Abstract: Several studies have stressed the necessity of fostering students’ creativity in the twenty-first-century learning process, particularly at the higher educational level. This study synthesized the characteristics (country, study population, and field of education/subject), methods, and theoretical ground used to foster students’ creativity in higher education research. Using the PRISMA 2020 as a guideline for writing a systematic literature review, two databases (ProQuest and Scopus) were searched for peer-reviewed, primary, and empirical research published in English between January 1, 2018, and October 15, 2022. A final selection of 28 studies that met the eligibility criteria were examined. The result showed that most of the studies reviewed were conducted on undergraduate students in developed industrialized East Asian countries and used surveys as the primary data collection method. Moreover, the grounding theories used in fostering creativity in higher education research were still scarce. This study showed that further research is needed to examine the mechanism for developing student creativity in higher education with more diverse samples, rigorous methods, and theoretical grounding.

Keywords: higher education, student creativity, creative teaching, creativity fostering teacher behavior, systematic literature review

1 Introduction

One of the critical skills to have in the twenty-first century is creativity (World Economic Forum, 2020). Creativity enables using, creating, improving, analyzing, and evaluating various ideas (Sharma & Sharma, 2018). Creativity also plays a crucial role in various aspects of idea generation and development (Benedek et al., 2016; Gundry, Ofstein, & Kickul, 2014; Ritter & Mostert, 2017). This skill enables individuals to discover new opportunities, enhance their creative thinking, and accurately assess the creativity of ideas.

Acknowledging its importance, educators and researchers agree that creativity in Higher Education Institutions (HEIs) is a relevant and essential skill for successful learning (Li, 2023; Nissim, Weissblueth, Scott-Webber, & Amar, 2016; Rae, 2023). Several studies have stressed the need to foster students’ creativity in HE (Fields & Bisschoff, 2013; Lee, Lee, Makara, Fishman, & Hong, 2015). Jackson, Oliver, Shaw, and Wisdom (2006) also stated that the goal of teaching in HE is to assist students in recognizing and leveraging their creativity. By doing so, students will become more effective learners and develop into individuals who can deal with uncertainty and complexity in their future workplace. Therefore, HEIs have proactively embraced this perspective by implementing creativity-nurturing programs designed to empower students to hone their creativity (Li, 2023). The programs aimed to enable students to develop their creativity so that they can demonstrate purposeful work that results in effective learning and retention.

Some governments also have developed educational initiatives to promote discussion and the implementation of educational policies to foster students’ creativity skills. For example, more than 20 years ago, the governments of China and Japan, and American and European business leaders mandated and recommended encouraging creativity in university curricula (Cheung, Roskams, & Fisher, 2006; Strom & Strom, 2002). European University Association also established a Creativity in Higher Education Project to analyze conditions that could promote or hinder creativity in the university setting in 21 different countries (European University Association, 2007). Recently, the Indonesian government has issued a “Merdeka Belajar – Kampus Merdeka (MBKM) Curriculum” through the Minister of Education and Culture Regulations Number 3 Year 2020 on National Standards of Higher Education (2020). The MBKM curriculum was designed to provide a student-centered
learning environment, encourage creativity, and provide contextual field experience, improving college students' competence and readiness for employment (Prahani et al., 2020).

The importance of fostering creativity becomes more critical in HEIs because HEIs are obligated to prepare their students and graduates to build a core competency for entry-level employment (Allen, Quinn, Hollingworth, & Rose, 2013; George, 2008). This is due to the increased demand for creative skills in the job market. According to IBM's Global CEO study (2010), 60% of global CEOs believe creativity is the most crucial leadership trait in the early twenty-first century. A PwC (2017) survey found that 77% of CEOs reported having trouble finding the creativity and innovation skills they needed. Moreover, LinkedIn surveyed corporate leaders, and creativity emerged as the most essential business skill, labeled “the most important skill in the world” (Petrone, 2018). In addition, the World Economic Forum (2020) also considered creativity one of the five most prominent and in-demand skills of the future. Consequently, higher education’s learning outcomes gradually changed their focus on producing creative graduates who can face the uncertainties of a dynamic future and prepare for jobs that may not have been thought of at this time (Hendayana, 2020; Pucio & Lohiser, 2020; van Laar, van Deursen, van Dijk, & de Haan, 2020).

Fostering creativity in HEIs cannot be separated from the role of lecturers who interact directly with students in the process of delivering knowledge. Lecturers' roles and competencies significantly impact student learning engagement (Almarghani & Mijatovic, 2017), which in turn will lead to producing creative learners (Kasmaienehzadfar, Pourrajab, & Rabbani, 2015). However, research on creativity in HE is multifaceted, with researchers advocating for a fusion of methodological and theoretical paradigms (Brown & Leigh, 2018). This complexity is further accentuated by university lecturers' diverse conceptions of creativity (Gaspar & Mabic, 2015; Kleiman, 2008).

A study by Mullet, Willerson, Lamb, and Kettler (2016) suggested that research on fostering creativity in educational settings should first consider lecturers' perceptions of creativity using qualitative or mixed-method research since their perceptions often differ from those used in research and theory. Moreover, according to studies, lecturers typically have an implicit concept of creativity, which influences their acceptance of creativity as an essential skill to teach (Cropley, Patston, Marrone, & Kaufman, 2019; Gaspar & Mabic, 2015; Pavlovic, Maksic, & Bodroza, 2013). Their implicit creativity theories may influence their educational practice and attitude toward students' creativity and development (Pavlovic et al., 2013). Cropley et al. (2019) also found that teachers' implicit ideas about creativity represent a more differentiated and operationalized framework. Furthermore, there is evidence that higher education lecturers have difficulty expressing, developing, and measuring creativity and that creativity in courses may be more implicit than explicit (Philip, 2015).

