



Creative development, self-esteem and barriers to creativity in university students of education according to their participation in artistic activities

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ABSTRACT

Different studies have pointed out the relationship between participation in artistic activities and creative development. However, there is scant literature that addresses the issue in students who are training to be future teachers. This is the reason for the present study, which focuses on university students of education degrees at two public universities located in different Spanish cities. The main objective of the study was to discover the role played in creative development, self-esteem and barriers to creativity by prior participation in artistic activities. The study also aimed to detect the frequency with which these students undertook artistic activities and to determine which activities were most frequently carried out by men and women. In view of the scarcity of rigorous measurement instruments validated for the Spanish population, the study also proposed to validate the Inventory of Personal Creativity Barriers in the Spanish population. A total of 574 students participated in the validation and 291 (randomly selected) in the subsequent quasi-experimental, descriptive, cross-sectional study. A questionnaire was used to collect socio-demographic data, a Personal Creativity Barriers Inventory, the Test of Creative Imagination for Adults (PIC-A) (2012) and the Rosenberg Self-Esteem Scale (1965). The validation of the Inventory showed contrasted evidence of internal consistency. The results of the study to determine differences associated with participation in artistic activities detected that the group who carried out such activities obtained higher scores in narrative, graphic (although at the limit of significance) and general creativity. No significant differences were found between the groups in the factors of barriers to creativity or self-esteem. We conclude by recommending participation in artistic activities given the benefits deriving from creativity, particularly in narrative and graphic tasks.

1. Introduction

There has not been much research that analyses the importance of the practice of artistic activities in the creative competence of university students in Education, even though it has been found to improve creativity (Burton et al., 1999; Chamorro-Premuzic et al., 2009; Corbalán & Limiñana-Gras, 2010; Guetzkow, 2002; Mareque et al., 2019; Solé et al., 2020). For students specializing in

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Education, creative development is all the more relevant, not only because these students will have the opportunity to develop this competence in their future practice, but also because creativity is a key competence within the Spanish university system (Mareque Álvarez-Santullano & de Prada-Creo, 2018), and is included among the competences that students from different Master's degrees and courses have to attain Agencia Nacional de Evaluación de la Calidad y Acreditación [Spanish National Agency of Evaluation of Quality and Accreditation] (2005); González and Wagenaar (2003). One of the variables that can be positively related to creative development, self-esteem, has been the subject of study (Cantero et al., 2016; Deng & Zhang, 2011; Goldsmith & Matherly, 2012; Sternberg, 2005), while creative barriers are among the variables that may interfere with this development in university students. Hence the present study sets out to investigate this issue. Our main objective was to learn about the role played by prior participation in artistic activities in the creative development, self-esteem and barriers to creativity of Education students.

1.1. Literature review

A relationship between creativity and participation in leisure or artistic activities carried out in educational contexts has been detected in populations of different ages (Alfonso-Benlliure et al., 2021; Cotter et al., 2016; Elisondo et al., 2022). It is accepted that visual arts foster personal development (Gardner, 2011; Hallam et al., 2022; Wright, 2010; Yates & Szenasi, 2021) through – among other aspects – the development of self-confidence and self-esteem (Barnes, 2015; Hallam et al., 2022; Hetland & Winner, 2004). People with more open attitudes towards these practices have a greater capacity for imagination and a greater tendency to divergent thinking, which facilitates the generation of ideas (Chamorro-Premuzic et al., 2009; Ozga & Cudo, 2022). They are more capable of producing creative solutions, including in the design and business world (An & Youn, 2018), and of improved learning in areas such as mathematics and science (Hetland et al., 2015).

It has been shown that students who have had greater exposure to drama, dance, music and art (Burton et al., 1999), or visual arts, photography, video or communication (Mareque et al., 2019), outperformed those who have had less experience of creative tasks. In this regard, Corbalán and Limiñana-Gras (2010) showed that students who developed artistic, cultural and social activities obtained higher scores in creativity, while visual arts students have a greater capacity for figurative elaboration, associated with imagination and elaboration of details expressed in the form of drawings (David et al., 2014). Similarly, it has been found that elementary school students who participated in artistic improvisation activities, such as dance, showed a greater increase in divergent thinking (Sowden et al., 2015), in the same way that a higher level of personal openness and flexibility in the dimension of divergent thinking has been found in students from art schools, compared to students from non-arts schools (Ozga & Cudo, 2022). The value of the practice of artistic activities for the development of creative thinking is also underlined in the infant and junior school population (De Backer et al., 2012; Kamak et al., 2017; Winner et al., 2013).

The importance of creativity in university students lies in the fact that being a creative person means having a wide range of strategies that allow one to be prepared to make decisions, to see things from different perspectives, to generate new possibilities and alternatives, to be flexible and tolerant, among other skills (Ghaffari, 2015), promoting self-confidence and the ability to take risks (David et al., 2014; Gibson, 2010), and feeling more fulfilled and motivated (Jackson, 2006). Being creative involves producing new and useful ideas related to products, procedures and processes, constituting the first step of innovation (Amabile, 2019; Klijn & Tomic, 2010; Sternberg & Lubart, 1996) as it contains two fundamental elements: novelty and originality (Runco & Jaeger, 2012). Assuming that creativity can be developed through learning (Beghetto & Karwowski, 2018; Chacón-López, 2021), and that all human beings with normal capacities can produce creative work at least moderately (Amabile, 2019), according to the confluence theory of creativity, six resources are needed for creativity to take place: intelligence, knowledge, intellectual styles, personality, motivation and environment (Sternberg & Lubart, 1996). The first five resources are person-centred, while the last is context-centred (Sternberg & Lubart, 1996). A person may have all the internal resources necessary to think creatively, but without an environment that supports and rewards their creative ideas, their creativity may not manifest itself. This support can be provided by helping to awaken creative ideas, supporting these ideas and providing a basis for evaluating and improving them. However, environments are often not fully conducive to the use of creativity (Sternberg & Lubart, 1996; Zhang & Sternberg, 2011), despite the consensus on the need to give it the attention it deserves (Alencar et al., 2017; Badger, 2019), because of its value for students' personal futures and social development (David et al., 2014), essential for adapting to changing situations while maintaining a resilient attitude in the face of failure (Fernández-Díaz et al., 2021).

Similar levels of overall creativity have been found among males and females (Charyton et al., 2008), although the research findings are inconclusive (Abraham, 2016; Baer & Kaufman, 2008; Nakano et al., 2021; Pagnani et al., 2011; Runco & Jaeger, 2012; Taylor & Barbot, 2021). It has been highlighted that humans maintain similar creative development in childhood, with differences beginning to emerge in youth and manifesting in adulthood (Abraham, 2016), and that girls have had fewer opportunities to express creativity than boys, although they were more involved in artistic creative activities (Gralewski & Karwowski, 2013), whereas boys were more involved in scientific creative activities. In this sense, it has been pointed out that females more frequently performed artistic activities in the field of arts and crafts, while males did so in science and technology (Diedrich et al., 2018). Higher scores have been found in corporal expression, art and design activities in the case of the former (Aranguren & Irrazabal, 2012), while the latter achieve higher scores in music, science and technology (Elisondo et al., 2022).

