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Article

Association among University Students' Motivation, Resilience, Perceived Competence, and Classroom Climate from the Perspective of Self-Determination Theory

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Abstract: Self-determination theory (SDT) suggests that motivation can interact with resilience and perceived competence. The climate-related characteristics of the classroom can influence student motivation. This study aimed to evaluate the associations between the differentiated motivation of theoretical and practical teaching, resilience, and perceived competence, considering the number of students per class and the profiles of the lecturers. A total of 789 students participated (mean age = 19.31; SD = 3.37) from Psychology, Nursing, and Education degrees from different Spanish universities. The BRS (resilience), PCNS (perceived competence), and PLOC-U (university student motivation) questionnaires were used with a new scale designed ad hoc to measure motivation in practical teaching. Student-to-class ratios and different levels of teaching experience were also recorded. A test–retest design was used to verify the stability of the measures before and after the examination of the subjects. Intrinsic motivation in practical teaching was significantly associated with resilience (r = 0.09, $p < 0.03$) and perceived competence (r = 0.23, $p < 0.01$), and in theoretical teaching, it was associated only with perceived competence (r = 20, $p < 0.01$). The factorial analysis of the new subscale of the PLOC-U for the measurement of motivation in practical teaching presented a good fit and reliability ($\alpha = 0.60$ to 0.84) in the five factors. Test–retest analyses revealed good temporal stability. Students in small groups with more experienced lecturers scored higher on intrinsic motivation, particularly in practical classes. The stable and reliable measurement of the different types of student motivation allows their analysis and association with other variables of interest in university education, which could lead to significant improvements in teaching planning.

Keywords: motivation; resilience; competence; PLOC-U; teaching; classroom environment

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1. Introduction

1.1. Self-Determination Theory and High Education

Research linked to Self-Determination Theory (SDT) [1,2] at elementary, secondary, and university levels has shown that motivation is more a continuous gradient than a dichotomous function (extrinsic vs. intrinsic). On this continuum, the aforementioned authors identify different types of motivation: amotivation (absence of motivation), external motivation (external perception of a demand or reward), regulated introjection (regulation by contingent self-esteem), regulated identification (an action is accepted as personally important), integrated regulation (uncommon in adolescents and young students), and intrinsic motivation (the student is motivated because he/she feels competent and acknowledged).

Within the framework of SDT, it is argued that classroom climates that promote students' basic needs (autonomy, competence, and relationships) give rise to more positive results [3].

The Bologna Process (1999) has placed the European Credit Transfer and Accumulation System (ECTS) at the centre of the university system, the axis around which all the organisational activities of teaching revolve. This is particularly true in relation to the distribution of ECTS credits between theoretical and practical classes, which is oriented towards the acquisition of competencies. For this reason, a deeper analysis of the European Higher Education Area (EHEA) is required, taking into account real classroom situations and including an analysis of several factors linked to SDT that have only been explored previously in isolation or outside the field of university education. It is also important to explore the role played by grading at a motivational level [4].

If the aim is to increase the integration of theoretical and practical knowledge that leads students to the highest levels of self-determination [5], it is important to analyse motivation in a differentiated manner (theory vs. practice) using new assessment tools. Practical classes are usually organised around active methodologies, are based on cooperative learning and work teams, and generally have continuous grading systems that differ from the traditional theoretical evaluation format. From the perspective of SDT, this practice has been questioned, suggesting that grades used as 'motivators' are perceived as controlling and serve only to diminish students' autonomy [4]. However, they also argue that when awarded under certain circumstances, grades may have an informative function (feedback), enhancing intrinsic motivation and its internalisation.

The situation described above prompts a recognition of the need to specifically analyse existing types of motivation in the field of practical activities, their continuous assessment, and their potential association with a contingency system [6]. Moreover, the most recent literature suggests that it may be enlightening to verify the role played by academic resilience in practical learning [7–9] and the perception of acquired skills [10,11] within the framework of SDT [1,2].

The dynamic and gradual nature of SDT is reflected in resilience, providing it is considered an adaptive process. In this sense, some authors [7] have reported a significant correlation between motivation and resilience, and other authors [9,12,13,] have confirmed that resilience is associated with good academic performance. Some studies [8,14,15] carried out in the non-university population have found significant associations between resilience, motivation, and academic performance.

SDT [1,2] holds that people need to feel competent. The Bologna Process encourages students to become competent, capable, and skilful in performing professional tasks [16] and, as a result, syllabuses now include processes designed to ensure the acquisition of specific and generic skills through continuous theoretical and practical learning.

Just as autonomous students feel in control of their behaviours and goals, competent students have been associated with good academic results [11,17]. Other authors [10] have also found that among university students, autonomous self-regulation is associated with a greater perception of competence.

1.2. Class Size and Instructor Profile

Several authors [18–22] have highlighted the instructor (teacher or lecturer) as a fundamental element in students' autonomous regulation and perceived competence. In this sense, some authors [23] have reported a direct, positive relationship between the time dedicated by instructors to individual students' needs and increased intrinsic motivation.

Some studies [24–27] have found that in large classes, instructor–student interactions are limited, thereby reducing the modulating effect of instructors' efforts to promote autonomy and competence. Furthermore, some authors [28] have found that, in large groups, the level of intrinsic motivation is considerably reduced, and other authors [29,30] have observed that more active and personalised learning approaches are used more frequently in smaller classes.

However, other studies [20,31] have argued that university faculty teach small groups the same way they teach large groups. Some authors [32] have addressed this issue in a large sample by considering instructors' years of general teaching experience and the length of time they have been teaching their specific subject. Additionally, in a large sample, it has also been found that class size negatively affects grades across a wide variety of class sizes, courses, and departments [33]. However, it is important to note that none of these studies has examined the association between motivation, class size, and instructor profile in terms of SDT.

The main aim of the present study is to examine the associations between motivation, resilience, and perceived competence, as well as class size and instructor profile, within the framework of SDT. Specifically, three research questions were posed:

Hypothesis 1 (H1). Are intrinsic motivation, resilience, and perceived competence really associated with each other? In line with some authors [7], we hypothesise that resilience, perceived competence, and intrinsic motivation are positively correlated.

Hypothesis 2 (H2). From the perspective of SDT, is it important to differentiate between theoretical and practical learning when analysing intrinsic motivation, resilience, and perceived competence? In line with previous research with the framework of SDT [1,2,16], we hypothesise that motivation in practical learning correlates more closely with resilience and perceived competence than motivation in theoretical learning.

Hypothesis 3a (H3a). Do the scores for motivation, resilience, and perceived competence differ in accordance with class size and instructor profile (general teaching experience and experience teaching their specific subject).

Hypothesis 3b (H3b). In line with previous research [24,28], we hypothesise that intrinsic motivation, resilience, and perceived competence are all lower in larger classes. In line with some authors [32], we also expect that instructors with more experience in teaching their subject can foster a higher level of intrinsic motivation among students.

Hypothesis 3c (H3c). Regarding instructors and their association with resilience and perceived competence, although no clear findings have been reported, it seems reasonable to hypothesise that instructors with more experience teaching their subject can produce higher levels of these variables among their students.

Hypothesis 3d (H3d). Although this question has not explicitly been addressed within the SDT framework, instructors' years of general teaching experience may also be related to these variables. We, therefore, expect the students of less-experienced (new) instructors to score lower for intrinsic motivation, resilience, and perceived competence than students of semi-experienced or more experienced instructors.

