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THE IMPACT OF CREATIVE SELF-EFFICACY IN EDUCATION: SCOPING REVIEW

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ABSTRACT

The advancement of technology since the Covid-19 pandemic has significantly impacted education, increasing the need for creativity in society. One notable concept that has emerged over the past two decades is creative self-efficacy, which refers to an individual's belief in their ability to generate creative ideas (Tierney & Farmer, 2002). This study employs a scoping review methodology to summarize the effects of creative self-efficacy in education. Specific criteria, as outlined in Table 1, were applied throughout the review process. From an initial selection of 273 articles, stages of identification, screening, and eligibility were conducted, resulting in 8 articles being included for further analysis. These 8 articles demonstrated variability in data collection methods, including mixed methods (n = 1), quantitative (n = 5), and literature reviews (n = 2). The analysis revealed six key impacts: (a) creativity, (b) creative performance, (c) team performance, (d) creative ideation, (e) divergent thinking skills, and (f) creative production. This study hopes to encourage the development of innovative learning methods in education, such as hybrid learning that integrates e-learning and other modern approaches.

Keywords: *creative self-efficacy, education, creativity, self-efficacy, scoping review*

1. INTRODUCTION

Technology plays a crucial role in daily life, with internet users in Indonesia reaching 212 million in 2023, accounting for 77% of the population (Rizaty, 2023). The majority of these users are students aged 7-18, making Indonesia the country with the highest student internet users globally (Harususilo, 2018). This highlights the strong connection between technology and education.

In education, technology fosters creativity, known as *creativity-focused technology education* (Cropley, 2022). Creativity refers to the ability to generate new and unique ideas (Guilford, 1950). By integrating technology, students can develop critical thinking, problem-solving, self-efficacy, and effective communication skills.

However, fostering creativity requires self-belief, or *self-efficacy*—one's confidence in achieving a goal (Bandura, 1977). A more specific concept, *creative self-efficacy* (Tierney & Farmer, 2002), relates to an individual's belief in their ability to generate creative ideas. Those with high *creative self-efficacy* persist in innovating despite challenges (Huang et al., 2020).

Research shows that *creative self-efficacy* enhances creativity and performance (Du et al., 2020). As this concept has been studied for over two decades, further research is needed to summarize its impact, particularly in education. To address this, a *scoping review* will be conducted based on specific inclusion criteria.

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2. RESEARCH METHOD

2.1 Search Strategy

There are six databases to summarize the impact of creative self-efficacy on education. These six databases are Psycinfo, Science Direct, Taylor & Francis Online, Wiley Online Library, Emerald Insight, and EBSCO host. In addition, there are several keywords used in searching for articles, namely: (a) creative self-efficacy; (b) school.

2.2 Inclusion and Exclusion Criteria

Conducting a literature review targeting the impact of creative self-efficacy on the field of education. The researchers include full-text open-access papers in English that can depict empirical findings (quantitative or qualitative) from field studies or systematic reviews regarding the impact of creative self-efficacy in education. Inclusion and exclusion criteria, as well as the number of studies included, will be detailed through the population, concept, and context table (Table 1. PCC Format in scoping review).

Table 1

PCC format in scoping review

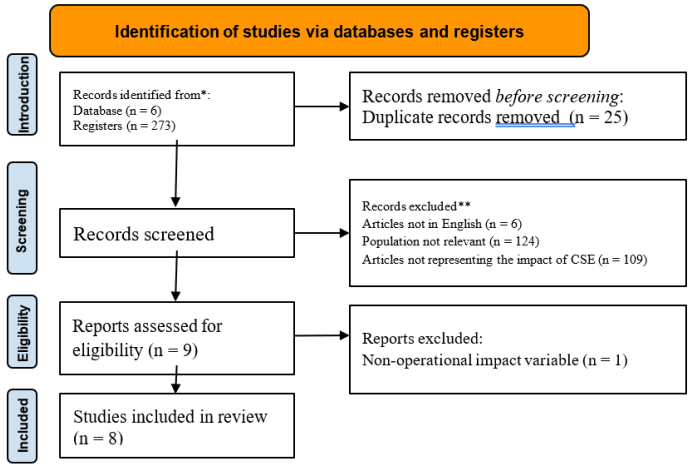
Criteria	Inclusion	Exclusion
Population	Education	Worker, etc
Concept	Impact of creative self-efficacy	Intervention to increase creative self-efficacy
Context	1. Article publication year 2019-2023 2. Written in English 3. Free access	1. The year of publication of the article below 2019 2. Articles are not in a language other than English