Regardless of the gender of the students, there is no doubt that the ability to innovate, to create, and to adapt to the environment, are qualities that the labour market demands (Powers, 2018). In this context, higher education institutions play a crucial role (David et al., 2014; Nordin & Malik, 2015) by encouraging university students not only to acquire knowledge and skills, but also the ability to adapt to change more efficiently. It has therefore been proposed that students should be involved in creative and research activities in order to improve the quality of education (Buckley & Conomos, 2010; Gibson, 2010; Jørgensen et al., 2011; Juhl & Buch, 2019; Sunley et al., 2019), because a relationship between academic performance and creativity has been detected (Karwowski et al., 2020), among

other reasons. However, in higher education, obstacles related to creative development, or creative barriers, have been identified that prevent students from achieving the desired outcomes (Hilal et al., 2013; Morais et al., 2014b; Talavera et al., 2015). These creative barriers are conflictive due to their complexity and variety (Sadi & Al-Dubaisi, 2008). Adam (2001) describes them as mental walls that block the resolution of problems, their correct perception, or their solution. This work identifies two main categories of inhibitors: structural barriers, which include psychological, cultural and environmental barriers; and process barriers, related to cognitive style. Other studies include the following as the most common barriers: self-concept (Hilal et al., 2013; Nordin & Malik, 2015; Wang & Wang, 2016); the need for compliance; those related to abstract capacity and environmental issues (Hilal et al., 2013); or those related to risk-taking (Nordin & Malik, 2015). Although not much research has addressed these in depth, some studies conclude that identifying the barriers to student creativity is as important as encouraging creativity (Hilal et al., 2013; Kazerounian & Foley, 2007). One of the drawbacks for the study of the topic relates to the scarcity of instruments for assessing it, given that most of the existing ones have focused on determining barriers in the world of work (Alencar et al., 2003; Morais et al., 2014b). Although there has not been much research analysing these creative barriers in university students in Education, they have been found in other disciplines, with barriers being detected in students of Sport Sciences and Physical Education (Konstantinidou et al., 2015) and Engineering education (Kazerounian & Foley, 2007). However, fewer creative barriers have been found in Social Sciences students (Morais et al., 2015).

Just as these barriers can interfere with creativity, a positive relationship between self-esteem and creative development has been found (Cantero et al., 2016; Deng & Zhang, 2011; Goldsmith & Matherly, 2012; Sternberg, 2005). However, the meta-analysis conducted by Deng and Zhang (2011) concludes that the research results are inconclusive, as the relationship between self-esteem and creativity is influenced by the orientation of the research; that is, they found that the relationship was stable and positive when creativity was studied in terms of the personality, or creative disposition, of the individual, rather than in terms of the outcomes. According to Rosenberg's (1965) model, self-esteem is defined as the feeling of approval, appreciation and regard that a person feels for oneself, which is therefore linked to personal beliefs about one's own abilities, social relationships and achievements. People with high self-esteem are more capable of performing any task or activity, are less afraid to express opinions other than those of the majority, and have greater ease in sharing creative ideas (Thatcher & Brown, 2010). Likewise, high self-esteem allows a person to maintain high levels of internal motivation, linked to creativity, and reduces external motivation (Amabile & Pillemer, 2012; Da Costa et al., 2015; Eisenberger & Aselage, 2009). Therefore, it is considered that self-esteem is beneficial for creativity for several reasons: it can increase self-regulation, reduce the perception of fear and anxiety, and induce new goals (Carver et al., 2008; Wang & Wang, 2016); it is also an important psychological resource that acts as a buffer against negative stress events (Baumeister et al., 2003; Cast & Burke, 2002).

As we have highlighted above, not many studies have been found that analyse the value of participation in artistic activities in university students enrolled in a bachelor's degree in Education, despite its importance in creative development during their training and professional future. Likewise, the literature shows the benefits of self-esteem in creative development and the existence of barriers that may interfere with it. Knowing the repercussion that participation in artistic activities has on the creative responses and perception of personal value of these pupils will allow us to orientate their recommendation.

1.2. Purpose of the study

The main and ultimate objective of the study was to discover the role played in creative development, self-esteem and barriers to creativity of Education students by prior participation in artistic activities. The study also aimed to find out the frequency of artistic activities and to investigate the state of the aforementioned intra-gender variables. In view of the scarcity of rigorous measurement instruments validated in the Spanish population in order to obtain a perspective of the barriers to creativity for university students, the study has also proposed to validate the Inventory of Personal Creativity Barriers in the Spanish population (Morais et al., 2014b). More specifically, the objectives pursued have been to:

- 1 Validate the Inventory of Personal Creativity Barriers in the Spanish population (Morais et al., 2014b).
- 2 Find out the frequency of artistic activities among students in Education and to determine which activities are most frequently carried out by men and women.
- 3 Analyse the relationship between barriers to creativity, creative development, self-esteem and previous participation in artistic activities of university students in the field of Education.

2. Method

2.1. Research design

In this study, we first carried out the validation of the Inventory of Personal Creativity Barriers in the Spanish population (Morais et al., 2014b). This was followed by a quasi-experimental, descriptive, cross-sectional study (Montero & León, 2002).

2.2. Participants

In total, $N = 574$ students participated in the study, from two public universities, located in different cities. They were selected using non-probabilistic (convenience) sampling, and they participated in the validation of the Personal Creativity Barrier Inventory (Morais et al., 2014b). The sample distribution was as follows: 99 men (17.83%) and 475 women (82.17%), all of whom were

second-year students enrolled in Social Education, Early-Childhood Education, Primary Education and Pedagogy Degrees who voluntarily agreed to participate. They came from the Faculties of Educational Sciences at the Universities of Granada and Almería (Spain). They were between 18 and 28 years of age ($M = 21.57$; $SD = 2.676$). To confirm the appropriateness of the sample size, the calculator provided by Creative Research Systems (2019) was used, which, for a population of 1.291.144 students, with a 5% confidence interval and 95% confidence level, requires a sample of 384 people.

Of the total sample of students ($N = 574$), 141 had participated in artistic activities (122 women, 86.5%; and 19 men, 13.59%), and 433 had not. From the latter group of students ($N = 433$) a randomly selected, gender and numerically balanced sample of 150 students (125 women, 83.3%; and 25 men, 16.6%) was drawn up, using SPSS version 25 software. The final sample participating in the research to analyse differences between students who have carried out artistic activities versus those who have not was made up of 291 students (247 women, 84.8%; and 44 men, 15.1%), aged between 18 and 28 ($M = 20.98$; $WD = 2.50$).

Table 1 shows the type of artistic activities in which the students participated, taking into account that some of them carried out more than one activity. This table also shows the percentage of participants.

2.3. Instruments

A personal socio-demographic data sheet (prepared ad hoc by the authors of the study) was drawn up for collecting items such as: age, gender, degree being studied, university of origin, participation in artistic activities (music, dance, plastic arts, theatre/circus, writing, others) during childhood/adolescence, or at present. This list of activities was drawn up taking into account those most frequently offered by schools.

