

Article

Self-Efficacy of Teachers in Initial Training: A Comparison between the Populations of Two Universities

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Abstract: This article carries out a comparison of the self-efficacy of teachers in initial training, between the populations of two universities. A questionnaire with two Likert scales is applied in two samples, 836 subjects from the Universidad Nacional (Costa Rica) and 588 from the Universidad de Granada (Spain). The data is reviewed by means of descriptive and inferential statistics (95% confidence interval), correlation tests (Kendall τ correlation coefficient) and variance analysis (Mann–Whitney U test and Kruskal–Wallis H test). The results indicate that both populations show high levels of self-efficacy during their initial training, where the self-perceived capacity to pay attention to the explanations and instructions of the teachers excels. Meaningful differences are observed with getting ahead with difficult situations, doing the extra-class tasks and having motivation in the less interesting classes.

Keywords: self-efficacy; initial teacher training; university education

1. Introduction

The self-efficacy inside the Social Cognitive Theory refers to the self-perception of a person of his own ability to perform specific acts in certain situations, such as achieving a concrete learning with a definite level of difficulty [1–3]. Self-efficacy does not assess whether the person's goals will be achieved or if the acts are finally carried out or not; it is in fact a concept focusing on the person's self-perceived ability to be able to perform them when necessary. The real value of the concept settles on a potent influence in the motivation to assume responsibilities, and about the will to do educational tasks. In fact, a high self-efficacy is needed for a continuous and permanent search of paths to success, avoiding fiasco and frustration, as stated by numerous investigations in this regard [4–10]

The perceptions of a person about their own capacities are directly related with a given time, specific objectives and a concrete environment, therefore, they are not immutable, but dynamic and changing, so that they can get better and develop by increasing the locus of control of the subject about their behaviors and acts, and also increasing the knowledge about their environment and their trustfulness to influence it in a positive way, as shown in research on the subject [11–16]. The development and maintenance of a high self-efficacy in the training field is a way to motivate learning and encourage self-regulation in all the processes, as evidenced by the investigations that relate these variables [17–22]. The subject of self-efficacy faces learning in a critical, systematic and self-regulated way, and proactively assumes the completion of tasks and the accomplishment of their educational goals [23–29].

The university context for teacher training offers great opportunities for the self-efficacy investigation, such is the objective of this article, which aims to analyze self-efficacy variables related with doing extra-class tasks, working with classmates, maintaining effort in the face of difficulty and overcoming adverse situations, these variables have been shown to be related to self-efficacy, particularly in teacher training processes in various contexts and levels of education [30–40]. Likewise, the aim is to study the relationships among the self-efficacy variables, and the influence of general variables (degree program, level, sex, age, among others) on them will be analyzed.

2. Methodology

As can be seen in the methodological section, this article is of the comparative type with a quantitative methodology.

2.1. Populations and Samples

The two populations of the study are, 2682 teachers who are studying their initial training at the Centro de Investigación y Docencia en Educación de la Universidad Nacional de Costa Rica (UNA-CR, Center for Research and Teaching in Education of the National University of Costa Rica) and 5725 teachers who attend the Facultad de Educación de la Universidad de Granada-España (UGR-ES, Faculty of Education of the University of Granada-Spain), arriving at a total number of 8407 subjects. Each population has a direct correspondence with a sample, the first sample consists of 836 subjects from UNA-CR and the second sample of 588 subjects from UGR-ES, meaning a total of 1424 teachers in initial training, to whom the questionnaire has been applied. The sample has been chosen at random by clusters, taking as clusters the groups of teachers in initial training, this sample is representative of the population, with a 5% sample error for statistical inference.

2.2. The Questionnaire and Its Variables

The questionnaire applied to the samples of teachers in initial training had a set of sixteen open questions referring to general variables such as age, sex, age, maximum university graduation obtained, degree program attended and level reached in it, university in which they study, years of work experience and available devices for personal access to Internet. The results obtained in these general variables were extrapolated to the population and were used to relate them to the main variables, as will be clarified in a later section.

The main questions correspond to fourteen self-efficacy variables in teacher training, and they have an ordinal scale of six levels equidistant between two extreme categories (disagreement and agreement). The questionnaire is presented in Figure A1 in the appendix section.

2.3. Reliability and Validity of the Questionnaire

It has been determined that the questionnaire has a Cronbach's alpha of 0.881, which shows that the questionnaire is reliable. Previously, all the items increasing the Cronbach's alpha were eliminated.