Creativity is a word that can be construed differently depending on the context; hence, there is no universal definition (Simkova, Bondarenko, & Bielovetska, 2021). For example, to describe the process of teaching and learning creativity in HEIs, the term “creative pedagogies” is frequently used. However, some scholars believe that the definitions of this term are still inconsistent and too broad as a construct (Batey, 2012; Simkova et al., 2021). For example, Lin (2011) and Holdhus (2019) used this term to avoid the dichotomy of “teaching for creativity” and “teaching creatively” because they believe that the two activities are inextricably linked. In contrast, Jeffrey and Craft (2004) thought these two activities must be distinguished.

Meanwhile, Sawyer (2017) defined creative pedagogies in HE as helping students break free from constractive learning methods and encouraging their openness to and exploration of diverse ideas. As such, it emphasizes the importance of explicitly defining and operationalizing creativity in higher education research and curricula to ensure that creativity is encouraged and designed to assist in teaching and learning (Philip, 2015). Therefore, there is a need for a systematic review that investigates how research on fostering creativity in HEIs has been defined and what theoretical frameworks have been used.

The theoretical framework is crucial in educational research, including research on fostering creativity in HE. It provides a basis for understanding the principles of creativity and its role in education, thereby facilitating the development of curricula and teaching methods that effectively nurture students' creativity (Egan, Maguire, Christophers, & Rooney, 2017). Moreover, the theoretical grounding aids in addressing challenges in higher education related to expressing, developing, and measuring creativity. By understanding these challenges, educators will be able to work toward embedding explicit and operational definitions of creativity into the curriculum to ensure that creativity is effectively cultivated and integrated into the teaching and learning process (Rae, 2023).

In this Systematic Literature Review (SLR), we refer to the study by Jeffrey and Craft (2004) and define teaching creatively as “using imaginative approaches to make learning more interesting and effective” (National Advisory Committee on Creative and Cultural Education, 1999, as cited by Jeffrey & Craft, 2004, p. 77). Meanwhile, teaching for creativity is defined as “forms of teaching
that are intended to develop young people’s own creative thinking or behavior” (Jeffrey & Craft, 2004). Furthermore, the terms “teaching for creativity” and “fostering creativity” in this review are used interchangeably because both refer to activities that promote students’ creativity. We made this decision after searching for synonyms of terms often used in student creativity research.

The number of reviews specifically addressing how to foster students' creativity in higher education is still relatively small. The most recent review on this topic was by Cremin and Chappell (2021), which discussed creative pedagogy on students aged 0–18 years, not particularly in HE, from articles published between 1990 and 2018. In addition, a study by Alencar, Fleith, and Pereira (2017) reviewed the driving and hindering factors from fostering creativity in HE. Sawyer (2017) investigated teaching creativity in the arts and design courses. Egan et al. (2017) did a scoping review about how HE formally fostered creativity. Mullet et al. (2016) examined lecturers’ perceptions of creativity.

Furthermore, to the best of the researcher’s knowledge, at the time of writing, no review currently provides insights into the methodologies, definitions, and theoretical frameworks employed in research on fostering creativity in HE. For those reasons, it is crucial to generate an overview and gain insight into the development of fostering creativity in HE in the recent literature. The research questions used to guide the analysis of this SLR are as follows:

(1) What are the characteristics (country, study population, program study/subject) and research methods for fostering creativity in higher education research?

(2) How is research on fostering creativity in higher education defined and theoretically grounded?

2 Method

This SLR was conducted according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement 2020 (Page et al., 2021). PRISMA 2020 is an update of PRISMA 2009. It is a guidance tool that helps researchers find, choose, evaluate, synthesize studies, and also provide a transparent, complete, and accurate account of the review process (Page et al., 2021). PRISMA has also obtained approval and adoption, co-published in several journals, cited in more than 60,000 reports, received support from about 200 journals and systematic review organizations, and has been used in a variety of disciplines (Page et al., 2021).

2.1 Protocol and Registration

The PRISMA 2020 Statement requires the systematic review to specify that this study was not registered and developed no protocol.

2.2 Information Sources and Search Strategy

Two electronic databases (ProQuest and Scopus) were used to search for literature published between January 1, 2018, and October 15, 2022. This time frame was chosen based on Kraus, Breier, and Dasi-Rodriguez (2020) proposition on research field maturity. Meanwhile, ProQuest and Scopus were selected because the authors have complete access to these databases. The initial inclusion criteria for this systematic review were peer-reviewed articles written in English and reporting on fostering students’ creativity in higher education. Clear inclusion and exclusion criteria were applied (Table 1). The search began on October 10, 2022 and concluded on November 15, 2022. The investigation started with identifying the correct search terms and synonyms for fostering creativity in higher education (Table 2), screening articles’ titles and abstracts, and conducting a full-text eligibility process.

2.3 Eligibility Criteria

Figure 1 depicts the procedure for determining article eligibility. A search of the databases resulted in 7,467 refer-

<table>
<thead>
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<th>Table 1: Inclusion and Exclusion Criteria</th>
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<tr>
<td><strong>Inclusion Criteria</strong></td>
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<tr>
<td>Published between January 1, 2018 and</td>
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<tr>
<td>October 15, 2022</td>
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<tr>
<td>English language</td>
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<tr>
<td>Empirical, primary research</td>
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<tr>
<td>Indexed in ProQuest and Scopus</td>
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<td></td>
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<tr>
<td>Fostering students’ creativity</td>
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<tr>
<td>Higher education</td>
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<tr>
<td>Full-text accessible</td>
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</table>
ences. Following the inclusion and exclusion criteria, 58 articles were considered for inclusion. After manual screening based on title and abstract, 27 articles were excluded, and the remaining 31 full-text articles were assessed. The validity and reliability of each article were evaluated by the transparency of the method, data, and how the methodology may have affected the results and reporting of the research.