Creative Imagination Test for Adults (PIC-A) (Artola et al., 2012). This evaluates verbal or narrative creativity (the degree to which a person is capable of offering many and original solutions to verbal problems) and graphic creativity (the degree to which one is capable of producing original or different mental images in non-verbal tasks), which combined give rise to an overall score of general creativity (estimate of creative potential, of the capacity to transform, combine and establish new combinations between mental elements). The scores that can be obtained in narrative creativity range from 0 to ≥ 88 ; in graphic creativity, they are situated between 0 and ≥ 23 ; and the score in general creativity ranges from 0 to ≥ 206 . The test consists of four games: 1, 2 and 3 measure verbal creativity and 4 measures graphic or figurative creativity. The reliability of the test, understood as internal consistency, is high ($\alpha = 0.83$). The analysis of factorial validity revealed the need to interpret the overall creativity score with caution and underlines the importance of distinguishing between narrative creativity (composed of fluency, flexibility and narrative originality scales) and graphic creativity (composed of scales of graphic originality, elaboration, special details and titles). As complementary evidence of validity, correlations with the criteria of expert judges were used, finding a positive correlation of 0.77 in the narrative area and 0.47 in the graphic area. These data are considered evidence of the validity of the test.

Rosenberg's Scale of Self-Esteem (Rosenberg, 1965), adapted for the Spanish population (Vázquez Morejón et al., 2004), provides an overall index of feelings of respect and self-acceptance. It assesses the overall positive or negative attitude of the person, and is one of the most widely used scales. Its internal consistency was high ($\alpha = 0.87$), with a reliability index of $r = 0.72$. It consists of ten multiple choice items with four response options (A = strongly agree; B = agree; C = disagree; D = strongly disagree). The overall score ranges from 10 to 40, with higher scores associated with a higher degree of self-esteem.

The Personal Creativity Barrier Inventory (Morais et al., 2014a) is designed to assess students' perception of personal and social barriers that inhibit their creativity. The scale has been translated into Spanish and validated for the Spanish population by the authors of this article (using IBM SPSS v25 software), starting with the Portuguese population version (Morais et al., 2014b). The translated Personal Creativity Barrier Inventory instrument shows good internal consistency ($\alpha = 0.943$). To check its validity we performed a factor analysis using the principal components method with varimax rotation. The homogeneity and sphericity indices were adjusted for this type of analysis ($KMO = 0.933$; Barlett $\chi^2_{(946)} = 12,705.932$, $p < 0.000$). The items of the scale can be divided into four factors, which explain 48.959% of the variance of the items, each of them showing good internal consistency and adequate factorial weight (Table 2).

Factor 1. inhibition/shyness (emotional barriers associated with inhibition/timidity), comprising 14 items ($\alpha = 0.925$, and factor weight between 0.506 and 0.741).

Factor 2. Lack of motivation (emotional barriers associated with lack of or low personal motivation), comprising 12 items ($\alpha = 0.830$, and factor weight between 0.389 and 0.760).

Table 1

Average scores, standard deviations and percentage of students who participated in artistic activities.

| Artistic activities | N | Mean | SD | % |
|---------------------|----|------|-------|------|
| Music | 53 | 0.11 | 0.313 | 11 |
| Dance | 77 | 0.16 | 0.365 | 15.9 |
| Plastic Arts | 55 | 0.11 | 0.318 | 11.4 |
| Theatre/circus | 29 | 0.06 | 0.234 | 6 |
| Writing | 19 | 0.04 | 0.190 | 3.9 |
| Other | 8 | 0.08 | 0.616 | 1.6 |

Note: SD = Standard Deviation.

Table 2
Factor weight of each of the items in the four retained factors.

| Item | Factors | | | |
|-----------------------------------------------------------------------------------|---------|-------|-------|-------|
| | 1 | 2 | 3 | 4 |
| 1 Believe in myself more | 0.597 | | | |
| 1 Be less shy to express my ideas | 0.626 | | | |
| 1 Be more spontaneous | 0.556 | | | |
| 1 Don't be so insecure | 0.691 | | | |
| 1 Be willing to run more risks | 0.506 | | | |
| 1 Don't be afraid to cross people | 0.620 | | | |
| 1 Don't be so conformist | | 0.448 | | |
| 1 Work harder | | 0.515 | | |
| 1 Have more motivation to create | | 0.476 | | |
| 1 Make more time | | | 0.482 | |
| 1 Don't be afraid to confront the unknown | 0.697 | | | |
| 1 Give more recognition to creative work | | | 0.559 | |
| 1 Exercise more the habit of looking for new ideas | | 0.395 | | |
| 1 Don't be afraid to face criticism | 0.699 | | | |
| 1 Don't be afraid to say what you think | 0.741 | | | |
| 1 Be more stimulated by my teachers | | | 0.351 | |
| 1 Don't be afraid to carry out my ideas | 0.666 | | | |
| 1 Be more extrovert | 0.542 | | | |
| 1 Don't feel inferior to others | 0.640 | | | |
| 1 Don't be afraid of being misunderstood | 0.586 | | | |
| 1 Make time to develop my ideas | | | 0.503 | |
| 1 My family should not limit me | | | | 0.562 |
| 1 Have more opportunities to put my ideas in practice | | | 0.526 | |
| 1 Don't be afraid of what others think of me | 0.703 | | | |
| 1 Have more opportunities to develop my potential | | | 0.529 | |
| 1 Don't receive such a rigid education | | | | 0.690 |
| 1 Don't be limited by my teachers | | | | 0.617 |
| 1 Have more opportunities to be wrong without being considered stupid or an idiot | | | | 0.543 |
| 1 Be less criticised | | | | 0.510 |
| 1 Be more constant | | 0.594 | | |
| 1 Value my ideas more | | | 0.529 | |
| 1 There should be more cooperation between people | | | 0.635 | |
| 1 There should be greater acceptance of fantasy in my environment in which I live | | | | 0.642 |
| 1 People should value new ideas more | | | 0.684 | |
| 1 There should be more respect for difference | | | 0.580 | |
| 1 The world should not be so authoritarian | | | | 0.322 |
| 1 Don't be so critical of other people's ideas | | | | 0.377 |
| 1 Be more committed in what I do. | | 0.734 | | |
| 1 Have more energy | | 0.690 | | |
| 1 Be richer in ideas | | 0.572 | | |
| 1 Be more focused on what I do | | 0.711 | | |
| 1 Be more curious | | 0.703 | | |
| 1 Have more enthusiasm | | 0.760 | | |
| 1 Have greater knowledge | | 0.389 | | |

Method of extraction: maximum plausibility; Varimax with Kaiser normalization.

*The rotation has converged in 6 iterations.

Table 3
Internal consistency and statistics from the translated questionnaire.

| | Internal consistency | | Scale statistics | | | |
|---------------|----------------------|-------------------------------------------------|------------------|----------|--------|-----------------|
| | Cronbach's alpha | Cronbach's alpha based on standardized elements | Mean | Variance | SD | Elements number |
| Factor 1 | 0.925 | 0.925 | 45.11 | 144.973 | 12.040 | 14 |
| Factor 2 | 0.830 | 0.833 | 37.70 | 41.142 | 6.414 | 10 |
| Factor 3 | 0.817 | 0.813 | 22.97 | 42.020 | 6.482 | 8 |
| Factor 4 | 0.894 | 0.893 | 40.05 | 94.425 | 9.717 | 12 |
| Questionnaire | 0.943 | 0.943 | 145.83 | 761.197 | 27.590 | 44 |

Note: SD = Standard Deviation.