2.3 Selection of Studies

A total of 273 articles were collected from six databases and uploaded to Zotero for duplicate review. After removing 25 duplicates, 248 articles remained. Screening based on titles and abstracts considered population and language (English) without restrictions on gender, race, ethnicity, or methodology. Two reviewers (CA, RVG), under PTYSS supervision, eliminated 239 articles, leaving 8. Further content evaluation removed one article due to a lack of clear explanation. Ultimately, 8 articles met the criteria, explicitly addressing the impact of creative self-efficacy in education (Figure 1).

Figure 1

PRISMA flow diagram



2.4 Mapping and Extracting Data

The author extracted, synthesized, and integrated data to summarize the impact of creative self-efficacy in education. Information was recorded in Excel, covering research details (authors, year), sample (gender, age, target group), theoretical framework, research design, duration, interventions, and outcomes. No age restrictions were applied.

2.5 Quality and Reporting Checklist

Included articles were evaluated using a checklist for sample criteria, research design, theoretical framework, and study reporting. Three reviewers (PTYSS, RVG, CA) independently assessed them. Quantitative data were categorized by study design, population, and impact, while qualitative data focused on described effects. Quantitative studies were scored (0–50) based on general information, theoretical basis, and study design, while qualitative studies were scored (0–40) based on sample and design adequacy. No studies were excluded based on these assessments, which were conducted for descriptive purposes only.

3. RESULTS AND DISCUSSIONS

3.1 Studies Characteristics

This research involves eight articles that meet the inclusion criteria and were published between 2019 and 2023. Out of the eight articles that meet the inclusion criteria, they collectively support the assertion that creative self-efficacy has an impact on individuals when optimized. Table 2 provides an overview of the participant characteristics used in these eight studies.

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Table 2
Participant Characteristics and Research Methods from the Studies

No.	Author	Year	Article Title	Participants				Method
				n	Country	Gender	Age	
1	Kaiye Du, Yan Wang, Xuran Ma, Zheng Luo, Ling Wang, and Baoguo Shi	2020	Achievement goals and creativity: the mediating role of creative self-efficacy	118	Shanxi, China	Study 1 (M = 62, F = 56) Study 2 (M = 111, F = 158)	16-19	Quantitative
2	Steffens, K. R.	2022	Examining Relationships Among Creativity Skills Training, Domain-Specific Creativity, and Creative Self-Efficacy: A Mixed Methods Study	200.000 participants (Quantitative phase), 5 participants (qualitative phase)	-	-	-	Quantitative and Qualitative
3	Neng-tang Huang, Yu-shan Chang, Chia-hui Chou	2020	Effects of creative thinking, psychomotor skills, and creative selfefficacy on engineering design creativity	209	Taipei, Taiwan	M = 103 F = 106	14	Literature Review
4	Park, Namgyoo Kenny; Jang, Wanjin; Thomas, Evan Leigh; Smith, Joshua;	2021	How to Organize Creative and Innovative Teams: Creative Self-Efficacy and Innovative Team Performance	223	Korea	M = 62 F = 161	31	Literature Review
5	Puthyrom Tep, Sorakrich Maneewan, Saranya Chuathong, and Matthew A. Easter	2021	The relationship between human values and creative ideation among undergraduate students: The role of creative self-efficacy	831	Thailand	M = 158 F = 673	19,37	Quantitative
6	Hongpo Zhang, Cuicui Sun, Xiaoxian Liu, Shaoying Gong, Quanlei Yu, Zhijin Zhou	2020	Boys benefit more from teacher support: Effects of perceived teacher support on primary students' creative thinking	362	Wuhan City, Hubei province, China	M = 196 F = 166	8-12	Quantitative
7	Zahir Vally, Leen Salloum, Dina AlQedra, Sara El Shazly, Maryam Albloshi, Safeya Alsheraifi, Alia Alkaabi	2019	Examining the effects of creativity training on creative production, creative self-efficacy, and neuro-executive functioning	133	United Arab		18-22	Quantitative
8	Jacek Gralewski and Dorota Maria Jankowska	2020	Do parenting styles matter? Perceived dimensions of parenting styles, creative abilities and creative self-beliefs in adolescents	552	Polish Town	M = 40.8% F = 59.2%	16-18	Quantitative