On the other hand, by means of a confirmatory factor analysis, it was established that all the items are valid indicators of the self-efficacy dimension. In fact, the items saturate only that dimension.

All the items which were invalid as indicators or did show convergent invalidity (according to the contrast results of the Lagrange Multipliers) were eliminated. Also, those items with saturations not significantly different from zero or those which showed nomological invalidity (according to the Wald Test results) were eliminated.

2.4. Statistical Tests Performed

A Relative Frequency analysis was applied to the nominal, ordinals and scalars variables of the questionnaire, complemented with the average and standard deviation calculation.

Tests were applied for the correlation analysis (Kendall τ correlation coefficient) among the self-efficacy variables. Together with tests for the variance calculation (Mann–Whitney U test and Kruskal–Wallis H test) to determinate the existence of significative differences in the self-efficacy variables according to the general variables.

All the statistics tests performed are non-parametric, with a bilateral significance level greater or equal to 95%, and in the case of the variance analysis, they are joined with the calculation of the effect size with a confidence level of 95%.

3. Results Analysis

3.1. Descriptive Analysis of Self-Efficacy in Both Populations

The relative frequency of the self-efficacy variables are shown in the Table 1, in order to allow the comparison between both university populations, the UNA-CR values are placed in the upper part and the UGR-ES values in the lower part; in each case the arithmetic mean and the standard deviation are calculated.

When adding the relative frequencies of the three top options of the scale (levels 4, 5 and 6), higher percentages than 75% are achieved in most variables. In the UGR-ES population, the accumulated percentages of levels 4, 5 and 6 are lower than 75% in the variables “Control the disruptive behavior of my classmates” (56.2%) and “Motivate myself when classes are uninteresting” (55.1%), which is also observed in the UNA-CR population, where accumulated percentages of 68.6% and 67.9%, respectively, are reached, for the three top levels of the variables. In addition, in UGR-ES only an accumulated 69.6% is reached for levels 4, 5 and 6 in the variable “Prevent behavior problems”, while in UNA-CR 77.2% is reached.

The three self-efficacy variables showing the lowest averages, both for UGR-ES population and UNA-CR population, were “Control the disruptive behavior of my classmates” ($\bar{X}_{\text{UNA-CR}} = 4.12$, $\bar{X}_{\text{UGR-ES}} = 3.69$), showing the biggest standard deviation of all of them ($\sigma_{\text{UNA-CR}} = 1.52$, $\sigma_{\text{UGR-ES}} = 1.24$), “Prevent behavior problems” ($\bar{X}_{\text{UNA-CR}} = 4.5$, $\bar{X}_{\text{UGR-ES}} = 4.06$) showing the second highest standard deviation ($\sigma_{\text{UNA-CR}} = 1.47$, $\sigma_{\text{UGR-ES}} = 1.28$) and “Motivate myself when classes are uninteresting” ($\bar{X}_{\text{UNA-CR}} = 4.09$, $\bar{X}_{\text{UGR-ES}} = 3.68$) showing the third highest standard deviation ($\sigma_{\text{UNA-CR}} = 1.42$, $\sigma_{\text{UGR-ES}} = 1.32$). This indicates that these three variables students of both populations show strong self-efficacy, but that in them can also be observed relatively large variations between students with higher scores and students with lower scores.

In the UNA-CR population, some self-efficacy variables stand out for having averages bigger than 5 and percentages of teachers in training who perceive they have those capacities greater than 90%, these variables are: “Get ahead with the most difficult situations”, “Do the exercises correctly”, “Pay attention to the teachers’ explanations”, “Follow the instructions of the teachers correctly”, “Achieve learning with little support at home”, “Keep working on tasks when they are difficult”, “Do my extra-class tasks”, “Follow the established rules”.

In the case of the UGR-ES population, no variable has an average higher than 5, the three self-efficacy variables with higher averages are the following: Follow the established rules (4.96), “Pay attention to the teachers’ explanations” (4.9) and “Follow the instructions of the teachers correctly” (4.9). All of them have in the UGR-ES percentages higher than the 90% of teachers in training who trust to have those capacities. These three variables have also high averages in the UNA-CR population.

According to the Mann–Whitney test, there are seven self-efficacy variables showing statistically significant differences between the population of the UNA-CR and the population of the UGR-ES, these variables are “Get ahead with the most difficult situations”, “Achieve learning with little support at home”, “Do my extra-class tasks”, “Control the disruptive behavior of my classmates”, “Prevent behavior problems”, “Remember what I have learned in past lessons” and “Motivate myself when classes are uninteresting”. In all cases the teachers in training at UNA-CR show an average significantly greater to those at UGR-ES.

