THE IMPACT OF COLLABORATIVE EPORTFOLIOS ON ACADEMIC LEARNING IN A UNIVERSITY SETTING

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Abstract

This study is focused on promoting self-reflection and self-regulation of learning through the use of digital tools to improve the academic performance of university students. Specifically, the main objective is to evaluate the impact of the use of collaborative ePortfolios on facilitating the comprehension of the concepts being studied. During the 2021/2022 academic term, a voluntary survey was administered to 60 students in the Adaptation Course of the Primary Education Degree Program. Through a structural equation analysis, a theoretical model was analyzed in which the intensity of participation in the ePortfolio appears as a mediating variable between the different independent variables and the improvement in academic learning. The results of the study confirm this mediating function for some variables, while at the same time they show a direct positive relationship between the intensity of participation in the ePortfolio and comprehension of the course concepts. The findings of this study can have important implications for the promotion of digital tools, such as ePortfolios, to improve learning in the university context. In addition, the work offers methodological alternatives to the recurring problem of analyzing complex relationships (both direct and indirect effects) with small samples.

Keywords – Academic performance, Higher education, Collaborative ePortfolio, Self-regulation, Educational innovation.

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1. Introduction

Throughout history, the different educational paradigms have gradually incorporated strategies for autonomous learning. The evolution of technology has substantially affected the awareness of educational issues. But this growing awareness of educational issues occurred under the auspices of different educational movements that appeared after the first Industrial Revolution, which meant great technological transformations in the western social context and in the educational environment. Contributions emerged from Rousseau, Pestalozzi, Fröebel, and later, Dewey, Freinet, Makarenco and

Maria Montessori, among others. This is how the progressive evolution in the educational thinking began, with alternatives to the traditional duties of teachers.

With regard to the present day, it can be stated that "we are currently experiencing the fourth industrial revolution, known as Industry 4.0." (Fidalgo-Blanco, Sein-Echaluce & García-Peñalvo, 2022: page 50). It is for this reason, in this changing context, that highly trained and motivated professionals are needed in order to adapt the existing resources to the current classroom situation. From this approach, the need emerges to continue to investigate the mechanisms that play a part in the construction of knowledge, mediated by the collaborative digital environments. It would be necessary to check the real impact they have when it comes to motivating students to boost their participation, level of commitment and awareness (Freire, 2005; Reeve, Cheon & Jang, 2020; Sánchez-Valverde, 2018).

Apathy and a lack of commitment towards their academic duties generate situations of failure, poor academic performance and even a rejection of the subject or the university environment itself. It is for this reason that "higher education is in urgent need of reflection on its responsibility in this situation and to implement strategies to improve and find feasible solutions in accordance with quality education." (Medina, Fereira & Marzol, 2018: page 23). Accordingly, certain authors coincide in stressing once again the responsibility of higher education in fostering the autonomy and initiative in students, awakening an interest in them to engage in continuous learning throughout their lives (Marcelo & Rijo, 2019; García, 2012). To accomplish this, instructors must facilitate environments that promote student participation and commitment to his or her own learning process.

In this sense, "learning self-regulation models" take on special importance, in reference to the degree to which students are active participants in their own learning processes from a metacognitive, motivational and behavioral perspective (Zimmerman, 1989). The active participation of the subject with regard to the proposed goals or objectives will thus be the main characteristic of learning based on these focuses (Martínez-Fernández & Rabanaque, 2008).

Several studies support this association between self-regulation of learning and academic success (Alegre, 2014; Fernández, Bernardo, Suárez, Cerezo, Núñez & Rosário, 2013; Rosário, Núñez & González-Pienda, 2004; Schunck & Zimmerman, 1997). Likewise, this association has also been found to be valid in virtual distance learning environments (Kizilcec, Pérez-Sanagustín & Maldonado, 2017; Machuca-Vivar, Sampedro-Guamán, Palma-Rivera & Villalta-Jadán, 2021). Self-regulation has also been shown to be effective in developing soft skills, such as problem solving, critical thinking and creativity (Barrett, 2000; Rubio & Galván, 2013).

