

Student engagement and creative confidence beliefs in higher education

Paula Álvarez-Huerta ^a, Alexander Muela ^b, Iñaki Larrea ^a

Abstract

The fostering of creativity in higher education has been linked to enhanced professional competences and personal development among students. The main aim of this study was to examine the relationship between student engagement and creative self-concept in undergraduates. The sample comprised 775 students (51.61 % female, 46.32 % male, 2.07 % other) from two Spanish universities, ranging in age from 17 to 43 years ($M = 20.78$, $SD = 2.65$). Students from the first and final year of various degree programs completed the National Survey of Student Engagement and a measure of creative self-concept. Results showed a positive relationship between student engagement and creative self-concept, as well as differences by gender, field of study, and academic year with regard to the dimensions of engagement that contributed most to enhanced creative confidence beliefs. The study highlights the importance of ensuring that students in higher education have the opportunity to participate in collaborative learning, meaningful interactions with faculty, higher-order learning, reflective and integrative learning, and high-impact practices. Higher-order learning and reflective and integrative learning appear to be particularly important in the early stages of a degree program, whereas with senior students, greater emphasis should be placed on reflective and integrative learning and high-impact practices.

1. Introduction

Creativity is acknowledged to be an important element in our ability to deal with contemporary social challenges ([Caballero García et al., 2019](#); [Daly et al., 2016](#)), with researchers specifically considering its role in relation to the socioeconomic repercussions of the global financial crisis of 2008 ([Kümmel and Lindenberger, 2020](#); [Pearson and Sommer, 2011](#)) or the complex problems associated with the current Covid-19 pandemic ([Cohen and Cromwell, 2020](#)). In addition to being important for adapting to novel situations ([Caballero García et al., 2019](#)), creativity also shares a mutually dependent relationship with [academic performance](#) ([Karwowski et al., 2020](#)). Consequently, and as set out in the Europe 2020 Strategic Framework for Education and Training ([European Union, 2014](#)), enhancing creativity and innovation has become a key goal of [educational policy](#) in European countries, with attempts being made to implement this across all levels of education and training. However, despite consensus over the need to cultivate creativity in higher education ([Badger, 2019](#)), there remains considerable room for improvement ([Grigorenko, 2019](#)), leading to calls for further research into the factors that influence the fostering of creativity among undergraduates ([Marquis et al., 2017](#)).

The primary aim of the present study was to examine the relationship between students' creative self-concept and their degree of engagement with the learning context. To the best of our knowledge, it is one of the first studies of this kind to be conducted in the Spanish educational context.

1.1. Creative self-beliefs

Increasing attention has been paid in recent years to the study of creative self-beliefs ([Puente-Díaz et al., 2020](#)), and there is now sufficient evidence of their influence on students' creative development ([Beghetto, 2006](#); [Karwowski and Lebuda, 2018](#); [Royston and Reiter-Palmon, 2019](#)). Creative self-beliefs reflect the degree of confidence that people feel in their ability to act or think creatively ([Karwowski and Beghetto, 2018](#)). While some beliefs of this kind relate to the ability to be creative in specific contexts, a person's creative self-concept ([Karwowski et al., 2019](#)) refers to a more general belief about the capacity to produce creative outcomes ([Beghetto and Karwowski, 2017](#)). Creative self-concept is considered to be a factor in the development of a creative identity, insofar as it influences a person's effort, perseverance, and performance during creative tasks ([Beghetto and Karwowski, 2017](#)).

Research indicates that creative self-beliefs may vary depending on both socio-cognitive factors (achievement goals, emotions) and contextual factors (previous experiences, interactions with peers or faculty) ([Karwowski et al., 2019](#); [Puente-Díaz, 2016](#)). In the higher education context, a small number of studies have examined the influence of contextual factors on students' creative confidence ([Mathisen and Bronnick, 2009](#); [Robbins and Kegley, 2010](#); [Vally et al., 2019](#)). The results of these studies suggest that specific training in creativity has a positive effect on students' creative self-beliefs and that academic institutions have a key role to play in promoting these skills. In recent years, however, attention has also turned to whether students' creative processes can be enhanced through greater engagement with the learning process and educational activities ([Miller and Dumford, 2016](#)).

1.2. Student engagement and self-concept

Engagement is a key factor in students' personal and academic development ([Bakadorova et al., 2020](#)), and various studies have found a positive association between school engagement and academic performance ([Fredricks et al., 2004](#)). Greater engagement has also been linked to lower levels of depression ([Li and Lerner, 2011](#)) and higher life satisfaction ([Lewis et al., 2011](#)). Although various interventions for promoting student engagement in higher education have been described ([Fredricks et al., 2019](#)), it is important to note that engagement is a complex and multifaceted concept, the exact nature of which is subject to debate ([Azevedo, 2015](#); [Kahu, 2013](#); [Payne, 2019](#); [Suri, 2020](#); [Trowler, 2010](#); [Vuori, 2014](#)). It is generally agreed, however, that engagement has behavioral, cognitive, and affective dimensions ([Kahu, 2013](#)).

One of the most widely recognized approaches to engagement derives from the behavioral conceptualization, where it refers to students' exposure to and participation in educational practices associated with high levels of personal and academic development ([McCormick et al., 2013](#)). A possible limitation of this perspective concerns its ability to capture the construct of engagement in all its complexity ([Kahu, 2013](#)), and it has also been suggested that a focus on these aspects might encourage competition between higher education institutions ([Bowden et al., 2019](#)). On the other hand, it has been argued that the behavioral approach to engagement can enhance students' learning and motivation through institutional support ([Zepke, 2018](#)), as well as boosting their confidence in their ability to achieve goals ([Bowden et al., 2019](#)). It also provides a benchmark for the effective management of learning environments in higher education ([Coates and McCormick, 2014](#)).

The National Survey of Student Engagement (NSSE), a project managed by the University of Indiana, is a good example of the behavioral approach to engagement. The NSSE assesses student engagement in relation to approaches to learning, [collaborative learning](#) with peers, interactions with faculty, and the campus environment ([Kuh, 2010](#)), and it is one of the most widely used tools for measuring engagement in higher education. As regards the areas assessed by the NSSE, [Miller and Dumford \(2016\)](#) found a significant relationship between approaches to learning and students' creative [cognitive processes](#). Following a [systematic review](#) of research in the field, [Davies et al. \(2013\)](#) concluded that there is strong evidence that creativity is closely related to opportunities for working collaboratively with peers. A more recent study by [del Moral Pérez et al. \(2018\)](#) supports the idea that a collaborative approach is effective in developing students' creative potential. Research has also found that interactions with faculty characterized by respect and [emotional support](#) can have a positive impact on students' creative development ([Gajda et al., 2017](#); [Grigorenko, 2019](#)).