Table 1. Relative frequency, average and standard deviation of the self-efficacy variables, populations comparison (Universidad Nacional de Costa Rica (UNA-CR)/Universidad de Granada-España (UGR-ES)*).

Self-Efficacy Variables	Relative Frequency						\bar{X} ⁽¹⁾	σ ⁽²⁾
	Disagree			Agree				
	1	2	3	4	5	6		
Get ahead with the most difficult situations ⁽³⁾	1.3	1.6	4.0	15.7	29.9	47.6	5.14	1.06
	0.3	1.7	10.7	23.6	41.0	22.6	4.71	1.01
Do the exercises correctly	1.0	1.5	4.4	19.2	37.7	36.4	5.00	1.01
	0.2	1.2	6.1	23.0	47.0	22.5	4.83	0.90
Pay attention to the teachers' explanations	0.6	1.0	4.9	17.4	37.0	39.1	5.12	1.70
	0.2	1.5	6.8	22.4	37.8	31.3	4.90	0.98
Follow the instructions of the teachers correctly	0.8	0.6	2.8	13.7	34.2	47.9	5.23	0.93
	0.2	1.0	7.0	20.4	43.4	27.9	4.90	0.93
Achieve learning with little support at home ⁽³⁾	1.8	2.3	6.7	12.2	30.3	46.7	5.07	1.16
	1.4	2.9	11.8	22.0	37.8	24.2	4.65	1.13
Keep working on tasks when they are difficult	0.4	1.3	5.2	15.5	35.7	41.9	5.10	0.98
	0.5	2.0	7.8	25.2	41.7	22.8	4.74	1.00
Successfully work with my classmates	2.3	1.9	7.4	21.0	32.0	35.3	4.84	1.18
	0.5	2.0	8.0	21.3	39.6	28.6	4.83	1.03
Overcome the adverse influences of society in my learning	1.6	1.8	7.3	19.4	34.1	35.8	4.90	1.12
	0.0	1.5	11.2	30.6	39.5	17.2	4.60	0.95
Do my extra-class tasks ⁽³⁾	1.2	1.6	3.3	12.7	29.1	52.2	5.23	1.03
	0.2	2.7	11.1	22.0	37.6	26.4	4.73	1.06
Control the disruptive behavior of my classmates ⁽³⁾	9.5	5.1	16.8	23.1	23.8	21.7	4.12	1.52
	4.1	13.6	26.2	28.1	21.8	6.3	3.69	1.24
Prevent behavior problems ⁽³⁾	6.8	3.8	12.3	18.3	27.1	31.8	4.50	1.47
	3.1	10.0	17.3	29.8	26.9	12.9	4.06	1.28
Follow the established rules	1.6	1.9	4.0	9.8	30.1	52.5	5.23	1.08
	0.3	1.5	7.2	17.6	39.1	34.3	4.96	1.00
Remember what I have learned in past lessons ⁽³⁾	1.8	2.4	8.6	23.1	36.8	27.3	4.72	1.13
	2.0	4.6	18.0	30.1	32.3	12.9	4.25	1.15
Motivate myself when classes are uninteresting ⁽³⁾	6.7	6.0	19.4	25.9	23.2	18.8	4.09	1.42
	5.1	13.8	26.0	27.9	17.2	10.0	3.68	1.32

N = 8407 (N_{UNA-CR} = 2682 and N_{UGR-ES} = 5725), n = 1424 (n_{UNA-CR} = 836 and n_{UGR-ES} = 588). The data is inferred to the population with a sampling error $\leq 5\%$. * In each case, the data in the upper half of the box corresponds to UNA-CR and the data in the lower half corresponds to UGR-ES ⁽¹⁾ \bar{X} = Arithmetic Mean ⁽²⁾ σ = Standard Deviation ⁽³⁾ Variable with statistically significant differences between institutions, according to the Mann–Whitney test, $p < 0.05$, two-tailed with a 95% confidence level.

3.2. Effect of General Variables on the Self-Efficacy of Populations

Table 2 shows the influence of the general variables on the self-efficacy variables, according to the test (Mann–Whitney U Test or Kruskal–Wallis H Test) carried out and according to the significance level (95% or 99%). In addition, the Effect Size (ES) is indicated in a comparative way, the one corresponding to the population of UNA-CR is placed in the upper part and the one corresponding to the population of UGR-ES is placed in the lower part, with a confidence level of 95%.