These skills are essential for academic and professional success in an increasingly complex, changing world. Along these lines, Alcibar, Monroy and Jiménez (2018) have demonstrated that the use of ICT is related to improved academic performance, inspired by effective involvement in these learning environments, which could be interpreted thanks to a generation of digital natives or millennials (Main, 2017; Mehring, 2018).

However, self-learning also presents certain challenges. The independent learning process requires a great deal of motivation, discipline and self-reliance. In addition, access to quality educational resources and the lack of structured support can complicate the self-learning process. It is therefore important for institutions of higher education to provide an appropriate environment for self-regulation of learning, offering quality educational resources, supporting student motivation and discipline and providing structured guidance to boost the self-learning.

There are different options to offer students spaces of self-regulation in their education in virtual distance learning environments. Among them, ePortfolios in blog format bring together the necessary characteristics to be used in the field of higher education. Blogs are one tool that is positively valued by students (Cobos-Sanchiz, López-Meneses & Llorent-Vaquero, 2016; Churchill, 2009). Furthermore, it is a

very versatile and useful tool in different learning environments, which can be used to promote cooperative learning (Molina, Valenciano, Valencia-Peris, Muñoz, Monforte, Martos et al., 2013).

Even though blogs are usually personal in nature, they do allow for cooperative work. As indicated by Rodríguez-Martín and Castillo-Sarmiento (2019: page 50), "the editing configuration allows us to have everything from a single author to a variable number of authors or users with different editing and comment permissions. They can therefore be used for cooperative projects." Furthermore, these virtual resources are ideal educational settings that promote the dynamics of self-regulation of one's behavior and that of the group members. For example, students can use a blog or other virtual learning elements to create a study plan and record their progress in ePortfolio format. At the same time, this context can provide immediate, personalized feedback on student performance, which allows them to evaluate their own learning and make adjustments accordingly. This can help them to develop metacognitive skills, such as planning, monitoring and evaluation of their own learning. However, it is important to point out that the use of these tools must be guided and supervised by the instructor in order to ensure their effectiveness and capacity to complement other teaching strategies.

Some studies suggest that the specific use of the reflective ePortfolio can improve self-reflection and self-regulation of learning (Hadwin, Oshige, Gress & Winne, 2010; Perry & Winne, 2013), which in turn can lead to improved academic performance (Brown & Harris, 2013). In this sense, a large number of studies show the correlation between effort by the students, active participation in the virtual environment and their academic performance (García-Aretio, 2017). However, it is not so easy to verify the causal relationship between doing, doing more and doing it better (Reich, 2015). Therefore, more studies are needed to establish a clear association between the use of virtual spaces and academic performance.

Related to the above, other research by Noshahr, Talebi and Mojallal (2014) has confirmed that the use of technologies can have an impact on the performance of students in a certain area, but not in others. For example, the use of specific educational technologies can improve learning in the Sciences, while it would not have the same impact on Mathematics (Antonijevic, 2007; Wittwer & Senkbeil, 2008).

Covering the most important contributions, the bibliographic review on the use of virtual learning spaces and academic performance in higher education has shown varying results. Some theorists state that the use of this type of resources in the classroom can improve the academic performance of students, either through improved motivation, information exchange or online cooperation (Granić & Marangunić, 2019). Other studies, such as those by Bryant and Hunton (2000) and Huilca and Ávalos (2013), however, have found little or no relationship between these resources and academic performance.

There are different reasons why these studies have not found any relationship between the use of virtual resources and academic performance. One possible reason is that the use of these resources is not always closely related to effective learning, if it is limited to the mere reading of the materials without any active participation in discussions with the instructor or classmates (Perera & Richardson, 2010). However, when the teaching and learning process is based on an active student-centered focus and the learning situations generate controlled stress, this context can favor the development of cognitive skills and an improvement in academic performance (Suarez-Riveiro, Martinez-Vicente & Valiente-Barroso, 2020).