In addition, the present study also presents a new subscale of the PLOC-U [6] that was used to assess students' motivation in practical classes.

2. Materials and Methods

2.1. Participants

A total of 789 students at the University of the <..........> and the University of _________ took part in the study (136 male and 653 female, respectively, making up 17.2% and 82.8% of the sample).

Of these, 409 (51.8%) were psychology students, 294 (37.3%) nursing students, and 86 (10.9%) education students. Participants were aged between 17 and 55 years (M = 19.31; SD = 3.37) and the study was performed over four academic years with four different cohorts of students. A total of seven lecturers teaching three courses (Psychology, Nursing, and Education) took part in the study. The cohort of students in Education was gender-balanced to examine possible gender differences. This cohort had the same teacher. They did not participate in the second part of the study. Concerning this second part, which aimed to test H3, two subjects were analysed. Here, six lecturers participated: three teaching the same Psychology subject and three teaching the same Nursing subject.

The G*Power program (see 3.1.9.6, Fanz Paul: Kiel, Germany) was used to calculate the minimum sample size required in light of the study design and the use of Student's t-tests ($n = 2$ groups, pre-test vs. post-test), with a medium effect size (0.50 to 0.79), a confidence level set to 95%, and power = 0.9. The results indicated that the minimum sample size required per academic year was 134 students. A non-probabilistic convenience sampling method was used and the inclusion criteria were students enrolled in the course for the first time who regularly attended both theoretical and practical classes and participated in the practical exercises.

Concerning the design of the second study that aimed to verify Hypothesis 3a, 3b, 3c and 3d, in this case, the G*Power program was used to calculate the ANOVA *F*-test ($n = 3$ groups, small, medium, and large class size), with a medium effect size (0.50 to 0.79), a confidence level set to 95%, and power = 0.9. The minimum sample size required per academic year was 107 students for a critical $F = 1.92$.

2.2. Instruments

The Perceived Locus of Causality Scale (PLOC-U) was adapted for the university context [6]. The Spanish version of the model [34] has previously been used in the sporting field. In the present study, the final version of the PLOC-U (see Appendix A) was used. This version comprises 20 items that assess motivation in academic theory classes, along with 20 new items that measure motivation in practical classes. Responses to all 40 items were given on a 6-point Likert-type scale (1 = Completely disagree to 6 = Completely agree). This type of scale was chosen deliberately to avoid centrality bias. Moreover, if the students responding are familiar with the topic (for example, if they are asked to assess their academic motivation both before and after taking their examinations), an ambivalent or neutral response option may not be required, particularly in an agreement scale. Indeed, some authors argue that clarity may be compromised when a dichotomous scale (agree vs. disagree) becomes longer [35].

The Brief Resilience Scale (BRS) is a specific resilience scale [36] comprising 6 items with a 5-point Likert-type response format (1 = Totally agree to 5 = Totally disagree). Items 1, 4, and 6 were reversed. The Spanish version of the scale [37,38] was used for the present study, with a Cronbach's alpha of 0.83.

The Perceived Competence for Students Scale (PCNS). This scale was designed to measure perceived competence among students [38]. It comprises 10 items rated on a 5-point Likert-type response scale (1 = Not at all competent to 5 = Totally competent). The PCNS scale can be administered to students from different scientific disciplines in accordance with their specific competencies. The scale has a Cronbach's alpha of 0.81.

Variables Linked to Class Climate:

Class size was measured as a nonlinear continuous variable and was re-categorised based on the following university-level distribution scheme commonly used in Spain:

- Small: 1 to 15 students
- Medium: 16 to 25 students
- Large: 26 to 60 or more students

The variable 'instructor's years of general teaching experience' was divided into four categories based on previous research [32]:

- New instructor (NEI): 0 to 3 years' experience
- Semi-experienced instructor (SEI): 4 to 6 years' experience
- Experienced instructor (EI): 7 to 9 years' experience
- Master instructor (MI): 10+ years' experience

The variable 'number of times instructors had taught their subject' was divided into three categories, also based on previous research [32]:

- Low repeat: 1–4 years
- Medium repeat: 5–9 years
- High repeat: >9 years

2.3. Procedure

An additional supplementary item not included in the PLOC-U was added for the test stage: 'Please indicate what grade you expect to obtain in your theoretical exam'. The aim was to determine students' expectations regarding their impending exams (expected grade scale: 0–0.5–1–1.5 … up to 10). This item was included again in the retest phase; however, this time, the focus of the question was the actual grade obtained by the respondents. In accordance with the test–retest method, 560 students completed the PLOC-U twice, with the retest taking place 4 weeks after the test period.

Temporal stability was assessed in all cohorts, with the test phase being carried out two weeks before the exam period and the retest phase two weeks after the exam period.

In relation to the second part of the study on class climate, we selected lecturers who had taught classes of the same size using the same syllabuses as their fellow faculty across all four years studied. Neither the design of the syllabuses nor the distribution of theoretical and practical classes changed over the four years under study. The University regulation that governs the maximum number of students admitted per academic year (numerus clausus) was not changed and the enrolment rate across all four years was 100%. The dropout rate was less than 2.5%, meaning that the number of students enrolled each year and the size of the various classes remained stable across the entire study period.

2.4. Data Analyses

Data analyses were performed using SPSS 21.0 and AMOS 21.0. Exploratory and confirmatory factor analyses were carried out to determine the factor structure of the practical learning scale and Cronbach's alpha indices were used to measure internal consistency and reliability.

Descriptive statistics were used to determine participants' scores on the PLOC-U. Correlations between factors were analysed using correlation analyses. Student's t-test and correlation analyses were performed to assess temporal stability, gender differences, and discrepancies between the expected and actual exam results (for the latter, only the Student's t-test was used). Finally, differential analyses (ANOVAs) were performed to compare the means for motivation, resilience, and perceived competence in accordance with class size and instructor profile.

2.5. Ethical Considerations

Students' participation was both voluntary and anonymous. All questionnaires were completed on paper in pencil during class time. All the students provided their written informed consent. The study was approved by the Human Experiment Ethics Committees at the Universities of the < > (CEISH nr. M10-2019-158) and < > (UA-2020-09-02) within the framework of a broader research programme.

3. Results

3.1. Confirmatory Factor Analysis and Reliability

An EFA was performed on the theoretical learning subscale during the preliminary validation. An exploratory factor analysis (EFA) with varimax rotation was carried out on a subsample (n = 408) to test the structure of the new practical PLOC-U subscale. The appropriateness of the data set for EFA was confirmed using the Kaiser–Meyer–Olkin (KMO) criterion of sampling adequacy (KMO = 0.88). Five factors emerged with eigenvalues > 1, which together explained 60.6% of the total variance observed. The factor loadings were between 0.37 and 0.93 (cutoff value higher than 0.3).

Next, a confirmatory factor analysis (CFA) was carried out on a different subsample (n = 381) to test the goodness of fit of both PLOC-U subscales with a five-factor structure similar to that of the PLOC (20 items). The goodness of fit of the PLOC-U questionnaire was assessed using the following indicators: (a) the ratio between chi squared and degrees of freedom (χ^2/df); (b) the Comparative Fit Index (CFI); (c) the Incremental Fit Index (IFI); and (d) the Root Mean Square of Approximation (RMSEA).