The NSSE also explores students' participation in what are known as high-impact practices, namely learning communities, service learning, research projects, internships, and study abroad. According to [Kuh \(2008\)](#), these practices are effective because they require dedication on the part of students and oblige them to communicate with both peers and faculty about meaningful topics. They also expose students to diverse ideas and people of different backgrounds, while providing them with regular assessments of their work and allowing them to apply their knowledge both within and beyond the classroom walls ([Kilgo et al., 2015](#)). Research has found that students who participate in one or more of these practices report gains in terms of personal growth and socially responsible leadership ([Kilgo et al., 2015](#)). Some studies have found that a diversity of social ties, which is characteristic of participation in high-impact practices, produces an environment that is favorable to the [development of creativity](#) ([Gong et al., 2019](#)). Similarly, it has been suggested that participation in multicultural [learning experiences](#) can facilitate the creative process ([Maddux et al., 2010](#)).

As regards student engagement and self-beliefs the literature suggests that the two constructs are interlinked ([Majer, 2009](#); [Schunk and Mullen, 2012](#)) and fulfill an important function in relation to students' academic performance ([Olivier et al., 2019](#)). There is evidence that self-beliefs affect motivation and engagement through the setting of goals and self-evaluations of progress ([Schunk and Mullen, 2012](#)), with studies reporting higher levels of engagement among students who score higher on self-efficacy beliefs ([Maricuțoiu and Sulea, 2019](#); [Pajares, 1996](#)). Although the majority of studies have focused on the influence of students' self-beliefs on their level of engagement ([Vera et al., 2014](#)), there appears to be a positive gain spiral between these two variables ([Gist and Mitchell, 1992](#); [Llorens et al., 2007](#); [Schunk and Mullen, 2012](#)). To our knowledge, no studies have explicitly examined the relationship between student engagement and creative confidence beliefs, although some authors have found that behavioral engagement predicted self-efficacy and self-esteem among university students ([Bowden et al., 2019](#)). It has also been reported that certain learning environments are able to increase students' confidence with regard to their competences ([Van Dinther et al., 2010](#)) and creative skills ([Anderson and Haney, 2020](#)).

1.3. The present study

As we have seen throughout the introduction, creativity is one of the key variables influencing an individual's academic and [professional development](#) and performance, and it is therefore important to foster it during higher education. However, and as noted, there is scope for improvement in this respect, and further practical and empirical research is needed to improve our understanding of how different learning environments influence students' creative development ([Marquis et al., 2017](#)). One of the factors that is now considered crucial for students' creative development is the extent to which they engage with learning processes and activities ([Miller and Dumford, 2016](#)). However, few studies have focused specifically on an area of research that is particularly relevant to the creative process, namely creative confidence beliefs.

The main aim of the present study was to examine the relationship between student engagement and creative self-concept in undergraduates. To this end, we applied the NSSE and a measure of creative self-concept to a sample comprising first-year and final-year students from various degree programs. We were particularly interested in identifying the dimensions of engagement that contributed most to the relationship with creative confidence beliefs in students at opposite ends of their degree program. Overall, we expected to find a positive relationship between student engagement and creative self-concept. In relation to academic year, research has found that new undergraduates have less experience of deep approaches to learning ([Baeten et al., 2010](#); [García Martín, 2016](#)), whereas those in their final year usually report more frequent interaction with faculty ([Johnson et al., 2009](#)) and more experience of high-impact practices ([Finley and McNair, 2013](#)). In the two universities where our participants were recruited, the first year of study is characterized by a [collaborative learning](#) approach aimed at enabling students both to acquire broader knowledge and to adapt to higher education. In the final year, greater emphasis is placed on more experiential and specialist learning,

through both the final research project or dissertation and opportunities for internships, service learning, or study abroad. Accordingly, among first-year students, we expected that collaborative learning, reflective and integrative learning, and higher-order learning would be more closely related to creative confidence beliefs because these variables play a greater role in learning processes and activities during the initial stages of university education. In final-year students, by contrast, we expected to observe a greater influence of student-faculty interaction and high-impact practices, as these types of experiences become more central towards the end of a degree program.

Our study had three further objectives. The first was to explore possible [gender differences](#), both in the relationship between student engagement and creative confidence beliefs overall and more specifically by academic year. As no previous research has examined this question in depth, we regard our study as exploratory and do not propose an initial hypothesis. It is important to point out that we consider gender to be a social and cultural construction that cannot be reduced to a binary division between male and female or to biological sex ([Brotman and Moore, 2008](#); [Glasser and Smith, 2008](#)). Accordingly, participants in this study were not limited to the options male or female when asked to indicate their gender. Another objective, which was also exploratory, was to examine the relationship between the level of engagement and students' creative self-concept in relation to the field of study. A final goal was to address the need for research in this field beyond the English-speaking world, and, to the best of our knowledge, our study is one of the first of its kind to be conducted in Spain. Although creativity is considered a key competence within the Spanish university system ([Álvarez-Santullano and De Prada Creo, 2018](#)), research shows that students in our country view creativity as one of the skills that is least fostered during their degree studies ([Gómez et al., 2018](#)), suggesting that faculty are unclear about how best to promote it. The present study may therefore shed light on which aspects of student engagement need to be addressed in order to enhance the creative self-concept of Spanish undergraduates. Finally, our use of internationally recognized tools for gathering data means that our results may be compared with those of similar studies in other countries.

2. Method

2.1. Participants

The sample for this study comprised 775 undergraduates (51.61 % female, 46.32 % male, 2.07 % other) from two universities in Spain (Mondragon Unibertsitatea and Florida Universitaria). They ranged in age from 17 to 43 years ($M = 20.78$, $SD = 2.65$). In Spain, and in accordance with the guidelines of the European Higher Education Area ([European Commission, 2018](#)), degree programs comprise a total of 240 ECTS credits and involve four years of study. Participating students were enrolled in either year 1 ($n = 382$) or year 4 ($n = 393$) of a degree program in a technical field (195) or social sciences (580). Of the 382 first-year students, 289 were enrolled in a social sciences degree and 93 in a technical study program; the figures for final-year students were 287

social sciences and 106 a technical field. Regarding gender, first-year students were 50.2 % female and 47.4 % male, while those in year 4 were 52.9 % female and 45.3 % male.

