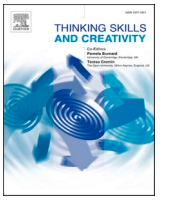
Thinking Skills and Creativity 63 (2027) 102397

Contents lists available at ScienceDirect

Thinking Skills and Creativity

journal homepage: www.elsevier.com/locate/tsc



Study of future teachers' perceptions of creativity: the case of a creativity training course

Guillaume Massy [a,*], John Didier [a], Maud Besançon [b]

[a] Haute École Pédagogique Vaud, Laboratoire CREAT, Switzerland
[b] Université Rennes 2, Laboratoire LP3C, France

ARTICLE INFO

Keywords:
Creativity
Perception
Teaching
Self creativity
Creativity teaching

ABSTRACT

There is growing interest in the multifaceted and complex nature of creativity, and more specifically in its integration into teachers' teaching practices. While many studies have focused on the development of creativity in schools and among pupils, little attention has been paid to how future teachers perceive their own creativity and its impact on their teaching practices. This study analyses 209 future teachers' perceptions of creativity and creative teaching using the Short Scale of Creative Self (SSCS) and the Creativity Teaching (CT) questionnaires, before and after creativity training. The main results reveal a moderate level of perception of the creative self and of creative teaching before training. At the end of the training, a significant increase in the creative self was observed across all levels of education. However, both before and after the training, the creative self was higher amongst early childhood teachers than amongst upper elementary teachers. By contrast, perceptions of creative teaching did not change significantly. These results suggest that creativity-focused training was associated with changes in how future teachers perceive their own creativity, whilst it's like to perceptions of creative teaching appears to be more limited. As well as reiterating the importance of studying the perceptions of future teachers, this study highlights the value of incorporating creativity-focused courses into initial teacher training, which may support to development of future teachers' creative self-perception and encourage the adoption of teaching practices that foster creativity.

1. Introduction

The Organisation for Economic Co-operation and Development (OECD) considers creativity to be a priority skill to develop in children. This is to enable them to meet the societal, environmental and technological challenges of tomorrow (OECD, 2018). This ability is recognised as an interdisciplinary skill that is essential for innovation, problem solving and personal development at all levels of education (Runco & Jaeger, 2012). While most researchers (Amabile, 1996; Besançon & Lubart, 2015; Lubart, 2023; Lubart et al., 2025) define creativity as the ability to produce new ideas or products that are both original and adapted to situational constraints, its translation into educational practices remains conceptually and operationally ambiguous. Despite a general consensus on fundamental criteria such as originality and relevance (Bonnardel & Lubart, 2023), there is no universally accepted framework for defining, promoting and developing creativity in schools. This difficulty stems both from the multidimensional nature of creativity (Barbot et al., 2019, 2022; Lau & Cheung, 2010; Said-Metwaly et al., 2020) and from persistent uncertainties regarding how creative abilities can be

* Corresponding author at: Haute École Pédagogique du Canton de Vaud, Lausanne, Vaud, Switzerland.
E-mail address: guillaume.massy@hepl.ch (G. Massy).

https://doi.org/10.1016/j.tsc.2026.102397
Received 18 July 2025; Received in revised form 15 October 2026; Accepted 15 October 2026
Available online 17 October 2026
1871-1871/© 2026 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

effectively developed within formal educational contexts (Lubart et al., 2019).

In this context, teachers and future teachers are among the key contributors to the development of the next generation's creative abilities (González-Sancho, 2020; Salinas et al., 2023). Their role is to encourage creativity in pupils aged 4 to 15 by designing learning activities and environments that stimulate creative thinking (Ferrari et al., 2009; Makris et al., 2021; Robinson, 2011) while ensuring the acquisition of academic knowledge (Berry et al., 2019; Cachia et al., 2010; OECD, 2019; Salinas et al., 2023).

Research among practising teachers has revealed a gap between teachers' stated intentions regarding creativity and their actual classroom practices (Aljughaiman & Mowrer-Reynolds, 2005; Karwowski et al., 2020b). Although many teachers report having a positive attitude towards creativity and challenge common misconceptions (Patston et al., 2017), this divergence in practice appears to be the result of a lack of preparation, knowledge and experience (Katz-Buonincontro et al., 2020) in terms of approach and support (Cheung, 2012) for teachers of creativity in the classroom (Gajda et al., 2017). Thus, their understanding of creativity often remains influenced by their personal experiences and previous training (Anderson et al., 2022; Cuevas & de la Herrán Gascón, 2015; Massy et al., 2024).

Finally, teachers' willingness, ability, and pedagogical choices to stimulate creativity in students appear to be strongly influenced by their perceptions, representations, and implicit theories of creativity (Cheung, 2012; Karwowski et al., 2020b; Kaufman & Beghetto, 2009; Mullet et al., 2016; Patston et al., 2017; Tsai, 2012). However, although we know more about the relationship between perceptions of creativity and teachers in the field, we know very little about how future teachers develop this dimension as a result of training (Massy et al., 2024, 2025; Muñoz-Salinas et al., 2025; Selkrig & Keamy, 2017).

1.1. Teachers' self-perception of creativity

Self-perception refers to how individuals perceive their own potential and creative abilities (Kaufman & Beghetto, 2013). In the educational field, it shapes the way teachers interpret and integrate creativity into their pedagogical practices (Katz-Buonincontro et al., 2020; Maggioni & Parkinson, 2008).

Although self-perception is influenced by past experiences, social interactions and comparisons with other beliefs about creativity (Paulus & Nijstad, 2019), it is not fixed and can evolve throughout personal or professional experiences (Anderson et al., 2022; Cuevas & de la Herrán Gascón, 2015). Research has shown, for instance, that teachers who engage in creative activities in their personal lives are more likely to value and promote creativity in their teaching (Henriksen & Mishra, 2015). Similarly, those who adopt innovative pedagogical approaches tend to develop greater awareness of the role of creativity in learning processes (Craft, 2001; Craft & Jeffrey, 2008).

Beyond contextual factors, the way individuals evaluate their own creativity, whether through introspection or external feedback, can influence both their confidence and their pedagogical practices (Neubauer et al., 2018). Accordingly, although a majority of teachers report perceiving themselves as creative (Al-Dababneh & Al-Zboon, 2017; Kasirer & Shnitzer-Meirovich, 2021), discrepancies have been observed between these self-perceptions and teachers' evaluation of their own creative classroom practices (Rubenstein et al., 2018). These findings suggest that self-perception constitutes a central psychological mechanism through which creativity-related beliefs may translate (or not) into pedagogical action. Thus, understanding creative self-perception (or creative self) under the influence of training allows us to examine the factors influencing engagement in creative teaching.

1.2. Perception of the creative self

The creative self refers to an individual's beliefs about their own creative abilities (Karwowski et al., 2018). Rooted in socio-cognitive theory, this construct captures how individuals perceive, evaluate and regulate their potential to generate original ideas and solve problems in novel ways. Early approaches to measuring the creative self were relatively succinct (Beghetto, 2006) and focused on specific components, including personal creative identity, Creative Self-Efficacy, creative mindset and creative metacognition (Beghetto & Karwowski, 2017; Kaufman & Beghetto, 2013). More specifically, these instruments assessed traits and self-evaluations related to creativity, such as having a vivid imagination, perceiving oneself globally as creative, or generating many original ideas (Zielińska et al., 2022).