Some authors [39] consider CFI and IFI values above 0.90 to be acceptable and according to some authors [40], values between 0.05 and 0.10 are acceptable for the RMSEA. For the theoretical learning subscale, the following CFA values were obtained (n = 789): χ^2 (160) = 786.66, $p < 0.001$; χ^2/df = 4.917; CFI = 0.91; IFI = 0.90; and RMSEA = 0.07. All items had saturations over 0.30. For the practical learning subscale, the following CFA values were obtained (n= 381): χ^2 (160) = 486.10, $p < 0.001$; χ^2/df = 0.04; CFI = 0.90; IFI = 0.90; and RMSEA = 0.07. All items had saturations over 0.30.

The practical PLOC-U learning subscale had coefficients of α = 0.62 for intrinsic motivation, α = 0.80 for regulated introjection, α = 0.61 for regulated identification, α = 0.60 for amotivation, and α = 0.81 for external motivation. The BRS and PCNS were found to have acceptable reliability values: α = 0.75 and α = 0.76, respectively [41].

3.2. Descriptive Analyses and Correlations

In the test phase (see Table 1), the 789 participants scored highest for regulated identification (M = 4.43; SD = 0.97 and M = 4.57; SD = 0.96, respectively, for the theoretical and practical learning subscales) and lowest for amotivation (M = 2.37; SD = *0.90* and M = 2.28; SD = 1.02, respectively, for the theoretical and practical learning subscales).

The mean score for all five factors of the PLOC-U questionnaire was used to calculate the self-determination index (SDI). The following formula, which was proposed by previous research [42], was used: [(2 × intrinsic motivation + regulated identification) − (regulated introjection + external motivation)]/[2 + (2 × amotivation)]. The scores for the practical and theoretical SDI indices were M = 85.42; SD = 0.70 and M = 85.45; SD = 0.77, respectively.

The scores for resilience and perceived competence in the test phase were M = 3.21; SD = 0.53 and M = 3.29; SD = 0.53, respectively. The K-S test revealed a normal distribution ($p > 0.05$) in all four academic years. The skewness values for all variables (Sk = −0.527 to 0.628) were less than 3 and the kurtosis values (k = −0.536 to 0.493) were less than 8, confirming good symmetry and normality [43].

The correlational analysis for the new practical PLOC-U scale (see Table 2) revealed positive correlations between the factors closest to intrinsic motivation, which were also found to correlate negatively with the factors closest to amotivation and external motivation, thereby indicating that similar to the theoretical subscale, the new subscale (practical learning) has good construct validity.

Perceived competence correlated significantly with resilience (r = 0.17, $p < 0.01$) and both were associated with motivation in practical learning, following a positive pattern in relation to intrinsic motivation (r = 0.09, $p < 0.03$; r = 0.23, $p < 0.01$, respectively). This correlation was also found in relation to theoretical learning, although in this case, only the association between intrinsic motivation and perceived competence was statistically significant (r = 0.20, $p < 0.01$), partially confirming Hypothesis 1.

Regarding Hypothesis 2, resilience and perceived competence correlated somewhat more strongly with motivation in practical learning than in theoretical learning. In practical learning, resilience was found to correlate significantly and negatively with external motivation and amotivation (r = −0.12, $p < 0.01$; r = −0.13, $p < 0.01$, respectively), as was perceived competence (r = −0.11, $p < 0.01$; r = −0.20, $p < 0.01$, respectively). In contrast, in relation to theoretical learning, no significant correlations were observed for resilience and those observed for perceived competence were weaker than those in the case of practical learning, thus confirming Hypothesis 2.

Table 1. Test–retest differences in the PLOC-U scales ($n = 560$).

	Test		Retest				
Scales	**Mean (SD)**		**Mean (SD)**		***T***	***Dz Cohen***	***r***
PLOC-U (theoretical learning)							
Intrinsic Motivation	3.73	(1.06)	3.60	(1.08)	3.418 **	0.14	0.81 **
Regulated Identification	4.43	(0.97)	4.26	(1.04)	4.952 **	0.21	0.77 *
Regulated Introjection	4.04	(0.95)	4.07	(0.90)	0.739	-----	0.59 **
External Motivation	3.25	(0.96)	3.29	(0.93)	1.440	-----	0.57 **
Amotivation	2.37	(1.05)	2.53	(1.13)	−3.506 **	0.15	0.74 **
PLOC-U (practical learning)							
Intrinsic Motivation	4.11	(0.97)	3.94	(1.05)	3.761 **	0.16	0.71 **
Regulated Identification	4.57	(0.96)	4.34	(1.07)	4.851 **	0.20	0.70 **
Regulated Introjection	4.36	(0.84)	4.31	(0.86)	2.557 **	0.11	0.56 **
External Motivation	3.95	(0.87)	4.01	(0.85)	−1.053	----	0.50 **
Amotivation	2.28	(1.02)	2.51	(1.20)	−5.724 **	0.24	0.64 **

* $p < 0.05$ ** $p < 0.01$.

Table 2. Correlation coefficients among the scores on the PLOC-U (theoretical and practical learning), BRS, and PCNS in the test phase ($n = 789$).

	1	**2**	**3**	**4**	**5**	**6**	**7**
Scales							
PLOC-U (theoretical learning)							
1. Intrinsic Motivation	---						
2. Regulated Identification	0.793 **	---					
3. Regulated Introjection	0.163 *	0.279 **	---				
4. External Motivation	−0.164 *	−0.079 *	0.520 **	---			
5. Amotivation	−0.613	−0.626	−0.140	0.227 **	---		
6. BRS	**	**	**	−0.049	−0.058	---	
7. PCNS.	0.021	0.041	−0.063	−0.076 *	−0.159 **	.166 **	---
	0.197 **	0.130 **	0.040				
PLOC-U (practical learning)							
1. Intrinsic Motivation	---						
2. Regulated Identification	0.798 **	---					
3. Regulated Introjection	0.117 **	0.209 **	---				
4. External Motivation	−0.299	−0.257	0.433 **	---			
5. Amotivation	**	**	−0.062	0.360 **	---		
6. BRS	−0.604	−0.681	−0.062	−0.120 **	−0.127 **	---	
7. PCNS	**	**	0.039	0.109 **	−0.195 **	0.166 **	---
	0.092 *	0.063					
	0.229 **	0.208 *					

** $p < 0.01$; * $p < 0.05$.

3.3. Temporal Stability and Gender Differences

A total of 560 out of the original 789 participants (71%) repeated the procedure in the retest phase. The Student's t-test revealed test–retest differences in several factors of the PLOC-U subscales (see Table 1), although *Dz Cohen* indicator indicated only a small effect size (0.14 to 0.24).

When retested after four weeks, participants scored highest for the regulated identification factor and lowest for the amotivation factor of theoretical learning (see Table 1). In relation to practical learning during the retest phase, the scores for external motivation were slightly higher than for intrinsic motivation, although the difference was not significant.