2.2. Procedure

In order to maximize statistical power for detecting effects of reasonable magnitude, we began by determining the optimum sample size using the G*Power tool ([Faul et al., 2007](#)). This indicated that 89 participants would be required for a power of 95 %. We thus proceeded to recruit a convenience sample of year 1 and year 4 students from the two aforementioned universities during the 2018–2019 academic year. Data were then collected using the two instruments described below, both of which were hosted online. Potential participants were first informed about the nature and purpose of the study, and how to access the questionnaire. It was made clear from the outset that participation was entirely voluntary, that they were free to withdraw at any point, and that all the information collected would remain confidential, in accordance with current data protection legislation in our country. All students who agreed to participate signed informed consent (electronically) prior to any data collection. It should also be noted that there were no dual relationships between the researchers and participating students, and the latter were not compensated in any way for their contribution to the study. The study protocol was reviewed and approved by the [Research Ethics](#) Committee of Mondragon University (Mondragon Unibertsitatea).

2.3. Instruments

2.3.1. Creative self-efficacy instrument ([Tierney and Farmer, 2002](#))

Despite its name, this three-item instrument was interpreted in the present study as being a measure of creative self-concept. The importance of distinguishing between creative self-concept and creative self-efficacy (the latter requiring more specific measurement tools) has been highlighted in the recent literature ([Beghetto and Karwowski, 2017](#); [Karwowski et al., 2019](#)). Each of the three items is rated on a 7-point Likert-type scale (1 = Totally disagree; 7 = Totally agree), such that the total score ranges from 3 to 21. The instrument, which can be completed in around two minutes, has been widely used in the educational field and shows good [psychometric](#) properties ([Puente-Díaz, 2016](#)). Internal consistency in the present sample was 0.70 (MacDonald's ω).

2.3.2. National survey of student engagement (NSSE; [Kuh, 2010](#); [Zilvinskis et al., 2017](#))

Items used with permission from *The College Student Report*, National Survey of Student Engagement, Copyright 2001–18. The Trustees of Indiana University. The NSSE examines various dimensions of student engagement. For the present study we focused on those which appeared, a priori, to be relevant both to our educational context and to the proposed theoretical framework, namely higher-order learning (4 items, min = 0; max = 240), [collaborative learning](#) (4 items; min = 0; max = 240), student-

faculty interaction (4 items; min = 0; max = 240), reflective and integrative learning (7 items, min = 0; max = 420), and participation in high-impact practices (5 items, min = 0; max = 20). With the exception of high-impact practices, item scores are converted to a 60-point scale, with higher scores indicating greater engagement on the corresponding indicator. For high-impact practices, students must indicate whether they have yet to decide, do not plan to, are planning to or have already participated in a given practice. Around ten minutes are required to complete the questionnaire.

In order to confirm a factor structure for the survey tool comprising five first-order dimensions within the higher-order factor of student engagement, we conducted a second-order [confirmatory factor analysis](#) (CFA), implementing the Lavaan 0.6–1 package ([Rosseel, 2012](#)) in R 4.0.2 (R Core Team, 2020). Model parameters were estimated using the robust maximum likelihood method. The model proposed by the CFA had acceptable fit indices: $\chi^2[247] = 525.113$; $p < .001$; CFI = .921; TLI = .912; GFI = .939; RMSEA [90 % CI] = .040 [.036; .045]; SRMR = 0.047. [Measurement invariance](#) by gender was also confirmed. All dimensions yielded acceptable coefficients of internal consistency, ranging between .62 and .78. (MacDonald's ω). A total score for student engagement was obtained by summing mean scores on each of the five first-order dimensions.

2.4. Data analysis

To determine the relationship between study variables, we began by conducting both a descriptive and bivariate correlation analysis, computing means and standard deviations and Pearson coefficients, respectively. We then performed a linear regression analysis to examine the relationship between student engagement and creative self-concept. Finally, and with the aim of exploring the relationship between the different dimensions of engagement and creative self-concept, both in the sample as a whole and in the two academic years considered, we carried out a series of [multiple linear regression analyses](#) that also took into account gender and field of study. In all cases we tested the assumptions regarding linearity, absence of collinearity, independence, normality, and homogeneity of variance. Regarding [gender differences](#), the small number of participants who self-identified as non-binary was insufficient for statistical analysis, and hence we only present comparative results for male and female students. All analyses were carried out using [SPSS](#) 26.0.

3. Results

3.1. Descriptive statistics and correlations

[Table 1](#) shows descriptive statistics for the study sample.

Table 1. Mean scores and standard deviations for creative self-concept, student engagement, and the five dimensions of engagement by gender (male and female only) and academic year.

Variable	Year	Gender	Mean	SD	N
Creative self-concept (<i>M</i> = 15.35; <i>SD</i> = 2.56; <i>N</i> = 727;)	1	Male	15.60	2.50	183
		Female	14.82	2.00	180
		Total	15.21	2.30	363
	4	Male	15.82	2.76	154
		Female	15.25	2.80	210
		Total	15.49	2.79	364
Student engagement (<i>M</i> = 648.32; <i>SD</i> = 152.69; <i>N</i> = 694;)	1	Male	625.80	131.96	174
		Female	614.95	142.56	178
		Total	620.31	137.33	352
	4	Male	669.33	165.43	143
		Female	682.75	160.12	199
		Total	677.14	162.26	342
Collaborative learning (<i>M</i> = 143.35; <i>SD</i> = 40.85; <i>N</i> = 759;)	1	Male	140.21	38.10	190
		Female	135.41	42.41	183
		Total	137.85	40.29	373
	4	Male	147.69	38.10	169
		Female	149.40	41.86	217
		Total	148.65	40.73	386
Student-faculty interaction (<i>M</i> = 107.81; <i>SD</i> = 48.32; <i>N</i> = 753;)	1	Male	107.45	47.30	188
		Female	98.47	43.39	183
		Total	103.01	45.57	371

Variable	Year	Gender	Mean	SD	N	
Higher-order learning ($M = 137.65$; $SD = 45.41$; $N = 750$)	4	Male	110.41	48.08	167	
		Female	114.04	52.29	215	
		Total	112.46	50.46	381	
	1	Male	135.95	41.22	188	
		Female	130.87	43.31	182	
		Total	133.45	42.28	370	
	Reflective and integrative learning ($M = 249.28$; $SD = 70.09$; $N = 722$)	4	Male	142.28	45.36	166
			Female	141.30	49.99	214
			Total	141.73	47.96	380
		1	Male	231.11	61.96	180
			Female	239.77	62.88	179
			Total	235.43	62.49	359
High-impact practices ($M = 12.31$; $SD = 3.13$; $N = 724$)	4	Male	255.36	75.27	151	
		Female	268.39	73.57	212	
		Total	262.97	74.46	363	
	1	Male	12.24	3.01	182	
		Female	11.89	2.56	179	
		Total	12.07	2.79	361	
4	Male	12.83	3.47	154		
	Female	12.34	3.35	209		
	Total	12.55	3.41	363		

Note: The possible score on each of the measures shown in the table is as follows: Creative self-concept, range 3–21; Student engagement, range 0–1160; Collaborative learning, range 0–240; Student-faculty interaction, range 0–240; Higher-order learning, range 0–240; Reflective and integrative learning, range 0–420; High-impact practices, range.0–20.