Furthermore, academic performance can also depend on factors such as student motivation, the learning environment (Rodríguez-Peñarroja, 2020) and the quality of the instruction (Salas, 2002).

It is also possible that the ICT resources are not being used appropriately or are not integrated properly into the curriculum (Bauer & Kenton, 2005; Wozney, Venkatesh & Abrami, 2006, as cited in Sánchez-García & Galindo-Villardón, 2018), which limits their capacity to improve academic performance.

In summary, active participation by students in the learning process is essential to ensure optimal academic performance. By increasing motivation, improving comprehension, developing critical skills, building confidence and fostering a more inclusive environment, it is possible to achieve better academic

performance. Therefore, it is important for instructors to promote strategies and methodologies that foster active participation by students in the learning process.

We can therefore conclude that an ePortfolio can be of great use in the academic progress of students. Nevertheless, more research is still required and empirical evidence needs to continue to be generated in order to determine with precision how different technologies affect student performance in different areas. In addition, we must take into consideration that there are many factors that can affect academic performance and the use of virtual resources, and the use of the ePortfolio is just one of them.

In accordance with this, in this research we attempt to determine whether the use of the reflective ePortfolio in an online environment has any association with the academic learning of university students. Also, in line with what has been presented, the hypotheses we propose are: h1: The intensity of participation in the ePortfolio has direct, positive effects on the improvement in the academic learning of university students; h2: the intensity of participation in the ePortfolio functions as a mediating variable of the effect of other independent variables on academic learning.

2. Methods
2.1.Source

The findings presented in this article are the result of a pilot project carried out at an international university that offers exclusively virtual education. The data were obtained during the months of February and May 2022 through a survey administered to two different groups of students, with a total of 60 participants in the Adaptation Course in the Primary Education Degree Program.

This course offers qualified teachers in Primary Education the opportunity to adapt to the degree program by studying 38 ETCS, in the event they have two years of prior teaching experience, and 60 ECTS for those who have less than two years of teaching experience. Therefore, the profile of the students is one with more professional experience than the profile of traditional students at a classroom-based university.

The characteristics of the sample are therefore oriented towards an exploratory objective that would allow other subsequent works to delve deeper into the relationship between digital tools such as ePortfolios and the improvement of university learning.

2.2. Analysis

We have made a reflective space available to our students in the format of a collaborative ePortfolio. Through this unique reflective space, students could participate by responding to specific questions related to the course topic, autonomously make text entries, participate in the debates that arise, label classmates to generate specific conversations, cooperate in the building of the ePortfolio by contributing resources, bibliographic entries, etc. Participation in this ePortfolio was voluntary, with no sort of direct compensation in the evaluation.

It is important to stress that, in order to ensure that the ePortfolio is effective in supporting the self-regulation during the learning process of the students, we have provided clear and specific guidelines about its use, as well as the expectations that there are of them. Furthermore, the faculty will provide regular feedback to the students regarding their reflections and work on the ePortfolio.

Upon completion of the course, the students responded to a questionnaire on their learning experience with the ePortfolios. Based on these responses, we have created a structural equation model in which the level of participation in the ePortfolios mediates the relationship that exists among the different independent variables and academic learning.

The structural equation models (SEM) make it possible to explore direct and indirect relationships of dependence, such as those proposed in this article, where different independent variables predict at the same time the behavior of two variables: improvement in learning and the level of participation in the

ePortfolio, with the latter also serving at the same time as a predictor of the improvement in learning. These relationships can be seen in graphic form in Figure 1.
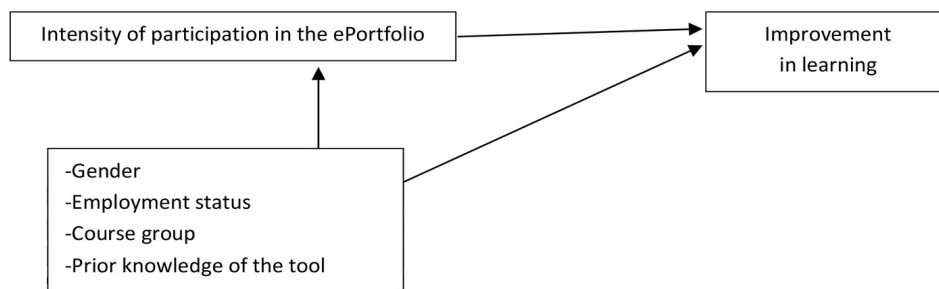