A major contribution to the conceptualisation and measurement of the creative self was made by Karwowski and Barbot (2016) through the development and validation of the Short Scale of Creative Self (SSCS). This instrument assesses two fundamental dimensions: 1) creative personal identity (CPI); 2) creative self-efficacy (CSE). CPI is a key factor in creative perseverance and commitment, reflecting the extent to which individuals define themselves as creative people. Creative self-efficacy (CSE) refers to individuals' belief in their ability to mobilise their cognitive and motivational resources to produce original ideas and implement innovative solutions. It is a reliable indicator of individuals' willingness to engage in creative problem solving, take risks, and persevere in the face of adversity (Karwowski et al., 2018; Karwowski, 2015; Karwowski & Barbot, 2016).

Based on these two dimensions, it is also possible to calculate an overall personal creativity score (CS), which encompasses attitudes, values and beliefs related to creativity, as well as a subjective assessment of one's own creative potential. These dimensions of the creative self interact and contribute together to the development and expression of creativity, in particular by influencing a person's confidence in their creative abilities and their adherence to creative values (Karwowski, 2015; Karwowski & Barbot, 2016; Karwowski et al., 2013).

From an educational perspective, several studies indicate that creative self-perceptions vary according to a professional context and teaching level. For example, Kasirer and Shnitzer-Meirovich (2021) showed that upper elementary teachers tend to perceive themselves as less creative than their early childhood counterparts. These findings suggest that creative self-beliefs are not solely individual

characteristics, but are also shaped by contextual and institutional factors (Kasirer & Shnitzer-Meirovich, 2021; Pont-Niclòs et al., 2024), including the level of education in which teachers operate (Izquierdo-Sanchis et al., 2025).

In the context of the present study, the creative self is not conceptualised as a direct determinant of creative teaching practices, but rather as a subjective indicator of how future teachers perceive their own creative potential. Anchored in the multivariate approach (Lubart et al., 2025) to creativity, creative self-beliefs reflect motivational and identity-related components of creative potential that may evolve through training. Examining changes in Creative Self-Efficacy and Creative Personal Identity therefore makes it possible to capture one dimension of the perceptual transformations associated with creativity-focused training, alongside changes in perceptions of creative teaching.

1.3. Perception of creative teaching

In the field of creativity in education, several frameworks have sought to clarify the role of teaching in fostering students' creativity. Among these, the creative pedagogy model proposed by Lin (2011)) conceptualises creativity in education as the interaction of three complementary components: 1) creative teaching; 2) teaching for creativity; and 3) creative learning. While creative teaching refers to the use of imaginative pedagogical approaches (Jeffrey & Craft, 2004; Lin, 2011; Selkrig & Keamy, 2017), teaching for creativity focuses more specifically on supporting the development of learners' creative potential. Selkrig and Keamy (2017) subsequently extended this model by placing teachers' own creative learning at its centre, arguing that how teachers themselves engage with and develop creativity underpins their capacity to teach both creatively and for creativity.

This updated framework is directly relevant to the present study, which examines two dimensions, as perceived by the trainee teachers themselves, of their relationship with creativity: a) their perception of their own creativity (creative self); and b) their perception of creative teaching. In Selkrig and Keamy's (2017) model, these dimensions revolve around teachers' creative learning, which links teachers' personal creative development to their professional ability to foster creativity in others. Consequently, we define the perception of creative teaching as teachers' self-referential assessment of their ability to implement pedagogical strategies (e.g. experimentation, the visual representation of ideas) that engage learners in creative learning, whilst considering contextual variables such as the learners' age and the learning environment. This perception can be modulated by several epistemic factors (teaching context, previous educational experiences) or linked to personal convictions (such as beliefs about creativity) and mastery of creativity methods and strategies (Karwowski et al., 2020a; Patston et al., 2017). Teachers' confidence in their perceptions of creative teaching can also play a role in pedagogical choices, teaching strategies, and interactions with students (Ahmadi, 2023; Ahmadi & Besançon, 2017). When teachers have a positive opinion of their creative teaching skills, they are more inclined to experiment with new approaches, stimulate students' curiosity and exploration, and encourage their active participation in the learning process (Kettler et al., 2018). Conversely, institutional constraints such as rigid curricula or lack of resources can have a negative impact on their willingness to teach creatively (Bereczki & Kárpáti, 2018).

Unlike teachers' general self-efficacy, which relates to their overall confidence in their teaching skills, the perception of creative teaching is domain-specific, focusing more specifically on the perceived ability to foster creativity. It also differs from pedagogical beliefs that support creativity, which concern what teachers think about creativity (for example, its value or whether it can be taught; Bereczki & Kárpáti, 2018). The perception of creative teaching, on the other hand, concerns how teachers assess their own ability to translate these orientations into pedagogical actions.

Finally, even if these factors modify their ability to promote creativity in their students (Ahmadi & Besançon, 2017; Chan & Yuen, 2014; Yeung & Bautista, 2024), research (Anderson et al., 2022; Massy et al., 2024) suggests that perceptions of creative teaching are not fixed but can evolve under the influence of theoretical and practical training, making this concept particularly relevant for examining the effects of creativity-focused teacher education programs (Massy et al., 2025; Selkrig & Keamy, 2017).

1.4. Measuring perceptions of creative teaching

Currently, there are few tools available to measure the extent to which teachers perceive themselves as capable of implementing teaching practices that promote creativity. To address this need and assess creativity in educational contexts, we used the French-language Questionnaire on Teaching Creativity (Ahmadi, 2023).

While the Short Scale of Creative Self (SSCS) measures individuals' beliefs about their personal creativity, namely Creative Personal Identity and Creative Self-Efficacy (Karwowski & Barbot, 2016), Ahmadi's (2023) instrument focuses on teachers' self-perceived pedagogical ability to integrate creativity into their teaching practices. To develop this instrument, Ahmadi (2023) draws on the distinction proposed by Jeffrey and Craft (2004) between teaching for creativity and creative teaching. Although further studies are needed to strengthen the validation of this instrument (Ahmadi, 2023), its focus on teachers' self-perception and its consistency with the theoretical framework adopted in this study make it a suitable tool for addressing gaps identified in the scientific literature. Firstly, whilst many instruments assess individuals' perceptions of their own creativity, few validated tools measure teachers' perceived ability to teach for creativity as a concept distinct from personal creativity (Ahmadi, 2023). Secondly, although previous research indicates that these perceptions can change through training (Anderson et al., 2022; Massy et al., 2024), quantitative data from pre-post tests on how a creativity-focused module influences both creative self and the perceived ability to teach creatively, and on whether these effects differ across educational levels, remain scarce (Massy et al., 2025).

1.5. Research questions and hypotheses

Although creativity is widely recognised as an essential competence in education, particularly for preparing future teachers to address the complex challenges associated with creativity-supportive teaching, it remains, for teachers, a concept characterised by ambiguity in both its definition and its perception. Even though creativity extends across all school subjects (Gajda et al., 2017; Kasirer & Shnitzer-Meirovich, 2021), research has primarily focused on practising teachers, while the development of creativity among pre-service teachers remains comparatively underexplored (Cheung, 2012; Muñoz-Salinas et al., 2025; Selkrig & Keamy, 2017). This gap is particularly noteworthy given the specific characteristics of pre-service teachers who: a) experience a reality shock when transitioning from the role of a student to that of a teacher (Deng et al., 2018); b) occupy a dual status as both learners and practitioners (Yuan et al., 2019); and c) are engaged in the construction of a professional identity that requires recognition by peers (Jokikokko & Uitto, 2017). In this context of shifting professional identity construction, future teachers often report uncertainties about their own creative potential and their perceived ability to teach creatively (Cheung, 2012; Selkrig & Keamy, 2017). Aware that the development of teaching practices is not limited to initial training (Borodina et al., 2019; Han & Abdrahim, 2023), understanding how future teachers learn and perceive creativity can lead to improvements in teacher training programmes in order to reduce uncertainties and initiate the development of truly creative teaching methods (Selkrig & Keamy, 2017).