It can be seen in [Table 1](#) that year 4 students scored higher than their year 1 counterparts on both creative self-concept and engagement, as well as on each dimension of the latter. Regarding gender, male students in year 1 had higher mean scores than their female peers on creative self-concept, engagement, and all except the 'reflective and integrative learning' dimension. The results for year 4 students were more varied: Females scored higher on engagement overall and on the collaborative learning, student-faculty interaction, and reflective-interactive learning dimensions, whereas males scored higher on creative self-concept, higher-order learning, and high-impact practices.

As shown in [Table 2](#), there were positive and statistically significant associations between the different indicators of student engagement. In addition, these indicators yielded positive and significant correlations of moderate magnitude with creative self-concept.

Table 2. Pearson correlations between creative self-concept and the different dimensions of student engagement.

Variable	1	2	3	4	5	6
• 1 Creative self-concept	--					
• 2 Collaborative learning	.24***	--				
• 3 Student-faculty interaction	.34***	.36***	--			
• 4 Higher-order learning	.36***	.24***	.40***	--		
• 5 Reflective and integrative learning	.42***	.31***	.46***	.56***	--	
• 6 High-impact practices	.29***	.20***	.33***	.27***	.31***	--

Variable	1	2	3	4	5	6
----------	---	---	---	---	---	---

High-impact practices

$p < .001$.

3.2. Effect of student engagement on creative self-concept

To examine the relationship between student engagement and creative self-concept, we conducted a linear regression analysis, controlling for the [effect of gender](#). The model obtained explained 23.5 % of the variance in creative self-concept, and the relationship between this variable and student engagement was statistically significant ($\beta = .469$, $t = 14.025$, $p < .001$). The results also showed that creative self-concept was predicted by collaborative learning ($\beta = .076$, $t = 2.059$, $p < .05$), student-faculty interaction ($\beta = .104$, $t = 2.578$, $p < .05$), higher-order learning ($\beta = .128$, $t = 3.061$, $p < .005$), reflective and integrative learning ($\beta = .235$, $t = 5.368$, $p < .001$), and high-impact practices ($\beta = .123$, $t = 3.370$, $p < .001$). The highest value of both the standardized regression coefficient and the semi-partial [correlation coefficient](#) corresponded to reflective and integrative learning.

We then conducted independent linear [regression analyses](#) for male and female students. Among females, we observed statistically significant relationships between creative self-concept and both reflective and integrative learning ($\beta = .343$, $t = 5.795$, $p < .001$) and high-impact practices ($\beta = .194$, $t = 4.109$, $p < .001$). A significant association between creative self-concept and reflective and integrative learning was also observed among male students ($\beta = .190$, $t = 2.924$, $p < .005$), in addition to a statistically significant relationship between creative self-concept and both student-faculty interaction ($\beta = .181$, $t = 2.968$, $p < .005$) and higher-order learning ($\beta = .164$, $t = 2.687$, $p < .05$). In terms of relative predictive weight and contribution to overall fit of the model, reflective and integrative learning was the most important variable in both male and female students.

Finally, we performed independent linear regression analyses according to students' field of study (social sciences vs. technical). For students on a social sciences degree, we found that creative self-concept was significantly associated with reflective and integrative learning ($\beta = .244$, $t = 4.697$, $p < .001$), high-impact practices ($\beta = .153$, $t = 3.649$, $p < .001$), student-faculty interaction ($\beta = .100$, $t = 2.208$, $p < .005$), collaborative learning ($\beta = .087$, $t = 2.057$, $p < .005$), and higher-order learning ($\beta = .108$, $t = 2.189$, $p < .005$). These results contrast with those obtained for students enrolled in a technical study program, where a statistically significant relationship was only observed between creative self-concept and reflective and integrative learning ($\beta = .190$, $t = 2.924$, $p < .005$). Regarding the relative predictive weight and contribution to overall fit of the model, reflective and integrative learning was the most important variable in both fields of study.

3.3. Effect of student engagement on creative self-concept in year 1 students

To examine the relationship between student engagement and creative self-concept in the sub-sample of year 1 students, we conducted a new linear regression analysis, once again controlling for the effect of gender. The results showed that creative self-concept was predicted by both higher-order learning ($\beta = .136, t = 2.362, p < .05$) and reflective and integrative learning ($\beta = .191, t = 3.124, p < .005$), although no statistically significant relationship was found with respect to the other indicators of engagement. Reflective and integrative learning was the variable that contributed most to the expected change in creative self-concept and to overall model fit.

In the regression analyses by gender, the results for female students showed significant associations between creative self-concept and both reflective and integrative learning ($\beta = .275, t = 3.056, p < .005$) and high-impact practices ($\beta = .219, t = 2.921, p < .005$). A significant association between creative self-concept and reflective and integrative learning was also observed among male students ($\beta = .199, t = 2.361, p < .05$), in addition to a significant relationship between creative self-concept and higher-order learning ($\beta = .233, t = 3.020, p < .005$). Among females the variable of greatest relative importance was reflective and integrative learning, whereas for male students it was higher-order learning.

Finally, the linear regression analyses by field of study showed that for students on a social sciences degree, creative self-concept was significantly associated with reflective and integrative learning ($\beta = .221, t = 3.030, p < .001$), high-impact practices ($\beta = .138, t = 2.293, p < .005$), and higher-order learning ($\beta = .147, t = 2.169, p < .005$). No significant relationship was observed between creative self-concept and the other two indicators of engagement. The variable of greatest relative importance was reflective and integrative learning. For students enrolled in a technical study program, creative self-concept showed a significant positive association with the overall score on engagement ($\beta = .300, t = 2.847, p < .001$), but not with any of its five dimensions.

3.4. Effect of student engagement on creative self-concept in year 4 students

The relationship between student engagement and creative self-concept in the sub-sample of year 4 students was likewise examined through linear regression analysis, controlling for the effect of gender. Here the results showed that creative self-concept was predicted by both reflective and integrative learning ($\beta = .274, t = 4.343, p < .001$) and high-impact practices ($\beta = .148, t = 2.874, p < .005$). The highest value of both the standardized regression coefficient and the semi-partial correlation coefficient corresponded to reflective and integrative learning.

