Teaching for Fostering Creativity in Higher Education for Facing The Global Competition : A Systematic Literature Review

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Abstract: This study aims to analyze the facilitators and barriers that influence teaching to foster students' creativity in higher education and how the implementation made by the university encourages creativity in students. This study used the systematic literature review method with PRISMA procedure based on the following criteria: The literature was published in Taylor and Francis and ProQuest from 1997 to 2022 and written in English. Literature extraction and synthesis were carried out from 19 articles and then analyzed using content analysis. Results showed more factors, namely teacher beliefs, positive attitudes of teachers toward creativity, collaboration in learning, group discussions, providing training, lecturers teaching method to instill a growth mindset, providing assessments according to actual situations, and the use of technology that encourages lecturers to foster creativity rather than the barriers. In addition, the implementation made by universities for fostering creativity includes training programs and using various technology-based creative applications adapted to the characteristics of the major disciplines.

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Introduction

Creativity is one of the skills needed in the 21st Century (Nakano & Wechsler, 2018). Creativity is not only needed in education but also plays an essential role in the economic growth of a country (Sharma & Sharma, 2018). Creativity in education benefits teachers and students by making learning more exciting and meaningful (Rinkevich, 2011). In addition, creativity can help improve students' academic abilities and involvement, influencing student personalities, such as self-efficacy and creative thinking (Sharma & Sharma, 2018). To develop students' creativity, the teacher needs to change the learning system in the classroom (Nakano & Wechsler, 2018). Teachers play a role in fostering students' creativity to generate creative human resources in the future (Sharma & Sharma, 2018). Therefore, teachers can encourage students to foster their creative needs through nine behaviors based on Cropley's (1997) principles. Such behaviors are: encouraging students to learn independently, teaching styles that are integrative or collaborative, motivating students, delaying judging students, encouraging students to think flexibly, enabling students to evaluate themselves, listening to suggestions and questions, providing opportunities for students to try various things, and helping students overcome failure/frustration (Cropley, 1997).

Several instruments have been developed to measure these behaviors. Soh (2000) developed an instrument to measure the nine characteristics above that foster student creativity based on Cropley's theory (1997) called the Creativity Fostering Teacher Index. The CFTIndex is increasingly used by researchers in various countries in the world, such as America, Canada, Chile, Hong Kong, Korea, Mexico, Nigeria, Turkey, and Singapore (Soh, 2015). In addition to Soh (2000), other researchers have also developed instruments that

measure teachers' teaching abilities to increase students' creativity, such as the Teaching for Creativity Scale developed by Rubenstein et al. (2013) and The Teacher's Creativity Nurturing Behavior Scale made by Sharma and Sharma (2018). Rubenstein et al. (2013) made the Teaching for Creativity instrument to measure teachers' perceptions of their abilities when teaching to foster student creativity. The teaching for Creativity Scale consists of four dimensions: teacher self-efficacy, environmental engagement, societal values, and student potential. Sharma and Sharma (2018) also developed the Teacher's Creativity Nurturing Behavior (TCNB) instrument, which measures teacher behavior to foster student creativity and consists of four dimensions: abstraction, inquisitiveness, motivation, and critical thinking.

For several reasons, fostering student creativity in higher education in facing global competition is essential. First, Having creativity skills can develop students' problem-solving abilities (Nakano & Wechsler, 2018). Second, creative thinking can boost students' motivation, making the learning process more effective (Wan, 2023).). Third, other creativity-based skills, such as finding solutions and dealing with uncertainty, it will be helpful for academic learning during college (Stolz et al., 2022) and future professional duties (De Alencar et al., 2017; Stolz et al., 2022). Although creativity is a crucial skill for students, many academic institutions and lecturers have yet to create a learning atmosphere that fosters creativity (De Alencar et al., 2017).

The study aims to conduct a systematic literature review by searching for evidence that discusses teaching skills to encourage creativity in higher education. It is due to the limited number of literature reviews that discuss teaching skills to encourage creativity at the college or university level. As creativity tends to decline with aging or due to the stringent course at university programs, it is nonetheless a necessary tool for innovation and must be fostered at all costs. Several existing systematic literature reviews discussed creativity in the context of lower-level education, starting from early childhood education to senior high school (Bereczki & Kárpáti, 2018; Cremin & Chappell, 2021). Cremin and Chappell (2021) reviewed the characteristics of creative pedagogy, while Bereczki and Karpati (2018) reviewed teachers' beliefs in creativity.