Figure 1. Proposed structural equations model

The SEM analysis makes it possible to verify whether the hypothesized relationships are coherent with the underlying covariance structure in the data. For this purpose, a series of goodness of fit measures of the model being considered were used. When these goodness of fit measures return acceptable values, it can be stated that the proposed model is coherent with the data. Garson (2015: page 95), after a detailed review of the literature, proposes the following goodness of fit measures: chi-square, relative chi-square, RMSEA and TLI or CFI, with the following cut-off points in order to consider that a model correctly reflects the covariance structure of the data: non-significant chi-square (Byrne, 2010); relative chi-square of less than 3 (Kline, 1998) or 2 (Tabachnick & Fidell, 2007); RMSEA with values of less than 0.05 indicating a good fit and up to 0.08 indicating a reasonable fit (Browne & Cudeck, 1993); TLI and CFI greater than 0.95 (Hu & Bentler, 1999).

With regard to the estimation method, we have taken into account the non-metric nature of the variables and the available sample. The extended use of non-metric variables in the Social Sciences has prompted a great deal of research on their impact on the reliability of the parameters and the goodness of fit of the structural equation models. As reflected by Byrne (2010: pages 148-149), the empirical evidence in these studies supports the use of non-metric variables, as long as an appropriate estimation method is used to deal with the presence of small samples and non-normal data. This includes the processing, under certain conditions, of ordinal variables from at least four categories as continuous variables (Bentler & Chou, 1988; Garson, 2015: page 484). The development of research into structural equation models has provided different estimation methods for non-normal multivariate distribution conditions. These estimation methods (Bentler, 2005; Coenders, Satorra & Saris, 1997; Hair, Anderson, Tatham & Black, 1999; Moustaki, 2001; Muthén & Muthén, 2004; Satorra & Bentler, 1994) allow us to obtain appropriate stable parameters and goodness of fit for these situations.

Bearing in mind all of the above, the estimation method we have used was the asymptotically distribution free (ADF) estimation, which unlike other estimation methods, does not require a multivariate normal distribution. However, the ADF estimation requires especially large samples. Yung & Bentler (1994) opened the door for the ADF estimation method for small samples. This new course of action confirmed in their work consists of combining ADF estimation with bootstrapping.

This was the procedure we followed here. The ADF estimation parameters were obtained through bootstrapping. This procedure consists of the following (Hair et al., 1999: page 633): the original sample is resampled (with replacement) a specified number of times (5000 times in this case) in order to generate a large number of new samples, with each one being a random subset of the original sample; the model is estimated and for each new sample, the estimated parameters are saved; the estimations of the final parameters are calculated as the means of the estimations of the parameters of all the samples. The confidence intervals are not estimated through a sampling error, rather they are observed directly, examining the effective distribution of the estimated parameters around the means. The confidence intervals that contain the zero are interpreted as statistically non-significant. For this type of estimation (ADF), different simulations (Chou, Bentler & Satorra, 1991; Curran, West & Finch, 1996; Hu, Bentler &

Kano, 1992) indicate that a sample equal to or greater than 5000 cases, such as that obtained through bootstrapping, compensates for the type I errors produced by smaller samples. The final model construction was carried out using the AMOS 24.0 program.

2.3. Measurements

The main variable of interest was improved learning, measured by the question: After using the reflective ePortfolio, has your level of comprehension of the concepts improved over your previous level. The response categories were offered on a scale of 1 to 5, where 1 means "Not at all" and 5 is "Totally."