In the UGR-ES population the percentage of men is 77%, in the UNA-CR population the percentages of men and women are more balanced, 51% are women. As shown in Table 2, only in the UNA-CR population is sex a variable that influences the variable “Do my extra-class tasks” (ES_{UNA-CR} = 0.113).

In the same way, only in this university population does the years of work experience influence the variables “Get ahead with the most difficult situations” ($ES_{UNA-CR} = 0.117$) and “Pay attention to the teachers’ explanations” ($ES_{UNA-CR} = 0.102$), in this population 24% have teaching working experience, with an average of 1.03 ± 0.05 years of experience, with a Standard Deviation (SD) equal to 4.21, while in UGR-ES the population has an average of 0.39 ± 0.02 years of experience ($SD = 1.08$), only 18.9% of the population has experience as teacher.

The 2682 teachers in training that make up the population of UNA-CR are distributed in twenty degree programs, the most populous are Rural Education I and II Cycles (315), Orientation (270), Teaching Mathematics (238), Teaching Social Studies (191) and Special Education (177). In the case of UGR-ES, its population is distributed in nine degree programs, the most populous are Degree in Primary Education (2181), Degree in Early Childhood Education (1333), Secondary Education Teaching Staff (710) and Degree in Social Education (613).

The “Degree program”, as a general variable, influenced the self-efficacy variables of the teachers in training, in both university populations it influenced “Prevent behavior problems” ($ES_{UNA-CR} = 0.113$ and $ES_{UGR-ES} = 0.135$), “Successfully work with my classmates” ($ES_{UNA-CR} = 0.188$ and $ES_{UGR-ES} = 0.116$) and “Follow the instructions of the teachers correctly” ($ES_{UNA-CR} = 0.136$ and $ES_{UGR-ES} = 0.105$). Only in the UNA-CR population did it influence “Get ahead with the most difficult situations” ($ES_{UNA-CR} = 0.108$), “Keep working on tasks when they are difficult” ($ES_{UNA-CR} = 0.138$), “Motivate myself when classes are uninteresting” ($ES_{UNA-CR} = 0.11$), “Overcome the adverse influences of society in my learning” ($ES_{UNA-CR} = 0.147$) and “Do my extra-class tasks” ($ES_{UNA-CR} = 0.182$). On the other hand, only in the UGR-ES population does this variable affect the self-efficacy variable “Control the disruptive behavior of my classmates”.

Table 2. Effect of general variables on the self-efficacy variables, populations comparison (UNA-CR/UGR-ES *).

Results of the Analysis of Variance Test with Confidence Intervals for the Effect Size		
Independent Variable (General)	Effect Size (ES) 95%	Dependent Variable (Main)
Sex	0.113 ± 0.057 ^(b)	Do my extra-class tasks
	-	
Degree program	0.108 ± 0.0054 ^(d) 0.091 ± 0.0455 ^(c)	Get ahead with the most difficult situations
	0.136 ± 0.068 ^(d) 0.105 ± 0.0525 ^(d)	Follow the instructions of the teachers correctly
	0.138 ± 0.069 ^(d) 0.046 ± 0.023 ^(c)	Keep working on tasks when they are difficult
	0.11 ± 0.055 ^(d) 0.087 ± 0.0435 ^(c)	Motivate myself when classes are uninteresting
	0.188 ± 0.094 ^(d) 0.116 ± 0.058 ^(d)	Successfully work with my classmates
	0.147 ± 0.0735 ^(d) 0.081 ± 0.0405 ^(c)	Overcome the adverse influences of society in my learning
	0.182 ± 0.091 ^(d) 0.037 ± 0.0185 ^(c)	Do my extra-class tasks
	0.093 ± 0.0465 ^(c) 0.106 ± 0.053 ^(c)	Control the disruptive behavior of my classmates
	0.113 ± 0.0565 ^(d) 0.135 ± 0.0675 ^(d)	Prevent behavior problems

Table 2. Cont.