Drawing on the theoretical framework presented above, creativity in teacher education can be approached through two complementary perceptual dimensions. The first is the creative self, which encompasses beliefs about one's own creative identity and creative self-efficacy (Karwowski, 2015; Karwowski & Barbot, 2016). The second is a perception of creative teaching, which refers to teachers' perceived ability to implement pedagogical approaches that support students' creativity (Ahmadi, 2023; Jeffrey & Craft, 2004; Lin, 2011; Selkrig & Keamy, 2017). These two dimensions reflect distinct but related aspects of how future teachers perceive their creative potential and their pedagogical capacity to foster creativity in educational contexts.

This study examines whether participation in creativity-focused training can influence these two perceptual dimensions in future teachers. More specifically, it investigates how such training affects: (a) pre-service teachers' perceptions of their own creative potential, as reflected in Creative Personal Identity and Creative Self-Efficacy; and (b) their perceptions of their ability to implement creativity-supportive teaching practices. Considering these elements, the research question is as follows:

Does participation in creativity-focused training influence how future teachers perceive their own creative potential and their ability to implement creativity-supportive teaching?

Based on the theoretical elements and empirical findings reviewed above, two hypotheses were formulated.

H1: Initial differences in creativity-related perceptions are expected between pre-service early childhood teachers and pre-service upper elementary teachers, in line with previous research suggesting variations according to teaching level (Izquierdo-Sanchis et al., 2025; Kasirer & Shnitzer-Meirovich, 2021).

H2: Participation in creativity-focused training is expected to be associated with an increase in pre-service teachers' perceptions of their own creativity (creative personal identity and creative self-efficacy) and in their perceived ability to teach creatively (Anderson et al., 2022; Karwowski, 2015; Karwowski & Barbot, 2016).

By examining changes in these two perceptual dimensions, this study aims to contribute to a better understanding of how creativity-focused training may shape future teachers' perceptions of their creative potential and their pedagogical capacity to support creativity. Such insights are expected to inform the design of teacher education programs and enhance their effectiveness in fostering creativity-supportive teaching practices.

2. Method

2.1. Participants

For this study, 209 pre-service teachers in their second year of training were recruited. Participants were aged between 19 and 56 years ($M = 25.72$; $SD = 7.77$), with 11% of men and 89% of women. All participants were enrolled at HEP Vaud, a teacher education institution in Switzerland, and belonged to two distinct training cycles. The first group comprises 161 pre-service early childhood teachers, preparing to work with children aged 4 to 7, aged between 19 and 56 ($M = 26.73$, $SD = 8.45$), with 8% of men and 92% of women. The second group was made up of 48 students in training for the upper elementary level, destined to work with children aged 8 to 12, aged between 19 and 50 ($M = 22.33$, $SD = 2.96$) with 24% of men and 76% women. The gender distribution of the sample did not differ significantly from that of the overall student population at the HEP Vaud (x^2 (1209) = 0.62, $p = .43$) ,[1] suggesting that the sample was representative with regard to gender.

[1] For the 1st degree, the percentages of the reference population are 10.19% men and 89.81% women, and for the 2nd degree, they are 25.76% men and 74.24% women. The frequencies observed in the sample are in line with these proportions.

2.2. Measuring instruments

2.2.1. Short scale of creative self (SSCS)

The Short Scale of Creative Self (Karwowski et al., 2018) was used to assess participants' creative self-perceptions. The scale measures two dimensions: Creative Self-Efficacy (CSE) and Creative Personal Identity (CPI). Participants rated the extent to which 11 statements described them on a 5-point Likert-type scale (1 = absolutely not, 5 = absolutely yes).

The CSE subscale comprises six items (e.g., "*I know I can efficiently solve even complicated problems*"), while the CPI subscale comprises five items (e.g., "*My creativity is important for who I am*"). A global Creative Self (CS) score can be calculated by averaging the 11 items, while subscale scores correspond to the mean of the items associated with each dimension (CSE and CPI).

Internal consistency analyses conducted on the present sample indicated good reliability, with Cronbach's alpha values of $\alpha = .819$ for CSE and $\alpha = .836$ for CPI. These values are comparable to those reported by Karwowski et al. (2018), who found $\alpha = .86$ for CSE and $\alpha = .87$ for CPI, confirming the satisfactory reliability of the scale in the present context.

2.2.2. Creative teaching test

The Creative Teaching questionnaire (Ahmadi, 2023; Ahmadi & Besançon, 2017) was used to assess teachers' perceptions of their ability to integrate creativity-supportive approaches into their teaching practice. The questionnaire consists of 12 items [see Appendix A], rated on a 7-point Likert scale (1 = Never, 7 = Always).

The instrument was initially validated with a sample of 150 teachers ($M = 30.94$ years; $SD = 6.98$ years) using repeated measures. The results of the factor analysis revealed two sub-dimensions: "creative teaching" (e.g. "*I imagine new ways of teaching a concept*") and "traditional teaching" (e.g. "*I don't feel that I help my students solve problems creatively*"), with a validity of $\alpha = 0.73$ and $\alpha = 0.71$.

In the present sample, internal consistency analyses yielded Cronbach's alpha coefficient of $\alpha = .659$ for the "creative teaching" subscale and $\alpha = .621$ for "traditional teaching" subscale. Although slightly lower than those reported in the original validation study, these values remain acceptable in an exploratory context.

2.2.3. Procedure

This study uses a pre-test-post-test design to evaluate the effects of a creativity-focused training module on pre-service teachers' perceptions of their creative self and creative teaching. Two questionnaires were administered to participants before and after the training: the Short Scale of Creative Self (SSCS) and the Creative Teaching (CT). The questionnaires were completed online, 15 days before and 15 days after the training module. The creativity module, which lasted a total of 36 h spread over 12 weeks, covered the main areas of creative pedagogy. More specifically, the module was structured around four complementary pillars: (1) Theory of creativity: introduction to the main theoretical frameworks. (2) Creative teaching: strategies for promoting creativity among teachers. (3) Creative learning: examples of student-centered activities. (4) Teaching creativity: designing and implementing teaching moments and sequences aimed at developing creative abilities through a project [see Appendix B for a detailed breakdown of content and time allocation].

Participation in the study was voluntary and entailed no financial compensation. Prior to participation, all participants were informed of the study's aims and provided informed consent. They were free to withdraw at any point without any consequences. At the time the data were collected, the host institution (HEP Vaud) had not yet established a Research Ethics Committee. The study was nonetheless conducted in accordance with recognised ethical principles for research involving human participants. Finally, all responses were anonymised and stored on a secure server, ensuring participants' confidentiality throughout the research process.

2.2.4. Analysis of results

Data analyses were conducted using Jamovi® and RStudio®. The normality of score distributions for the variables under study was assessed using the Shapiro-Wilk test. Although the test indicated a slight deviation from a Gaussian distribution ($W = .98$, $p = .011$), parametric analyses were considered robust given the sample size.

Descriptive statistics were computed to examine participants' initial perceptions (pre-test) and changes following the training (post-test). Inter-group effects were examined using analyses of variance (ANOVA) to assess the influence of teaching level (early childhood vs. upper elementary) and time (pre-test vs. post-test) on the variables studied. For all analyses of variance, effect sizes are reported as partial eta-squared (ηp^2), interpreted following Cohen's (1988) conventional benchmarks ($\eta p^2 \approx .01$, .06, and .14 for small, medium, and large effects).