As a mediating variable, we have used the variable "intensity of participation in the ePortfolio." This was measured by means of the question: Evaluate your level of participation and involvement in the course blog. The response options were offered on a scale of 1 to 5, where 1 means "I have not participated at all" and 5 is "I have been very participative."

As control variables, we have used the variables: gender (female/male); course group (group 1 or 2), employment status (currently working as an instructor/not currently working as an instructor) and prior knowledge of the tool, as measured by the question: Did you know about the use of the ePortfolio in an educational setting? The response categories were offered on a scale of 1 to 5, where 1 means Not at all and 5 is Totally.

3. Results

Table 1 reflects the basic characteristics of the sample.

Before highlighting the other basic characteristics of the sample, it is important to remember that all the respondents are students in the Adaptation Course in the Primary Education Degree Program. They are therefore all education professionals, most of whom (75%) were also working as instructors at the time of completing the survey. However, the respondents in theory did not have very in-depth knowledge of the possibilities of the ePortfolio in the educational setting. On the other hand, being a highly female-dominated profession, the information that the vast majority are women is not surprising.

With regard to the degree of participation, it was relatively high, taking into account that the participation was completely voluntary and had no effect on the final evaluation. Finally, the subjective perception of improvement in learning after using ePortfolio was also high, with more than 70% of the students giving it a rating of four or five out of five.

Beyond these basic descriptive statistics, Tables 2-5 show the results of the joint structural equation model proposed in Figure 1. First, it is essential to point out the goodness of fit measures of the model: the non-significant chi-square (χ^2: 7.06, df: 6, p-value: 0.31); relative chi-square: 1.18; RMSEA: 0.055; TLI: 0.953; CFI: 0.98. These values indicate a correct convergence of the data with the proposed model.

Table 2 shows the total effects of the variables on the improvement in learning. These total effects reflect both their direct and indirect influence through the mediating variable (intensity of participation in the ePortfolio).

As can be seen, the intensity of participation in the ePortfolio is the variable that exerts the greatest influence on the improvement in learning: the greater the participation, the more learning is reported by the students. The variable related to the employment status also proved to be statistically significant, relating the improvement in learning to not having to work as an instructor while studying the Adaptation Course for the Degree. These two variables explain the high percentage of the variance (R^2=0.43).

Tables 3-5 break down the total effects shown in the previous table. This is important because, as indicated by Hayes (2018: page 117), there is a consensus in the current literature regarding the need to explore the indirect effects, even in the case that a particular variable does not present any total effects.

Variables	(%)
Gender	
Female	75
Male	25
Employment status	
Currently works as an instructor	75
Does not currently work as an instructor	25
Course group	
Group 1	80
Group 2	20
Prior knowledge of the ePortfolio	
1 None at all	26.7
2	16.7
3	25
4	23.3
5 Totally	8.3
Intensity of participation in the ePortfolio	
1 I haven't participated at all	20
2	23.3
3	25
4	23.3
5 I have been very participative	8.3
Improvement in learning	
1 None at all	3.3
2	8.3
3	23.3
4	43.3
5 Totally	20
NA	1.7

Table 1. Characteristics of the sample

Variable	Coeff.	Bc 95% CI	
		Lower	Upper
Group 2 (ref.: group 1)	0.08	-0.48	0.56
Is not currently working as an instructor (ref.: is working)	0.73*	0.15	1.32
Male (ref.: female)	-0.29	-0.93	0.24
Prior knowledge of the tool	0.16	-0.04	0.36
Intensity of participation in the ePortfolio	0.48***	0.29	0.69

R^2: Improvement in learning: 0.43; ***$p<.001$; **$p<.01$; *$p<.05$
Bc 95% CI: Bias corrected percentile method. Confidence intervals 95%. Resampling 5000 samples.