Results of the Analysis of Variance Test with Confidence Intervals for the Effect Size		
Independent Variable (General)	Effect Size (ES) 95%	Dependent Variable (Main)
Level reached in the degree program	- 0.108 ± 0.054 ^(d)	Get ahead with the most difficult situations
	- 0.125 ± 0.0625 ^(d)	Do the exercises correctly
	- 0.139 ± 0.0695 ^(d)	Remember what I have learned in past lessons
	- 0.12 ± 0.06 ^(d)	Overcome the adverse influences of society in my learning
	- 0.212 ± 0.106 ^(d)	Do my extra-class tasks
Working experience years	0.117 ± 0.0585 ^(d) 0.052 ± 0.026 ^(c)	Get ahead with the most difficult situations
	0.102 ± 0.051 ^(d) 0.01 ± 0.005 ^(c)	Pay attention to the teachers' explanations
Another degree program has been completed	0.06 ± 0.03 ^(a) 0.111 ± 0.0555 ^(b)	Do the exercises correctly
	0.097 ± 0.0485 ^(a) 0.111 ± 0.0555 ^(b)	Pay attention to the teachers' explanations
	- 0.134 ± 0.067 ^(b)	Do my extra-class tasks
Studied at a different University	- 0.103 ± 0.0515 ^(b)	Control the disruptive behavior of my classmates
	0.092 ± 0.046 ^(a) 0.113 ± 0.0565 ^(b)	Do the exercises correctly
Maximum university graduation obtained	- 0.128 ± 0.064 ^(d)	Do the exercises correctly
	0.041 ± 0.0205 ^(c) 0.114 ± 0.057 ^(d)	Pay attention to the teachers' explanations
	0.035 ± 0.0175 ^(c) 0.175 ± 0.0875 ^(d)	Do my extra-class tasks
Availability of a laptop to access the Internet	- 0.111 ± 0.0555 ^(b)	Keep working on tasks when they are difficult
	0.075 ± 0.0375 ^(a) 0.101 ± 0.0505 ^(b)	Remember what I have learned in past lessons
Availability of a tablet to access the Internet	0.135 ± 0.066 ^(b) 0.102 ± 0.051 ^(b)	Successfully work with my classmates
Availability of a tablet to access the Internet	0.101 ± 0.0505 ^(b) 0.036 ± 0.018 ^(a)	Overcome the adverse influences of society in my learning

N = 8407 (N_{UNA-CR} = 2682 and N_{UGR-ES} = 5725), n = 1424 (n_{UNA-CR} = 836 and n_{UGR-ES} = 588). * In each case, the data in the upper half of the box corresponds to UNA-CR and the data in the lower half corresponds to UGR-ES. ^(a) $p < 0.05$ according to Mann-Whitney U test, this implies a margin of error of less than 5% ^(b) $p < 0.01$ according to Mann-Whitney U test, this implies a margin of error of less than 1% ^(c) $p < 0.05$ according to Kruskal-Wallis H test, this implies a margin of error of less than 5% ^(d) $p < 0.01$ according to Kruskal-Wallis H test, this implies a margin of error of less than 1%. In all cases tests were two-tailed with a 95% confidence level.

The general variable “Level reached in the degree program” only influences learning self-efficacy variables in the UGR-ES population of teachers in training, this variable affects “Get ahead with the most

difficult situations" ($ES_{UGR-ES} = 0.108$), "Do the exercises correctly" ($ES_{UGR-ES} = 0.125$), "Remember what I have learned in past lessons" ($ES_{UGR-ES} = 0.139$), "Overcome the adverse influences of society in my learning" ($ES_{UGR-ES} = 0.12$) and "Do my extra-class tasks" ($ES_{UGR-ES} = 0.212$).

It should be noted that in the UNA-CR population of teachers in training 30.6% are at the first level, 27.5% at the second, 12.5% at the third, 22.3% at the fourth and 15.1% at postgraduate level. In the case of the UGR-ES population, only 8.4% are at postgraduate level, 38% are at the third level, 35.4% are at the second level and 18.2% at the first level.

In the UGR-ES population, 17.9% have studied at another university, and 24% have completed another degree program. In the case of UNA-CR, 19.5% of the population have completed another degree program and just 21% have studied at another university. In the UGR-ES population 2.7% have a doctorate (2.7% have postgraduate) while in the UNA-CR population, just 0.1% have this degree (6.74% have postgraduate). Regarding the other degrees, in the populations of UNA-CR and UGR-ES, 1.8% and 1.5% have a bachelor's degree and 12.2% and 14.8% have a lower degree, respectively. The vast majority of both populations do not have a university degree (UNA-CR = 79.3%, UGR-ES = 79.4%).