### 2.4 Data Extraction and Data Synthesis

To gather and standardize data from each article, authors created a data extraction form that contained the following information: authors, year of publication, variables, aim, methodology, research design, participants’ characteristics, country, research instrument, creativity definition, theoretical framework, key findings related to fostering creativity, and how the method, data, and how the methodology may have affected the results and reporting of the research.
students’ creativity, authors’ decision to include or exclude the articles, reasons to inclusion/exclusion. Three full-text articles were excluded from the 31 potentially eligible articles (Table 3), leaving 28 eligible articles in the narrative synthesis.

3 Result and Discussion

3.1 Study Characteristics

Of the 28 studies on fostering students’ creativity in higher education, multidisciplinary study program was the most often researched (21.4%, \( n = 6 \)), with five studies (17.9%) explicitly investigating the creativity of the education program, four (14.3%) engineering program, three (10.7%) economics program, two (7.1%) health program, 2 (7.1%) arts program, two (7.1%) science program, and one (3.6%) design program. A brief summary of the study characteristics is presented in Appendix A. It should be emphasized that the data in the research instrument column and the key findings column in Appendix A only pertain to fostering students’ creativity in higher education, not the whole findings of the studies.

3.2 Geographical Characteristic

Taiwan, China, and Spain each contributed 14.3% (\( n = 4 \)) to the study of fostering creativity in higher education, followed by the United States at 10.7% (\( n = 3 \)). The rest came from various countries such as Thailand, Indonesia, Philippines, Korea, Spain, Norway, Poland, Russia, Canada, Ukraine, Brazil, the UK, and Australia, each contributing one study. Only one study (Park, Niu, Cheng, & Allen, 2021) carried out cross-cultural research in the USA and China. In comparison, industrial countries in East Asia, such as China, Taiwan, and Korea, have the most studies on fostering creativity in higher education (32.1%), followed by European countries (25.0%).

In this review, only one article by Nelmi, Efi, and Sandra (2022) about fostering creativity in HE was identified in Indonesia. It examines a learning model designed to promote the development of students’ creativity through Embroidery learning. The participants of this study were students majoring in the Fashion Design Study Program. Other studies about fostering creativity in Indonesia are by Halimah, Marwati, and Abdillah (2020) and Kurniaawati, Saleh, and Safitri (2022). Kurniaawati et al. (2022) conducted a study to investigate the effect of teachers’ intellectual humility and subjectivity on teachers’ behavior in fostering creativity.

Meanwhile, Halimah et al. (2020) investigated how students’ creativity in project-based learning can be fostered through lap booking. However, both of those studies were not in the context of HE. Kurniaawati et al. (2022) recruited elementary, junior high, and high school teachers as research participants; meanwhile, Halimah et al. (2020) recruited elementary students as participants. These results showed that fostering creativity in HE in Indonesia is still limited and can be an opportunity for further research in the future.

3.3 Study Population

A total of 11 studies (39.3%) were conducted at the undergraduate education level, five studies (17.9%) at the undergraduate and postgraduate level, four studies (14.3%) at the postgraduate level, and only one study (3.5%) at the vocational course level. The remaining seven (25.0%) did not explicitly state the study population’s educational level.

While the focus on undergraduate students in the reviewed studies provides great insights, it also raises important questions about the unique challenges and opportunities in fostering creativity at other educational levels. The emphasis on foundational knowledge and diverse student backgrounds may allow undergraduates to shape creative thinking early in their academic journeys. However, difficulties may arise when dealing with various learning styles and expectations.

Exploring postgraduate and vocational levels may reveal different dynamics, with postgraduates possibly exhibiting

<table>
<thead>
<tr>
<th>Article authors</th>
<th>Reason for exclusion</th>
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<tr>
<td>Smatanová and Vitková (2018)</td>
<td>Insufficient information about fostering creativity in higher education</td>
</tr>
<tr>
<td>Tahirsylaj, Mann, and Matson (2018)</td>
<td>Did not discuss fostering creativity in higher education</td>
</tr>
<tr>
<td>Williams (2020)</td>
<td>Did not elaborate the outcome of creative pedagogies on students’ creativity</td>
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</table>
more advanced creative capacities honed through specialized training. Vocational students, on the other hand, may require tailored approaches that combine creativity with practical skills relevant to their fields. Addressing these nuances in future research could lead to a more comprehensive understanding of how to foster creativity at various educational levels.

The majority of the 28 studies recruited undergraduate students as research participants (78.6%, n = 22). There are only four studies (14.3%) that investigated teaching for creativity by involving both students and lecturers as participants, and two studies (7.1%) that recruited faculty members (deans, lecturers, and administrative staff) as participants. This showed that among recent literature in ProQuest and Scopus databases, the research on teaching creativity in HE mainly focused on the undergraduate level and chose solely students as research participants.

The results showed that there is a need for future research to involve both students and lecturers in research on teaching creativity. It is critical for effective creativity fostering in HE. By involving students and lecturers, we can have a more thorough understanding of creativity and its development in educational settings. Students can offer valuable insights into their experiences and perspectives on creativity, while lecturers can provide expertise and guidance on teaching practices that can improve creativity.