Research Method

This study used the systematic literature review method to describe the overview of research that has been carried out on teaching for creativity in a university context. The systematic literature review used the Preferred Items for Systematic Reviews and meta-analysis (PRISMA) statement 2020 guidelines (Page et al., 2021) to ensure adequate reporting as the basis of this systematic review. The study used two databases for literature search procedures to complete the electronic search: Taylor and Francis and Proquest. The publication of journal articles was limited from 1997 to 2022 based on Cropley's (1997) theory, which discusses creativity fostering teacher behavior. The keywords used in the search were teaching for creativity (OR) creativity fostering teacher behavior (OR) creativity nurturing teacher behavior, (AND) higher education or college or university, (AND NOT) early childhood education or kindergarten, primary school, high school or middle school or K-12. The total search results using these keywords in both databases were 7656 articles.

Literature selection procedures were carried out by a total of 7656 articles containing keywords selected by applying several inclusion and exclusion criteria. Inclusion criteria include research articles with various methodological designs and in various course subjects, assessed both the teachers' application (teaching behavior) and creativity outcomes, were peer-reviewed, written in English, and within the higher education context. The exclusion

criteria included articles that were not the result of a literature review, the research context was not early childhood education to senior high school, the article was not about the construction of instruments, the article was not a dissertation or thesis, and the article was fully accessible by the author. From 7656 journal articles, 46 were selected based on the title and abstract. After applying the inclusion and exclusion criteria, 19 articles were obtained. The literature selection procedure can be seen in Figure 1.
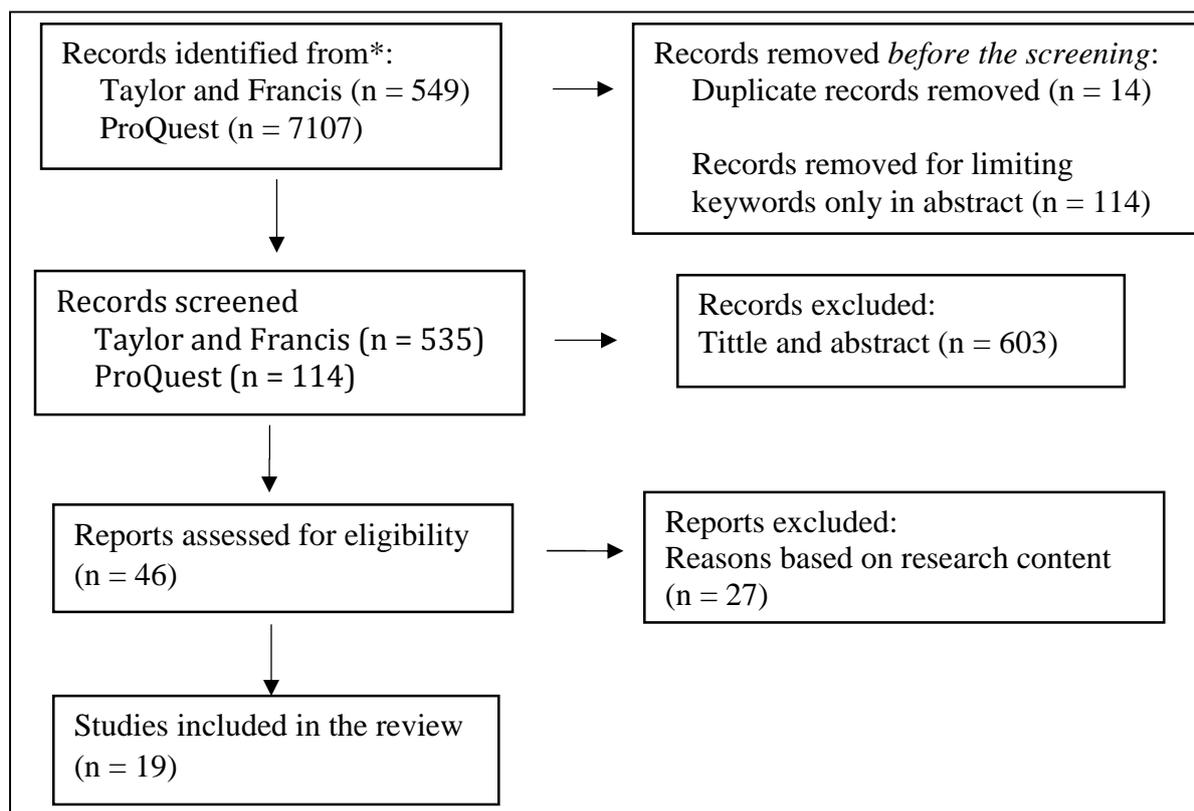
Figure 1. Flow diagram of the literature selection process with PRISMA

The data analysis technique of this research used content analysis. Each article was scanned manually to ensure that it contained teaching for fostering creativity in higher education. Next, themes and keywords were extracted. Data quantification, such as the country's location and courses, also was done. The content of articles was analyzed and noted in Table 1 based on authors, year of research, title, country, and findings.