Finally, Pearson's correlation analyses were conducted to explore associations between the dimension of the creative self (Creative Personal Identity and Creative Self-Efficacy) and participants' perceived ability to implement creative teaching.

3. Results

The results of this study are organized according to the two research objectives: 1) differences in initial perceptions (CS, CPI, and CSE) at the individual and professional (CT) levels according to educational levels (Hypothesis 1); and 2) changes in perceptions after creativity training (Hypothesis 2).

3.1. Differences in perception according to the level of education

Hypothesis 1 predicted that pre-service teachers' perceptions of their creative self (CS, CPI, CSE) and their perceived ability to

implement creativity-supportive teaching practices (CT) would differ according to the level of education they were being trained to teach (early childhood vs. upper elementary). Descriptive statistics for all variables in pre-test and post-test are presented in Table 1.

3.1.1. Pre-tests: effect of teaching level

Univariate analyses of variance were conducted to examine the effect of education level on participants' initial perceptions prior to creativity training.

Although there was a trend toward higher mean scores among early childhood teacher candidates than upper elementary teacher candidates, the effect of teaching level on CSE was not significant ($F(1, 207) = 3.60$, $p = .059$, $\eta p^2 = .017$). In contrast, the results of the analyses indicate a significant effect of teaching level on CS ($F(1, 207) = 5.33$, $p = .022$, $\eta p^2 = .025$) with higher scores observed among early childhood teachers in training than among upper elementary teachers in training.

A similar trend was identified for CPI ($F(1, 207) = 5.46$, $p = .020$, $\eta p^2 = .026$), indicating that teachers in training in the field of early childhood education perceive themselves as more creative than their counterparts in upper elementary education.

Finally, a significant effect of teaching level was found for CT, ($F(1, 207) = 4.08$, $p = .045$, $\eta p^2 = .019$) with teachers in training in the field of early childhood education reporting a higher score in terms of their ability to implement teaching practices that promote creativity.

3.1.2. Post-test: effect of teaching level

A second series of univariate analyses was conducted to examine whether differences between teaching levels persisted after creativity training. Results showed a significant effect of teaching level on CS ($F(1, 207) = 10.51$, $p = .001$, $\eta p^2 = .048$) with higher post-test scores for pre-service early childhood teachers.

A significant effect of teaching level was also observed for CPI ($F(1, 207) = 11.63$, $p < .001$, $\eta p^2 = .053$) and for CSE ($F(1, 207) = 6.72$, $p = .010$, $\eta p^2 = .031$). In both cases, pre-service early childhood teachers reported higher post-training scores than pre-service upper elementary teachers. In contrast, no significant difference between teaching levels was found for CT at the post-test.

3.2. Changes in perceptions before and after training

Hypothesis 2 predicted that pre-service teachers' perceptions of their personal creativity (CS, CPI, CSE) and their perceived ability to implement creativity-supportive teaching practices (CT) would increase following creativity-focused training. Descriptive statistics for all variables in pre-test and post-test are presented in Table 1. To examine changes over time and the potential influence of teaching level, a series of repeated-measure analyses of variance (ANOVA) were conducted, with time (pre-test vs. post-test) as a within-subject factor and teaching level (early childhood vs. upper elementary) as a between-subject factor.

3.2.1. Effect of the time

No significant effect of time was found for CT ($F(1, 207) = 0.085$, $p = .771$, $\eta p^2 = .000$), indicating that participants' perceived ability to implement creativity-supportive teaching practices did not change significantly between pre-test and post-test when considered independently of teaching level.

However, the analyses revealed a significant main effect of time on several dimensions of the creative self. A significant effect of time was observed for CPI ($F(1, 207) = 14.82$, $p < .001$, $\eta p^2 = .067$), indicating an increase in the extent to which participants identified creativity as part of their self-concept following the training. A similar effect was found for CSE ($F(1, 207) = 7.35$, $p = .007$, $\eta p^2 = .034$), suggesting a modest increase in participants' perceived confidence in their creative problem-solving abilities.

Regarding CS, the global score also showed a significant effect of time ($F(1, 207) = 14.13$, $p < .001$, $\eta p^2 = .064$), reflecting an overall increase in creative self-perceptions across the training period.

Overall, these results suggest that the training was associated with changes in several dimensions of the creative self, while perceptions related to creative teaching remained relatively stable over time.

3.2.2. Combined effects of time and teaching level

To examine whether changes over time differed according to teaching level, interaction effects between time and teaching levels were analysed.

Table 1
Average scores and standard deviations for the SSCS and CT dimensions before and after training, by the level of education.

	Dimensions	Pre-training	Post-training
Early childhood	CS	3.56 (*0.66*)	3.77 (*0.64*)
	CPI	3.51 (*0.69*)	3.74 (*0.65*)
	CSE	3.63 (*0.74*)	3.81 (*0.74*)
	CT	4.71 (*0.54*)	4.72 (*0.63*)
Upper elementary level	CS	3.31 (*0.74*)	3.42 (*0.66*)
	CPI	3.23 (*0.79*)	3.37 (*0.66*)
	CSE	3.40 (*0.83*)	3.49 (*0.79*)
	CT	4.54 (*0.47*)	4.56 (*0.63*)

Note: Values represent means and standard deviations (in italics within parentheses).

The results indicated no significant interaction between time and teaching level for any of the dimensions assessed, including CS ($F(1, 207) = 1.04$, $p = .309$, $\eta p^2 = .005$), CPI ($F(1, 207) = 0.904$, $p = .343$, $\eta p^2 = .004$), CSE ($F(1, 207) = 0.70$, $p = .402$, $\eta p^2 = .003$), and CT ($F(1, 207) = 0.039$, $p = .842$, $\eta p^2 = .000$). This absence of interaction suggests that the evolution of perceptions over time was similar to pre-service early childhood and upper elementary teachers.

In addition, significant between-subject effects of teaching level were observed for several dimensions (CS ($F(1, 207) = 9.05$, $p = .003$, $\eta p^2 = .042$), CPI ($F(1, 207) = 9.94$, $p = .002$, $\eta p^2 = .046$), CSE ($F(1, 207) = 5.96$, $p = .016$, $\eta p^2 = .028$), and CT ($F(1, 207) = 4.0$, $p = .047$, $\eta p^2 = .019$). This corresponds to the results presented in Section 3.1. In particular, early childhood pre-service teachers reported higher overall levels of creative self-perceptions than their upper elementary counterparts, both before and after training.

3.3. Correlation between the dimensions of the creative self and creative teaching

Pearson's correlation analyses were conducted to examine the relationships between the dimensions of the creative self (CS; CPI; CSE) and perceived creative teaching (CT), both before and after the creativity-focused training program.

3.3.1. Pre-test correlations

In the pre-test, the correlations between the Creative Self subscales were all significant (see Table 2).

Weak but significant correlations were observed between the Creative Self subscales and creative teaching ($r = .18$, $p = .009$) as well as between CPI and CT ($r = .19$, $p = .005$). However, the correlation between CSE and CT did not reach the significance threshold (see Table 2).

3.3.2. Post-test correlations

In the post-test, strong correlations among the dimensions of the creative self remained (see Table 3), with coefficients ranging from .73 to .94 ($p < .001$), confirming the internal coherence of the creative self-construct.

Associations between Creative Self-perceptions and creative teaching increased in magnitude compared to the pre-test. CS was moderately correlated with CT ($r = .37$, $p < .001$). Similar patterns were observed for CPI ($r = .38$, $p < .001$) and CSE ($r = .31$, $p < .001$).