In the linear regression analyses by gender, the results for female students showed significant associations between creative self-concept and both reflective and integrative learning ($\beta = .372, t = 4.660, p < .001$) and high-impact practices ($\beta = .177, t = 2.848, p < .005$), with reflective and integrative learning having the greatest relative importance. Among male students we only observed a statistically

significant association between creative self-concept and student-faculty interaction ($\beta = .244, t = 2.561, p < .05$).

Finally, the linear regression analyses by field of study showed that for students on a social sciences degree, creative self-concept was significantly associated with reflective and integrative learning ($\beta = .256, t = 3.475, p < .001$) and high-impact practices ($\beta = .169, t = 2.756, p < .001$), with the former being the variable of greatest relative importance. No significant relationship was observed between creative self-concept and the other three indicators of engagement. Among students enrolled in a technical study program, a statistically significant relationship was only observed between creative self-concept and reflective and integrative learning ($\beta = .390, t = 3.069, p < .001$).

4. Discussion

The main aim of this study was to examine the relationship between creative self-concept and student engagement among undergraduates. As expected, the results showed a positive association between these two variables. More specifically, we found that creative self-concept was predicted by collaborative learning, student-faculty interaction, higher-order learning, reflective and integrative learning, and high-impact practices. These findings have considerable implications for [educational policy](#). The importance of creativity for tackling the challenges that society is currently facing has been widely recognized ([Caballero García et al., 2019](#); [Daly et al., 2016](#)). However, although educational institutions have acknowledged their obligation to cultivate students' creative potential ([Badger, 2019](#)), activities aimed at achieving this are often lacking in practice ([Marquis et al., 2017](#)), a problem that is especially evident in our country, Spain ([Gómez et al., 2018](#)). Our findings regarding how creative confidence beliefs may be fostered through various dimensions of student engagement therefore provide a platform for implementing activities and practices that promote creativity in the higher education context.

The variable most closely related to creative self-concept in our study was reflective and integrative learning, an activity that has been previously linked to students' creative process ([Miller, 2018](#); [Miller and Dumford, 2016](#)). Reflective learning refers to the connection between what students learn and the world around them, and to the reconsideration of problems and ideas from diverse perspectives ([Campbell and Cabrera, 2014](#)). It is considered that when students engage in personally meaningful learning and are open to learning and knowledge that challenges their preconceived ideas, they are involved de facto in a creative process ([Beghetto and Schreiber, 2017](#)). From a practical point of view, therefore, one of the conclusions to be drawn from the present study is that reflective and integrative learning should be ascribed a key role in educational initiatives aimed at enhancing higher education students' creative confidence beliefs. Importantly, our analysis also showed that reflective and integrative learning was the variable that contributed most to the relationship between students' creative self-concept and engagement regardless of whether they were enrolled in a

social sciences or technical degree program. This further underlines the need to promote this approach to learning in higher education.

Another aim of our study was to identify the specific dimensions of engagement that contributed most to the relationship with creative self-concept in students at opposite ends of their degree program (year 1 and year 4). Here we found that reflective and integrative learning was the variable most strongly associated with creative self-concept in both year 1 and year 4 students, suggesting that this kind of [learning experience](#) should be available throughout a degree program. However, there were also some results that were specific to one of the two year groups.

In the sub-sample of year 1 students we found that creative self-concept was predicted not only by reflective and integrative learning but also by higher-order learning, indicating that in the first year of a degree program, deep learning experiences can help to enhance students' creative self-concept. This finding is consistent with our hypothesis, in that students new to higher education generally have less experience of reflective and higher-order learning ([García Martín, 2016](#)). Learning environments that encourage cognitive tasks such as understanding, synthesis, analysis, and reappraisal would therefore be expected to have a positive impact on creative self-concept. It should also be noted, however, that we observed differences among year 1 students depending on their field of study. For those on a social sciences degree, creative self-concept was related to deep learning approaches and high-impact practices. Among students enrolled in a technical study program, by contrast, creative self-concept was positively associated with the overall score on engagement, but not with any of its five dimensions. In light of these results, one might speculate that students in more technical fields of study have a more stable creative self-concept in the early stages of higher education, although this hypothesis requires corroboration because the number of students in this sub-group was considerably less than in the social sciences sub-group.

As regards year 4 students, the results showed that higher scores on creative self-concept were associated with both reflective and integrative learning and high-impact practices. In our view, this is due to the particular importance that high-impact practices acquire as students approach the end of their degree program and prepare to embark on a professional career. From an applied point of view, and in line with existing recommendations ([Finley and McNair, 2013](#)), we would argue that greater emphasis should be placed on engagement in high-impact practices throughout higher education. If the aim is to enhance students' creative self-concept, then these practices should expose students to diverse ideas and people of different backgrounds, allowing them to apply their knowledge in practice and offering them regular assessments of their work ([Garvey et al., 2018](#); [Kilgo et al., 2015](#)). The review by [Maddux et al. \(2010\)](#) also suggests that multicultural learning experiences can make an important contribution here. As in the case of their year 1 counterparts, there were also differences among year 4 students depending on the field of study. For those on a social sciences degree, creative self-concept was positively associated with both reflective and integrative learning and high-impact practices, whereas among students enrolled in a technical

study program a significant relationship was only observed between creative self-concept and reflective and integrative learning. Further studies with larger samples are required before drawing conclusions as to the implications of these results.

A final objective of the present study was to explore possible gender differences in the relationship between creative self-concept and student engagement. The results of this analysis showed that reflective and integrative learning was the variable most closely related to higher scores on creative self-concept in both male and female students, thus providing further support for the importance of this kind of experience. However, we also observed some gender differences. Specifically, among female students in both year 1 and year 4, creative self-concept was strongly associated with high-impact practices. Although this finding should be interpreted with caution and requires corroboration in further studies, we speculate that women may, more than men, have personal characteristics that help to explain why high-impact practices are particularly relevant to the development of their creative self-concept. Research suggests that women benefit more from intercultural experiences because they are more open to diversity and score lower than men on [ethnocentrism](#) (Tompkins et al., 2017). In addition, a stronger relationship between extroversion and creative confidence beliefs has been reported in women (Karwowski et al., 2013).

With respect to our male students, the results for those in year 1 showed a close relationship between creative self-concept and higher-order learning. This association between creativity and deep learning experiences is not itself surprising, because all forms of creativity originate in subjective perceptions and interpretations of knowledge (Beghetto and Schreiber, 2017; Kaufman and Beghetto, 2009). What is striking is that the relationship between higher-order learning and creative self-concept was only observed among male students in year 1. Although further studies are required to shed more light on these gender differences, it may have to do with the fact that, while men and women do not differ in creative ability, they do appear to use different cognitive strategies when performing creative tasks (Abraham, 2016).

