JTET

Fostering Creative Self-Efficacy to Boost the Effect of Teaching Quality and Social Support on Creative Thinking of Vocational Students

Tuatul Mahfud[1]*, Mingchang Wu[2], Henry Winnarko[3], Channa Khieng[4]

[1] *Tourism Department, Balikpapan State Polytechnic, INDONESIA*

[2] *National Yunlin University of Science and Technology, TAIWAN*

[3] *Tourism Department, Balikpapan State Polytechnic, INDONESIA*

[4] *National Polytechnic Institute of Cambodia, CAMBODIA*

*Corresponding Author: tuatul.mahfud@poltekba.ac.id
DOI: https://doi.org/10.30880/jtet.2024.16.03.006

Article Info

Abstract

The acquisition of creative thinking skills is deemed essential for future employability. In the present setting, Vocational High Schools play a crucial role in equipping individuals with the necessary skills and fostering their creativity, thereby preparing them to become competent candidates for the workforce. Hence, it is necessary to foster creative thinking through the learning process by involving social support factors and the creative self-efficacy of vocational school students. This study examines the impact of teaching quality, social support, and creative self-efficacy on the development of creative thinking among vocational school students. This study is ex-post facto research. This study involved 342 vocational school students in the culinary arts field in the province of East Kalimantan, Indonesia. Data analysis in this study used structural equation modeling (SEM) via Amos 18 software. Study findings prove that social support and creative self-efficacy influence vocational school students' creative thinking skills. Meanwhile, the teaching quality was proven not to influence the creative thinking skills of vocational school students significantly. Other findings of this study also reveal that creative self-efficacy as a mediator is influenced by the teaching quality and social support. Finally, this study showed that creative self-efficacy significantly mediated the effects of teaching quality and social support on vocational school students' creative thinking skills. The results of this study provide important implications for vocational education practitioners to foster creative thinking skills through innovative teaching.

1. Introduction

Instilling creative thinking skills in an educational environment is very important to prepare students to produce new concepts and strategies to solve everyday problems. In particular, in critical developmental stages such as adolescence, creative thinking plays a vital role so that they have excellent and flexible adaptation to rapidly changing social environments (Barbot & Heuser, 2017; Beghetto & Dilley, 2016; Madar et al., 2019; Renatovna & Renatovna, 2021). In the context of vocational education, creative thinking is one of the skills that is needed in the world of work, for example, in the culinary industry (Abidin et al., 2022), fashion (Karpova et al., 2013),

information technology (Chang et al., 2022), and various other engineering industry sectors (Du, 2022; Huang et al., 2020). Individuals, businesses, industries, and countries cannot achieve lasting success without creative thinking (Ford & Gioia, 2000). Encouraging creativity and its application in all industrial sectors is essential for promoting business innovation (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2015; National Bureau of Economic Research, 2019). In fact, in the era of the Industrial Revolution 4.0, creative work has been positioned as a type of work that is stable in facing the application of Industrial Revolution technology, showing an increasing need for creative thinking skills (Das et al., 2019).

Therefore, it is natural that all levels of education in Indonesia, including vocational high schools, encourage creative thinking skills through learning in schools (Ministry of Education, Culture, 2020). This policy is a form of response from educational institutions to prepare students to master 21st-century skills of creative thinking, critical thinking, collaboration, and communication (Greiff et al., 2015; Trilling & Fadel, 2009). Currently, many studies have examined the importance of creative thinking for vocational school students (Capron Puozzo & Audrin, 2021; Magenes et al., 2022; Taşdelen Baş et al., 2022). Many of these studies focus on exploring the antecedent factors of creative thinking, which originate from internal aspects of the individual. Meanwhile, an interesting question arises regarding how to foster students' creative thinking abilities through the learning process (for example, teaching quality), which is part of external factors.

Referring to the sociocognitive theory developed by Bandura (1986) states that human behavior is organized around triadic reciprocal causes, which involve three interrelated factors, namely: 1. environment, 2. individual, and 3. individual behavior. Based on this, cultivating students' creative thinking depends on their external and internal factors. This paper highlights how to instill creative thinking skills in vocational school students through learning activities. Connecting sociocognitive theory with the context of this study, external factors can include the quality of teacher teaching and student social support. Meanwhile, internal factors can be creative self-efficacy. There may be questions like, why do we highlight these factors in forming creative thinking in vocational school students?

Previous studies reveal that one way to foster students' creative thinking skills is primarily determined by their learning process (Aizikovitsh-Udi & Amit, 2011; Flor et al., 2013; Perry & Karpova, 2017; Rivas, 2017). This means that teachers are essential in developing students' creative thinking during teaching. A study by Rivas (2017) states that teaching strategies are crucial to fostering students' creative thinking. Students involved in good education and training have much higher levels of creative thinking than before (Karpova et al., 2011). So, teachers must include creativity training through learning activities and help students develop their creative thinking. However, what needs to be noted is that teaching quality is not the only role that influences students' creative thinking skills. Other factors contribute to fostering creative thinking besides the quality of teacher teaching, namely social support and creative self-efficacy.