4. Discussion

The aim of our study was to examine the changes in the perception of personal creative skills and in the ability to teach creativity among future teachers following a creativity-focused training. The results led to three major conclusions: (1) significant differences exist between future teachers of early childhood and those of upper elementary level in terms of perception of personal creativity, (2) creativity-focused training was associated with an increase in participants' creative self, regardless of their level of teaching, and (3) a positive correlation exists between perception of Creative Self and the ability to teach creativity, particularly reinforced after training. We will discuss these results in detail, analysing each hypothesis and placing them in the context of the existing literature, while exploring their theoretical and practical implications.

4.1. Differences and changes in perception according to the level of education

The first hypothesis, predicting differences in creativity-related perceptions between pre-service early childhood teachers and pre-service upper elementary teachers, was partially supported. At the pre-test stage, early childhood teachers reported higher levels of Creative Self (CS), Creative Personal Identity (CPI), and perceived creative teaching (CT) than their upper elementary counterparts. These results are consistent with those of previous studies conducted among practising teachers, highlighting differences in perceptions of creativity across different levels of education (Izquierdo-Sanchis et al., 2025; Kasirer & Shnitzer-Meirovich, 2021).

Although the differences between the levels mentioned above constitute the only relationship directly supported by our data, we put forward the speculative hypothesis that the origin of these differences may be linked to the distinct pedagogical contexts in which trainee teachers are educated (Muñoz-Salinas et al., 2025). Early childhood education is often characterized by playful, exploratory, and imaginative learning activities that tend to place creativity at the heart of teaching practices (Dere, 2019; Resnick, 2017). For example, teaching at this level mobilizes pupils' imagination through stories, songs, and varied artistic or bodily activities adapted to

Table 2
Correlation matrix for the dimensions of Creative Self and Creative Teaching in the pre-test.

Correlation matrix				
	CS pre-test	CPI pre-test	CSE pre-test	CT pre-test
CS pre-test	—			
CPI pre-test	0.932***	—		
CSE pre-test	0.913***	0.702***	—	
CT pre-test	0.180**	0.195**	0.134	—

Note. Entries are Pearson r coefficients. ** p < .01. *** p < .001.

Table 3
Correlation matrix of the Creative Self and Creative Teaching dimensions in the post-test.

Correlation matrix				
	CS pre-test	**CPI pre-test**	CSE pre-test	CT pre-test
CS pre-test	—			
CPI pre-test	0.935***	—		
CSE pre-test	0.927***	0.732***	—	
CT pre-test	0.374***	0.383***	0.311***	—

Note. Entries are Pearson r coefficients. ** $p < .01$. *** $p < .001$.

their development. This pedagogical environment may provide pre-service early childhood teachers with more frequent and diverse opportunities for creative engagement, thereby reinforcing their perceptions of themselves as creative individuals (Henriksen & Mishra, 2015; Karwowski et al., 2020b). By contrast, upper elementary education is more heavily influenced by the requirements of the curriculum (particularly the use of textbooks) and by academic constraints, which may limit opportunities to experiment with approaches that foster creativity and, consequently, to develop their creative perceptions on both a personal and professional level. Notably, none of these contextual mechanisms, whether opportunities for creative engagement or the constraints of the curriculum, were measured in this study, and this interpretation remains a hypothesis to be tested.

However, it is important to note that the observed effect sizes were small to moderate, suggesting that teaching level alone does not fully account for differences in creativity-related perceptions. Other factors, such as prior experiences, individual beliefs, and characteristics of the training context, are likely to play a role (Chan & Yuen, 2014; Muñoz-Salinas et al., 2025; Yeung & Bautista, 2024).

4.2. Changes in the creative self and creative teaching following training

The second hypothesis predicted positive changes in creativity-related perceptions following training. The results showed significant changes over time in several dimensions of the creative self, particularly Creative Personal Identity (CPI) and, to a lesser extent, Creative Self-Efficacy (CSE), depending on the analytical model considered. In terms of magnitude, these changes corresponded to small to moderate effects (Cohen, 1988). These findings suggest that creativity-focused training may contribute to reinforcing future teachers' identification with creativity and their awareness of their own creative potential.

Importantly, no significant interaction between time and teaching level was observed, indicating that changes in creative self-perceptions occurred in a similar manner for both early childhood and upper elementary teachers. This absence of interaction suggests that the training program had a broadly comparable impact across teaching levels, supporting the idea that creativity-focused training can be relevant in diverse teacher education contexts (Anderson et al., 2022; Cuevas & de la Herrán Gascón, 2015).

In contrast, changes in perceived creative teaching (CT) were more limited. The repeated-measures analysis showed no significant change in CT over time, either as a main effect of time or in interaction with teaching level. This suggests that, although training may be associated with greater awareness of creativity and changes in creative self-perceptions, translating these changes into perceptions of pedagogical practice may require additional time, experience, or contextual support. Similar conclusions have been reported in previous studies (Borodina et al., 2019; Han & Abdrahim, 2023), which highlight that developing creativity-supportive teaching practices often involves a longer-term process and structural constraints beyond individual training.

4.3. Relationships between the creative self and creative teaching

Correlation analyses revealed a significant relationship between the Creative Self and the perceived ability to teach creatively (Creative Teaching), both before and after the training. This relationship between the CS dimensions was strengthened after the training, indicating that the participants perceived themselves to be more creative, consistent with their personal creative identity and self-efficacy after the training. Although the correlations with the CT increased compared with those observed at the start of the training, they remained relatively moderate. These results are consistent with the work of Kaufman (2019) and Karwowski et al. (2013), who highlighted the importance of the creative self in the development of teachers' creative skills and their ability to integrate creative practices into their teaching. In other words, a higher creative self tends to be associated with a greater willingness to encourage creativity in pupils, highlighting the importance of strengthening the Creative Self in creativity training (Anderson et al., 2022).

However, although these analyses support the hypothesis that higher levels of Creative Self are associated with greater confidence in the ability to teach creativity, it is important to note that may be partly related to the exploratory nature of the instrument and to the distinct conceptual levels captured by the measures (Ahmadi, 2023). In addition, the lack of significant correlations among future upper elementary teachers after training could indicate that other contextual or personal factors influence their ability to apply the creative skills they have acquired (Han & Abdrahim, 2023). It is possible that the more formal structure of the curriculum at the upper elementary level limits the integration of creative practices, compared to early childhood education, where pedagogical constraints are more flexible and allow for a wider variety of creative, artistic, and sensory-based activities. Future research could explore these barriers and identify appropriate solutions to encourage these teachers to use more creative strategies in their classrooms.

4.4. Practical implications

Several practical implications can be drawn. Firstly, the results suggest that future early childhood teachers report higher initial and overall creativity-related perceptions than those at the upper elementary level. Taking into account the specific pedagogical constraints they face, it might be useful to adapt the training modules to the needs of future teachers at the upper elementary level. Given the different representations of creativity depending on the training profile and the tensions identified earlier (Karwowski et al., 2020b), it would be worth considering additional modules or specific training situations aimed at overcoming these obstacles.

Furthermore, in order to extend the positive effects observed, it would be beneficial to consider the continuity of training activities focusing on creativity throughout teachers' careers. Future research could explore the impact of these changes in order to gain a deeper understanding of the mechanisms that influence future teachers' perception of creativity.

