and to gather information about the evaluation and feedback processes. Therefore, the initial goal was to revise the design, since the data provided evidence of the importance of its simplicity and flexibility.

Other aspects to reflect on were the incorporation of other social networks that would allow sharing images, evidence and commitment.

It is worth mentioning that the average results were better in some specialities, whereas the level of satisfaction was constant. The same occurred when the most representative groups were also grouped by gender, age and academic year, shown by the multivariate analysis as influential factors in the rating of the tests. Why is motivation higher in the pre-test? The fact that they did not know the tool or its actual applicability could have led students to have a greater initial motivation. Why does attitude increase? The students showed an interest toward the use of the tool after the training.

Considering the perceptions of the students and attending to the objectives of this study, we could conclude that the CourseSites platform was a vehicle for the professional development of future teachers that improved the quality of the learnings of the participants.

In this sense, it is worth highlighting the importance of further developing this type of research, to allow future teachers to actively participate in the design of their own didactic models (Posner, 2004). Therefore, we have shown that the integration of the CourseSites platform helped the users in the selection of activities or cognitive challenges and stimulation of the intrinsic motivation of their students (Pintrich 1999), and in the incorporation and development of collaborative work strategies (Waugh & Su-Searle, 2012).

Conclusions

The aim of this study was to generate motivating experiences in which an authentic learning was activated. The data obtained in the results demonstrate that such objective was attained. In this sense, we identified the potential of motivation, critical analysis and reflection, from an empirical perspective.

At the beginning of the present study, we had two questions to answer: (1) Do training experiences backed by the use of "eco environments" (digital tools), which may initially awaken feelings of confusion or fear, provoke a change in the attitudes and motivation of students? The data show that the answer is yes. Thus, we encourage future teachers to incorporate these tools in their teaching activities. (2) Do the personal characteristics of the students or their initial digital competences influence the obtained data? The answer is yes. The students who have a good academic background and digital abilities and skills enjoy the learning processes and increase their academic achievements. This is shown by the data of these nine years of experience in their final grades, which is corroborated by the comparison of differences in the mean values, where a p-value of 0.03 was obtained.

We were able to confirm that teaching practices can be transformed into smart practices (barriers were shared, solutions were sought, and the sensory stimulation required to carry out their own evaluation was produced). We confirm that the use of "training ecoenvironments" is fundamental in the present time. Therefore, we produced an answer to our question about whether the CourseSites platform was a meeting space for participation.

Secondly, the results obtained show the degree of motivation of our students in the application of specific activities in the classroom and the exchange that took place with their classmates and the teachers that led the training experience.

We were also able to confirm the differences in the variables age, sex and academic year of the students through the statistics used in this study.

The future teachers who participated in this study experienced the real classroom life at all times accompanied and valued by their own peers (Darling-Hammond & Adamson, 2013). Our objective was to achieve the activation of professional action competences. The type of methodology was constructive and based on learning projects incorporated in the learning ecosystem (Riano-Galan, Garcia-Ruiz, Rodriguez Martin, & Alvarez-Arregui, 2016). These training eco-environments facilitated the development of an active, fun and motivating training, where unnecessary information was removed and a ubiquitous and mobile learning was promoted (Qualcomm, 2017). Likewise, it helped to create simulators of "conflict" situations, providing safe environments for the students, considering the long-term analyses (meta-analyses of 10 or 15 years) that showed the positive results (Tekedere & Goker, 2016) and the initiative of our concurrent longitudinal study.

This study allowed revising the causes that showed how the valuation of the students toward the use of technologies decreased after the experience (Zanfrillo & Diaz-Noguera, 2015). Some of the causes could be due to the management of their suggestions and proposals.

Another recurrent aspect in the studies about this topic is the degree of frustration that future teachers are willing to endure with this type of activity. The proposals for improvement are aimed to make the interaction with the object intuitive, comfortable and easy (all these principles are common to the use of new technologies).

Likewise, it is worth mentioning that the paper format is not predominant in the educational scope; therefore, the incorporation of different elements from other symbolic systems contributes to the stimulation of multiple intelligences, adding value to the activation of those abilities that we proposed with the development of our study.

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