In the UGR-ES population, the self-efficacy variable "Do the exercises correctly" is influenced by "Another degree program has been completed" ($ES_{UGR-ES} = 0.111$), the "Maximum university graduation obtained" ($ES_{UGR-ES} = 0.128$) and having "Studied at a different University" ($ES_{UGR-ES} = 0.113$), the latter has an effect on the self-efficacy variable "Control the disruptive behavior of my classmates". Only in the UGR-ES population is the variable "Pay attention to the teachers' explanations" affected by "Another degree program has been completed" ($ES_{UGR-ES} = 0.111$) and the "Maximum university graduation obtained" ($ES_{UGR-ES} = 0.114$); also, only in the UGR-ES population is the variable "Do my extra-class tasks" affected by these same two general variables with $ES_{UGR-ES} = 0.134$ and $ES_{UGR-ES} = 0.175$, respectively.

The UGR-ES population accesses the Internet using a diversity of devices, the main ones are Smartphones (99.83% of the population), laptops (97.96% of the population), desktop computers (52.04% of the population) and tablets (46.43% of the population). These devices are also the ones mainly used by the UNA-CR population: Smartphones (95.17%), laptops (82.48%), desktop computers (48.14%) and tablets (29.74%). The "Availability of a laptop to access the Internet", as a general variable, influences the variable "Successfully work with my classmates" in both populations ($ES_{UNA-CR} = 0.135$ and $ES_{UGR-ES} = 0.102$), and only in the UGR-ES population does this general variable influence the "Keep working on tasks when they are difficult" ($ES_{UGR-ES} = 0.111$) and "Remember what I have learned in past lessons" ($ES_{UGR-ES} = 0.101$). In the case of the UNA-CR population, the "Availability of a laptop to access the Internet" is a variable that has an impact on the self-efficacy variable "Overcome the adverse influences of society in my learning" ($ES_{UNA-CR} = 0.101$).

3.3. Relationship between the Populations' Self-Efficacy Variables

Table 3 shows the self-efficacy variables correlations of the two populations of teachers in initial training, the UNA-CR coefficients are placed in the upper position and the UGR-ES coefficients in the lower one.

As can be seen in the matrix, for both university populations the variables "Get ahead with the most difficult situations" and "Do the exercises correctly" are strongly correlated ($\tau \geq 0.5$), in turn, the variable "Pay attention to the teachers' explanations" is strongly correlated with the variables "Do the exercises correctly" and "Follow the instructions of the teachers correctly" ($\tau \geq 0.5$). Also, the variables "Control the disruptive behavior of my classmates" and "Prevent behavior problems" are potentially related ($\tau \geq 0.5$) for both university populations.

On the other hand, for both populations of teachers in training, the variable "Do my extra-class tasks" has a median relation ($0.5 > \tau \geq 0.4$) with the variable "Overcome the adverse influences of society in my learning", and it has a strong relationship ($\tau \geq 0.5$) with "Follow the established rules" only for UNA-CR. For both populations the variable "Keep working on tasks when they are difficult" is moderately related ($0.5 > \tau \geq 0.4$) with the variables "Get ahead with the most difficult situations", "Do the exercises correctly", "Achieve learning with little support at home" and "Follow

the instructions of the teachers correctly". This last variable, in turn, is moderately related ($0.5 > \tau \geq 0.4$) with the variable "Follow the established rules", for both UGR-ES and UNA-CR; and is moderately related to the variable "Keep working on tasks when they are difficult" only for UGR-ES.

Only for UNA-CR are the variables "Get ahead with the most difficult situations", "Pay attention to the teachers' explanations" and "Overcome the adverse influences of society in my learning" moderately related to each other, this last variable, is moderately related to the variables "Do the exercises correctly", "Successfully work with my classmates", "Follow the instructions of the teachers correctly" and "Keep working on tasks when they are difficult".

Also, for UNA-CR, the variables "Achieve learning with little support at home", "Get ahead with the most difficult situations" and "Follow the instructions of the teachers correctly" are moderately related to each other. This last variable is moderately related to "Do my extra-class tasks", which in turn has a median relation with "Keep working on tasks when they are difficult", only for UNA-CR.

Table 3. Correlation between self-efficacy variables, population comparison (UNA-CR/UGR-ES *).