A final result to consider is the relationship we observed among male students in year 4 between creative self-concept and student-faculty interaction, a variable that refers to the joint discussion of meaningful topics or future career plans. This result suggests that interactions of this kind can have a positive impact on students' creative confidence as they approach the end of their studies and prepare to enter the [labor market](#). The fact that this relationship was only observed among male final-year students may have to do with gender differences in motivation and creativity. Specifically, research suggests that males and females differ in the [neurophysiology](#) of reward processing (Volf and Tarasova, 2013), and also that extrinsic motivation plays an important role in men's creative development (Abraham, 2016), which may explain why feedback from faculty has a greater impact on their creative self-concept.

5. Limitations

This study has a number of limitations. First, participants were recruited from just two Spanish universities, and a larger sample would be required to generalize the results. Further studies are also needed to test the external validity of our findings with respect to those obtained in other countries. In addition, the data obtained here from first- and final-year students would need to be complemented with equivalent data from students in the intermediate years (2 and 3) of a degree program. In this respect, a longitudinal design with a single group of students would provide a more robust test of the results reported here. Finally, although we consider that our study adds to knowledge on student engagement in higher education, the use in future studies of more recent measurement instruments such as the Short Scale of Creative Self (SSCS; [Karwowski and Lebuda, 2018](#)) would provide a new level of information about the variables of interest, thus enabling the analysis, for example, of the effect of students' creative confidence beliefs on their engagement and analyzing possible mediators and moderators of this relationship.

6. Conclusion

The results of this study show that creative self-concept is positively associated with student engagement in higher education. This highlights the importance of ensuring that students have the opportunity to participate in collaborative learning, meaningful interactions with faculty, higher-order learning, reflective and integrative learning, and high-impact practices. Higher-order learning and reflective and integrative learning appear to be particularly important in the early stages of a degree program, whereas with senior students, greater emphasis should be placed on reflective and integrative learning and high-impact practices.

Author statement

Paula Alvarez-Huerta conceived and planned the research; Alexander Muela analyzed the data; Iñaki Larrea contributed to the interpretation of the results. Paula Alvarez-Huerta, Alexander Muela and Iñaki Larrea wrote the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

Acknowledgments

This research was supported by a grant from Gipuzkoako Foru Aldundia to the Faculty of Humanities and Education Sciences of Mondragon Unibertsitatea.

References

- Abraham, A. (2016). Gender and creativity: An overview of behavioral and brain function. *Brain Imaging and Behavior*, *10*(2), 609–618. <https://doi.org/10.1007/s11682-015-9410-8>.
- Alvarez-Santullano, M. M., & De Prada Creo, E. (2018). Evaluaci' on de las competencias profesionales a trav' es de las pr' acticas externas: Incidencia de la

creatividad [Assessment of professional competences through external placements: Impact of creativity]. *Revista de Investigacion Educativa*, 36(1), 203–219. <https://doi.org/10.6018/rie.36.1.275651>.

Anderson, R. C., & Haney, M. (2020). Reflection in the creative process of early adolescents: The mediating roles of creative metacognition, self-efficacy and self-concept. *Psychology of Aesthetics, Creativity, and the Arts*, 2. <https://doi.org/10.1037/aca0000324>.

Azevedo, R. (2015). Defining and measuring engagement and learning in science: Conceptual, theoretical, methodological, and analytical issues. *Educational Psychologist*, 50(1), 84–94. <https://doi.org/10.1080/00461520.2015.1004069>.

Badger, J. (2019). A case study of Chinese students' and IEP faculty perceptions of a creativity and critical thinking course. *Higher Education Studies*, 9(3), 34. <https://doi.org/10.5539/hes.v9n3p34>.

Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review*, 5(3), 243–260. <https://doi.org/10.1016/j.edurev.2010.06.001>.

Bakadorova, O., Lazarides, R., & Raufelder, D. (2020). Effects of social and individual school self-concepts on school engagement during adolescence. *European Journal of Psychology of Education*, 35(1), 73–91. <https://doi.org/10.1007/s10212-019-00423-x>.

Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity Research Journal*, 18(4), 447–457. https://doi.org/10.1207/s15326934crj1804_4.

Beghetto, R. A., & Karwowski, M. (2017). Towards untangling creative self-beliefs. In M. Karwowski, & J. C. Kaufman (Eds.), *The creative self: Effect of beliefs, self-efficacy, mindset, and identity* (pp. 1–394). Academic Press Inc. <https://doi.org/10.1016/C2015-0-07011-3>.

Beghetto, R. A., & Schreiber, J. B. (2017). Creativity in doubt: Toward understanding what drives creativity in learning. In R. Leikin, & B. Sriraman (Eds.), *Creativity and giftedness* (pp. 147–162). Springer. https://doi.org/10.1007/978-3-319-38840-3_10.

Bowden, J. L. H., Tickle, L., & Naumann, K. (2019). The four pillars of tertiary student engagement and success: A holistic measurement approach. *Studies in Higher Education*, 0(0), 1–18. <https://doi.org/10.1080/03075079.2019.1672647>.

Brotman, J. S., & Moore, F. M. (2008). Girls and science: A review of four themes in the science education literature. *Journal of Research in Science Teaching*, 45(9), 971–1002. <https://doi.org/10.1002/tea.20241>.

Caballero García, P. A., Sanchez Ruiz, S., & Belmonte Almagro, M. L. (2019). Analisis de la creatividad de los estudiantes universitarios. Diferencias por género, edad y

elección de estudios [Analysis of creativity in undergraduates: Differences by gender, age and study program]. *Educación XX1*, 22(2), 213–234. <https://doi.org/10.5944/educxx1.22552>.

Campbell, C. M., & Cabrera, A. F. (2014). Making the mark: Are grades and deep learning related? *Research in Higher Education*, 55(5), 494–507. <https://doi.org/10.1007/s11162-013-9323-6>.

Coates, H., & McCormick, A. C. (2014). *Engaging university students. International insights from system-wide studies*. Springer. <https://doi.org/10.1007/978-981-4585-63-7>.

Cohen, A. K., & Cromwell, J. R. (2020). How to respond to the COVID-19 pandemic with more creativity and innovation. *Population Health Management*, 00(00), 1–3. <https://doi.org/10.1089/pop.2020.0119>.

Daly, S. R., Mosyjowski, E. A., & Seifert, C. M. (2016). Teaching creative process across disciplines. *The Journal of Creativity Behavior*, 0(0), 1–13. <https://doi.org/10.1002/jocb.158>.

Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in education: A systematic literature review. *Thinking Skills and Creativity*, 8(1), 80–91. <https://doi.org/10.1016/j.tsc.2012.07.004>.

del Moral Perez, M. E., Villalustre Martínez, L., & del Neira Piñero, M. R. (2018). Percepción docente del desarrollo emocional y creativo de los escolares derivado del diseño colaborativo de digital storytelling [Teachers' perception of students' emotional and creative development following the collaborative design of digital storytelling]. *Educacion XXI*, 21(1), 345–374. <https://doi.org/10.5944/educXX1.18303>.

European Commission. (2018). *The EU in support of the bologna process*. <https://doi.org/10.2766/3596>.

European Union. (2014). Education and training in a smart, sustainable and inclusive Europe. *Official Journal of the European Union*.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>.

Finley, A., & McNair, T. (2013). *Assessing underserved students' engagement in high-impact practices*. Association of American Colleges and Universities.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>.

- Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019). Interventions for student engagement: Overview and state of the field. *Handbook of student engagement interventions*. <https://doi.org/10.1016/b978-0-12-813413-9.00001-2>.
- Gajda, A., Beghetto, R. A., & Karwowski, M. (2017). Exploring creative learning in the classroom: A multi-method approach. *Thinking Skills and Creativity*. <https://doi.org/10.1016/j.tsc.2017.04.002>.
- García Martín, M. T. (2016). ¿Como aprenden los alumnos en su primer año de universidad al inicio y al final del curso? [How do students' learn at the beginning and end of their first year of university?] REDU. *Revista de Docencia Universitaria*, 14(1), 27–50. <https://doi.org/10.4995/redu.2016.5911>.
- Garvey, J. C., Brckalorenz, A., Latopolski, K., & Hurtado, S. S. (2018). High-impact practices and student–faculty interactions for students across sexual orientations. *Journal of College Student Development*, 59(2), 210–226. <https://doi.org/10.1353/csd.2018.0018>.
- Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review*, 17(2), 183–211.
- Glasser, H. M., & Smith, J. P. (2008). On the vague meaning of “gender” in education research: The problem, its sources, and recommendations for practice. *Educational Researcher*, 37(6), 343–350. <https://doi.org/10.3102/0013189x08323718>.
- Gomez, G. R., Saiz, M. S. I., & Ibanez, J. C. (2018). Competencias b´asicas relacionadas con la evaluaci´on. Un estudio sobre la percepci´on de los estudiantes universitarios [Basic assessment-related competences: A study of undergraduate perceptions]. *Educacion XXI*, 21(1), 181–208. <https://doi.org/10.5944/educXX1.14457>.
- Gong, Y., Kim, T. Y., & Liu, Z. (2019). Diversity of social ties and creativity: Creative self-efficacy as mediator and tie strength as moderator. *Human Relations*. <https://doi.org/10.1177/0018726719866001>.
- Grigorenko, E. L. (2019). Creativity: A challenge for contemporary education. *Comparative Education*, 55(1), 116–132. <https://doi.org/10.1080/03050068.2018.1541665>.
- Johnson, D. M., Wardlow, G. W., & Graham, D. L. (2009). Academic engagement and satisfaction of undergraduate agricultural, food and life sciences students. *North American Colleges and Teachers of Agriculture (NACTA)*, 53(4), 12–17.
- Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, 38(5), 758–773. <https://doi.org/10.1080/03075079.2011.598505>.
- Karwowski, M., & Beghetto, R. A. (2018). Creative behavior as agentic action. *Psychology of Aesthetics, Creativity, and the Arts*. <https://doi.org/10.1037/aca0000190>.

- Karwowski, M., & Lebuda, I. (2018). Measuring creative self-efficacy and creative personal identity. *The International Journal of Creativity & Problem Solving*, 28(1), 45–57.
- Karwowski, M., Jankowska, D. M., Brzeski, A., Gajda, A., Lebuda, I., & Beghetto, R. A. (2020). Delving into creativity and learning. *Creativity Research Journal*, 32(1), 4–16. <https://doi.org/10.1080/10400419.2020.1712165>.
- Karwowski, M., Lebuda, I., & Beghetto, R. (2019). Creative self-beliefs. In J. Kaufman, & R. Sternberg (Eds.), *The Cambridge handbook of creativity (Cambridge Handbooks in psychology, pp. 396–418)*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781316979839.021>.
- Karwowski, M., Lebuda, I., Wisniewska, E., & Gralewski, J. (2013). Big five personality traits as the predictors of creative self-efficacy and creative personal identity: Does gender matter? *The Journal of Creative Behavior*, 47(3), 215–232. <https://doi.org/10.1002/jocb.32>.
- Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four C model of creativity. *Review of General Psychology*, 13(1), 1–12. <https://doi.org/10.1037/a0013688>. Kilgo, C. A., Ezell Sheets, J. K., & Pascarella, E. T. (2015). The link between high-impact practices and student learning: Some longitudinal evidence. *Higher Education*, 69, 509–525. <https://doi.org/10.1007/s10734-014-9788-z>.
- Kuh, G. D. (2008). *High-impact educational practices: What they are, who has access to them, and why they matter*. Association of American Colleges and Universities.
- Kuh, G. D. (2010). Assessing what really matters to student learning inside the National Survey of Student Engagement. *Change the Magazine of Higher Learning*, 33(3), 10–17. <https://doi.org/10.1080/00091380109601795>.
- Kümmel, R., & Lindenberger, D. (2020). Energy, entropy, constraints, and creativity in economic growth and crises. *Entropy*, 22(10), 1–22. <https://doi.org/10.3390/e22101156>.
- Lewis, A. D., Huebner, E. S., Malone, P. S., & Valois, R. F. (2011). Life satisfaction and student engagement in adolescents. *Journal of Youth and Adolescence*, 40(3), 249–262. <https://doi.org/10.1007/s10964-010-9517-6>.
- Li, Y., & Lerner, R. M. (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology*, 47(1), 233–247. <https://doi.org/10.1037/a0021307>.
- Llorens, S., Schaufeli, W., Bakker, A., & Salanova, M. (2007). Does a positive gain spiral of resources, efficacy beliefs and engagement exist? *Computers in Human Behavior*, 23(1), 825–841. <https://doi.org/10.1016/j.chb.2004.11.012>.
- Maddux, W. W., Adam, H., & Galinsky, A. D. (2010). When in Rome... learn why the Romans do what they do: How multicultural learning experiences facilitate creativity.

Personality & Social Psychology Bulletin, 36(6), 731–741.

<https://doi.org/10.1177/0146167210367786>.