Results and Discussion

Data extraction from 19 articles was then carried out using a template containing the authors, year of research, title, country, and findings. The results of data extraction and analysis can be seen in results (Table 1).

Table 1 The Results of Full Text Article Extraction and Analysis

No	Authors	Year	Tittle	Country	Findings
1.	Newton, D., Wang, Y., Newton, L.	2022	'Allowing them to dream': fostering creativity in mathematics undergraduates	United Kingdom	- Teacher confidence is not the only factor determining students' creative thinking abilities. - Application of creativity in Mathematics by conducting training (workshops) and collaborating to improve critical

No.	Author	Year	Title	Country	Findings
					thinking skills.
					- The inhibiting factor in improving students' creative thinking skills is determined by the process or product of creativity and the origin/source of the emergence of creativity.
2.	Powell, L., Lambert, D., McGuigan, N., Prasad, A., & Lin, J.	2020	Fostering creativity in audit through co-created role-play	Australia	The role-play method effectively increases students' creativity by providing valuable experiences because students can share experiences when doing self-discovery learning.
3.	de Bruin, L. R.	2018	Apprenticing for creativity in the improvisation lesson: a qualitative enquiry	Australia	Lecturers develop the concept of learning and problem-solving by modeling, coaching, scaffolding, reflection, and exploration to increase creativity by fostering a growth mindset to solve problems and think creatively in students.
4.	Rossetto, C. & Chapple, S.	2018	Creative accounting? The critical and creative voice of students	Australia	Creativity can be applied effectively when conducting assessments so it can help improve student learning experiences
5.	Liu, H. Y., Hsu, D. Y., Han, H., M., Wang, I. T., Chen, N. H., Han, C., Y., Wu, S., M., Chen, H. F., & Huang, D. H.	2022	Effectiveness of interdisciplinary teaching on creativity: A quasi-experimental study	Taiwan	- Students who received the IDT intervention had higher scores in terms of divergent creative thinking abilities and positively impacted perceptions of team creativity. - Collaboration and group discussion can increase the creativity of Nursing students.
6.	Oskay, O., O.	2015	Prospective teachers creativity fostering behaviors, perceptions on their technology skills and success in project based material development	Turkey	- The study found that teachers were not creative in the independence sub-dimension but had little creativity in the motivating, flexibility, and evaluating sub-dimensions, creativity was in integrating, questioning, providing opportunities, and judging, and creativity was high in disappointment. However, overall creativity is at a moderate level after receiving training. - Perception of technology skills and behavior encourages creativity to get 25% achievement.
7.	Byrge,C. & Hansen, S.	2013	Course in new thinking in higher education: Enhancing creativity through the means of	Denmark	- The results show that the training has a positive effect on increasing creativity in students. - Small groups are also known to have a better impact on increasing creativity than large

No.	Author	Year	Title	Country	Results
			training, theory and workshop		groups.
8.	Marquis, E & Henderson, J., A.	2015	Teaching creativity across disciplines at Ontario Universities	Canada	- There are differences in the perception of lecturers from various disciplines in developing creativity in students. - The strategies carried out so far are collaboration, provoking ideas, and challenging students to find new solutions to problems. - The barriers found were time constraints and student attitudes.
9.	Velikova, E. & Petkova, M.	2019	Analyzing students' creativity in integrating GeoGebra applets in solving Geometrical Problems	Bulgaria	Training using creative software such as GeoGebra can be successful in increasing creativity in solving geometry problems in Mathematics.
10.	Ashmore, N. & Moriarty, J.	2016	Living archives – supporting creative practice students learning leaps in interdisciplinary workshops	United Kingdom	- Students feel the positive impact of the training and feel happy when allowed to study in various disciplines compared to traditional methods. - Students need time when practicing in the community so that it is more suitable for a more extended period
11.	Fitriah	2018	The role of technology in teacher's creativity development in English teaching practices	Indonesia	Teachers realize the important role of technology in encouraging students' creativity and supporting the formation of creative activities in learning the language
12.	Andriani, A. & Sagala, P. N.	2020	The use of mixed apps as accommodation of Mathematical student creativity	Indonesia	Mixed Apps software has proven to be effective in developing student creativity.
13.	Halakova, Z.	2007	Is creativity characteristic for incoming teachers of Science?	Slovakia	- 20% of respondents who completed the figural form have high level of creativity in terms of creative thinking flexibility. - 60% of the respondents who completed the form were known to have an average level of creativity.
14.	Liu, H. Y. & Wang, I. T.	2019	Creative teaching behaviors of health care school teachers in Taiwan: mediating and moderating effects	Taiwan	- Creative-teaching self-efficacy mediates the school creative climate and creative teaching behavior. - Creative teaching abilities can be a moderator in the relationship between school's creative climate and creative teaching behavior