Furthermore, involving faculty members in research on teaching creativity can provide a more comprehensive understanding of the challenges and opportunities for fostering creativity in HE. However, faculty members’ limited participation in these studies suggests a lack of awareness or interest in the importance of creativity in higher education. Understanding why this is happening can provide valuable insights into how to effectively engage faculty members in fostering creativity in higher education.

### 3.4 Methodological Characteristics

Surveys were the most commonly used data collection approach in all studies, followed by interviews and document analysis (Table 4). There were two studies (7.1%) that collected data both online and onsite, six studies (21.4%) online, 19 (67.8%) offline, and the remaining one (3.5%) did not state explicitly (Sun, 2020). Most of the studies used quantitative methods (42.8%, n = 12), followed by qualitative methods (32.1%, n = 9), and the rest used mixed-method designs (25%, n = 7). These results showed that recent literature had not considered the use of more varied research methods and examined the perspective of both teachers and students about fostering creativity in class, as suggested by Mullet et al. (2016).

### 3.5 Definition and Theory-Grounded Used on Fostering Creativity Research in Higher Education

The complexity of the construct is a common theme within research on teaching creativity because it is highly dependent on context (Simkova et al., 2021). Studies showed that a clear and accurate conceptualization of creativity is essential to explore it in the learning environment. This study showed that 50% of the articles reviewed did not clearly define teaching for creativity, student creativity, or creativity used in the studies.

Only four studies (14.28%) provided the definition of teaching for creativity (Kim, Bae, Choi, Kim, & Lim, 2019; Kozlov & Shemshurina, 2018; Raymundo, 2020; Twigg & Yates, 2019). Raymundo (2020, p. 6) defined teaching for creativity as “the use of teaching strategies that can develop students’ creative skills.” Twigg and Yates (2019, p. 2) defined teaching for creativity as “teaching practices that inspire and nurture students’ creative abilities.” It can be concluded that both of these studies defined teaching for creativity as teaching practices that can develop students’ creative skills. It can be supposed that these two studies believed teaching creativity is a teaching practice that can develop students’ creative skills. Furthermore, Kozlov and Shemshurina (2018) and Kim et al. (2019) specified the definition of teaching for creativity based on learning context. Kozlov and Shemshurina (2018) defined teaching for creativity as a teaching practice to improve students’ problem-solving skills in science-technology fields or engineering programs. Kim et al. (2019) described it as a learning process to enhance students’ problem-solving skills in mathematics.

Of 28 studies, only 10 (35.7%) studies stated the definition of creativity but did not elaborate on the notion of teaching creativity; for example, Han, Abadi, Jin, and Chen (2020, p. 758) stated “Creativity refers to the

<table>
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<th>Method</th>
<th>n</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Surveys</td>
<td>20</td>
<td>71.4</td>
</tr>
<tr>
<td>Interviews</td>
<td>10</td>
<td>35.7</td>
</tr>
<tr>
<td>Document analysis</td>
<td>9</td>
<td>32.1</td>
</tr>
<tr>
<td>Focus group</td>
<td>2</td>
<td>7.1</td>
</tr>
<tr>
<td>Observation</td>
<td>1</td>
<td>3.5</td>
</tr>
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</table>
production of new and useful ideas or solutions.” There is one study that explicitly stated that it does not want to dichotomize “teaching creatively” with “teaching for creativity” and prefers to use “creative pedagogies,” which includes both terms (Holdhus, 2019). Meanwhile, Sun (2020, p. 1) was the only study that stated the definition of student creativity. She refers to the study by Tsai, Horng, Liu, Hu, and Chung, (2015), “Student creativity is the tendency of students to generate new ideas that are useful in implementing products or services in individual learning environments, through interaction and sharing knowledge with other students.” The remaining 14 (50%) studies did not include the definition of creativity, teaching for creativity, fostering creativity, or student creativity in their articles. These differences showed that it is vital for each study to explicitly include the definition or concept of creativity used in the study.

Moreover, this SLR also found that most studies’ widely used theories were constructivism theory and Amabile’s theory of creativity components. However, over half of the 28 studies reviewed did not use theoretical grounds. This result represents the possibility of further challenges and discussion related to the theories to ground research in fostering creativity in HE. Specifically, the theoretical foundations were used in 12 studies (42.8%), with constructivism cited in three studies (Holdhus, 2019; Powell, Lambert, McGuijan, Prasad, & Lin, 2020; Raymundo, 2020) and Amabile’s component theory of creativity used in two studies (Liu, Wang, Chen, & Chao, 2020; Meng & Zhao, 2018). Other studies refer to Bandura’s social learning theory (Liu & Wang, 2019), the Theory of Planned Behavior (TPB) (Lagüa, Moriano, & Gorgievski, 2019), C–K (Concept–Knowledge Theory) (Sun, 2020), Perkin’s dispositional theory of thinking (Rabello-Mestre & Otondo, 2021), Simonton’s theoretical model of scientific creativity (Oliveira et al., 2021), games-torming theory (Fejoo, Crujeiras, & Moreira, 2018), and Janusian’s conceptual combination and structure-mapping theory (Kao, 2019).

These findings revealed a significant gap in explicit conceptualizations and theoretical foundations. In order to close the gap, future research could incorporate prominent theoretical frameworks that provide comprehensive insights into fostering creativity in higher education. According to the results, constructivism theory and Amabile’s theory were widely used. The emphasis of constructivism theory on active participation, collaboration, and problem-solving is consistent with the goals of fostering creativity. This theory provides a solid foundation for understanding how learners construct knowledge and foster a creative environment. More research could be conducted to investigate the nuanced applications of constructivism in various educational contexts and disciplines, as well as its adaptability and effectiveness.