Table 2. Total effects on the improvement in learning. Non-standardized beta coefficients

Variable	Coeff.	Bc 95% CI	
		Lower	Upper
Group 2 (ref.: group 1)	0.62	-0.25	1.44
Is not currently working as an instructor (ref.: is working)	1.00***	0.45	1.59
Male (ref.: female)	0.55	-0.04	1.15
Prior knowledge of the tool	0.16	-0.10	0.38

R^2: Intensity of participation in the ePortfolio: 0.24; ***$p<.001$; **$p<.01$; *$p<.05$
Bc 95% CI: Bias corrected percentile method. Confidence intervals 95%. Resampling 5000 samples

Table 3. Direct effects on the intensity of participation in the ePortfolio. Non-standardized beta coefficients

Variable	Coeff.	Bc 95% CI	
		Lower	Upper
Group 2 (ref.: group 1)	-0.22	-0.61	0.14
Is not currently working as an instructor (ref.: is working)	0.25	-0.23	0.81
Male (ref.: female)	-0.56*	-1.07	-0.11
Prior knowledge of the ePortfolio	0.08	-0.09	0.26
Intensity of participation in the ePortfolio	0.48***	0.29	0.69

R^2: Improvement in learning: 0.43; ***$p<.001$; **$p<.01$; *$p<.05$
Bc 95% CI: Bias corrected percentile method. Confidence intervals 95%.Resampling 5000 samples.

Table 4. Direct effects on the improvement in learning. Non-standardized beta coefficients

Variable	Coeff.	Bc 95% CI	
		Lower	Upper
Group 2 (ref.: group 1)	0.30	-0.09	0.76
Is not currently working as an instructor (ref.: is working)	0.49**	0.22	0.88
Male (ref.: female)	0.27*	0.01	0.61
Prior knowledge of the ePortfolio	0.08	-0.04	0.22

R^2: Improvement in learning: 0.43; ***$p<.001$; **$p<.01$; *$p<.05$
Bc 95% CI: Bias corrected percentile method. Confidence intervals 95%. Resampling 5000 samples.

Table 5. Indirect effects on the improvement in learning. Non-standardized beta coefficients.

The total effects are the sum of the direct and indirect effects. In this sense, we have observed that the participation in the ePortfolio is directly associated with the improvement in learning.

Two variables of those tested failed to show any influence on the improvement in learning. That is to say, neither the group to which the subjects belong nor prior knowledge of the ePortfolio have any influence on learning, either directly or indirectly, through participation.

The variable related to employment status has indirect effects on the learning through its influence on participation (Table 3). Those students who do not have to balance studies with their teaching profession make greater use of the ePortfolio and it is that participation which generates the true effects (Table 4).

Finally, the variable "gender" has a complex behavior, which is precisely what analyses like the SEM analysis allow us to observe more clearly. On the one hand, the model shows evidence that gender exerts a direct effect on the improvement in learning (Table 4): women show a greater improvement in learning.

On the other hand, gender has an indirect effect through participation (Table 5). This indirect effect is present even when gender is not statistically significant in its relationship with participation (Table 3). This is possible because the indirect effects, unlike the total effects, are not estimated as the sum of the individual effects, but rather as the product of the two, and so the statistical significance of the individual effects is not a requirement for the existence of the indirect effects (Hayes, 2018: page 116).

The unique behavior of the gender variable is reflected in another situation. The indirect effects that are reflected through participation, in turn, cancel out the direct effects that it presented. This occurs in situations in which the direct and indirect effects of a variable have a different sign, such as what occurs here. In this case, women show a greater improvement in learning (Table 4), but it is the men who participate more (Table 5). As a result, both effects are canceled out, and thus gender does not show statistically significant total effects. In these situations, the effects have been referred to as suppression or inconsistent mediating effects (MacKinnon, Krull & Lockwood, 2000; Zhao, Lynch & Chen, 2010).

4. Discussion

The ePortfolio tool is especially useful in the university setting (Alcaraz, 2016; Barberá, Gewerc & Rodríguez-Illera, 2009; Rubio & Galván, 2013). This setting is appropriate in order to promote an interactive environment, in which reflective practice stands out as its main characteristic. This seems to be

indicated by the considerable relative participation found here, especially taking into account that the ePortfolio activities did not form part of the evaluation.