Factor 3. Lack of time/opportunities (social barriers associated with lack of time/opportunities), comprising 10 items ($\alpha = 0.817$, and factor weight between 0.351 and 0.684).

Factor 4. Social repression/social obstacles (social barriers), comprising 8 items ($\alpha = 0.894$, and factor weight between 0.322 and 0.690).

Table 3 presents the internal consistency data, both for the individual factors and for the total scale.

The results obtained in the statistical analyses, both exploratory and confirmatory, lead us to conclude that the Scale is an instrument with contrasted evidence of internal consistency. The validated version consists of 44 items, in which the response options, on a five-point Likert scale, range from 1 (completely disagree) to 5 (completely agree). Higher scores indicate more creative barriers. Comparing the validated instrument with the original, it was found that after factor analysis the items are assigned to each of the factors in an identical manner, with factor weights that deviate minimally from the original, obtaining better internal consistency values, both in the questionnaire as a whole and in each of the four factors of the validated instrument (Table 4).

2.4. Procedure

The research was approved by the ethics committee of the University of Granada (by informed written consent) during the year 2019–2020.

Firstly, a meeting was held with different groups of students enrolled in the Faculty of Education Sciences, at the Universities of Granada and Almeria, to explain the objectives of the study and the methodology to be followed. After requesting their voluntary collaboration, they were provided with the instruments they had to fill in (socio-demographic data, creative competence and self-esteem), in an individual online format, through a website created by the researchers. The data was collected using an electronic version of the Lime Survey application (Version 2.00+), and they were provided with the necessary assistance through the research forum. Anonymity was ensured by accessing the platform through a code. The PIC test was completed on paper (as it was impossible to do it online) and, therefore, in-person sessions. They were assessed during class time, in a single 1 h session. All cases that had not completed any of the tests were eliminated from the study, with 574 students participating in the validation of the instrument Personal Creativity Barrier Inventory (Morais et al., 2014b).

Subsequently, once the group of 141 students that participate in artistic activities had been identified from the full group, a similar group balanced in number and gender was randomly selected (by SPSS version 25 software).

3. Results

The analysis of the data was carried out using SPSS version 25 software, assuming a significance level of 0.05 in all the contrasts made.

Firstly, a frequency analysis was carried out to find out the percentage of students participating in artistic activities and the most frequent activities carried out by males and females. This analysis showed that 24.56% were involved in them, with a higher frequency among females (25.68%) than males (19.19%). Table 5 shows that the most frequent activity among females is dance, followed by plastic arts and music. In the case of men, the activity with the highest frequency is music, followed by plastic arts.

Next, the data were analysed in order to determine the most appropriate type of statistical procedure to be applied. The Levene test statistic was calculated via a *t*-test for independent samples. It was decided that parametric tests were appropriate due to the homogeneity of variance outcomes.

A Pearson correlation analysis (Table 6) was then carried out to find out if there was a relationship between the factors of barriers to creativity, tests of creative imagination, self-esteem and participation in artistic activities. As can be seen, significant positive correlations were found between PIC-A (Narrative), PIC-A (General) and participation in artistic activities. Significant negative correlations were obtained between F1 (Social inhibition), F3 (Lack of time/opportunities), F4 (Social repression/Social barriers) and self-esteem, showing that lower self-esteem scores correlate with more creative barriers. It should be noted that in all cases the correlations are not very high.

The General Univariate Linear Model was carried out for each of the variables assessed to analyse differences between students who have carried out artistic activities, compared with those who have not. The effect size was also calculated. The results of different ANOVA analysis conducted in each evaluated variable are shown in Table 7. As can be seen, significant differences were obtained between groups in the three tests of creative imagination: PIC-A (Narrative), PIC-A (Graphic) (although at the limit of significance) and PIC-A (General), with higher scores being observed in the group that has participated in artistic activities. The effect size between the groups varied between 0.014 and 0.095, which is low, according to the criterion established by Cohen (1988). No significant

Table 4
Internal consistency values of the original and the validated questionnaire.

| | Cronbach's alpha | | | | |
|-----------|------------------|-------|-------|-------|-------|
| | Questionnaire | F1 | F2 | F3 | F4 |
| Original | 0.91 | 0.81 | 0.73 | 0.72 | 0.61 |
| Validated | 0.943 | 0.925 | 0.830 | 0.817 | 0.894 |

Table 5

Average scores, standard deviations and percentage of students who participated in artistic activities.

| Artistic activities | Women | | | | Men | | | | Total | | | |
|---------------------|-------|------|-------|------|-----|------|-------|------|-------|------|-------|------|
| | N | Mean | SD | % | N | Mean | SD | % | N | Mean | SD | % |
| Music | 43 | 0.35 | 0.480 | 35.2 | 10 | 0.53 | 0.513 | 52.6 | 53 | 0.11 | 0.313 | 11 |
| Dance | 73 | 0.60 | 0.492 | 59.8 | 3 | 0.16 | 0.375 | 15.8 | 77 | 0.16 | 0.365 | 15.9 |
| Plastic Arts | 48 | 0.39 | 0.491 | 39.3 | 7 | 0.37 | 0.496 | 36.8 | 55 | 0.11 | 0.318 | 11.4 |
| Theatre/circus | 27 | 0.21 | 0.411 | 21.3 | 2 | 0.11 | 0.315 | 10.5 | 29 | 0.06 | 0.234 | 6 |
| Writing | 15 | 0.12 | 0.330 | 12.3 | 3 | 0.16 | 0.375 | 15.8 | 19 | 0.04 | 0.190 | 3.9 |
| Other | 6 | 0.25 | 1.125 | 4.9 | 2 | 0.37 | 1.116 | 10.6 | 8 | 0.08 | 0.616 | 1.6 |

Note: SD = Standard Deviation.

Table 6

Pearson correlation analysis and significance between participation in artistic activities, PIC-A tests, creative barriers and self-esteem.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----------------|---------|---------|---------|--------|----------|---------|----------|---------|---|
| 1. P.A.A. | 1 | | | | | | | | |
| 2. PIC-A (Nar) | 0.183** | 1 | | | | | | | |
| 3. PIC-A (Gra) | 0.104 | 0.184** | 1 | | | | | | |
| 4. PIC-A (Gen) | 0.192** | 0.987** | 0.338** | 1 | | | | | |
| 5. F1 | 0.012 | 0.006 | 0.037 | 0.012 | 1 | | | | |
| 6. F2 | 0.026 | 0.076 | 0.100 | 0.089 | 0.408** | 1 | | | |
| 7. F3 | -0.009 | 0.052 | -0.027 | 0.045 | 0.504** | 0.567** | 1 | | |
| 8. F4 | 0.013 | -0.027 | -0.018 | -0.029 | 0.529** | 0.403** | 0.494** | 1 | |
| 9. Self-est. | 0.059 | -0.027 | 0.041 | -0.019 | -0.346** | -0.024 | -0.175** | -0.114* | 1 |

Note 1: P.A.A. = participation in artistic activities; PIC-A (Nar) = Narrative; PIC-A (Gra) = Graphic; PIC-A (Gen) = General; F1 = inhibition/shyness; F2 = lack of motivation; F3 = lack of time and opportunities; F4 = social repression and social obstacles; Self-est. = self-esteem.