Variables	Kendal τ Coefficient									
	1	2	3	4	5	6	7	8	9	10
1 Get ahead with the most difficult situations										
2 Do the exercises correctly	0.579 0.583									
3 Pay attention to the teachers' explanations	0.426 0.379	0.552 0.498								
4 Follow the instructions of the teachers correctly	0.434 0.369	0.474 0.471	0.558 0.633							
5 Achieve learning with little support at home	0.414 0.383	0.357 0.38	0.338 0.335	0.428 0.386						
6 Keep working on tasks when they are difficult	0.448 0.457	0.408 0.431	0.384 0.379	0.381 0.402	0.477 0.478					
7 Successfully work with my classmates	0.341 0.312	0.275 0.301	0.273 0.373	0.374 0.35	0.267 0.258	0.323 0.322				
8 Overcome the adverse influences of society in my learning	0.417 0.374	0.407 0.358	0.416 0.274	0.42 0.305	0.392 0.348	0.415 0.361	0.423 0.392			
9 Do my extra-class tasks	0.373 0.303	0.365 0.335	0.343 0.357	0.439 0.349	0.343 0.337	0.465 0.38	0.384 0.335	0.405 0.405		
10 Control the disruptive behavior of my classmates	0.193 0.179	0.218 0.111	0.203 0.148	0.245 0.197	0.195 0.166	0.252 0.126	0.213 0.194	0.334 0.26	0.21 0.187	
11 Prevent behavior problems	0.308 0.279	0.29 0.226	0.302 0.225	0.333 0.292	0.245 0.218	0.283 0.219	0.269 0.3	0.356 0.268	0.297 0.184	0.578 0.532
12 Follow the established rules	0.275 0.265	0.309 0.359	0.335 0.367	0.475 0.452	0.328 0.34	0.348 0.321	0.324 0.366	0.335 0.256	0.562 0.395	0.26 0.204

N = 8407 (N_{UNA-CR} = 2682 and N_{UGR-ES} = 5725), n = 1424 (n_{UNA-CR} = 836 and n_{UGR-ES} = 588). In all cases $p < 0.01$, tests were two-tailed with a 95% confidence level. * In each case, the data in the upper half of the box corresponds to UNA-CR and the data in the lower half corresponds to UGR-ES.

4. Discussion and Recommendations

Both populations of teachers in training have a high self-efficacy in the analyzed variables. The UNA-CR population of teachers in training has high self-efficacy in getting ahead with difficult situations, correctly doing extra-class tasks and exercises proposed in their training even when they are difficult, learning with little support at home, paying attention to the teachers' explanations and instructions and following the established rules. In the UGR-ES population these latter variables also stand out, a high self-efficacy is observed in following the established rules, paying attention to the teachers' explanations and following their instructions. In both populations a good self-efficacy is perceived in these variables, it is recommended to extend the study in order to determine the causes

of these good results. In this sense, recent research recommends encouraging the development of self-efficacy as an important element in teacher training [41–47].

On the other hand, in both populations it is observed that the lowest results of self-efficacy are in preventing behavioral problems, controlling the disruptive behavior of classmates and motivating oneself when classes are uninteresting. In both populations, the statistical tests indicate the existence of groups not achieving self-efficacy in these variables. In this sense, it is recommended to expand the study of these variables, clearly identify the sectors of the populations not achieving self-efficacy in these capacities and develop strategies to improve the self-efficacy of the teachers in training. Some research offers ideas about the variables that influence self-efficacy and open the possibility of putting into practice strategies for their development in teachers [48–57].

The UNA-CR population shows greater self-efficacy in getting ahead with the difficult situations, learning with little support at home, doing extra-class tasks, controlling disruptive behavior of classmates and preventing behavioral problems, remembering what has been learnt in past lessons and staying motivated when classes are uninteresting. Because these variables refer to important capacities for teachers in training, it is recommended to continue with comparative research to deepen the study of population differences regarding these variables.

It has been proven in the study that the degree program of the teacher in training is a factor influencing self-efficacy in preventing behavioral problems, achieving working with classmates and following the instructions of teachers correctly, in both populations. However, in the UNA-CR population, it also influences the students' confidence in their capacity to keep working on tasks when they are difficult, to overcome the adverse influences of society in learning and to do extra-class tasks.

In the UGR-ES case, the level reached in the degree program affects the self-perceived ability of the population teachers in training to do the exercises correctly, to remember what has been learnt in past lessons and to overcome the adverse influences of society in learning. For this population, doing the exercises correctly is also influenced by having studied at a different university, having completed another degree program, and having obtained the maximum university graduation. These last factors also affect self-efficacy in doing the extra-class tasks and paying attention to the teachers' explanations, in the UGR-ES population. It is recommended to conduct comparative research between degree programs and levels to deepen the understanding of the self-efficacy of teachers in training. In general, it is recommended to take into account all the factors with an impact on the self-efficacy of teachers in training in future studies, this will help to identify causes and formulate improvement proposals. For example, it could deepen the understanding of why and how the availability of a laptop to access the Internet influences ($ES = 0.135$) the self-efficacy to work with classmates. Research on the subject points out the importance of a positive self-efficacy for the adequate professional performance of a teacher [58–64].