Furthermore, Amabile’s theory of creativity components offers a systematic approach to comprehending the intrinsic (individual) and extrinsic (social) factors that influence creativity. Future research could delve into specific features such as domain-relevant skills, creativity-relevant processes, and intrinsic task motivation to unravel the intricate dynamics of fostering creativity in HE. Thus, future research can offer tailored recommendations for instructional design and pedagogical strategies by investigating how these components interact in various educational settings.

Another theoretical framework used in the reviewed study was the application of Bandura’s social learning theory. This theory, which emphasizes observational learning and modeling, may help us understand how social interactions and learning environments influence creativity. Furthermore, the TPB provides a psychological framework for investigating the role of intention and perceived behavioral control in fostering creativity. Future research could delve into these theories, providing a more comprehensive understanding of the intricate relationship between teaching practices, theoretical frameworks, and creativity in higher education.

Furthermore, previous studies have found differences in perceptions and attitudes about creativity between cultures; hence, cross-cultural studies are required (Lee et al., 2015; Wong & Niu, 2013). One of the studies that acknowledged the relationship between creativity and culture in this review is a study by Bausawan (2018). She discovered that while most faculty members (deans, lecturers, and administrative staff) agreed that students should be more courageous in expressing their thoughts and opinions for their creativity to develop, this was hampered in practice by cultural factors that expected students always to be obedient and submissive to elders. This review found only one cross-cultural study in recent literature (Park et al., 2021); therefore, more cross-cultural studies are needed in the future. Park et al. (2021) proved that there are disparities in the two countries’ creativity and critical thinking levels, with Chinese students excelling in critical thinking and American students excelling in creativity. They also found that having research experience at a university (e.g., taking a research techniques class) significantly impacts students’ creativity and critical thinking, regardless of cultural or national background. These findings suggest that more cross-cultural studies in fostering creativity are needed. From our review, we also arrived at the conclusion that although creativity and critical thinking were used interchangeably (Rusimamto, Nurlaela,
Sumbawati, Munoto, & Samani, 2019) and showed a strong correlation, Park et al. (2021) discovered that these two skills must be separately examined and measured in order to generate a precise and thorough analysis.

4 Conclusion, Limitation, and Future Direction

This study synthesizes 28 studies from 2018 to 2022 on creativity fostering teacher behavior in higher education. The majority of studies were conducted in developed industrialized East Asian countries such as China, Taiwan, and Korea, with China and Taiwan each contributing four studies. The sample population consists primarily of undergraduate students with no specification on the majors or program study they pursue. The quantitative technique with survey methods was the most commonly utilized research method. Furthermore, it was discovered that only a few studies incorporated theoretical grounding in the study process. Overall, this review shows the need for future research to apply more controls over the methodology in order to substantiate and analyze the mechanism for fostering student creativity in higher education, as well as firm theoretical grounding.

Following the PRISMA 2020 Statement, the authors have attempted to follow the principles of writing an SLR as closely as possible. However, this work is still at risk of bias because it only includes English publications from the two electronic databases (ProQuest and Scopus), with limitations on the publication year from 2018 to 2022. The studies were included based on the author’s assessment perspective. Additionally, it is critical to recognize the potential bias caused by the concentration of studies reviewed in developed East Asian countries. Future research endeavors should actively seek diverse global perspectives to address this limitation and promote a more inclusive understanding of fostering creativity in HE. Researchers are encouraged to investigate and incorporate studies from a broader range of cultural and regional contexts to achieve a comprehensive and nuanced understanding of fostering creativity in HE worldwide.

Funding information: This work was supported by Hibah PUTI Q3 from Universitas Indonesia.

Conflict of interest: The authors state no conflict of interest.