Note 2: **p 0.01; *p 0.05.

Table 7

Mean scores, standard deviations, ANOVA, significance and effect size of PIC-A tests, creative barriers and self-esteem.

| | Participants | | Non-participants | | F | p | η^2 |
|-------------|--------------|--------|------------------|--------|--------|-------|----------|
| | Mean | SD | Mean | SD | | | |
| PIC-A (Nar) | 78.319 | 33.125 | 67.39 | 27.477 | 10.691 | 0.001 | 0.091 |
| PIC-A (Gra) | 12.504 | 5.143 | 11.39 | 5.077 | 3.841 | 0.051 | 0.014 |
| PIC-A (Gen) | 90.823 | 34.798 | 78.79 | 28.625 | 11.927 | 0.001 | 0.095 |
| F1 | 3.316 | 0.962 | 3.274 | 0.738 | 0.201 | 0.654 | 0.001 |
| F2 | 3.838 | 0.610 | 3.776 | 0.628 | 0.820 | 0.366 | 0.004 |
| F3 | 2.916 | 0.859 | 2.912 | 0.783 | 0.002 | 0.963 | 0.000 |
| F4 | 3.404 | 0.888 | 3.353 | 0.760 | 0.313 | 0.576 | 0.001 |
| Self-esteem | 30.092 | 5.444 | 29.65 | 5.294 | 0.554 | 0.457 | 0.004 |

Note 1: PIC-A (Nar) = Narrative; PIC-A (Gra) = Graphic; PIC-A (Gen) = General; F1 = inhibition/shyness; F2 = lack of motivation; F3 = lack of time and opportunities; F4 = social repression and social obstacles; Self-est. = self-esteem.

Note 2: p < 0.05; SD = standard deviation.

differences were found between the groups in the factors of barriers to creativity or self-esteem (see Table 7), suggesting that participation in arts activities does not seem to influence these variables.

4. Discussion

Given the scarcity of validated instruments in Spanish that allow us to obtain a perspective of the barriers to creativity in university students, we undertook the validation of the *Personal Creativity Barriers Scale* (Morais et al., 2014a). Once the *Personal Creativity Barriers Scale* (Morais et al., 2014a) had been translated, and the terminology had been adjusted to the linguistic and cultural environment, and after the appropriate statistical analyses had been carried out, a scale with good psychometric properties was drawn up to evaluate the phenomenon and help in the research. With respect to the original instrument, after the factor analysis we detected that the items are assigned identically to each of the factors, with factor weights that deviate minimally from the original, with better internal consistency values being obtained in the validated questionnaire as a whole (see Table 4) and in each of the four factors it comprises. This validation provides an instrument with which to advance in the detection of possible barriers that interfere with the creativity of the university population and professionals in general. This is a noteworthy aspect of research, since other studies have highlighted the existence of creative barriers in university students of different degrees (Kazerounian & Foley, 2007; Konstantinidou et al., 2015), which is why detecting possible barriers is as important as encouraging creativity (Hilal et al., 2013; Kazerounian & Foley, 2007).

The second objective of this study was to find out the frequency of artistic activities among students in education and to determine

which activities are most frequently carried out by males and females. The results showed that around a quarter of the students participating in the study engaged in artistic activities, and that it was more frequent among girls, a finding that is consistent with results found in previous studies (Gralewski & Karwowski, 2013). The data suggests that girls are more likely to participate in this type of activity, leading to the assumption that they may have found a more favourable environment, or that they may have been more motivated to do so. However, we cannot confirm this assertion as it has not been taken into account in the evaluation carried out.

Among the most popular activities performed were dance among females and music among males. This is in line with previous studies that detected greater frequency in the practice of activities such as dance and body expression in girls (Aranguren & Irrazabal, 2012; Diedrich et al., 2018) and music (among other activities) in boys (Elisondo et al., 2022).

The third objective was to find out if there was any relationship between the barriers, creative imagination, participation in artistic activities and the self-esteem of university students. The results show a positive relationship between participation in artistic activities and narrative and general imagination, a relationship that has been demonstrated in the comparison between the group that has carried out artistic activities and the group that has not. Differences in graphic creativity were also obtained. This data is in line with those obtained in other studies that have highlighted the positive relationship between participation in artistic activities and improvement in creativity (Alfonso-Benlliure et al., 2021; Cotter et al., 2016; Elisondo et al., 2022). Likewise, a negative relationship was detected between barriers associated with social inhibition or shyness, lack of time/opportunities, social repression/social obstacles, and self-esteem (although the correlations obtained are not very high), suggesting that lower self-esteem scores correlate with more creative barriers (such as those mentioned above). While other research has found a positive relationship between self-esteem and creativity (Cantero et al., 2016; Deng & Zhang, 2011; Goldsmith & Matherly, 2012), we have not found many studies in which the relationship with creative barriers is analysed, as in the present study, thus making it difficult to contrast the results. It should not be forgotten that people with high self-esteem consider themselves more capable of performing any task or activity, are less afraid of expressing different opinions, find it easier to share creative ideas (Thatcher & Brown, 2010) and also note fewer barriers to creativity. Therefore, the negative relationship detected between self-esteem and the above-mentioned creative barriers should be taken into consideration.

The main objective of this study was to analyse the importance of the practice of artistic activities in the creative competence of university students in Education, even though it has been found that these practices improve creativity. The comparison between the group that had participated in artistic activities and the one that had not shows that the former obtained higher scores in the three tests of creative imagination, showing their increased ability to come up with imaginative solutions to narrative and graphic problems. The data is consistent with others that have referred to the improvement of creativity in students who have participated in artistic, cultural and social activities (Chamorro-Premuzic et al., 2009; Corbalán & Limiñana-Gras, 2010; Ozga & Cudo, 2022), or those that have concluded that students more exposed to drama, dance, music, art (Burton et al., 1999), or visual arts, dance, photography, video or communication skills (Mareque et al., 2019), outperformed those students who had been less exposed to creative tasks. The present study, it should be noted, focused specifically on the assessment of narrative, graphic and general creativity. The greater creative development of these students is encouraging for two reasons: firstly, because these are students in training who will be able to apply this creative development to the rest of the subjects that make up the academic curriculum, particularly as the relationship between academic performance and creativity has been established (Karwowski et al., 2020). Secondly, because they are students who are preparing to work as education professionals in the future, who will have among their competences the creative development of their students, if they provide an environment that favours it. According to the confluence theory of creativity (Sternberg & Lubart, 1996; Zhang & Sternberg, 2011), there is a need for resources, including the environment, to awaken and support the presence of creative ideas in students, given that the environment does not always favour creativity (Sternberg & Lubart, 1996; Zhang & Sternberg, 2011). Hence the importance of having teachers who motivate their students and reinforce these initiatives by encouraging the participation of these children in artistic activities. The benefit of participation in these artistic practices for the creative development of school children has been also highlighted (De Backer et al., 2012; Kamak et al., 2017; Winner et al., 2013), just as it has been pointed out that all human beings with normal capacities can produce creative work (Amabile, 2019), and that creativity can be trained through learning (Beghetto & Karwowski, 2018; Chacón-López, 2021).