Both teacher populations demonstrate that the self-efficacy to get ahead with the most difficult situations and the self-efficacy to do the exercises correctly are strongly related, also self-efficacy to pay attention to the teachers' explanations is strongly related with the self-efficacy to do the exercises correctly, also, the self-perceived ability to control the disruptive behavior of classmates has a strong relationship with the self-perceived ability to prevent behavior problems. Only in the UNA-CR population does the perception of the student's own ability to do extra-class tasks have a strong relationship with the ability to follow established rules. It is recommended to continue with the investigation of these relationships as a way to improve the understanding of the self-efficacy of teachers in training.

5. Conclusions

The conclusions of the present study are the following:

- i. In both populations, high levels of self-efficacy are observed during initial training.
- ii. In both populations, self-efficacy stands out in following established rules, paying attention to the teachers' explanations and following their instructions.


- iii. The UNA-CR population has significantly greater confidence in their ability to get ahead with the most difficult situations, to achieve learning with little support at home, to do extra-class tasks, to control disruptive behavior of classmates, to prevent behavior problems, to remember what has been learnt in past lessons and to motivate oneself when classes are uninteresting.
- iv. The general variables “Degree program” and “Level reached in the degree program” influence the self-efficacy of teachers in training, in this sense, it is recommended to do comparative research between degree programs and levels in them to increase the understanding of this subject. In both university populations, the variable “Degree program” affects the self-perceived ability to prevent behavior problems, successfully work with classmates and follow the instructions of teachers correctly.
- v. In both populations the availability of a laptop to access the Internet affects the ability to work with classmates. It is recommended to deepen the understanding of the influence of this device on the self-efficacy of the teachers in training.
- vi. The self-efficacy to get ahead with the most difficult situations and the self-efficacy to do the exercises correctly are strongly related. Also, the self-efficacy to pay attention to the teachers’ explanations is related with the self-efficacy to do the exercises correctly, and the self-efficacy to control the disruptive behavior of my classmates is related with the self-efficacy to prevent behavioral problems. These are self-efficacy pairs that enhance each other. It is recommended to encourage their development.

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Appendix A



Self-efficacy and self-regulation scale - Students


Identification code: (Career, university where he studies, appearance sequence)
 A* Sex M..... F..... B* Age..... C* University degree currently underway..... D* Level I am in my degree.....
 E* University where I study this career..... F* I have work experience practicing the specialty of this career Yes..... No..... G* Total years of work experience..... H* I have taken other university courses Yes..... No..... I* I have studied at another university Yes..... No..... J* Total years of university studies..... K* Highest university graduation I have ever obtained: None..... Grade..... Lic..... Master..... Doc..... Other..... I have the following devices that allow me to surf the Internet: L* Desktop Computer Yes No..... M* Laptop Yes..... No..... N* Cell Phone Yes No..... O* Tablet Yes..... No..... P* Other device Yes..... No.....

Instructions: Please indicate your level of agreement about each statement by enclosing the appropriate response. There are no right or wrong answers; we are interested in your honest opinion. Your answers will be used only for academic purposes and the publication of results will keep confidentiality.

Keys: 1 = Completely Disagree 2 = Mostly Disagree
 3 = Slightly Disagree 4 = Slightly Agree
 5 = Mostly Agree 6 = Completely Agree

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Q* In the classes I attend, I trust in my ability to:

	Disagree ----> Agreement
1 Get ahead with the most difficult situations	1 2 3 4 5 6
2 Do the exercises correctly	1 2 3 4 5 6
3 Pay attention to the teachers' explanations	1 2 3 4 5 6
4 Follow the instructions of the teachers correctly	1 2 3 4 5 6
5 Achieve learning with little support at home	1 2 3 4 5 6
6 Keep my effort on tasks when they are difficult	1 2 3 4 5 6
7 Successfully work with my classmates	1 2 3 4 5 6
8 Overcome the adverse influences of society in my learning	1 2 3 4 5 6
9 Do my extra-class tasks	1 2 3 4 5 6
10 Control the disruptive behavior of my classmates	1 2 3 4 5 6
11 Prevent behavior problems	1 2 3 4 5 6
12 Follow the established rules	1 2 3 4 5 6
13 Remember what I have learned in past lessons	1 2 3 4 5 6
14 Motivate myself when classes are uninteresting	1 2 3 4 5 6

I can write comments and suggestions on the next page




Figure A1. The questionnaire.

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