Among the eight articles that have passed through various stages of selection, three studies have the highest number of participants. These three studies were conducted by Steffens (2022) with over 2000 participants; Puthyrom et al. (2021) with 831 participants; and Jacek and Dorota (2020) with 552 participants. Among all the articles, there were more female participants than male participants (Puthyrom et al., 2021). From these eight articles, it is also evident that many articles originated from China (Du et al., 2020; Hongpo et al., 2020), and there are two articles that did not provide information about the data collection location (Jacek and Dorota, 2022; Steffens, 2022). Furthermore, out of the eight analyzed articles, five used quantitative methods (Du et al., 2020; Hongpo et al., 2020; Jacek and Dorota, 2020; Puthyrom et al., 2021; Zahir et al., 2019), two were literature reviews (Neng et al., 2020; Park et al., 2021), and one employed a mixed-method approach (quantitative and qualitative) (Steffens, 2022).

3.2 Quality and Report Assessment

Out of the eight articles that met the criteria, there are five articles that employed quantitative methods with a potential total quality score ranging from a minimum of 15 to a maximum of 20. Additionally, there are two articles that utilized literature review methods with a potential total

quality score of 18. Furthermore, there is one article that employed a mixed-method approach (combining quantitative and qualitative) with a potential total quality score of 18. The overall assessment of these articles was based on the analysis of the methods and measurement instruments used, as well as the explanations related to each measurement item and examples. The assessment results for the 8 articles can be found in Table 3.

Table 3
Assessment results

No.	Author	Year	Article Title	Research Method	Measures Score	Participants Score	Theoretical Framework Score	Results Score	Total Score
1	Kaiye Du, Yan Wang, Xuran Ma, Zheng Luo, Ling Wang, and Baoguo Shi	2020	Achievement goals and creativity: the mediating role of creative self-efficacy	Quantitative	5	5	5	5	20
2	Steffens, K. R.	2022	Examining Relationships Among Creativity Skills Training, Domain-Specific Creativity, and Creative Self-Efficacy: A Mixed Methods Study	Mix Method (Quantitative and Qualitative)	5	3	5	5	18
3	Neng-tang Huang, Yu-shan Chang, Chia-hui Chou	2020	Effects of creative thinking, psychomotor skills, and creative selfefficacy on engineering design creativity	Literature Review	5	5	3	5	18
4	Park, Namgyoo Kenny; Jang, Wanjin; Thomas, Evan Leigh; Smith, Joshua;	2021	How to Organize Creative and Innovative Teams: Creative Self-Efficacy and Innovative Team Performance	Literature Review	5	*5*	3	5	18
5	Puthyrom Tep, Sorakrich Maneewan, Saranya Chuathong, and Matthew A. Easter	2021	The relationship between human values and creative ideation among undergraduate students: The role of creative self-efficacy	Quantitative	5	5	3	5	18
6	Hongpo Zhang, Cuicui Sun, Xiaoxian Liu, Shaoying Gong, Quanlei Yu, Zhijin Zhou	2020	Boys benefit more from teacher support: Effects of perceived teacher support on primary students' creative thinking	Quantitative	5	5	3	5	18
7	Zahir Vally, Leen Salloum, Dina AlQedra, Sara El Shazly, Maryam Albloshi, Safeya Alsheraifi, Alia Alkaabi	2019	Examining the effects of creativity training on creative production, creative self-efficacy, and neuro-executive functioning	Quantitative	5	2	3	5	15
8	Jacek Gralewski and Dorota Maria Jankowska	2020	Do parenting styles matter? Perceived dimensions of parenting styles, creative abilities and creative self-beliefs in adolescents	Quantitative	5	4	3	5	17