It should be noted that, although differences between the groups participating in this study are evident, the effect size shows that they are not very significant. Also, the differences detected between the groups in our study do not extend to the factors of barriers to creativity or self-esteem variables, although examining Table 7 allows us to observe somewhat lower scores in those who do not participate in artistic activities.

4.1. Limitations and future studies

One of the weaknesses of this study is related to the sample. Although it can be considered that the number of students who have participated is sufficient to validate the Inventory, the representativeness has been reduced by the difficulty of working with samples matched by genders. It would be interesting to continue in-depth research into the analysed questions, trying to match the samples, a goal that is difficult to achieve given that degrees in Educational Sciences are chosen mostly by women. Secondly, the negative relationship detected between self-esteem and barriers associated with social inhibition or shyness, lack of time/opportunities and social repression/social obstacles, should be taken into account and taken up in future studies. For these reasons, the lack of time, the social imposition of continuous performance and competition, and the negative consideration of mistakes must be treated as problems to be tackled in the educational field. Paradigms need to be changed in order to improve learning and teaching processes. Thirdly, it would be useful to consider in the evaluation why men and women decided to pursue different artistic activities and the type of support they received.

5. Conclusions

Regarding the contributions of the study, firstly we want to highlight the validation of the Inventory of Barriers to Personal Creativity (Morais et al., 2014a) as being an instrument that can contribute to the research on the subject. Moreover, it concludes by recommending the participation in artistic activities in early stages or when young (especially for girls), given the benefits derived from these practices in the creative answers of the students. Higher scores in narrative and graphic creativity obtained by the group of students who have participated in artistic activities are sufficient reasons to defend the benefits of carrying out activities such as those that have been considered in the present research (music, dance, plastic arts, theatre/circus, and writing). This is especially so when referring to students of degrees in Education, which may encourage children's participation in artistic activities in the future.

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Ethics statement

The study has the approval of the Ethics Committee of the University of Granada. Informed written consent to participate in this study was provided by participants.

The authors declare

The authors, following the journal's transparency policy, declare that we are agree with the availability of the data, with the aim that them may be available, accessible to any researcher who considers interesting and useful.

Declaration of Competing Interest

The authors declare no conflict of interest.

Data availability

Data will be made available on request.

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References

- Abraham, A. (2016). Gender and creativity: An overview of psychological and neuroscientific literature. *Brain Imaging and Behavior*, 10(2), 609–618. <https://doi.org/10.1007/s11682-015-9410-8>
- Adams, J. L. (2001). *Conceptual blockbusting: A guide to better ideas* (4th Edition). Basik Books.
- Agencia Nacional de Evaluación de la Calidad y Acreditación [The National Agency of Evaluation of Quality and Accreditation, Spain]. (2005). *Libro blanco. Título de grado en magisterio*, 1. ANECA. Vol.1 https://educacion.uah.es/facultad/documentos/libroblanco_jun05_magisterio1.pdf.
- Alencar, E., Fleith, D. S.de, & Martinez, A. M. (2003). Obstacles to personal creativity between Brazilian and Mexican university students: A comparative study. *The Journal of Creative Behavior*, 37(3), 179–192. <https://doi.org/10.1002/j.2162-6057.2003.tb00832.x>
- Alencar, E., Fleith, D. S.de, & Pereira, N. (2017). Creativity in higher education: Challenges and facilitating factors. *Temas Em Psicologia*, 25(2), 553–561. <https://doi.org/10.9788/TP2017.2-09>
- Alfonso-Benlliure, V., Motos Teruel, T., & Lee Fields, D. (2021). Is it true that young drama practitioners are more creative and have a higher emotional intelligence? *Thinking Skills and Creativity*, 39, Article 100788. <https://doi.org/10.1016/j.tsc.2021.100788>
- Amabile, T. M. (2019). *Creativity in context: Update to the social psychology of creativity* (eBook). Routledge. <https://doi.org/10.4324/9780429501234>
- Amabile, T. M., & Pillemer, J. (2012). Perspectives on the social psychology of creativity. *The Journal of Creative Behavior*, 46(1), 3–15. <https://doi.org/10.1002/jobc.001>
- An, D., & Youn, N. (2018). The inspirational power of arts on creativity. *Journal of Business Research*, 85, 467–475. <https://doi.org/10.1016/j.jbusres.2017.10.025>
- Aranguren, M., & Irrazabal, N. (2012). A scale for the evaluation of creativity behavior in different domains: Development and design. *Ciencias Psicológicas*, 6(1), 29–41. <https://doi.org/10.22235/cp.v6i1.60>
- Artola, T., Barraca, J., Mosteiro, P., Ancillo, I., Poveda, B., & Sánchez, N. (2012). *PIC-A prueba de imaginación creativa para adultos*. TEA Ediciones. <https://web.teaediciones.com/PIC-A-Prueba-de-Imaginacion-Creativa-Adultos.aspx>.