References


Table A1: Summary of included studies

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Aim</th>
<th>Methodology</th>
<th>Sample/Country</th>
<th>Research instrument</th>
<th>Key findings concerning fostering creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Belur, Patil, Mahantshetti, and Patil (2022)</td>
<td>Identified the boosters of creativity and modeled the relationships among the identified boosters</td>
<td>Online survey</td>
<td>MBA students (n = 269), India</td>
<td>Critical thinking (Florea &amp; Hurjui, 2015), risk-taking (Dewett &amp; Gruys, 2007), problem-solving (Gapp &amp; Fisher, 2006), adaptability and creativity (Lou, Chung, Dzan, &amp; Shih, 2012), teamwork (Ahmadi &amp; Besançon, 2017)</td>
<td>Adaptability, teamwork, risk-taking, problem-solving, and critical thinking competencies positively affected students’ creativity. Adaptive and teamwork learning model proved to be the basis for various competencies, which in turn fostered creativity among MBA students.</td>
</tr>
<tr>
<td>2. Buasuwan (2018)</td>
<td>Examined the gaps and key challenges in fostering creativity that higher education institutions faced</td>
<td>In-depth interview, document analysis, survey</td>
<td>Faculty member (dean lecture and administrator) (n = 100), Thailand</td>
<td>Priority Need Index (PNI)</td>
<td>Although the majority of faculty members stated that students should be bolder in expressing their thoughts and opinions so that their creativity would develop, they also expected students always to be obedient and submissive to the elderly. There were cultural factors in the community that upheld strict values toward seniority, which caused the development of students’ creativity to be hampered.</td>
</tr>
<tr>
<td>3. Feijoo et al. (2018)</td>
<td>Developed students’ creativity and teamwork through Gamestorming methodology</td>
<td>Survey</td>
<td>Undergraduate engineering students (n = 129), Spain</td>
<td>Evaluation of the skills developed in the Gamestorming activity</td>
<td>The nature and quality of interaction between students and lecturers or interaction among students positively affected the quality of learning, student motivation, and attitudes toward courses. Students considered the Gamestorming methodology as a mechanism to enhance their creativity in decision-making processes and group work.</td>
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<tr>
<th>Author/s</th>
<th>Aim</th>
<th>Methodology</th>
<th>Sample/Country</th>
<th>Research instrument</th>
<th>Key findings concerning fostering creativity</th>
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<tbody>
<tr>
<td>4. Han et al. (2020)</td>
<td>Explored the drivers, barriers, and processes for encouraging student creativity in interdisciplinary design teams in colleges</td>
<td>Interviews via video conference system</td>
<td>Undergraduate and postgraduate students ($n=15$), USA</td>
<td>Interview questions list</td>
<td>A positive team climate and team efforts significantly impact creative outcomes when interdisciplinary teams work together. Brainstorming activities, strong motivation, and diverse perspectives were vital to fostering creativity. At the same time, a lack of equipment and time could foster or hinder creativity, depending on the context.</td>
</tr>
<tr>
<td>5. Holdhus (2019)</td>
<td>Examined how creativity pedagogy, mainly teaching for creativity, can occur in various practical surroundings</td>
<td>Document analysis</td>
<td>Postgraduate music and visual art students ($n=13$), Norway</td>
<td>Student's assignment files</td>
<td>Teachers and students need to get to know one another in order to build trust and creativity. Also, creativity must be made relevant and contextualized based on where it functions.</td>
</tr>
<tr>
<td>6. Kao (2019)</td>
<td>Examined how irrelevant stimulus words and antonyms can foster students' creativity and affect their creativity fluency and originality scores</td>
<td>Survey</td>
<td>Undergraduate language and arts students (study 1: $n=173$, study 2: $n=151$), Taiwan</td>
<td>Janusian Sentence Completion (developed by the author)</td>
<td>Combining irrelevant and contradictory concepts in learning activities could facilitate and foster students' creativity.</td>
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<td>7. Kao (2020)</td>
<td>Compared students' creativity fluency and originality scores between the three types of analogy items (IQ-test type, traditional type, and novel metaphorical type)</td>
<td>Survey</td>
<td>Undergraduate and postgraduate language and arts students ($n=190$), Taiwan</td>
<td>New Test of Creative Thinking (Wu et al., 1998)</td>
<td>With a proper design, learning activities involving analogies could encourage logical thinking and students' creativity.</td>
</tr>
<tr>
<td>8. Katz-Buonincontro, Perignat, and Hass (2020)</td>
<td>Investigated pre-service and in-service teachers' epistemic beliefs about creativity and teaching for creativity</td>
<td>Semi-structured interview, focus group (onsite and online)</td>
<td>Undergraduate (pre-service teacher) &amp; postgraduate (in-service teacher) students ($n=16$), USA</td>
<td>Interview questions list</td>
<td>Pre-service and in-service teachers believed that teaching for creativity requires giving students the freedom to think, take risks, and explore and express new ideas. Although teachers consider creativity essential in learning, and students' creativity can be developed, teachers also believe that some students are inherently closed-minded and do not want to develop their creativity.</td>
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<tr>
<td>Kim et al. (2019) 9</td>
<td>Examined to what extent curriculum units that integrate creativity and character education affect the pre-service teacher’s perspective on creativity and character education in the mathematics education program</td>
<td>Document analysis, pre- and post-test surveys</td>
<td>Undergraduate (pre-service teacher) math education program students (n = 56), Russia</td>
<td>Testing Tool for Mathematical Creativity and Character (Whang, Kim, Lee, &amp; Choi, 2017); Video of student debate sessions; Student's reflection essays; Student's final project presentation</td>
<td>Curriculum units that integrated creativity effectively influenced pre-service teachers' perspectives on creativity and character education and raised their desire to foster student creativity when they teach in later periods</td>
</tr>
<tr>
<td>Kozlov and Shemshurina (2018) 10</td>
<td>Developed a multipurpose technological support to design creative activities for engineering students</td>
<td>Document analysis, pre- and post-test survey, interview</td>
<td>Undergraduate engineering students (n = 150), Russia</td>
<td>Engineering students' research competency levels (developed by authors)</td>
<td>Equipping students with a good understanding of research activities and specific problem-based learning systems was an effective strategy for fostering students' creativity</td>
</tr>
<tr>
<td>Laguía et al. (2019) 11</td>
<td>Explored the relationship between self-perceived creativity and potential antecedents of students' creativity (university and family support for creativity and taking creativity courses)</td>