For the retest phase, we recalculated the self-determination index (SDI) [42]. When the test phase theoretical learning SDI (M = 85.45; SD = 0.77) and the retest phase theoretical learning SDI (M = 76.91; SD = 0.78) were compared, the resulting correlation was observed to be positive and statistically significant (r = 0.84, p < 0.01). In relation to the practical learning SDI, when the test phase values (M = 85.42; SD = 0.74) were compared with the retest ones (M = 74.70; SD = 0.77), the correlation observed was again positive and statistically significant (r = 0.78, p < 0.01). The correlations between the mean scores for each factor of the two PLOC-U subscales in the test and retest phases were positive and statistically significant, with values between 0.50 and 0.81 (see Table 1).

We used a subsample of 86 students from the Education degree course (42 men and 44 women, respectively, making up 49% and 51% of the subsample) to test the differences between men and women in the PLOC-U subscales. The Student's t-tests revealed no differences in relation to theoretical learning. In practical learning, however, women scored higher (t (84) = 2.601, p < 0.01) than men for regulated introjection (M = 5.66; SD = 0.56 and M = 5.26; SD = 0.86, respectively) and lower (t(84) = −2.296, p < 0.02) than men for amotivation (M = 1.21; SD= 0.56 and M = 1.57; SD= 0.86, respectively). In both cases, the effect size was small (*Dz Cohen* = 0.28 and *Dz Cohen*= 0.25, respectively).

The results of the reliability analysis carried out on the PLOC-U theoretical learning subscale during the retest phase were as follows: coefficients of α = 0.88 for intrinsic motivation, α = 0.70 for regulated introjection, α = 0.87 for regulated identification, α = 0.84 for amotivation, and α = 0.64 for external motivation. The practical PLOC-U learning subscale had coefficients of α = 0.81 for intrinsic motivation, α = 0.68 for regulated introjection, α= 0.89 for regulated identification, α = 0.87 for amotivation, and α = 0.62 for external motivation.

3.4. Comparative Analysis of Intrinsic Motivation and External Motivation

In the theoretical learning PLOC-U subscale, the correlational analysis again revealed positive associations during the retest phase between the factors closest to intrinsic motivation such as regulated introjection and regulated identification (r = 0.27, p < 0.001 and r = 0.83, p < 0.001, respectively). Intrinsic motivation was negatively associated with the factors closest to amotivation and external motivation (r = −0.70, p < 0.001 and r = −0.09, p < 0.03, respectively). Identical associations of similar significance were found in relation to the practical learning subscale of the PLOC-U, with intrinsic motivation correlating positively with regulated identification and regulated introjection (r = 84, p < 0.001 and r = 0.14, p < 0.001, respectively) and negatively with external motivation and amotivation r = −0.30, p < 0.001 and r = −0.67, p < 0.001, respectively).

The five factors of the two PLOC-U subscales (see Table 1) were found to follow the same mean score pattern in the retest phase as in the test phase, with the exception of external motivation in the practical learning subscale. Once again, the mean scores indicate a progressive drop in the continuum of the PLOC-U subscales at the end closest to amotivation and external motivation.

When we compared the scores for external motivation on the theoretical and practical learning PLOC-U subscales during the test phase (M = 3.25; SD = 0.96 and M = 3.95; SD =

0.87, respectively), we found a statistically significant difference (*t* (767) = −19.609, $p <$ 0.001, *Dz Cohen* = 0.71). We found similar differences during the retest phase ((*M* = 3.29; *SD* = 0.93 and *M* = 4.01; *SD = 0.85*, respectively) and (*t* (559) = −18.100, $p < 0.001$, *Dz Cohen* = 0.76). The effect size was medium to large in both cases.

3.5. Analysis of Expectations Regarding Exam Results

In relation to participants' (*n* = 789) expectations regarding their exam results in the academic aspect of the subject, only 9.9% of respondents said they expected to obtain a grade of 5 or less out of 10. Once the exam results had been published (*n* = 560), it was found that 10.1% had obtained a grade of less than 5 out of 10.

We next analysed the differences between the expected exam results and the final grades obtained. A Wilcoxon signed rank test revealed no significant differences (*Z*= −1.57; n.s.) between the intrasubject means (*M* = 7.23; *SD* = 1.32 vs. *M* = 7.39; *SD* = 1.50, respectively).

3.6. Differential Analysis of Motivation, Resilience, and Perceived Competence by Class Size and Instructor Profile

For the analysis in terms of class size, ANOVA was performed using the three types of classes described in Section 2. The number of students in each type of class remained stable across the four academic years.

As shown in Table 3, the intrinsic motivation scores were higher in small classes than in medium and large classes, with the difference being statistically significant. In the case of extrinsic motivation, the opposite was found, with scores being higher in large classes than in medium and small ones, with the difference again being statistically significant.

No differences were found in the resilience scores across the three types of classes. In small classes, the perceived competence scores (*M* = 3.43; *SD* = 0.53) were higher (*F* (765,2) = 3.88, $p <.05$, respectively) than in large classes (*M* = 3.24; *SD* = 0.53, respectively), with the difference being statistically significant. No differences were found in relation to medium classes. These results partially confirm Hypothesis 3a.

Table 3. Means and descriptive values for the subscales of the PLOC-U. Resilience and perceived competence and mean differences between the three samples (class size).

	1 n= 86		**2 n= 336**		**3 n= 367**			***p***		
SUBSCALES	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**ANOVA**	**1–2**	**1–3**	**2–3**
Intrinsic Motivation (theory)	5.11	(0.58)	3.81	(1.0)	3.34	(0.91)	*F* (765,2) = 129.03	**0.000**	**0.000**	**0.000**
External Motivation (theory)	3.02	(0.94)	3.08	(0.91)	3.44	(0.97)	***	0.823	**0.000**	**0.000**
Intrinsic Motivation (practi-	5.21	(0.72)	4.24	(0.81)	3.72	(0.88)	*F* (765,2) = 14.98	**0.000**	**0.000**	**0.000**
cal)	3.52	(0.73)	3.88	(0.89)	4.11	(0.85)	***	**0.001**	**0.000**	**0.002**
External Motivation (practi-	3.27	(0.44)	3.17	(0.56)	3.22	(0.53)	*F* (765,2) = 112.36	0.236	0.697	0.392
cal)	3.43	(0.53)	3.29	(0.53)	3.24	(0.53)	***	0.084	**0.015**	0.595
Resilience							*F* (765,2) = 18.24 **			
Perceived competence							*F* (765,2) = 1.64 n.s.			
							F (765,2) = 3.88 *			

1 = small class size 1 to 15 students; 2 = medium class size 16 to 25 students; 3 = large class size 26 to 60 or more students. Statistically significant differences between the three samples according to the ANOVA and Tukey's post hoc tests are shown in bold. Levene's test was not significant in any of the means. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

For the analysis in terms of instructor profile (general teaching experience and experience teaching their specific subject), ANOVA was performed using the profiles described in Section 2. Instructors remained with the same groups throughout the four-year period analysed.

In both Psychology and Nursing, students whose instructors had taught their subjects for a longer time (see Table 4) scored higher for intrinsic motivation (in relation to both theoretical and practical classes) than those students whose instructors had taught their subjects for a shorter time. The scores for external motivation (theoretical and practical classes) were lower among students whose instructors had taught their subjects for a longer time, although the differences were only statistically significant in the case of the Psychology students (F (403,2) = 3.29, p <. 05) in relation to practical classes. These results confirm Hypothesis 3b.

Since Education had only one instructor (with 5–9 years' experience), no analysis of this subject was conducted.