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15.	Semmler, L., Uchinokura, S., Pietzner, V.	2018	Comparison of German and Japanese student teachers' views on creativity in chemistry class	Japan and Germany	Most teachers in both types of respondents have positive attitudes about creativity, but there are still differences in understanding and implementing creativity in the classroom.
16.	Zalloom, B.	2019	Increasing creativity and community responsibility through the interactive learning at the schools of Architecture in Jordan	Jordan	Workshops can increase students' knowledge about social sustainability in designing buildings, especially public places, and increase student creativity in making designs with creative thinking.
17.	Suyidno, Nur, M., Yuanita, L., Prahani, B. K., & Jatmiko, B.	2018	Effectiveness of creative responsibility based teaching (CRBT) model on basic Physics learning to increase student's scientific creativity and responsibility	Indonesia	- There has been a significant improvement after the implementation of CRBT. - The student's scientific creativity level is moderate.
18.	Siri, A., Puente, G., D., Martini, M., & Bragazzi, N., L.	2017	Ethnopsychiatry fosters creativity and the adoption of critical and reflexive thinking in higher education students: Insights from a qualitative analysis of a preliminary pilot experience at the faculty of medicine and surgery, University of Genoa, Italy	Italy	Participants in the group that received innovative and interactive training were known to be able to find solutions to solve problems.
19.	Hellkar, T., Cutucache, C. E., Dahlquist, L.M., Herek, T. A., Larson, J.J., & Rogers, J. A.	2015	Integrating interactive computational modeling in Biology curricula	USA	The results explain that the Cell Collective can be used as a new learning method for Biology students

Characteristics of the research

The first characteristics of the research were based on the country's location. The authors found that the studies were in various continents of America (United States, Brazil, Canada), Europe (UK, Italy, Germany, Slovakia, Bulgaria, Denmark), Asia (Taiwan, Japan, Indonesia, Jordan, Turkey), and Australia. However, research on teaching creativity in Africa has yet to be available. The finding did not align with Soh (2015), who reported a study of

creativity fostering teacher behavior in higher education in Nigeria. However, unfortunately, the author did not find the manuscript to be further read. The systematic literature review by Bereczki and Karpa (2018) also found that research on teacher beliefs in creativity was only conducted in America, Asia, Europe, and Australia, with no available articles from the African continent. Although the authors limited the publication year range to 1997, most of the articles included in the analysis were published in 2013, and only one article (Halakova, 2007) was published before 2013. It indicates that teaching research in the context of higher education is still in its early stages.

Half of all studies use a quantitative approach consisting of intervention-based designs with data from self-report questionnaires. Research with a qualitative approach was carried out by three articles using Marton's phenomenographic analysis, interpretative phenomenological analysis, and concept maps. A total of three studies applied mixed-method designs. The remaining five articles (Ashmore & Moriarty, 2016; Helikar et al., 2015; Rossetto & Chapple, 2019; Siri et al., 2017; Zalloom, 2019) only describe the training methods that can increase creativity without providing more detail on how to measure the effectiveness of the training provided. This finding is also almost similar to the literature study conducted by Bereczki and Karpati (2018), which found that most quantitative studies were conducted in creativity research. Course subjects that designed creative learning schemes to encourage creativity were mainly from the natural sciences and technology, with 47.3%. However, some courses in social (26.3%) and health sciences (10.5%) have also started to apply creativity in their courses. The findings in this systematic literature review showed different results from Bereczki and Karpati (2018), which explained that subjects from social humanities showed very little applications of creativity teaching. However, the authors' findings that the natural sciences were the subjects that used the most creativity were similar to Bereczki and Karpati's (2018) findings.

Facilitators and barriers that influence teaching creativity in universities

The differences in perceptions of educators from various scientific disciplines will affect the differences in teaching creativity in universities (Marquis & Henderson, 2015). Studies on teacher perceptions are also primarily found in the systematic literature review conducted by Bereczki and Karpati (Bereczki & Kárpáti, 2018) in the context of lower education levels, from kindergarten to senior high school. In addition, several factors encouraged and inhibited the implementation of teaching for creativity in universities.