4.5. Limits of the study

Although our study produced some interesting results, several limitations should be highlighted. Firstly, the SSCS is a quantitative self-report scale (Kimberlin & Winterstein, 2008), and its use for assessing perceptions of creativity carries several inherent limitations. The SSCS was used in a variety of ways (paper-and-pencil version, electronic version, during telephone interviews, etc.), but the impact of the method of administration has not been sufficiently studied to account for the invariance of the results obtained (Shaw et al., 2021). In addition, as is often the case with quantitative self-report instruments, it is subject to biases arising from differences in participants' self-reflection abilities or, depending on the context in which it is administered, from social desirability effects (Paulhus & Vazire, 2007). Finally, studies reveal group differences, such as the male humility bias, where men overestimate their creativity while women underestimate it (Karwowski, 2011). Second, factors other than those identified in this study may have influenced teachers' perceptions. For example, the participants' previous experience in education or their previous training. Furthermore, the lack of significant progress in the perception of creative teaching among future upper elementary teachers could be linked to a limited number of participants or a partial inadequacy of the measurement tool used (Ahmadi, 2023). These findings highlight the need for further studies to refine and validate this tool to ensure that it accurately measures specific aspects of creative teaching. Finally, the limitation of our sample to a single educational institution and a single training module restricts the generalisability of our results. Further studies involving various training institutions and integrating creativity training for future teachers would be necessary to confirm these results.

5. Conclusion

This study contributes to a better understanding of how creativity-focused training relates to future teachers' perceptions of their own creative potential and their perceived ability to support creativity in teaching. Thus, the initial differences observed according to educational levels for several dimensions partially support Hypothesis 1, although the associated effect sizes were small. In addition, creativity-focused training was associated with an increase in future teachers' self-perceptions as creative individuals, whereas changes in perceptions of creative teaching were more limited. These findings therefore partially support Hypothesis 2. While these results represent an important step in understanding how future teachers perceive themselves and develop their creativity, the specific mechanisms underlying these changes remain to be further elucidated (Selkrig & Keamy, 2017).

In the meantime, the differences observed between creativity training profiles raise questions about the effectiveness of the creativity training program for upper elementary teachers. As argued by Eckhoff (2011), meaningful engagement, through meaningful opportunities, can lead them to develop new perspectives about their own creative beliefs. In light of our findings, this suggests that specific interventions aimed at strengthening the Creative Self could be associated with improvements in perceptions of creative teaching, thereby maximising the benefits of different groups of teachers. Clearly, further research is needed, particularly with teachers at higher elementary levels. This would allow a more detailed exploration of the dynamics at play, and more specifically, an examination of the factors associated with changes in teachers' creative perceptions following training.

Finally, it seems essential that the promotion of creativity, as recommended by international reports and integrated into teacher training plans, should be based on effective and appropriate training schemes for future teachers. To achieve this, training courses must support these budding professionals as they develop their own perceptions of creativity. Besançon and Lubart (2015) emphasized the importance of cultivating an environment conducive to the development of creativity in students. The results of this study, meanwhile, underscore the need to also design an environment conducive to creativity for future teachers. By becoming aware of their own perception of creativity, they will be better prepared to adopt a creative attitude in their teaching practices while actively and effectively supporting their students' creative skills throughout their careers.

CRediT authorship contribution statement

Guillaume Massy: Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization. **John Didier:** Writing – review & editing, Supervision, Conceptualization. **Maud Besançon:** Writing – review & editing, Supervision, Methodology, Formal analysis, Conceptualization.

Appendix

Appendix A

Instruction: Respond to each statement by indicating how often these are part of your daily teaching practice. Answer spontaneously and honestly.

Items	Never	Very rarely	Rarely	Occasionally	Often	Very often	Always
1. I don't feel that I help my students solve problems creatively.	1	2	3	4	5	6	7
2. I incorporate new methods into my teaching practice.	1	2	3	4	5	6	7
3. I approach complicated concepts in a very formal way.	1	2	3	4	5	6	7
4 I imagine new ways of teaching a concept.	1	2	3	4	5	6	7
5. I quickly become overwhelmed when it comes to supervising creative moments in class.	1	2	3	4	5	6	7
6. I make sure to keep the same teaching approach to simplify the work for students.	1	2	3	4	5	6	7
7. Teaching my students to solve problems in an original way is not one of my strengths.	1	2	3	4	5	6	7
8. My school does not encourage students to explore new ideas or methods.	1	2	3	4	5	6	7
9. Teaching creatively at my school can lead to misunderstanding from my colleagues.	1	2	3	4	5	6	7
10. I rely on traditional, tried-and-tested teaching methods.	1	2	3	4	5	6	7
11. I design my lessons in an original way.	1	2	3	4	5	6	7
12. Teaching students to think creatively is not one of my school's teaching priorities.	1	2	3	4	5	6	7

Appendix B

Details of the creativity module (36 h in total over 12 weeks)

Training focus	Summary of content	Estimated duration
Theoretical foundations of creativity	Creative process (4 Cs model), 7 Cs model, multivariate approach (psychological factors, creative potential) and creativity development in children aged 4 to 8.	Approx. 6 h (17% of the total duration)
Teaching methods that encourage teacher creativity	Strategy for fostering teachers' creativity: including creativity-focused pedagogy, self-assessment of creative abilities and processes, engagement in creative tasks, and complex learning scenarios.	Approx. 8 h (22% of the total duration)
Creative learning in students	Student-centred activities: individual or collaborative exploration, experimentation with techniques/materials, working under creative constraints.	Approx. 8 h (22% of the total duration)
Teaching creativity	Designing instructional sequences aimed at developing pupils' creative abilities through project-based learning and targeted pedagogical strategies.	Approx. 14 h (39% of the total duration)

Teaching methods used: theoretical lectures, experiential workshops, and collaborative design tasks, among others.

Data availability

Data will be made available on request.

References

Ahmadi, N. (2023). Le développement de la créativité et la pensée critique dans la pratique professionnelle des enseignants, lien entre auto-évaluation et pratiques en situation de classe [Thèse de doctorat, Université Rennes 2]. HAL https://theses.hal.science/tel-04703664.

Ahmadi, N., & Besançon, M. (2017). Creativity as a stepping stone towards developing other competencies in classrooms. *Education Research International, 2017*(1), Article 1357456. https://doi.org/10.1155/2017/1357456

Al-Dababneh, K. A., & Al-Zboon, E. K. (2017). Can teachers' self-reported characteristics and beliefs about creativity predict their perception of their creativity practices in the classroom. *International Journal of Special Education, 32*(4), 723–745.

Aljughaiman, A., & Mowrer-Reynolds, E. (2005). Teachers' conceptions of creativity and creative students. *The Journal of Creative Behavior, 39*(1), 17–34. https://doi.org/10.1002/j.2162-6057.2005.tb01247.x

Amabile, T. M. (1996). *Creativity in context.* Westview Press.

Anderson, R. C., Katz-Buonincontro, J., Bousselot, T., Mattson, D., Beard, N., Land, J., & Livie, M. (2022). How am I a creative teacher? Beliefs, values, and affect for integrating creativity in the classroom. *Teaching and Teacher Education, 110*, Article 103583. https://doi.org/10.1016/j.tate.2021.103583

Barbot, B., Besançon, M., Cassotti, M., Camarda, A., & Lubart, T. (2022). Le développement de la créativité chez l'enfant et l'adolescent. *Le développement neurocognitif de la naissance à L'adolescence* (pp. 147–156). Elsevier. https://doi.org/10.1016/B978-2-294-77402-7.00013-8

Barbot, B., Hass, R. W., & Reiter-Palmon, R. (2019). Creativity assessment in psychological research: (Re)setting the standards. *Psychology of Aesthetics, Creativity, and the Arts, 13*(2), 233–240. https://doi.org/10.1037/aca0000233

Beghetto, R. (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). Toward untangling creative self-beliefs. *The creative self* (pp. 3–22). Academic Press. https://doi.org/10.1016/B978-0-12-809790-8.00001-7

Bereczki, E. O., & Kárpáti, A. (2018). Teachers' beliefs about creativity and its nurture: A systematic review of the recent research literature. *Educational Research Review, 23*, 25–56. https://doi.org/10.1016/j.edurev.2017.10.003

Berry, Y., Tehan, D., Mitchell, S., Uibo, S., Grace, G., Gardner, J., Rockliff, J., Merlino, J., & Ellery, S. (2019). Alice springs (Mparntwe) education declaration, education services Australia. https://www.reviewmelbournedeclaration.edu.au/.