3.3 Impact of Creative Self-Efficacy

Throughout the course of the research, the researchers discovered that creative self-efficacy has the potential to enhance and influence seven human behaviors, namely: (a) creativity; (b) creative performance; (c) team performance; (d) creative ideation; (e) divergent thinking ability; (f) creative production; and (g) creative abilities, as presented in Table 4 below.

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Table 4

Article characteristics, impact of creative self-efficacy, measurement tools, definitions, and theories used

No.	Author	Year	Article Title	Impact	Instrument	Definition	Theory	Explanation Of The Theory
1	Kaiye Du, Yan Wang, Xuran Ma, Zheng Luo, Ling Wang, and Baoguo Shi	2020	Achievement goals and creativity: the mediating role of creative self-efficacy	Kreativitas (*creativity*) $r = 0.620$, $p < 0.001$	Creativity: Williams Creativity Assessment Packet (William, 1980) > risk-taking (12 items), curiosity (13 items), imagination (13 items), and complexity (12 items). Example item: 'Trying a new game or activity is an interesting thing'. total 48 items	Creativity is an attitude characterized by the willingness to take risks, a high level of curiosity, a vivid imagination, and the ability to tackle complex issues.	The control value theory	The control value theory posits that the structure of one's goals can influence beliefs about control, such as self-concept of abilities and self-efficacy.
2	Steffens, K. R.	2022	Examining Relationships Among Creativity Skills Training, Domain-Specific Creativity, and Creative Self-Efficacy: A Mixed Methods Study	Kreativitas *(creativity)* $r(36) = -.31$, $p = .11$	Kaufman Domains of Creativity Scale (K-DOCS) (Kaufman, 2012) > 94 items, "Compared to people of approximately your age and life experience, how creative would you rate yourself for each of the following acts? For acts that you have not specifically done, estimate your creative potential based on your performance on similar tasks,"	Creativity is the everyday ability, particularly in self-development, to engage in scientific thinking or ideation, the capacity to engage in performance such as writing and music, mechanical skills, and artistic abilities. Creativity is the ability to smoothly execute a task, employ various approaches to solve challenges, describe new and unique ideas, and enhance or diversify existing ideas.	The Amusement Park Theoretical Model of Creativity	It encompasses four levels: initial requirements, general thematic areas, domains, and microdomains. It is stated that an individual's skill experience has an impact on their creative development.
3	Neng-tang Huang, Yu-shan Chang, Chia-hui Chou	2020	Effects of creative thinking, psychomotor skills, and creative selfefficacy on engineering design creativity	Creative performace $r = 0.67$, $p < 0.01$	Creativity: The Creative Thinking Scale consists of four dimensions: fluency (the number of ideas, e.g., "I can add many features to my smartphone"), flexibility (various ways to address challenges, e.g., "I can use my smartphone stand for other purposes"), originality (describing an idea as something new and unique, e.g., "I can design a new-look smartphone stand"), and elaboration (the level of detail in describing an idea, e.g., "I can generate	Creativity is the skill to perform tasks smoothly, employing various approaches to address challenges, describing a novel and unique concept, and enhancing or varying existing ideas. Creative performance refers to the assessment of an individual's ability to generate original and high-quality creative ideas and translate them into	Amabile 1996 , Creativity in Context	For an individual to demonstrate their performance, intrinsic motivation is required, where if there is an internal drive within the individual, they will strive to complete what they desire.