Majer, J. M. (2009). Self-efficacy and academic success among ethnically diverse first-generation community college students. *Journal of Diversity in Higher Education*, 2(4), 243–250. <https://doi.org/10.1037/a0017852>.

Maricuțoiu, L. P., & Sulea, C. (2019). Evolution of self-efficacy, student engagement and student burnout during a semester. A multilevel structural equation modeling approach. *Learning and Individual Differences*, 76(101785).

<https://doi.org/10.1016/j.lindif.2019.101785>.

Marquis, E., Radan, K., & Liu, A. (2017). A present absence: Undergraduate course outlines and the development of student creativity across disciplines. *Teaching in Higher Education*, 22(2), 222–238. <https://doi.org/10.1080/13562517.2016.1237495>.

Mathisen, G. E., & Bronnick, K. S. (2009). Creative self-efficacy: An intervention study. *International Journal of Educational Research*, 48(1), 21–29. <https://doi.org/10.1016/j.ijer.2009.02.009>.

McCormick, A. C., Kinzie, J., & Gonyea, R. M. (2013). Student engagement: Bridging research and practice to improve the quality of undergraduate education. In M. Paulsen (Ed.), *Higher education: Handbook of theory and research: Vol. XXVIII*. Springer.

<https://doi.org/10.1007/1-4020-2456-8>.

Miller, A. L. (2018). Connecting creative coursework exposure and college student engagement across academic disciplines. *Gifted and Talented International*, 33(1–2), 26–40. <https://doi.org/10.1080/15332276.2019.1655681>.

Miller, A. L., & Dumford, A. D. (2016). Creative cognitive processes in higher education. *The Journal of Creative Behavior*, 50(4), 282–293. <https://doi.org/10.1002/job.77>.

Olivier, E., Archambault, I., De Clercq, M., & Galand, B. (2019). Student self-efficacy, classroom engagement, and academic achievement: Comparing three theoretical frameworks. *Journal of Youth and Adolescence*, 48(2), 326–340.

<https://doi.org/10.1007/s10964-018-0952-0>. Pajares, F. (1996).

Self-efficacy beliefs in academic settings. *Review of Educational Research*, 66(4), 543–578. Payne, L. (2019). Student engagement: Three models for its investigation. *Journal of Further and Higher Education*, 43(5), 641–657. <https://doi.org/10.1080/0309877X.2017.1391186>.

Pearson, C. M., & Sommer, S. A. (2011). Infusing creativity into crisis management. An essential approach today. *Organizational Dynamics*, 40(1), 27–33. <https://doi.org/10.1016/j.orgdyn.2010.10.008>.

Puente-Diaz, R., Toptas, S. D., Cavazos-Arroyo, J., Wimschneider, C., & Brem, A. (2020). Creative potential and multicultural experiences: The mediating role of creative

self-efficacy. *The Journal of Creative Behavior*, 54(4), 815–823.

<https://doi.org/10.1002/jocb.408>.

Puente-Díaz, R. (2016). Creative self-efficacy: An exploration of its antecedents, consequences, and applied implications. *The Journal of Psychology*, 150(2), 175–195.

<https://doi.org/10.1080/00223980.2015.1051498>.

Robbins, T. L., & Kegley, K. (2010). Playing with Thinkertoys to build creative abilities through online instruction. *Thinking Skills and Creativity*, 5(1), 40–48. <https://doi.org/10.1016/j.tsc.2009.07.001>.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5-12 (BETA). *Journal of Statistical Software*, 48(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>.

Royston, R., & Reiter-Palmon, R. (2019). Creative self-efficacy as mediator between creative mindsets and creative problem-solving. *The Journal of Creative Behavior*, 53(4), 472–481. <https://doi.org/10.1002/jocb.226>.

Schunk, D. H., & Mullen, C. A. (2012). Self-efficacy as an engaged learner. *Handbook of research on student engagement* (pp. 1–840). <https://doi.org/10.1007/978-1-4614-2018-7>. Issue November.

Suri, H. (2020). Ethical considerations of conducting systematic reviews in educational research. *Systematic reviews in educational research*. https://doi.org/10.1007/978-3-658-27602-7_3.

Tierney, P., & Farmer, S. M. (2002). Self-efficacy: Its potential antecedents and relationship to creative performance. *The Academy of Management Journal*, 45(6), 1137–1148. <https://doi.org/10.2307/3069429>.

Tompkins, A., Cook, T., Miller, E., & LePeau, L. A. (2017). Gender influences on students' study abroad participation and intercultural competence. *Journal of Student Affairs Research and Practice*, 54(1), 204–216.

<https://doi.org/10.1080/19496591.2017.1284671>.

Trowler, V. (2010). Student engagement literature review. *The higher education academy* (Issue November) http://americandemocracy.illinoisstate.edu/documents/democratic-engagement-white-paper-2_13_09.pdf.

Vally, Z., Salloum, L., AlQedra, D., El Shazly, S., Albloshi, M., Alsheraifi, S., & Alkaabi, A. (2019). Examining the effects of creativity training on creative production, creative self-efficacy, and neuro-executive functioning. *Thinking Skills and Creativity*, 31(October 2018), 70–78. <https://doi.org/10.1016/j.tsc.2018.11.003>.

Van Dinther, M., Dochy, F., & Segers, M. (2010). Factors affecting students' self-efficacy in higher education. *Educational Research Review*, 6, 95–108. <https://doi.org/10.1016/j.edurev.2010.10.003>.

Vera, M., Le Blanc, P. M., Taris, T. W., & Salanova, M. (2014). Patterns of engagement: The relationship between efficacy beliefs and task engagement at the individual versus collective level. *Journal of Applied Social Psychology, 44*(2), 133–144. <https://doi.org/10.1111/jasp.12219>.

Volf, N. V., & Tarasova, I. B. (2013). The influence of reward on the performance of verbal creative tasks: Behavioral and EEG effects. *Human Physiology, 39*(3), 302–308. <https://doi.org/10.1134/S0362119713020187>.

Vuori, J. (2014). Student engagement: Buzzword or fuzzword? *Journal of Higher Education Policy and Management, 36*(5), 509–519.

Zepke, N. (2018). Student engagement in neo-liberal times: What is missing? *Higher Education Research & Development, 37*(2), 433–446. <https://doi.org/10.1080/07294360.2017.1370440>.

Zilvinskis, J., Masseria, A. A., & Pike, G. R. (2017). Student engagement and student learning: Examining the convergent and discriminant validity of the revised National Survey of Student Engagement. *Research in Higher Education, 58*, 880–903. <https://doi.org/10.1007/s11162-017-9450-6>.