The facilitators include teacher beliefs (Newton et al., 2022), positive attitudes of teachers toward creativity (Semmler et al., 2018), collaboration in learning (Liu et al., 2022; Newton et al., 2022), group discussions (Liu et al., 2022), providing training (Newton et al., 2022), lecturers doing modeling, coaching, scaffolding, reflection, and exploration to instill a growth mindset (Bruin, 2018), providing assessments according to actual situations in the work environment (Rossetto & Chapple, 2019), and the use of technology (Fitriah, 2018). Collaboration and group discussion during the learning process are also characteristics of creative pedagogy that Cremin and Chappell (2021) found in their review. Collaboration is also one of the characteristics of teacher behavior that fosters creativity based on Cropley's (1997) theory. In addition, the teacher factor was also found by Bereczki and Karpati (2018) as the facilitator for teaching to increase creativity.

The author also discovered a few studies using mediators and moderators. One study that discussed mediators and mediators in teaching creativity was carried out by Liu and Wang (2019), who found that creative-teaching self-efficacy is known to mediate the relationship between a school's creative climate and creative teaching behavior. In addition,

the role of creative teaching abilities as a moderator was also found in the relationship between a school's creative climate and creative teaching behavior. It explains that teacher abilities and creative-teaching self-efficacy influence their behavior in teaching creativity (Liu & Wang, 2019). Although many facilitators were found in this systematic literature review, there were still some barriers to teaching creativity in universities, namely the process during learning, creativity products (Newton et al., 2022), time constraints, and student attitudes (Marquis & Henderson, 2015). Bereczki and Karpati (2018) also found that time and student-related factors can inhibit teaching from fostering creativity based on the articles analyzed in their review.

Efforts by universities to foster student creativity

Based on the results of the articles included in this review, it is known that universities make various efforts to encourage or foster student creativity. The Torrance Test of Creative Thinking instrument examined by Halakova (2007) was the most widely used tool to measure creativity. Some of the efforts that universities have made were mainly in the form of providing training/workshops and using of various types of applications or software according to the subject of the course.

Several efforts to increase creativity found in this review were; the role-play method that also aided in self-discovery learning (Powell et al., 2020), Interdisciplinary Teaching (IDT) can increase divergent creative thinking and team creativity (Liu et al., 2022), interdisciplinary workshops (Ashmore & Moriarty, 2016), project-based educational technology and material development course (Oskay, 2015), The Creative Platform (TCP) (Byrge & Hansen, 2013), GeoGebra Software (Velikova & Petkova, 2019), Mixed Apps software (Andriani & Sagala, 2020), workshops with interactive learning (Siri et al., 2017; Zalloom, 2019), creative responsibility-based teaching (CRBT) (Suyidno et al., 2017), and the Cell Collective (Helikar et al., 2015). The many and varied efforts made by universities to improve teaching for creativity resulted in various outcomes, with findings by Bereczki and Karpati (2018) and Cremin and Chappell (2021), who explained that implementation of creative learning is still scarce in lower education level from early childhood education to senior high school.

The conceptual implications of the results study are that the various teaching methods and techniques used in learning can foster creativity in students. Universities have an essential role in developing lecturers' teaching methods, lecturer's positive attitudes, and lecturer's beliefs that can have significant influences on students' creativity. The practical implications of the results study are that lecturers can apply teaching methods that focus on collaboration in learning, group discussion, and use real situations in learning.

Conclusion

Based on the systematic literature review, the researchers concluded that there were more factors, namely teacher beliefs, positive attitudes of teachers toward creativity, collaboration in learning, group discussions, providing training, lecturers teaching method to instill a growth mindset, providing assessments according to actual situations, and the use of technology that encouraged teaching for creativity rather than factors that inhibit teaching for creativity. Efforts made by universities to encourage creativity in students have mostly been made by conducting various pieces of training and using various technology-based creative applications adapted to the discipline's characteristics.

Recommendation

Based on the study, the authors might recommend that university leaders as policymakers can provide training for lecturers to improve the lecturers' beliefs, lecturers' positive attitudes about creativity, and their teaching methods for fostering student creativity. Universities may also develop technology-based learning applications to foster student creativity and encourage lecturers to use teaching methods to foster creativity. The recommendation for lecturers is that they use various teaching methods to foster student creativity and provide a learning environment that supports collaboration and discussion in learning.

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