No.	Author	Year	Article Title	Impact	Instrument	Definition	Theory	Explanation Of The Theory
					ideas to enhance the functionality and appearance of a smartphone" (Hardy et al., 2017; Kassim et al., 2014).	tangible products or outcomes.		
4	Park, Namgyoo Kenny; Jang, Wanjin; Thomas, Evan Leigh; Smith, Joshua;	2021	How to Organize Creative and Innovative Teams: Creative Self-Efficacy and Innovative Team Performance	Team performance (r = 0.81)	Tierney and Farmer's three-item scale (Tierney & Farmer, 2002) "I have confidence in my ability to solve problems creatively", and "I feel that I am good at generating novel ideas."	Team performance is an individual's ability that places confidence in their capacity to creatively solve problems and generate new ideas used to support a group. Team performance is a task carried out by a creative organization and is likely to require skills exceeding individual talents.	*U-shaped relationship*	The U-shaped relationship is commonly explored in strategic research and has been found in various contexts, such as the relationship between strategy and performance in strategic management.
5	Puthyrom Tep, Sorakrich Maneewan, Saranya Chuathong, and Matthew A. Easter	2021	The relationship between human values and creative ideation among undergraduate students: The role of creative self-efficacy	Creative ideation r = 0.56 , p < 0.001	Creative Ideation: Runco Ideational Behavior Scale (RIBS) by Runco et al. (2001) > 23 items: This scale emphasizes an individual's self-perception regarding ideas and measures their ability to generate ideas, e.g., "I have many ideas or solutions to problems," and to find unique ways to solve problems, e.g., "I can think of answers to unsolved problems."	Creative ideation is an individual's ability to perceive self-generated ideas and select unique ways to solve problems.	the values theory	Schwartz's (1992) theory suggests that creative individuals tend to support SDV, UNV, and STV values. Individual values are defined as "desired goals that stand above situations, vary in importance, and serve as guiding principles in social life." Based on the Basic Human Values Theory, individual values consist of ten types and are organized into four hierarchical dimensions. First, the dimension of openness to change includes self-direction (SDV) and stimulation (STV) values. Second, the conservation dimension includes values of tradition, conformity, and security. Third, the self-transcendence dimension includes universalism (UNV) and benevolence values. Finally, the self-enhancement dimension includes power and achievement values, while hedonism shares characteristics

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No.	Author	Year	Article Title	Impact	Instrument	Definition	Theory	Explanation Of The Theory
								with all dimensions (Schwartz, 1992).
6	Hongpo Zhang, Cuicui Sun, Xiaoxian Liu, Shaoying Gong, Quanlei Yu, Zhijin Zhou	2020	Boys benefit more from teacher support: Effects of perceived teacher support on primary students' creative thinking	*Divergent Thinking* (B = .39, SE = .13, *p* = .002).	Creative Thinking: Divergent and convergent thinking tests > Divergent Thinking assessed using the Torrance Test of Creative Thinking. Divergent thinking has three dimensions: (a) fluency (number of responses), (b) flexibility (number of response categories), and (c) originality (unconventional responses).	Divergent thinking involves relying on three dimensions: fluency, which is the number of responses when questioned; flexibility, which is the number of response categories when there is a question; and originality, which is unique responses when faced with a problem. Convergent thinking is the ability to think quickly when confronted with a new problem, the ability to produce creative ideas, and resilience in facing negative responses.	The Social Cognitive Theory (Bandura, 1977)	It is argued that the influence of the external environment affects the course of individual behavior by influencing psychological cognitive factors.
7	Zahir Vally, Leen Salloum, Dina AlQedra, Sara El Shazly, Maryam Albloshi, Safeya Alsheraifi, Alia Alkaabi	2019	Examining the effects of creativity training on creative production, creative self-efficacy, and neuro-executive functioning	Creative production (r = 0.48, p < 0.001)	Creativity: Byrge and Tang's (2015) assessment consists of three tasks, two drawing tasks (task 1 and task 2), and one drawing and writing task (task 3). Pre-test and post-test assessments are similar in design but contain different stimulus materials to avoid sensitization effects (see Byrge & Tang, 2015 for further details).	Creative production refers to the ability to generate diverse or varied solutions, ideas, or associations in response to specific problems or stimuli, such as drawings and writings.	Lee & Kemple (2014)	To produce creativity, one requires high creative skills to demonstrate good psychological well-being and the ability to improve one's resilience and flexibility in dealing with the demands of daily life.
8	Jacek Gralewski and Dorota Maria Jankowska	2020	Do parenting styles matter? Perceived dimensions of parenting styles, creative abilities and creative self-beliefs in adolescents	Creative abilities r = .82; p < .001	Creativity: The Polish adaptation of the Test for Creative Thinking-Drawing Production (TCT-DP; Urban and Jellen, 1996) > six elements placed asymmetrically on the test sheet: five within the square boundaries and one outside. Evaluation using TCT-DP (Urban and Jellen, 1996) involves fourteen different criteria. The total score indicating the level of creative ability is the sum of points for all criteria.	Creative ability is the capacity to depict something asymmetric with the aim of effectively solving complex problems.	*Self determination theory*	The conceptualization of parental autonomy support initially focused on the absence of psychological control or coercion (Soenens & Vansteenkiste, 2010), but is now more commonly referred to as supportive control (Skinner et al., 2005). Parents exhibiting this attitude encourage their child's independence, support them in exploring preferences and personal opinions, allow them to freely express ideas and actions, and encourage their contribution in