Statistically significant differences were observed in relation to resilience and perceived competence according to the number of years instructors had taught their subjects, although the results were somewhat confusing (see Table 4), with the nature of the differences varying with the subject (Psychology vs. Nursing). These results partially confirm Hypothesis 3c.

Finally, students whose instructors had less teaching experience scored lower for intrinsic motivation (M_{NI} = 3.43; SD = 1.01) than students whose instructors had more teaching experience: intrinsic motivation (M_{SEI} = 3.76; SD = 1.27; M_{EI} = 4.20; SD = 0.85 and M_{MI} = 3.55; SD = 0.87). However, although the results of the ANOVA were statistically significant (F (767,3) = 15.266; p < 0.001), Tukey's HSD post hoc test revealed no statistically significant differences between the four types of instructors. No differences were observed in relation to the rest of the variables studied. These results fail to confirm Hypothesis 3d.

Table 4. Means and descriptive values for the subscales of the PLOC-U, resilience and perceived competence, and mean differences (number of times the instructor had taught their subject).

Psychology Instructors	1 n = 48		2 n = 79		3 n = 279			p		
Subscales	Mean	(SD)	Mean	(SD)	Mean	(SD)	ANOVA	1–2	1–3	2–3
Intrinsic Motivation (theory)	3.10	(0.72)	2.85	(0.98)	3.55	(0.87)	F (403,2) = 22.64 ***	0.253	0.**003**	**0.000**
External Motivation (theory)	3.21	(1.0)	3.25	(0.97)	3.53	(0.95)	F (403,2) = 3.92 *	0.968	0.094	0.070
Intrinsic Motivation (practical)	3.36	(0.75)	3.52	(1.1)	3.88	(0.84)	F (403,2) = 10.83 **	0.581	**0.003**	**0.003**
	4.33	(0.80)	4.16	(0.96)	4.02	(0.82)	F (403,2) = 3.29 *	0.513	**0.045**	0.370
External Motivation (practical)	3.01	(0.49)	3.26	(0.62)	3.27	(0.52)	F (403,2) = 4.86 ***	0.**032**	**0.006**	0.985
Resilience	3.11	(0.51)	3.39	(0.56)	3.24	(0.51)	F (403,2) = 4.97 ***	0.**007**	0.232	**0.049**
Perceived competence										

Nursing Instructors	4 n = 92		5 n = 39		6 n = 145			p		
Subscales	Mean	(SD)	Mean	(SD)	Mean	(SD)	ANOVA	4–5	4–6	5–6
Intrinsic Motivation (theory)	3.30	(0.92)	3.83	(1.2)	4.20	(0.86)	F (273,2) = 26.55 ***	**0.008**	**0.000**	0.076
External Motivation (theory)	3.11	(0.93)	3.19	(1.0)	2.97	(0.85)	F (273,2) = 1.07 n.s	0.888	0.449	0.384
Intrinsic Motivation (practical)	4.08	(0.74)	4.37	(1.1)	4.39	(0.77)	F (273,2) = 4.19 **	0.150	**0.015**	0.996
	4.04	(0.89)	3.79	(0.97)	3.82	(0.89)	F (273,2) = 2.07 n.s	0.285	0.148	0.974
External Motivation (practical)	3.18	(0.45)	3.35	(0.52)	3.06	(0.60)	F (273,2) = 4.71 **	0.262	0.200	**0.010**
Resilience	3.09	(0.46)	3.42	(0.71)	3.38	(0.49)	F (273,2) = 10.29 ***	**0.003**	**0.000**	0.936
Perceived competence										

Instructors: 1 = Psychology$_1$ 1–4 years, 2 = Psychology$_2$ 1–4 years, 3 = Psychology$_3$ >9 years; 4 = Nursing$_1$ 1–4 years, 5 = Nursing$_2$ 1–4 years, 6 = Nursing$_6$ 5–9 years. Statistically significant differences between the three samples according to the ANOVA and Tukey's post hoc tests are shown in bold. Levene's test was not significant in any of the means. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

4. Discussion

As with the PLOC-U scale for the theoretical classes, five well-differentiated factors were found to emerge from the 20 items included in the PLOC-U scale for the practical sessions. This five-factor structure was also identified in the original PLOC test [44], other PLOC validations in different languages and samples, [32,45,46], and the validation of the PLOC-R in its different adaptations [47,48] or similar instruments [49].

As in other PLOC and PLOC-R validations [6,34,45–48], all factors were found to have acceptable reliability indices. These findings suggest that the PLOC-U has good internal consistency.

As expected, the factors measuring or close to intrinsic motivation correlated positively with each other, as did those measuring or close to external motivation, whereas the association between the factors close to intrinsic motivation and those close to external motivation was negative. A similar correlation pattern was observed in the original version of the PLOC scale [44], the preliminary validations of both the PLOC and the PLOC-U [6,34], and other PLOC and PLOC-R validations [45–48] or the SIMS Scale [49]. This correlation pattern denotes the good construct validity of both the theoretical and practical PLOC-U scales.

The fact that the factor scores revealed a correlation between both time points suggests that the instrument has good test–retest reliability, similar to the temporal stability reported by other PLOC validations [34,47]. Concerning the changes in motivation after 4 weeks, the scores for all factors were very similar in both the test and retest phases, although those linked to intrinsic motivation were lower at retest, whereas those close to extrinsic motivation were higher. These changes were expected since the retest phase began two weeks after the end of the exam period when the most intrinsic aspect of students' motivation may have diminished. Although expected, the decreases in the intrinsic motivation scores after the exam grades were published suggest that, although useful, grades may only be temporary motivators. Beyond this, it is difficult to determine whether, in this case, the grades acted as intrinsic motivation boosters or affected students negatively, as discussed by some authors [4]. Additionally, in contrast with other studies [49], which found women to be more intrinsically motivated than men, no significant gender differences were found in the balanced subsample.

Regarding resilience and perceived competence, these two variables correlated positively with intrinsic motivation and the factors close to intrinsic motivation, and negatively with external motivation and amotivation on the practical scale. This correlation pattern was also partially observed on the theoretical scale, although in this case, no association was found between resilience and the PLOC-U factors. These results support our first hypothesis, indicating the existence of a relationship between motivation, resilience, and perceived competence, as suggested by SDT [7].

The results also support our second hypothesis and are consistent with those reported in previous research in the field of SDT [1,2,6], which suggests that motivation may correlate more closely with resilience and perceived competence in practical learning than in theoretical learning.

We found that intrinsic motivation was higher in small classes than in medium and large classes, whereas the extrinsic motivation scores were higher in large classes than in medium and small ones. Supporting our third hypothesis, and consistent with the results presented here, some studies have reported that motivation and performance levels tend to be higher in smaller classes than in larger ones [23,33]. Indeed, a large group size seems to reduce not only motivation but also self-efficacy and task mastery among students [28].

Nevertheless, recent studies have suggested that the influence of class size on students' performance depends on other variables such as students' gender or race [32]. This variability may explain the inconsistent results obtained in relation to resilience and perceived competence, which only partially support Hypothesis 3a and highlight the need to take relationships between class size and other variables into account when assessing the influence of the former on motivation, resilience, and/or student performance.