Besançon, M., & Lubart, T. (2015). *La créativité de l'enfant: évaluation et développement*. Mardaga.

Bonnardel, N., & Lubart, T. (2023). Conceptions et théories de la créativité. In D. N. Bonnardel, F. Girandola, É. Bonetto, & T. Lubart (Eds.), *La créativité en situations: Théories et applications* (pp. 40–51). Dunod. https://doi.org/10.3917/dunod.bonna.2023.01.0040.

Borodina, T., Sibgatullina, A., & Gizatullina, A. (2019). Developing creative thinking in future teachers as a topical issue of higher education. *Journal of Social Studies Education Research, 10*(4), 226–245.

Cachia, R., Ferrari, A., Ala-Mutka, K., & Punie, Y. (2010). Creative learning and innovative teaching. Final report on the study on creativity and innovation in education in the EU member states. https://doi.org/10.2791/52913.

Chan, S., & Yuen, M. (2014). Creativity beliefs, creative personality and creativity-fostering practices of gifted education teachers and regular class teachers in Hong Kong. *Thinking Skills and Creativity, 14*, 109–118. https://doi.org/10.1016/j.tsc.2014.10.003

Cheung, R. H. P. (2012). Teaching for creativity: Examining the beliefs of early childhood teachers and their influence on teaching practices. *Australasian Journal of Early Childhood, 37*(3), 43–52. https://doi.org/10.1177/183693911203700307

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Craft, A. (2001). An analysis of research and literature on creativity in education. *Qualifications and Curriculum Authority, 51*(2), 1–37.

Craft, A., & Jeffrey, B. (2008). Creativity and performativity in teaching and learning: Tensions, dilemmas, constraints, accommodations and synthesis. *British Educational Research Journal, 34*(5), 577–584. https://doi.org/10.1080/01411920802223842

Cuevas, J. C., & de la Herrán Gascón, A. (2015). Creatividad, complejidad y formación: Un enfoque transdisciplinar/creativity, complexity and training: A transdisciplinary approach. *Revista Complutense de Educación, 26*(3), 505–526. https://doi.org/10.5209/rev_RCED.2015.v26.n3.43876

Deng, L., Zhu, G., Li, G., Xu, Z., Rutter, A., & Rivera, H. (2018). Student teachers' emotions, dilemmas, and professional identity formation amid the teaching practicums. *The Asia-Pacific Education Researcher, 27*(6), 441–453. https://doi.org/10.1007/s40299-018-0404-3

Dere, Z. (2019). Investigating the creativity of children in early childhood education institutions. *Universal Journal of Educational Research, 7*(3), 652–658. https://doi.org/10.13189/ujer.2019.070302

Eckhoff, A. (2011). Creativity in the early childhood classroom: Perspectives of preservice teachers. *Journal of Early Childhood Teacher Education, 32*(3), 240–255. https://doi.org/10.1080/10901027.2011.594486

Ferrari, A., Cachia, R., & Punie, Y. (2009). Innovation and creativity in education and training in the EU member states: Fostering creative learning and supporting innovative teaching. *JRC Technical Note, 52374*, 64. https://www.scirp.org/reference/referencespapers?referenceid=1806982.

Gajda, A., Karwowski, M., & Beghetto, R. A. (2017). Creativity and academic achievement: A meta-analysis. *Journal of Educational Psychology, 109*(2), 269–299. https://doi.org/10.1037/edu0000133

González-Sancho, C. (2020). Chapitre 6. Attitudes et pratiques des enseignants relatifs à la créativité et à l'esprit critique. In S. Vincent-Lancrin (Ed.), *Développer la créativité et l'esprit critique des élèves: Des actions concrètes pour l'école* (pp. 205–246). Éditions de l'OCDE.

Han, W., & Abdrahim, N. A. (2023). The role of teachers' creativity in higher education: A systematic literature review and guidance for future research. *Thinking Skills and Creativity, 48*, Article 101302. https://doi.org/10.1016/j.tsc.2023.101302

Henriksen, D., & Mishra, P. (2015). We teach who we are: Creativity in the lives and practices of accomplished teachers. *Teachers College Record: The Voice of Scholarship in Education, 117*(7), 1–46. https://doi.org/10.1177/016146811511700708

Izquierdo-Sanchis, E., Echegoyen-Sanz, Y., & Martín-Ezpeleta, A. (2025). Primary school teachers' creative self-perception and beliefs on teaching for creativity. *Education Sciences, 15*(2), 211. https://doi.org/10.3390/educsci15020211

Jeffrey, B., & Craft, A. (2004). Teaching creatively and teaching for creativity: Distinctions and relationships. *Educational Studies, 30*(1), 77–87. https://doi.org/10.1080/0305569032000159750

Jokikokko, K., & Uitto, M. (2017). The significance of emotions in Finnish teachers' stories about their intercultural learning. *Pedagogy, Culture & Society, 25*(1), 15–29. https://doi.org/10.1080/14681366.2016.1201128

Karwowski, M. (2011). It doesn't hurt to ask … But sometimes it hurts to believe: Polish students' creative self-efficacy and its predictors. *Psychology of Aesthetics, Creativity, and the Arts, 5*(2), 154–164. https://doi.org/10.1037/a0021427

Karwowski, M. (2015). Development of the creative self-concept. *Creativity: Theories-Research-Applications, 2*(2), 165–179.

Karwowski, M., & Barbot, B. (2016). Creative self-beliefs: Their nature, development, and correlates. In J. C. Kaufman, & J. Baer (Eds.), *Creativity and reason in cognitive development* (pp. 302–326). Cambridge University Press. https://doi.org/10.1017/CBO9781139941969.016.

Karwowski, M., Czerwonka, M., Lebuda, I., Jankowska, D. M., & Gajda, A. (2020a). Does thinking about Einstein make people entity theorists? Examining the malleability of creative mindsets. *Psychology of Aesthetics, Creativity, and the Arts, 14*(3), 361–366. https://doi.org/10.1037/aca0000226

Karwowski, M., Gralewski, J., Patston, T., Cropley, D. H., & Kaufman, J. C. (2020b). The creative student in the eyes of a teacher: A cross-cultural study. *Thinking Skills and Creativity, 35*, Article 100636. https://doi.org/10.1016/j.tsc.2020.100636

Karwowski, M., Lebuda, I., & Wiśniewska, E. (2018). Measuring creative self-efficacy and creative personal identity. *The International Journal of Creativity & Problem Solving, 28*, 45–57.