No.	Author	Year	Article Title	Impact	Instrument	Definition	Theory	Explanation Of The Theory
								decision-making and problem-solving. Excessive protection is the opposite of autonomy support; it is associated with undue interference in the child's personal affairs, continuous parenting, and excessive attention. Parents who employ excessive protection fail to recognize the child's need for autonomy (Plopa, 2008; Puchalska-Wasyl & Jankowski, 2020).

The fourth, creative self-efficacy also impacts creative ideation, the ability to generate unique solutions to problems (Runco et al., 2001). Tep et al. (2021) found a correlation of $r = 0.56$, $p < 0.001$, linking creative self-efficacy to ideation. This aligns with Schwartz's (1992) Values Theory, which states that personal values guide daily life, suggesting that individuals with strong internal values continuously generate creative ideas.

The fifth, creative self-efficacy also influences divergent thinking, the ability to generate varied, unique responses to problems (Castro et al., 2018; Liu et al., 2013). Zhang et al. (2020) found a positive relationship ($B = 0.39$, $SE = 0.13$, $p = 0.002$) between the two. This aligns with Bandura's (1997) Social Cognitive Theory, which suggests that external influences shape cognitive and behavioral factors, implying that indirect encouragement can enhance motivation for creative problem-solving.

The sixth, creative self-efficacy also impacts creative production, which requires originality and uniqueness (Byrge & Tang, 2015). Vally et al. (2019) found a positive correlation ($r = 0.48$, $p < 0.001$) between them. Lee and Kemple (2014) further emphasize that high creative skills are essential for overcoming daily challenges, suggesting that creative production stems from problem-solving in real-life situations.

The seventh, creative abilities are the ability to depict something asymmetrical or abstract, based on one's thinking ability (Urban & Jellen, 1996). Research conducted by Gralewski and Jankowska (2020) indicates that creative abilities ($r = 0.82$, $p < 0.001$) are one of the impacts of creative self-efficacy. Additionally, the Self-Determination Theory in Gralewski and Jankowska's (2020) research explains that with external assistance in exploration, individuals can express their ideas and actions further, based on their own thinking abilities (Soenens & Vansteenkiste, 2010).

4. CONCLUSIONS AND SUGGESTIONS

This research identifies creative self-efficacy as a form of creativity shaped by an individual's self-belief. Using a scoping review method, the study summarizes previous articles and categorizes them based on research methods. The findings highlight seven key impacts of creative self-efficacy in education: creativity, creative performance, team performance, creative ideation, divergent thinking, creative production, and creative thinking-drawing production.

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These impacts significantly influence individual self-development, emphasizing that creativity in education should not rely solely on internal processes but also involve external support from teachers or peers.

The study provides valuable insights for education and other fields to enhance creative self-efficacy. Understanding its impacts can help develop new learning methods, including hybrid learning through e-learning or similar approaches, to better support creativity and innovation.

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