The results indicated a positive impact on the improvement in learning by the students through the use of the ePortfolio. This conclusion has been corroborated in previous works by Schunk (2012) and Nguyen and Ikeda (2015). These findings further support the positive perception of the students regarding the use and effectiveness of the ePortfolio in their learning process, as was observed by means of a direct question and was ratified through the model presented in the SEM analysis, reinforcing the confidence in the educational benefits of this tool. The use of this type of virtual resources is valued as a cognitive tool for reviewing, creating and organizing ideas and concepts (García-Valcárcel & Tejedor-Tejedor, 2017).

Along these same lines, according to the studies by Chaves-Barboza, Trujillo-Torres and López-Núñez (2015) and Chaves-Barboza, Trujillo-Torres, López-Núñez and Sola-Martínez (2017), the reflection on the learning itself and the use of digital tools, such as blogs and ePortfolios to organize and delve deeper into ideas and concepts from the course contribute to the students reflecting on what they have learned and engaging in additional investigation into the topics that were dealt with. It is therefore evidenced that the virtual spaces in ePortfolio format are not limited to merely collecting work, rather they include a reflective narrative that promotes the comprehension of concepts and can also facilitate evaluation (Prendes-Espinosa & Sánchez-Vera, 2008). It is therefore necessary to provide students with cognitive tools so that they are aware of their educational development (Klenowski, 2004; Barberà, 2005).

On the other hand, based on the results obtained, we can confirm that employment status can have an influence on the learning, both directly, through improved understanding of the concepts, and indirectly, through greater participation in the ePortfolio. Those who do not work as educators could have more free time to dedicate to the ePortfolio and this could allow them to reflect on their learning, evaluate their own progress and receive specific feedback. However, it is important to mention that this depends on how they use the time available, since having extra time does not always guarantee better performance. In this regard, research in the area of the self-regulation of learning has identified several factors that can have a key impact on the students' ability to self-regulate their learning. Time management is one of these factors, and it has been demonstrated that this is especially challenging for online students, proving to be a key factor in their academic performance (Vohs & Baumeister, 2016; Zimmerman & Moylan, 2009; Panadero & Alonso-Tapia, 2013; Rowe & Rafferty 2013; Van Laer & Elen, 2017). As these studies have shown, the available time and effort influence the setting of goals and objectives by the students. Therefore, it is important for the students to be aware of these factors and to use this information to establish realistic, achievable learning goals. In this sense, the implementation of activities based on tools like the ePortfolio must take into account these pragmatic strategies by the students.

It should be mentioned that students who work may have less time available to dedicate to the ePortfolio and to extracurricular activities, but this does not mean that they cannot make valuable contributions to the project. Furthermore, having a job many help them develop skills such as time management, the ability to work as a team and resilience, which can be beneficial for the ePortfolio, and can help compensate for having less time available to dedicate to it. In this context, the students will be active promoters of their own academic performance, on the premise that active participation is a requirement to improve their results, and where the student is who plans his or her time and reflects, while the instructor assumes the role of the facilitator of the learning resources (Arancibia, Cabero & Marín, 2020).

Finally, the results reveal the need to delve deeper into the specific mechanisms through which the gender variable operates in the context of online tools, such as those of the ePortfolio. While being a woman has direct positive effects on improved learning, it is being a man that has positive effects, but this time indirectly, through participation. The bibliography echoes this need to properly focus on the specific conditions through which the differences between men and women are expressed in this area.