Karwowski, M., Lebuda, I., Wiśniewska, 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

Kasirer, A., & Shnitzer-Meirovich, S. (2021). The perception of creativity and creative abilities among general education and special education teachers. *Thinking Skills and Creativity, 40*, Article 100820. https://doi.org/10.1016/j.tsc.2021.100820

Katz-Buonincontro, J., Perignat, E., & Hass, R. W. (2020). Conflicted epistemic beliefs about teaching for creativity. *Thinking Skills and Creativity, 36*, Article 100651. https://doi.org/10.1016/j.tsc.2020.100651

Kaufman, J. C. (2019). Self-assessments of creativity: Not ideal, but better than you think. *Psychology of Aesthetics, Creativity, and the Arts, 13*(2), 187–192. https://doi.org/10.1037/aca0000217

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

Kaufman, J. C., & Beghetto, R. A. (2013). In praise of Clark Kent: Creative metacognition and the importance of teaching kids when (not) to be creative. *Roeper Review, 35*(3), 155–165. https://doi.org/10.1080/02783193.2013.799413

Kettler, T., Lamb, K. N., Willerson, A., & Mullet, D. R. (2018). Teachers' perceptions of creativity in the classroom. *Creativity Research Journal, 30*(2), 164–171. https://doi.org/10.1080/10400419.2018.1446503

Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American Journal of Health-System Pharmacy, 65*(23), 2276–2284. https://doi.org/10.2146/ajhp070364

Lau, S., & Cheung, P. C. (2010). Developmental trends of creativity: What twists of turn do boys and girls take at different grades? *Creativity Research Journal, 22*(3), 329–336. https://doi.org/10.1080/10400419.2010.503543

Lin, Y.-S. (2011). Fostering creativity through education – A conceptual framework of creative pedagogy. *Creative Education, 02*, 149–155. https://doi.org/10.4236/ce.2011.23021

Lubart, T. (2023). Homo creativus: Approche différentielle. *L'Année Psychologique, 123*(2), 413–423. https://doi.org/10.3917/anpsy1.232.0413

Lubart, T., Besançon, M., & Barbot, B. (2019). La créativité, ressource potentielle de l'enfant et l'adolescent, à évaluer, révéler et développer. *Neuropsychiatrie de l'Enfance et de l'Adolescence, 67*, 121–129. https://doi.org/10.1016/j.neurenf.2019.02.004

Lubart, T., Tordjman, S., & Zenasni, F. (2025). *Psychologie de la créativité* (3e éd.). Dunod.

Maggioni, L., & Parkinson, M. M. (2008). The role of teacher epistemic cognition, epistemic beliefs, and calibration in instruction. *Educational Psychology Review, 20*(1), 445–461. https://doi.org/10.1007/s10648-008-9081-8

Makris, S., Welch, G. F., & Himonides, E. (2022). Music teachers' perceptions of, and approaches to, creativity in the Greek-cypriot primary education. *The Journal of Creative Behavior, 56*(1), 92–107. https://doi.org/10.1002/jocb.518

Massy, G., Besançon, M., Didier, J., et al. (2024). Former à la créativité dans un contexte de formation: évolution des perceptions des futurs·es enseignant·es. In Y. Buyck, et al. (Eds.), *Les didactiques face à l'évolution des curriculums. Savoir(s) et pratiques pour entrer dans la complexité du monde. actes du 6ème colloque international de l'ARCD* (pp. 19–30). Université de Genève.

Massy, G., Besançon, M., & Didier, J. (2025). From creativity to the creative student, an evolutionary analysis of social representations among future teachers. *Thinking Skills and Creativity, 57*, Article 101860. https://doi.org/10.1016/j.tsc.2025.101860

Mullet, D. R., Willerson, A., Lamb, K. N., & Kettler, T. (2016). Examining teacher perceptions of creativity: A systematic review of the literature. *Thinking Skills and Creativity, 21*, 9–30. https://doi.org/10.1016/j.tsc.2016.05.001

Muñoz-Salinas, Y., Caro-Zúñiga, D., & Jeria, I. (2025). Creativity and preservice teachers: A literature review of an underexplored field (2014–2024). *Education Sciences, 15*(3), 395. https://doi.org/10.3390/educsci15030395

Neubauer, A. C., Pribil, A., Wallner, A., & Hofer, G. (2018). The self–other knowledge asymmetry in cognitive intelligence, emotional intelligence, and creativity. *Heliyon, 4*(12), Article e01061. https://doi.org/10.1016/j.heliyon.2018.e01061

OECD. (2018). *Résultats du pisa 2015 (Volume V): Résolution collaborative de problèmes*. OECD. https://doi.org/10.1787/9789264305199-fr

OECD. (2019). Teaching, assessing and learning creative and critical thinking skills in primary and secondary education. https://www.oecd.org/education/ceri/assessingprogressionincreativeandcriticalthinkingskillsineducation.htm.

Patston, T. J., Cropley, D. H., Marrone, R. L., & Kaufman, J. C. (2017). Teacher self-concepts of creativity: Meeting the challenges of the 21st century classroom. *The International Journal of Creativity & Problem Solving, 27*(2), 23–34.

Paulhus, D. L., & Vazire, S. (2007). The self-report method. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 224–239). The Guilford Press.

Paulus, P. B., & Nijstad, B. A. (Eds.). (2019). *The oxford handbook of group creativity and innovation (1re éd.)*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190648077.001.0001.

Pont-Niclòs, I., Echegoyen-Sanz, Y., & Martín-Ezpeleta, A. (2024). Creative self-perception of Spanish secondary teachers. *Journal of Education Culture and Society, 15*(1), 231–246.

Resnick, M. (2017). *Lifelong kindergarten: Cultivating creativity through projects, passion, peers, and play*. MIT press.

Robinson, K. (2011). *Out of our minds: Learning to be creative*. Capstone.

Rubenstein, L. D., Ridgley, L. M., Callan, G. L., Karami, S., & Ehlinger, J. (2018). How teachers perceive factors that influence creativity development: Applying a social cognitive theory perspective. *Teaching and Teacher Education, 70*, 100–110. https://doi.org/10.1016/j.tate.2017.11.012

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

Said-Metwaly, S., Fernández-Castilla, B., Kyndt, E., & Van den Noortgate, W. (2020). Testing conditions and creative performance: Meta-analyses of the impact of time limits and instructions. *Psychology of Aesthetics, Creativity, and the Arts, 14*(1), 15–38. https://doi.org/10.1037/aca0000244

Salinas, D., Avvisati, F., & Castaneda Velle, R. (2023). *PISA 2022 results: The state of learning and equity in education, I*. OECD Publishing. https://doi.org/10.1787/53f23881-en

Selkrig, M., & Keamy, K. (2017). Creative pedagogy: A case for teachers' creative learning being at the centre. *Teaching Education, 28*(3), 317–332. https://doi.org/10.1080/10476210.2017.1296829

Shaw, A., Kapnek, M., & Morelli, N. A. (2021). Measuring creative self-efficacy: An item response theory analysis of the creative self-efficacy scale. *Frontiers in Psychology, 12*, Article 678033. https://doi.org/10.3389/fpsyg.2021.678033

Tsai, K. C. (2012). Play, imagination, and creativity: A brief literature review. *Journal of Education and Learning, 1*(2), 15–20. https://doi.org/10.5539/jel.v1n2p15

Yeung, J., & Bautista, A. (2024). Definitions of creativity by kindergarten stakeholders: An interview study based on Rhodes' 4P model. *Creativity: Theories-Research-Applications, 11*, 1–19. https://doi.org/10.2478/ctra-2024-0008

Yuan, R., Liu, W., & Lee, I. (2019). Confrontation, negotiation and agency: Exploring the inner dynamics of student teacher identity transformation during teaching practicum. *Teachers and Teaching, 25*(8), 972–993. https://doi.org/10.1080/13540602.2019.1688286

Zielińska, A., Lebuda, I., & Karwowski, M. (2022). Scaling the creative self: An item response theory analysis of the short scale of creative self. *Creativity Research Journal, 34*(4), 431–444. https://doi.org/10.1080/10400419.2022.2123139