<td>Survey</td>
<td>Undergraduate and postgraduate students (n = 559), Spain</td>
<td>Creative Potential and Practiced Creativity scale (CPPC-17) (DiLiello &amp; Houghton, 2008); Perceived support for creativity (Zampetakis, Gotsi, Andriopoulos, &amp; Moustakis, 2011)</td>
<td>University support for creativity was slightly more strongly associated with self-perceived creativity than family support. Significant determinants of self-perceived creativity were taking creative classes and family and university support</td>
</tr>
<tr>
<td>Leśniewska-Napierala, Napierala, Tjørve, and Tjørve (2020) 12</td>
<td>Examined whether, as an educational tool, can foster students’ creativity</td>
<td>Online and onsite survey, in-depth interview</td>
<td>Undergraduate students (n = 27), tutor (n = 7), Poland</td>
<td>The '24 HOURS Tourism Contest’ evaluation questionnaire regarding participants' desire to win (developed by authors); Interview questions list</td>
<td>Students' creativity increased during the contest through the development of social competence (teamwork or interacting with other teams). However, as a tool of education, a contest was unsatisfying in increasing students' creativity because they were more oriented towards winning or gaining knowledge rather than acquiring social competence</td>
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<tr>
<td>Liu and Wang (2019) 13</td>
<td>Examined whether the teaching for creativity module (TCM) can improve the faculty member's teaching behaviors and self-efficacy in creativity</td>
<td>Survey pre and post-test</td>
<td>Faculty member of Nursing Department (control group: n = 27; experiment group: n = 21), Taiwan</td>
<td>Creativity Teaching Behavior Scale (CTBS) (Chang, Chen, &amp; Hsu, 2010; Soh, 2000); Creativity Teaching Efficiency of Technology Institute Teacher’s Scale (CTETITS) (Chen, 2005); Self-efficacy for Creativity Teaching Scale (SECTS) (Lin &amp; Chiou, 2008)</td>
<td>TCM module positively affected both creativity teaching behavior and creativity teaching efficiency of faculty members. The module, which focused on creativity training for faculty members, had a positive effect on behavior that would stimulate and facilitate students’ creativity</td>
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<td>14. Liu et al. (2020)</td>
<td>Examined how fostering creativity might be influenced by the possible moderating and mediating role of the relationship between (a) creative teaching self-efficacy and creative teaching behavior and (b) school's creative climate and creative teaching behaviors</td>
<td>Survey</td>
<td>Lecturer of Healthcare University (n = 53), Taiwan</td>
<td>CTBS (Chang et al., 2010; Soh, 2000); CTETITS (Chen, 2005); SECTS (Lin &amp; Chiou, 2008)</td>
<td>A creative school climate is a critical component that is affected teachers' creative teaching behavior</td>
</tr>
<tr>
<td>15. Mareque, de Prada Creo, and Gonzalez-Sanchez (2019)</td>
<td>Examined how leisure activities and soft skills were related to fostering creativity in higher education</td>
<td>Online survey</td>
<td>Undergraduate students of business administration and tourism program (n = 303), Spain</td>
<td>“Runco Ideational Behavior Scale: short form” (RIBS-s) (Runco et al., 2014)</td>
<td>Students who participated in leisure activities showed a higher level of creativity, especially those who participated in art-related activities. The activities that most influenced creativity were visual arts and writing. Despite this strong relationship, the percentage of students who did writing activities in their free time was meager, even though some research had emphasized the importance of oral and written communication skills in various fields of work</td>
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<tr>
<td>16. Meng and Zhao (2018)</td>
<td>Examined the mediating mechanisms of intrinsic motivation, creative thinking, and professional knowledge between academic supervisor leadership (ASL) and postgraduate students' creativity</td>
<td>Survey</td>
<td>Postgraduate students of the life sciences program (n = 677), China</td>
<td>Creative thinking scale developed by the authors based on the definition of creativity-relevant processes by Amabile (1983) and; Creativity scale (Tierney, Farmer, &amp; Graen, 1999; Zhang &amp; Bartol, 2010)</td>
<td>ASL positively influenced postgraduate students' creativity through intrinsic motivation, creative thinking, and professional knowledge. This result transforms ASL's tasks to inspire students' intrinsic motivation, impart their professional knowledge, and foster the creative thinking skills of postgraduate students toward scientific research. But many ASLs were not ready to foster creativity in postgraduate students</td>
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<td>Miño-Puigcercós, Domingo-Coscollola, and Sancho-Gil (2019)</td>
<td>Examined how the learning and teaching culture is affected when integrating learning practices related to the DIY (Do It Yourself) perspective, such as encouraging creativity, collaboration, self-regulation, authorship, and the critical use of digital technology</td>
<td>Document analysis, focus groups, observation, and research-based practice</td>
<td>Undergraduate students (pre-service teacher) ( (n = 471) ), lecturer of education program ( (n = 20) ), Spain</td>
<td>Verbatim of discussion groups, observation notes, and field notes</td>
<td>Because the DIY culture puts students at the center of learning, students admitted it was difficult to change their passive role into an active and participatory role. At the same time, lecturers also admitted their discomfort due to ignorance of the outcome of students' projects. Initial hesitation and resistance from lecturers and students might be related to their fear of losing control. However, at the end of the project, the participants agreed that their doubts and resistance turned into satisfaction.</td>
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<tr>
<td>Nelmira et al. (2022)</td>
<td>Designed learning models to encourage the development of students' creative attitudes</td>
<td>Interviews, document analysis (students' product design)</td>
<td>Undergraduate fashion design student ( (n = 12) ), Indonesia</td>
<td>Interview questions list</td>
<td>Student Research-Based learning (S-RBL) model proved to help improve students' understanding of learning material and also develop students' creativity of students.</td>
</tr>
<tr>
<td>Oliveira et al. (2021)</td>
<td>Examined the effectiveness of open-ended drawing as a pedagogical tool to encourage creativity and engagement among undergraduate biology students</td>
<td>Document analysis (classroom videos and students' open-ended drawing tasks)</td>
<td>Undergraduate biology students ( (n = 52) ), Canada</td>
<td>Visual design analysis (Kress &amp; van Leeuwen, 2006)</td>
<td>The use of open-ended drawing in the sciences program effectively fosters students' creativity and creative performance.</td>
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<tr>
<td>Park et al. (2021)</td>