The results of the present study suggest that in both Psychology and Nursing, students whose instructors had taught their subjects for longer periods scored higher for intrinsic motivation in both the theoretical and practical subscales. External motivation, however, was lower in practical Psychology classes in which the instructor had more teaching experience. These findings support Hypothesis 3b. However, the same results were not observed for resilience and perceived competence, the scores for which varied depending on the subject, making it impossible to confirm Hypothesis 3c in this case.

When instructors were classified in accordance with their general teaching experience, no significant differences were found in the motivation scores across the four resulting types, failing to confirm Hypothesis 3d. As mentioned earlier, students whose instructors had less teaching experience had lower intrinsic motivation scores. Previous research on the role of the instructor's teaching experience in motivation and other student variables, such as performance, resilience, self-efficacy, and competence, has led to a range of different conclusions [32,50–52]. Although some authors argue that students with more experienced instructors perform better [53], others suggest that it is the instructor's efficacy, rather than experience, that is related to students' motivation, self-efficacy, beliefs, and goals [51]. Furthermore, other studies report that students with both the least and most experienced instructors score lowest for motivation, suggesting that experience plays no definitive role in motivation and may interact with other variables, such as inconsistent instructor behaviour, to affect motivation [50].

Additionally, worth mentioning are the differences observed in the motivation scores between those students whose instructors had taught their subjects for a longer time and those whose instructors had taught their subjects for a shorter time when Psychology and Nursing courses were compared. These differences were particularly pronounced in scores related to external motivation for which differences were observed among Psychology students but not among Nursing students in both theoretical and practical classes. In general, and consistent with the findings of other authors [6,49], the Nursing students in our study had medium to high levels of intrinsic motivation. It seems that the instructor's experience may play a role in explaining the differences observed in extrinsic motivation among students in Psychology and Nursing courses. However, due to the characteristics of the experimental design, we must be cautious in our interpretations.

5. Conclusions

Summing up the findings, it may be important to assess motivation separately in relation to theoretical and practical classes, since this variable, as well as its associations with resilience and perceived competence, seems to behave differently according to the type of teaching provided. Indeed, as argued by SDT, motivation and its interaction with other variables such as resilience or perceived competence, plays a vital role in educational settings [4], meaning that it must be assessed using well-adapted, validated instruments.

One of the limitations of the present study is the convenience sampling method used. Nevertheless, its effect was reduced by the large-scale participation of the students enrolled in the selected subjects, as well as the fact that all members of the selected subjects' teaching teams took part. The longitudinal nature of the design, which covered four academic years, with measurements taken at two time points in each year, enables us to advance our search for the predictors of motivation in higher education. However, the experimental design used precludes the establishment of definitive causal relationships. Moreover, although some of the variables analysed were self-reported, the inclusion of objective variables (academic success, class size, instructor profile) increases the reliability of the interpretations.

Another limitation is that no confounding variables were controlled when assessing the impact of both class size and instructor's experience on students' motivation, resilience, and perceived competence. In this sense, it is important to note that the classroom is a subsystem of the class climate in which students and teachers interact [54,55], yet our study did not analyse the instructor's actions or teaching style [56,57], which may have influenced the results.

As mentioned earlier, sociodemographic variables such as gender or race may affect the relationship between class size, instructor's experience, and motivation, as well as other variables related to the teaching environment such as autonomy support or need-supportive teacher behaviour [4]. Moreover, although our analyses revealed no remarkable gender differences in terms of the scores obtained in the PLOC-U scales, the highly feminised sample used in this study, which is characteristic of both Psychology and Nursing degrees, may have affected the results.

The PLOC-U seems to be a useful instrument for assessing motivation in all its dimensions within the framework of SDT among students in both theoretical and practical classes. This study also helps shed light on the potential role of class size and instructor's experience in motivation, resilience, and perceived competence. Understanding the effects of these two factors in educational settings may be very useful for establishing a more motivating classroom climate and, consequently, improving students' experiences and outcomes at university.

Further research is required with other samples and in other countries to adapt and validate the PLOC-U in different populations. Moreover, future studies should assess the interactions between students and instructors in theoretical and practical learning oriented towards a motivational climate [56], taking into account both class size and instructor's experience.

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Appendix A

PLOC-U questionnaire

<Response Scale> (1 = Completely disagree, 2 = Mainly disagree, 3 = Partly disagree, 4 = Partly agree, 5 = Mainly agree, and 6 = Completely agree)

In general, I attend ***theoretical classes*** *on <subject name>*

Item 1 Because <subject name> is fun.
Item 2 Because I want to learn and acquire an understanding of <science>.
Item 3 To check whether or not I am capable of passing the subject
Item 4 Because I will have problems if I do not.
Item 5 But I do not really know why I do.
Item 6 Because I enjoy learning new things.
Item 7 Because it is important to do well in <subject name>.
Item 8 Because I would feel bad if I did not.
Item 9 Because it is what I am supposed to do.
Item 10 But I do not understand why we have to study <subject name>.
Item 11 Because <subject name> is interesting.
Item 12 Because I want to improve my training as a <profession>.
Item 13 To check whether or not I am on track to pass the subject.
Item 14 So that the professor does not single me out.
Item 15 But I actually think I am wasting my time in <subject name>.
Item 16 Because I find satisfaction in acquiring new knowledge and written-oral skills.
Item 17 Because I learn things which I can then apply in other areas of my life.
Item 18 Because I fret if I do not go.
Item 19 Because I believe the system requires me to go to this class even though attendance is optional.
Item 20 But I do not think I am getting much out of <subject name>.

Theoretical Classes' Subscale:

Intrinsic motivation: items 1, 6, 11, and 16
Regulated identification: items 2, 7, 12, and 17
Regulated introjection: items 3, 8, 13, and 18
External motivation: items 4, 9, 14, and 19
Amotivation: items 5, 10, 15, and 20

In general, I attend ***practical classes*** *on <subject name>*

Item 21 Because, at the end of the day, it's what I learn that really matters, not what grade I get in the continuous practical assessment.

Item 22 Because they help complement my theoretical knowledge.
Item 23 Because I would feel bad if I didn't.
Item 24 Because the practical assessment system gives me the opportunity to obtain up to <...> points out of my final subject grade.
Item 25 But I don't see the benefit of practical classes.
Item 26 Because they help improve my written and oral skills.
Item 27 Because it's important for me to be able to do the practical part of this subject well.
Item 28 Because they help me monitor my progress in the subject, so I get a clearer idea of whether or not I'm likely to pass.
Item 29 Mainly because, the most important thing, more than learning, is getting the points awarded for completing the practical part.
Item 30 But I don't see why <subject name> should have a practical part.
Item 31 Because I enjoy acquiring knowledge that complements the theoretical part of the subject.
Item 32 Because I want to acquire technical and practical skills.
Item 33 Because doing so brings me one step closer to passing the subject.

Item 34 Because it's what I'm supposed to do in this academic context.
Item 35 But I don't really understand the advantage of practical classes.
Item 36 Because practical classes make the subject more interesting.
Item 37 Because they are an important part of my training as a <……>.
Item 38 Because I fret if I do not go.
Item 39 Because if I didn't, I wouldn't get the minimum grade needed to pass.
Item 40 But I don't really know why I do.

Practical Subscale:

Intrinsic motivation: items 21, 26, 31, and 36
Regulated identification: items 22, 27, 32, and 37
Regulated introjection: items 23, 28, 33, and 38
External motivation: items 24, 29, 34, and 39
Amotivation: items 25, 30, 35, and 40.