- 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), 34–44. <https://doi.org/10.5539/hes.v9n3p34>
- Baer, J., & Kaufman, J. C. (2008). Gender differences in creativity. *The Journal of Creative Behavior*, 42(2), 75–105. <https://doi.org/10.1002/j.2162-6057.2008.tb01289.x>
- Barnes, R. (2015). *Teaching art to young children* (3rd Edition). Routledge.
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1–44. <https://doi.org/10.1111/1529-1006.01431>
- Beghetto, R., & Karwowski, M. (2018). Educational consequences of creativity: A creative learning perspective. *Creativity. Theories – Research – Applications*, 5, 146–154. <https://doi.org/10.1515/ctra-2018-0011>
- Buckley, B., & Conomos, J. (2010). *Rethinking the contemporary art school: The artist, the PhD and the academy*. Press of the Nova Scotia College of Art & Design.
- Burton, J., Horowitz, R., & Abeles, H. (1999). Learning in and through the arts: Curriculum implication. In E. Fiske (Ed.), *Champions of change: The impact of the arts of learning* (pp. 35–46). Arts Education Partnership.
- Cantero, M.-J., Alfonso-Benlliure, V., & Melero, R. (2016). Creativity in middle childhood: Influence of perceived maternal sensitivity, self-esteem, and shyness. *Creativity Research Journal*, 28(1), 105–113. <https://doi.org/10.1080/10400419.2016.1125246>
- Carver, C. S., Scheier, M. F., & Fulford, D. (2008). Self-regulatory processes, stress, and coping. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed.). Guilford Press.
- Cast, A. D., & Burke, P. J. (2002). A theory of self-esteem. *Social Forces*, 80(3), 1041–1068. <https://doi.org/10.1353/sof.2002.0003>
- Chacón-López, H. (2021). Increased creative production in Spanish university students of education. *Thinking Skills and Creativity*, 41(Complete), 100908. <https://doi.org/10.1016/j.tsc.2021.100908>
- Chamorro-Premuzic, T., Reimers, S., Hsu, A., & Ahmetoglu, G. (2009). Who art thou? Personality predictors of artistic preferences in a large UK sample: The importance of openness. *British Journal of Psychology* (London, England: 1953), 100(Pt 3), 501–516. <https://doi.org/10.1348/000712608X366867>
- Charyton, C., Basham, K. M., & Elliott, J. O. (2008). Examining gender with general creativity and preferences for creative persons in college students within the sciences and the arts. *The Journal of Creative Behavior*, 42(3), 216–222. <https://doi.org/10.1002/j.2162-6057.2008.tb01296.x>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Lawrence Erlbaum Associates, Publishers.
- Corbalán, J., & Limiñana-Gras, R. (2010). The genie in a bottle. The CREA test, questions and creativity. Introduction to special theme "The CREA test, creative intelligence. *Anales de Psicología*, 26, 197–205.
- Cotter, K. N., Pretz, J. E., & Kaufman, J. C. (2016). Applicant extracurricular involvement predicts creativity better than traditional admissions factors. *Psychology of Aesthetics, Creativity, and the Arts*, 10(1), 2–13. <https://doi.org/10.1037/a0039831>
- Da Costa, S., Páez, D., Sánchez, F., Garaigordobil, M., & Gondim, S. (2015). Personal factors of creativity: A second order meta-analysis. *Journal of Work and Organizational Psychology*, 31(3), 165–173. <https://doi.org/10.1016/j.rpto.2015.06.002>
- David, A. P., Morais, M., de, F., Primi, R., & Miguel, F. K. (2014). Metaforas e pensamento divergente: Criatividade, escolaridade e desempenho em artes e tecnologias. *Avaliação Psicológica: Interamerican Journal of Psychological Assessment*, 13(2), 147–156.
- De Backer, F., Lombaerts, K., De Mente, T., Buffel, T., & Elias, W. (2012). Creativity in artistic education: Introducing artists into primary schools. *International Journal of Art & Design Education*, 31(1), 53–66. <https://doi.org/10.1111/j.1476-8070.2012.01715.x>
- Deng, X., & Zhang, X.-K. (2011). Understanding the relationship between self-esteem and creativity: A meta-analysis. *Advances in Psychological Science*, 19, 645–651. <https://doi.org/10.3724/SP.J.1042.2011.00645>
- Diedrich, J., Jauk, E., Silvia, P. J., Gredlein, J. M., Neubauer, A. C., & Benedek, M. (2018). Assessment of real-life creativity: The inventory of creative activities and achievements (ICAA). *Psychology of Aesthetics, Creativity, and the Arts*, 12(3), 304–316. <https://doi.org/10.1037/aca0000137>
- Eisenberger, R., & Aselage, J. (2009). Incremental effects of reward on experienced performance pressure: Positive outcomes for intrinsic interest and creativity. *Journal of Organizational Behavior*, 30(1), 95–117. <https://doi.org/10.1002/job.543>
- Elisondo, R. C., Soroa, G., & Flores, B. (2022). Leisure activities, creative actions and emotional creativity. *Thinking Skills and Creativity*, 45, Article 101060. <https://doi.org/10.1016/j.tsc.2022.101060>
- Fernández-Díaz, J. R., Gutiérrez-Ortega, M., Llamas-Salguero, F., & Cantón-Mayo, I. (2021). Creativity and resilience as predictors of career success. *Sustainability*, 13(8), 4489. <https://doi.org/10.3390/su13084489>
- Gardner, H. (2011). *Educación artística y desarrollo humano* (F. M. Ortí, Trans.). Paidós.
- Ghaffari, K. (2015). The effect of teacher creativity in self-esteem of beginner EFL learners. *Modern Journal of Language Teaching Methods*, 5(1), 100–102.
- Gibson, R. (2010). The 'art' of creative teaching: Implications for higher education. *Teaching in Higher Education*, 15(5), 607–613. <https://doi.org/10.1080/13562517.2010.493349>
- Goldsmith, R. E., & Matherly, T. A. (2012). Creativity and self-esteem: A multiple operationalization validity study. *The Journal of Psychology*, 122(1), 47–56. <https://doi.org/10.1080/00223980.1988.10542942>
- González, J. M., & Wagenaar, R. (2003). *Tuning educational structures in Europe*. Universidad de Deusto. Informe Final Fase 2 <https://dialnet.unirioja.es/servlet/libro?codigo=733259>.
- Gralewski, J., & Karwowski, M. (2013). Polite girls and creative boys? Students' gender moderates accuracy of teachers' ratings of creativity. *The Journal of Creative Behavior*, 47(4), 290–304. <https://doi.org/10.1002/jobc.36>
- Guetzkow, J. (2002). How the arts impact communities. In *Proceedings of the taking the measure of culture conference of the centre for arts and cultural policy studies. Working paper*.
- Hallam, Dr. J., Gallagher, Mrs. L., & Owen, Dr. K. (2022). 'I'm not the best at art': An exploration of children's growing sense of artistry within an outdoor, arts-based intervention. *Thinking Skills and Creativity*, 44, Article 101038. <https://doi.org/10.1016/j.tsc.2022.101038>
- Hetland, L., & Winner, E. (2004). Cognitive transfer from arts education to nonarts outcomes: Research evidence and policy implications. In E. W. Eisner, & M. D. Day (Eds.), *Handbook of research and policy in art education* (p. 288). Routledge.
- Hetland, L., Winner, E., Veenema, S., & Sheridan, K. M. (2015). *Studio thinking 2: The real benefits of visual arts education* (2nd Edition). Teachers College Press.
- Hilal, M. H. H., Husin, W. N. I., & Zayed, T. M. (2013). Barriers to creativity among students of selected universities in Malaysia. *International Journal of Applied Science and Technology*, 3(6), 51–60.
- Jackson, N. (2006). Imagining a different world. In N. Jackson, M. Oliver, M. Shaw, & J. Wisdom (Eds.), *Developing creativity in higher education. An imaginative curriculum*. Routledge.
- Jørgensen, U., Brodersen, S., Lindgaard, H., & Boelskifte, P. (2011). Foundations for a new type of design engineers—Experiences from DTU. In *ICED 11 - 18th international conference on engineering design - Impacting society through engineering design* (pp. 275–286). <http://www.scopus.com/inward/record.url?scp=84858807585&partnerID=8YFLogxK>
- Juhl, J., & Buch, A. (2019). Transforming academia: The role of education. *Educational Philosophy and Theory*, 51(8), 803–814. <https://doi.org/10.1080/00131857.2018.1508996>
- Kamak, A., Auelbekov, E., Zhumabekova, F., Zhiyentayeva, B., & Mandykaeva, A. (2017). Creative development of junior school students in the process of fine art training. *Journal of Entrepreneurship Education*, 20(3), 1–7.
- Karwowski, M., Jankowska, D. M., Brzeski, A., Czerwonka, M., 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>
- Kazerounian, K., & Foley, S. (2007). Barriers to creativity in engineering education: A study of instructors and students perceptions. *Journal of Mechanical Design*, 129(7), 761–768. <https://doi.org/10.1115/1.2739569>
- Klijn, M., & Tomic, W. (2010). A review of creativity within organizations from a psychological perspective. *Journal of Management Development*, 29(4), 322–343. <https://doi.org/10.1108/02621711011039141>