<td>Investigated the relationship between creativity and critical thinking, how college research experience affected students' creativity and critical thinking, and how culture influenced creativity and critical thinking</td>
<td>Online survey</td>
<td>University students (grades not specified) in the USA ( (n = 103) ) and China ( (n = 166) )</td>
<td>STEAM Related Creative Problem Solving (developed by authors); Psychological Critical Thinking Exam (PCT Exam) (Lawson, Jordan-Fleming, &amp; Bodle, 2015); California Critical Thinking Skills Test (Facione &amp; Facione, 1994); Sternberg Scientific Inquiry and Reasoning (Sternberg &amp; Sternberg, 2017)</td>
<td>Having research experience in universities had a significant effect on students' creativity and critical thinking. Despite the strong correlation between creativity and critical thinking, these two skills must be studied separately to produce a precise and comprehensive analysis. Culture could influence students' creativity, and this study showed that Chinese students excel in critical thinking while American students excel in creativity.</td>
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<td>21. Powell et al. (2020)</td>
<td>Examined how co-created role-play helps Accounting and Audit Program students foster their creativity</td>
<td>Online survey</td>
<td>University students of the economy program (grades not specified) ( n = 313 ), Australia</td>
<td>Students' perceptions and experiences related to role-playing learning strategy (developed by authors)</td>
<td>Co-created role-play effectively removed the creative barriers often found in traditional forms of Accounting and Auditing programs. It provides opportunities for students to be as creative as possible in developing and conducting audit scenarios.</td>
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<tr>
<td>22. Rabello-Mestre and Otondo (2021)</td>
<td>Examined how incorporating “Creative Sound Workshop” into the Acoustic Engineering undergraduate curriculum could create an applied music creativity experience for engineering students</td>
<td>Survey, document analysis</td>
<td>Undergraduate engineering students ( n = \text{not stated} ), Chile</td>
<td>Self-reported assessment, students' final project assignment</td>
<td>The instructional design developed based on the Dispositional Theory of Thinking positively impacted student motivation and successfully promoted a positive and critical learning culture. While fluency in creativity was not high in student projects, creativity was often manifested in different project features such as creative use of visual elements, conceptual originality, and resourceful use of the programming environment.</td>
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<tr>
<td>23. Raymundo (2020)</td>
<td>Examined how feasible, effective, and acceptable creative-collaborative group projects were to foster postgraduate students' creativity in a fully online education program</td>
<td>Survey (open-ended question)</td>
<td>Postgraduate students of the Master of Distance Education (MDE) program ( n = 38 ), Philippines</td>
<td>Students' feedback and reflection essays about their experience participating in creative-collaborative group projects</td>
<td>Creative-collaborative group projects proved to be a learning strategy that can be implemented easily, effectively, and acceptably to encourage student creativity in online education settings.</td>
</tr>
<tr>
<td>24. Simkova et al. (2021)</td>
<td>Examined the creative thinking development of students from different majors during ESP (English for Specific Purposes) courses by implementing web-based applications and integrated learning</td>
<td>Online survey, semi-structured interview</td>
<td>Undergraduate students who took an online class of English for Specific Purposes ( n = 310 ), Ukraine</td>
<td>Torrance Tests of Creative Thinking (TTCT); Guilford's Alternative Uses Test; Wallach and Kogan's creative thinking test; Semi-structured interview (5 min)</td>
<td>Students experienced changes in the development of their creative thinking (originality type) before and after web-based applications were implemented in ESP class.</td>
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<td>Suacamram (2019)</td>
<td>Designed and examined a series of workshop classes to promote student creativity based on the C–K (Concept-Knowledge) theory</td>
<td>Survey, interview, and forms to evaluate lesson plans</td>
<td>Undergraduate film major students (<em>n</em> = 25), China</td>
<td>Torrance Tests of Creative Thinking (TTCT) adapted by Kim (2006); Creative role identity scale (Jaussi, Randel, &amp; Dionne, 2010); Creative Self-efficacy scale (Karwowski, Lebuda, Wisniewska, &amp; Gralewski, 2013); Assessment rubric to assess student creativity from their assignments (developed by the author)</td>
<td>The group of students taught using the C–K theory showed a higher level of creative development than those who did not. The differences in average creativity scores were unaffected by creative role identity or creative self-efficacy</td>
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<tr>
<td>Sun (2020)</td>
<td>Examined the relationship between social media use and students' creativity and the role of student engagement as a mediator in the educational context in China</td>
<td>Survey</td>
<td>Undergraduate students (<em>n</em> = 652), China</td>
<td>Creativity scale (Tsai et al., 2015)</td>
<td>The use of social media in an educational setting was associated with student engagement and creativity, and student engagement partially mediated the relationship between social media use and student creativity</td>
</tr>
<tr>
<td>Twigg and Yates (2019)</td>
<td>Investigated creative teaching and teaching for creativity practices experienced by students during their internship</td>
<td>Survey, interview</td>
<td>Internship undergraduate students of early childhood program (<em>n</em> = 30), UK</td>
<td>Interview questions list</td>
<td>Students observed more teaching for creativity than creative teaching in their internships; Creativity was not always appreciated in all educational situations and settings</td>
</tr>
<tr>
<td>Vilarinho-Pereira and Fleith (2021)</td>
<td>Compared the role of technology in fostering students' creativity motivation from the perspective of professors and students, which were divided into three groups (professors who used information and communication technologies (ICT) creatively, professors who made traditional use of these technologies, and professors who did not use ICT at all)</td>
<td>Survey, semi-structured interview</td>
<td>Undergraduate students (<em>n</em> = 249), professors (<em>n</em> = 9), Brazil</td>
<td>For students: The Inventory of Teaching Practices for Creativity in Higher Education (ITPC-HE) (de Alencar &amp; de Souza Fleith, 2014) For professors: Interview questions list</td>
<td>The use of ICT, both in the group who used ICT creatively and traditionally, did not provide a significant change in students' motivation and their perception of professors' teaching for creativity value. The group of students and professors who did not use ICT at all showed higher teaching for creativity value than the other two groups</td>
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