References

1. Deci, E.L.; Ryan, R.M. The general causality orientations scale: Self-determination in personality. *J. Res. Personal.* **1985**, *19*, 109–134. https://doi.org/10.1016/0092-656690023-6.
2. Ryan, R.M.; Deci, E.L. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* **2000**, *55*, 68–78. https://doi.org/10.1037/0003-066X.55.1.68.
3. Deci, E.L.; Ryan, R.M. Perspectives from Research and Practice using Self-Determination Theory. In *Building Autonomous Learners*; Springer: Singapore, 2016; pp. 9–29. https://doi.org/10.1007/978-981-287-630-0.
4. Ryan, R.M.; Deci, E.L. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemp. Educ. Psychol.* **2020**, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860.
5. Deci, E.L.; Koestner, R.; Ryan, R.M. A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychol. Bull.* **1999**, *125*, 627–668. https://doi.org/10.1037//0033-2909.125.6.627.
6. Sánchez de Miguel, M.; Lizaso, I.; Hermosilla, D.; Alcover, C.M.; Goudas, M.; Arranz-Freijó, E. Preliminary validation of the Perceived Locus of Causality scale for academic motivation in the context of university studies (PLOC-U). *Br. J. Educ. Psychol.* **2017**, *87*, 558–572. https://doi.org/10.1111/bjep.12164.
7. Martin, A.J.; Marsh, H.W. Academic buoyancy: Towards an understanding of students' everyday academic resilience. *J. Sch. Psychol.* **2008**, *46*, 53–83. https://doi.org/10.1016/j.jsp.2007.01.002.
8. Ratioran, S.; Phlainoi, S. Promoting Resilience in Schoolchildren in Urban Slums. *ASR Chiang Mai Univ. J. Soc. Sci. Humanit.* **2014**, *1*, 73–82. https://doi.org/10.12982/cmujasr.2014.0005.
9. Werner, E.E. Protective factors and individual resilience. In *Handbook of Early Childhood Intervention*; Shonkoff, J.P., Meisels, S.J., Eds.; Cambridge University Press: London, UK, 2000; pp. 115–132.
10. Black, A.E.; Deci, E.L. The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Sci. Educ.* **2000**, *84*, 740–756. https://doi.org/10.1002/1098-237X(200011)84:6<740::AID-SCE4>3.0.CO;2-.
11. Connell, J.P.; Wellborn, J.G. Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In *Self Processes and Development*; Gunnar, B.M., Sroufe, L.A., Eds.; Lawrence Erlbaum Associates, Inc.: Hillsdale, NJ, USA, 1991; pp. 43–77.
12. Cicchetti, D. Annual research review: Resilient functioning in maltreated children-Past, present, and future perspectives. *J. Child Psychol. Psychiatry Allied Discip.* **2013**, *54*, 402–422. https://doi.org/10.1111/j.1469-7610.2012.02608.x.
13. Luthar, S.S.; Cicchetti, D.; Becker, B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Dev.* **2000**, *71*, 543–562. https://doi.org/10.1111/1467-8624.00164.
14. Khalaf, M.A. Validity and Reliability of the Academic Resilience Scale in Egyptian Context. *US-China Educ. Rev.* 2014, *4*, 202–210.
15. Kuyper, N. The Influence of Schooling on the Resilient Behaviour and Academic Performance of Poverty-Stricken Adolescents in Gauteng Schools. Doctoral Dissertation, University of South Africa: : Pretoria, South Africa, 2014.
16. Hopia, H.; Liimatainen, L.; Victorovna, N.; Filenkov, A. Nurse Education in Practice Exchanging Expertise, Theory and Practice at Master' s level Healthcare Education between Russia and Finland e Experiences from an Intensive Course in St. Petersburg. *Nurse Educ. Pract.* **2011**, *11*, 14–19. https://doi.org/10.1016/j.nepr.2010.05.009.
17. Grolnick, W.S.; Ryan, R.M.; Deci, E.L. Inner resources for school achievement: Motivational mediators of children's perceptions of their parents. *J. Educ. Psychol.* **1991**, *83*, 508–517. https://doi.org/10.1037/0022-0663.83.4.508.
18. Guay, F.; Boggiano, A.K.; Vallerand, R.J. Autonomy Support, Intrinsic Motivation, and Perceived Competence: Conceptual and Empirical Linkages. *Personal. Soc. Psychol. Bull.* **2001**, *27*, 643–650. https://doi.org/10.1177/0146167201276001.
19. Hardre, P.L.; Reeve, J. A motivational model of rural students' intentions to persist in, versus drop out of, high school. *J. Educ. Psychol.* **2003**, *95*, 347–356. https://doi.org/10.1037/0022-0663.95.2.347.