- Konstantinidou, E., Zisi, V., Katsarou, D., & Michalopoulou, M. (2015). Barriers and inhibitors of creativity in physical education. *European Psychomotricity Journal*, 7(1), 17–31.
- Mareque Álvarez-Santullano, M., & de Prada-Creo, E. (2018). Evaluación de las competencias profesionales a través de las prácticas externas: Incidencia de la creatividad. *Revista de Investigación Educativa*, 36(1), 203–219. <https://doi.org/10.6018/rie.36.1.275651>
- Mareque, M., de Prada-Creo, E., & Gonzalez-Sanchez, M. B. (2019). Fostering creativity and communicative soft skills through leisure activities in management studies. *Education+ Training*, 61(1), 94–107. <https://doi.org/10.1108/ET-07-2018-0149>
- Montero, I., & León, O. G. (2002). Classification and description of research methodologies in psychology. *International Journal of Clinical and Health Psychology*, 2(3), 503–508.
- Morais, M., de F., & Almeida, L. S. (2015). Percepções de obstáculos à criatividade em universitários de diferentes áreas curriculares e níveis de graduação || Perceptions of obstacles to creativity with university students from different subject areas and grade levels. *Revista de Estudios e Investigación en Psicología y Educación*, 2(2), 122–129. <https://doi.org/10.17979/reipe.2015.2.2.1358>
- Morais, M. de F., Almeida, L. S., Azevedo, I., Alencar, E., & Fleith, D. (2014a). Inventory of barriers to personal creativity: A validation study involving university students. In Z. Bekirogullari & M. Y. Minas (Eds.), *Cognitive—Social, and behavioural sciences – icCSBs 2014*, vol 1. *European Proceedings of Social and Behavioural Sciences: Vol. Cognitive-Social, and Behavioural Sciences – icCSBs 2014* (pp. 135–145). Future Academy. <https://www.europeanproceedings.com/article/10.15405/epsbs.2014.05.16>.
- Morais, M., de F., Almeida, L. S., Azevedo, I., Alencar, E., Fleith, D., & de, S. (2014b). Validação portuguesa do inventário de práticas docentes para criatividade na educação superior. *Avaliação Psicológica*, 13(2), 167–175.
- Nakano, T., de, C., Oliveira, K., da, S., & Zaia, P. (2021). Gender differences in creativity: A systematic literature review. In *Psicologia: Teoria e pesquisa*, 37. <https://doi.org/10.1590/0102.3772e372116>
- Nordin, N., & Malik, M. (2015). Undergraduates' barriers to creative thought and innovative in a new millennial era. In , 201. *Procedia - social and behavioral sciences* (pp. 93–101). <https://doi.org/10.1016/j.sbspro.2015.08.136>
- Ozga, W. K., & Cudo, A. (2022). Exploring factors that differentiate art and non-art high school students. *The Journal of Creative Behavior*, 56(1), 6–15. <https://doi.org/10.1002/jocb.508>
- Pagnani, A. R., Runco, M., & Pritzker, S. (2011). Gender differences. In *Encyclopedia of creativity* (2nd Edition, 1 pp. 551–557). Elsevier. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/gender-differences>.
- Powers, A. (2018). *Creativity is the skill of the future*. Forbes. Retrieved 11 August 2022, from <https://www.forbes.com/sites/annapowers/2018/04/30/creativity-is-the-skill-of-the-future/>.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal*, 24(1), 92–96. <https://doi.org/10.1080/10400419.2012.650092>
- Sadi, M. A., & Al-Dubaisi, A. H. (2008). Barriers to organizational creativity: The marketing executives' perspective in Saudi Arabia. *Journal of Management Development*, 27(6), 574–599. <https://doi.org/10.1108/02621710810877839>
- Solé, L., Sole-Coromina, L., & Poole, S. E. (2020). Mind the gap: Identifying barriers to students engaging in creative practices in higher education. *Journal of Work-Applied Management*, 12(2), 207–220. <https://doi.org/10.1108/JWAM-03-2020-0017>
- Sowden, P. T., Clements, L., Redlich, C., & Lewis, C. (2015). Improvisation facilitates divergent thinking and creativity: Realizing a benefit of primary school arts education. *Psychology of Aesthetics, Creativity, and the Arts*, 9(2), 128–138. <https://doi.org/10.1037/aca0000018>
- Sternberg, R. J. (2005). Creativity or creativities? *International Journal of Human-Computer Studies*, 63(4), 370–382. <https://doi.org/10.1016/j.ijhcs.2005.04.003>
- Sternberg, R. J., & Lubart, T. I. (1996). Investing in creativity. *American Psychologist*, 51(7), 677–688. <https://doi.org/10.1037/0003-066X.51.7.677>
- Sunley, R., Harding, L., & Jones, J. (2019). Realising creativity in management education: Putting student energy into action. *The International Journal of Management Education*, 17(2), 172–181. <https://doi.org/10.1016/j.ijme.2019.02.007>
- Talavera, M., Hurtado, A., Domenech, J., & Martin-Baena, D. (2015). Valoración de la creatividad grupal y barreras del pensamiento creativo en universitarios [Assessment of group creativity and barriers to creative thinking among university students]. *Journal of Learning Styles*, 8, 70.
- Taylor, C. L., & Barbot, B. (2021). Gender differences in creativity: Examining the greater male variability hypothesis in different domains and tasks. *Personality and Individual Differences*, 174, Article 110661. <https://doi.org/10.1016/j.paid.2021.110661>
- Thatcher, S. M. B., & Brown, S. A. (2010). Individual creativity in teams: The importance of communication media mix. *Decision Support Systems*, 49(3), 290–300. <https://doi.org/10.1016/j.dss.2010.03.004>
- Vázquez Morejón, A. J., Jiménez García-Bóveda, R., & Vázquez-Morejón Jiménez, R. (2004). Escala de autoestima de Rosenberg: Fiabilidad y validez en población clínica española. [The Rosenberg self-esteem scale: Reliability and validity in clinical samples of the Spanish population]. *Apuntes de Psicología*, 22(2), 247–255.
- Wang, Y., & Wang, L. (2016). Self-construal and creativity: The moderator effect of self-esteem. *Personality and Individual Differences*, 99, 184–189. <https://doi.org/10.1016/j.paid.2016.04.086>
- Winner, E., Goldstein, T. R., & Vincent-Lancrin, S. (2013). Art for art's sake?: The impact of arts education: Educational research and innovation. *Organisation for Economic Cooperation & Development*.
- Wright, S. (2010). *Understanding creativity in early childhood: Meaning-making and children's drawing*. Sage. <https://doi.org/10.4135/9781446251447>
- Yates, E., & Szenasi, J. (2021). Engaging the local community in cultural heritage through a children's ceramic arts exhibition. In J. M. Salvador, & A. Pazos (Eds.), *The museum for all people. Proposals for accessibility and social inclusion in the XXI century*. Peter Lang. <http://hdl.handle.net/10545/625651>.
- Zhang, L., & Sternberg, R. J. (2011). Revisiting the investment theory of creativity. *Creativity Research Journal*, 23(3), 229–238. <https://doi.org/10.1080/10400419.2011.595974>