There are several studies that have attempted to explain the reason behind the difference in the effectiveness of the use of this type of resources between men and women. Some studies suggest that

women may have a greater sense of responsibility and commitment to learning (Ozsoy, Memis & Temur, 2009; Cachón, Cuervo, Zagalaz & González, 2015; Extremera, Durán & Rey, 2007; Grau, Agut, Martínez & Salanova, 2002), which allows them to take better advantage of the educational tools. On the other hand, some studies have found that gender has no significant relationship to commitment and responsibility in learning (Jackling & Natoli, 2011; Benevides, Fraiz & Porto, 2009, cited in Cachón-Zagalaz, Lara-Sánchez, Zagalaz-Sánchez, López-Manrique & Mesa, 2018).

Furthermore, there are studies that suggest that the difference in the effectiveness of the use of the ePortfolio between men and women could be attributed to differences in experience and prior use of these technologies, and not to gender itself (Valencia-Ortiz, Cabero-Almenara & Garay-Ruiz, 2020).

As can be seen, research on the gender differences in the use of learning strategies is a complex topic and one in constant evolution. Even though several studies have suggested that there are differences in the use of certain self-regulation strategies between men and women (De la Fuente & Justicia, 2001), these findings seem to depend more on the degree studied (Cano, 2000) or biases in the responses from the students on the self-reporting questionnaires (Pajares, 2003; Pintrich & Zusho, 2002).

It has also been proposed that women may have greater skill in communicating their thoughts and knowledge in social settings, due to their tendency to be more verbal as compared to men. This could give them an advantage in the use of resources that promote communication and cooperation in learning, such as the ePortfolio. In this perspective, studies by Lin, Tang and Kuo (2012) and Vekiri and Chronaki (2008) have emphasized the importance of considering how women interact with digital technologies in their social environment and how communication skills and strategies affect their capacity to take advantage of the opportunities offered by ICT. However, it is important to bear in mind that the capacity to communicate effectively online is not necessarily related to the comprehension of technical concepts and that there are also multiple factors that contribute to effective online communication.

5. Conclusions

In recent years and especially following the COVID-19 pandemic, training strategies have been expanded, consolidating cooperative, reflective work by students. It is increasingly more evident that the techniques and methods used in the classroom are not static, rather they are in constant change and evolution. This is due to the complexity of the educational environment, which is in a state of constant transition and change. It is therefore necessary for educational institutions to carry out their work in conditions that meet the needs of this environment.

Technology is changing the way in which we teach and learn, allowing broader access to information and online resources and permitting a more personalized approach in education. However, this also requires an additional effort on behalf of the faculty to adapt to these new methodologies and technological tools.

In light of all of the above, the use of online platforms like ePortfolio in blog format can be a useful tool to provide greater comprehension and retention of concepts. Studies suggest that the use of ePortfolio may have benefits for the development of skills such as reflection, self-regulation, self-determination and communication, which are considered essential in order to improve the comprehension of concepts.

The results obtained in this work follow the same lines. Participation in the ePortfolio emerges as a crucial predictor of the improvement in learning. Delving deeper into the motivations or incentives that could facilitate this participation becomes an important goal, since this participation is conditioned by different aspects. In this sense, in this work, in an exploratory manner, we have been able to elucidate how employment status, for example, affects this improvement in learning through participation in the ePortfolio. The availability of the students' time is a crucial element when it comes to considering this type of educational experiences. It would of course be necessary to also consider other factors, such as teaching methodology, the quality of the educational resources, the support from the faculty and other student skills and motivations.

Gender is another of the variables that require special attention in this context, since its influence will depend on specific elements with which it interacts. Furthermore, this interaction is not always unequivocal. I can happen, as we have shown here, that being female directly facilitates the learning, but it indirectly complicates it through a lower level of participation, for example.

The limitations to this work, derived from its exploratory nature, do not allow us to delve deeper into aspects such as those indicated, but a door is opened to better understand the use of tools such as those found on the ePortfolio in the university educational setting. As we have seen, this deepening of insight must be built on analysis methods that are capable of taking into account the relationships that are produced among the variables of interest. In this sense, with the presentation of the SEM analysis type used here (ADF estimation with resampling), our work offers methodological solutions to common problems, such as the reliable estimation of these complex relationships in small samples and/or with a non-normal data distribution.

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