20. Hattie, J.A. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*; Routledge: London, UK, 2009.
21. Reeve, J.; Jang, H.; Carrell, D.; Jeon, S.; Barch, J. Enhancing Students' Engagement by Increasing Teachers' Autonomy Support. *Motiv. Emot.* **2004**, *28*, 147–169. https://doi.org/10.1023/B:MOEM.0000032312.95499.6f.
22. Su, Y.L.; Reeve, J.; Su, Y.L.; Reeve, J.A. Meta-analysis of the Effectiveness of Intervention Programs Designed to Support Autonomy. *Educ Psychol Rev* **2011**, *23*, 159–188. https://doi.org/10.1007/s10648-010-9142-7.
23. Albornoz, F.; Berlinski, S.; Cabrales, A. Motivation, resources, and the organization of the school system. *J. Eur. Econ. Assoc.* **2018**, *16*, 199–231. https://doi.org/10.1093/jeea/jvx001.
24. Müller, F.H.; Louw, J. Learning environment, motivation and interest: Perspectives on self-determination theory. *South Afr. J. Psychol.* **2004**, *34*, 169–190. https://doi.org/10.1177/008124630403400201.
25. Noels, K.A.; Clément, R.; Pelletier, L.G. Perceptions of teachers' communicative style and students' intrinsic and extrinsic motivation. *Mod. Lang. J.* **1999**, *83*, 23–14.
26. Van Berkel, H.J.M.; Schmidt, H.G. The Role of Lectures in Problem-Based Learning. In Proceedings of the Annual Meeting of the American Educational Research Association, Seattle, WA, USA, 10–14 April 2001.
27. Ward, A.; Jenkins, A. The problems of learning and teaching in large classes. In *Teaching Large Classes in Higher Education: How to Maintain Quality with Reduced Resources*; Gibbs, G., Jenkins, A., Eds.; Routledge: London, UK, 1992; pp. 23–36.
28. Van Blankenstein, F.M.; Saab, N.; Van der Rijst, R.M.; Danel, M.S.; Bakker-van den Berg, A.S.; Van den Broek, P.W. How do self-efficacy beliefs for academic writing and collaboration and intrinsic motivation for academic writing and research develop during an undergraduate research project? *Educ. Stud.* **2019**, *45*, 209–225. https://doi.org/10.1080/03055698.2018.1446326.
29. Lammers, W.J.; Murphy, J J. A Profile of Teaching Techniques Used in the University Classroom: A Descriptive Profile of a US Public University. *Act. Learn. High. Educ.* **2002**, *3*, 54–67. https://doi.org/10.1177/1469787402003001005.
30. Monks, J.; Schmidt, R.M. The Impact of Class Size on Outcomes in Higher Education. *BE J. Econ. Anal. Policy* **2011**, *11*, 1–17. https://doi.org/10.2202/1935-1682.2803.
31. Harfitt, G.J.; Tsui, A.B.M. An examination of class size reduction on teaching and learning processes: A theoretical perspective. *Br. Educ. Res. J.* **2015**, *41*, 845–865. https://doi.org/10.1002/berj.3165.
32. Ake-Little, E.; Von der Embse, N.; Dawson, D. Does Class Size Matter in the University Setting? *Educ. Res.* **2020**, *49*, 595–605. https://doi.org/10.3102/0013189X20933836.
33. Kokkelenberg, E.C.; Dillon, M.; Christy, S.M. The effects of class size on student grades at a public university. *Econ. Educ. Rev.* **2008**, *27*, 221–233. https://doi.org/10.1016/j.econedurev.2006.09.011.
34. Moreno, J.A.; González-Coll, D.; Chillón, M. Preliminary validation in spanish of a scale designed to measure motivation in physical education classes: The perceived locus of causality (PLOC) scale. *Span. J. Psychol.* **2009**, *12*, 327–337. https://doi.org/10.1017/S1138741600001724.
35. Krosnick, J.A.; Presser, S. Question and Questionnaire design. In *Handbook of Survey Research*; Marsden, P.V., Wright, J.D., Eds.; Emerald Group: London, UK, 2010; pp. 263–314.
36. Smith, B.W.; Dalen, J.; Wiggins, K.; Tooley, E.; Christopher, P.; Bernard, J. The brief resilience scale: Assessing the ability to bounce back. *Int. J. Behav. Med.* **2008**, *15*, 194–200. https://doi.org/10.1080/10705500802222972.
37. Rodríguez-Rey, R.; Alonso-Tapia, J.; Hernansaiz-Garrido, H. Research on translations of tests: Reliability and validity of the brief resilience scale (BRS) Spanish version. *Psychol. Assess.* **2016**, *28*, e101–e110. https://doi.org/10.1037/PAS0000191.
38. Orkaizagirre-Gómara, A.; Sánchez De Miguel, M.; Ortiz de Elguea, J.; Ortiz de Elguea, A. Testing general self-efficacy, perceived competence, resilience, and stress among nursing students: An integrator evaluation. *Nurs. Health Sci.* **2020**, *22*, 529–538. https://doi.org/10.1111/nhs.12689.
39. Hu, L.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model. A Multidiscip. J.* **1999**, *6*, 1–55. https://doi.org/10.1080/10705519909540118.
40. Marsh, H.W.; Hau, K.T.; Wen, Z. In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Struct. Equ. Model.* **2004**, *11*, 320–341. https://doi.org/10.1207/s15328007sem1103_2.
41. Nunnally, B.; Bernstein, I.R. *Psychometric Theory*; Oxford University: New York, NY, USA, 1994.
42. Vallerand, R.J.; Rousseau, F.L. Intrinsic and extrinsic motivation in sport and exercise: A review using the hierarchical model of intrinsic and extrinsic motivation. In *Handbook of Sport Psychology*, 2nd ed.; Singer, I.R., Hausenblas, H., Janelle, C., Eds.; John Wiley & Sons: Hoboken, NJ, USA, 2001; Volume 52, pp. 389–416.
43. Kline, R.B. *Principles and Practice of Structural Equation Modelling*; The Gilford Press: New York, NY, USA, 2005.
44. Goudas, M.; Biddle, S.; Fox, K. Perceived locus of causality, goal orientations, and perceived competence in school physical education classes. *Br. J. Educ. Psychol.* **1994**, *64*, 453–463. https://doi.org/10.1111/j.2044-8279.1994.tb01116.x.
45. Wang, C.K.J.; Liu, W.C.; Hagger, M. A cross-cultural validation of perceived locus of causality scale in physical education context. *Res. Q. Exerc. Sport* **2009**, *80*, 313–325. https://doi.org/10.1080/02701367.2009.10599566.
46. Yang, M.; Viladrich, C.; Cruz, J. Measuring motivation in physical education among Chinese and Spanish adolescents: Comparing the psychometric properties of perceived locus of causality scale. *Rev. De Psicol. Del Deporte* **2019**, *28*, 87–96. https://doi.org/https://ddd.uab.cat/record/211117.
47. Ferriz, R.; González-Cutre, D.; Sicilia, A. Revision of the Perceived Locus of Causality Scale (PLOC) to include the measure of integrated regulation in physical education. *Rev. De Psicol. Del Deporte* **2015**, *24*, 329–338.

48. Hutmacher, D.; Eckelt, M.; Bund, A.; Steffgen, G. Lifting the Curtain on Motivation in Exercise: Validation of Two Questionnaires for Physical Education and Leisure Time in French and German. *J. Psychoeduc. Assess.* **2021**, *39*, 623–639. https://doi.org/10.1177/07342829211005571.
49. Sánchez-Bolivar, L.; Escalante-González, S.; Martínez-Martinez, A. Motivation and Social Skills in Nursing Students compared to Physical Education Students. *SPORT TK-EuroAmerican, J. Sport Sci.* **2022**, *11*, 1–16. https://doi.org/10.6018/sportk.462121.
50. Ghafarpour, H.; Moinzadeh, A. A dynamic systems analysis of classrooms: Teacher experience and student motivation. *Learn. Environ. Res.* **2020**, *23*, 101–116. https://doi.org/10.1007/s10984-019-09293-y.
51. Herman, P. Teacher experience and teacher efficacy: Relations to student motivation and achievement. In *Dissertation Abstracts International Section A: Humanities and Social Sciences*; The University of North Carolina at Chapel Hill: Chapel Hill, NC, USA, 2001; Volume 61.
52. Mueller, S. Teacher experience and the class size effect-Experimental evidence. *J. Public Econ.* **2013**, *98*, 44–52. https://doi.org/10.1016/j.jpubeco.2012.12.001.
53. Fetler, M. High school staff characteristics and mathematics test results. *Educ. Policy Anal. Arch.* **1999**, *7*, 1–23. https://doi.org/10.14507/epaa.v7n9.1999.
54. Abelló, D.; Alonso-Tapia, J.; Panadero. E. Classroom Motivational Climate in Higher Education: Validation of a Model for Assessment. *Int. J. Instr.* **2021**, *14*, 685–702. https://doi.org/10.29333/iji.2021.14238a.
55. Anderson, C.S. The search for school climate: A review of the research. *Rev. Educ. Res.* **1982**, *52*, 368–420. https://doi.org/10.3102/00346543052003368.
56. Ames, C. Achievement goals and the classroom motivational climate. In *Student Perceptions in the Classroom*; Schunk, D.H., Meece, J.L., Schunk, D., Meece, J.L., Eds.; Lawrence Erlbaum Associates, Inc.: Hoboken, NJ, USA, 1992; pp. 327–348.
57. Alonso-Tapia, J.; Ruiz, M.A.; Huertas, J.A. Differences in classroom motivational climate: Causes, effects and implications fo teacher education. *Ann. Psychol.* **2020**, *36*, 122–133. https://doi.org/10.6018/analesps.337911.