In a different context, Shi, Chen, and Zhou (2023) reported that social capital and creative teaching self-efficacy influence teachers' creative teaching behavior. Other studies also state that individual social support greatly determines a person's creative productivity (Olszewski-Kubilius, 2000; Op den Kamp et al., 2020). Social support may come from teachers, family, and friends (Ray & Miller, 1994; Zimet et al., 1988). Empirically, individual creative thinking is influenced by social support originating from teachers (H. Zhang et al., 2020), family (Zhao & Yang, 2021), and friendships (Ahmadi et al., 2019; Boekhorst et al., 2021; Wulanningtyas & Fauzan, 2022). Meanwhile, in the individual's internal aspect, creative self-efficacy has also been widely reported by Scholars that this factor is significant for fostering creative thinking (Jaussi & Randel, 2014; Karwowski et al., 2018; W. Liu et al., 2017; Redifer et al., 2021). Karwowski et al. (2018) reported that creative self-efficacy is positively related to individual creative thinking.

In vocational context, vocational students need to have creative thinking skills because the world of work continues to develop and becomes increasingly complex, demanding the ability to find innovative solutions to various practical problems. Creative thinking skills enable students to not only follow existing procedures but also develop new, more efficient and effective ways of carrying out their tasks. In addition, this ability helps vocational students to adapt quickly to changes in technology and the job market so that they can become more flexible and competitive workers. This skills is essential for students to adapt to the dynamic demands of the workforce and excel in their chosen fields Winangun (2017). Students need to develop the ability to think innovatively and apply their knowledge effectively in real-world scenarios, preparing them to navigate the complexities of the modern workplace (Dewi et al., 2020). Moreover, creative thinking skills are crucial for fostering students' character development, communication abilities, and multicultural literacy, all of which are vital for success in vocational settings (Pradana & Sundawa, 2023). By nurturing creative thinking skills, vocational students can enhance their employability, contribute meaningfully to their professions, and thrive in a rapidly changing global landscape (Agustiana et al., 2021).

Secara empiris, creative thinking among vocational students is significantly influenced by their self-efficacy beliefs (Capron Puozzo & Audrin, 2021; Lychuk & Nozhovnik, 2020; Magenes et al., 2022). When vocational students have high levels of self-efficacy, they are more likely to engage actively in learning processes, formulate hypotheses, and think creatively, leading to enhanced creative thinking skills (Huang et al., 2020; Sun et al., 2021).

Additionally, self-efficacy has been found to mediate the relationship between servant leadership and innovative work behavior, indicating its importance in promoting creativity in vocational settings (Sun et al., 2021). Studies have shown that creative self-efficacy acts as a mediator in the relationship between various factors such as teacher support, metacognition, and critical thinking, and the creative outcomes of students (Huang et al., 2020; Xie et al., 2023). Also, social support is a key factor in enhancing vocational students' creative thinking abilities (Op den Kamp et al., 2020). Research has shown that the interactions between teachers and students, characterized by supportive and encouraging conversations, create an ideal environment for nurturing creativity in problem-solving projects. Fredagsvik (2023) emphasizes that the collaborative exchange between teachers and students during the process of defining and solving problems serves as a platform for fostering students' creative skills. This supportive educational environment not only encourages students to think innovatively but also boosts their confidence in their creative capabilities, ultimately enhancing their creative thinking skills and preparing them for success in their vocational endeavors. These findings imply that social conditions and creative self-efficacy are essential in forming creative thinking in vocational school students. A survey of the available literature shows that these studies separately investigated the role of teaching, social support, and creative self-efficacy on creative thinking. A gap appears, namely, how to foster creative thinking through the learning process by involving social support factors and creative self-efficacy of vocational school students. This shows the need to simultaneously investigate the influence of teaching quality, social support, and creative self-efficacy on vocational school students' creative thinking.

2. Literature Review

2.1 Creative Thinking for Vocational Student

Creative thinking is the ability to generate, evaluate, and improve thinking, to generate original solutions, and to facilitate the influential presentation of knowledge and imagination (OECD, 2019). In addition, creativity is considered an attitude and skill in seeing things from different perspectives (Fox & Schirrmacher, 2014). Creative thinking is beneficial because work success and quality of life are closely related (Worwood & Plucker, 2017). Creative thinking is one of the most critical 21st-century skills (Trilling & Fadel, 2009). According to Ayyildiz & Yilmaz (2021), creative thinking is an essential factor in using creative thinking in 21st-century life. In Bloom's classification of learning skills, creative thinking is the most complex and abstract part of high-level cognitive skills (Krathwohl, 2002), which can reconstruct problems and provide solutions through unexpected insights (Bowden et al., 2005).

In the context of vocational education, mastery of creative thinking skills is necessary to create innovative products or services in the world of work. This is because vocational education aims to prepare skilled individuals for specific areas of work (Billet, 2011). Unfortunately, the world of work often complains about the qualifications of vocational school graduates, including their creative thinking abilities (Yang, 2015). Many studies have highlighted the importance of creative thinking for vocational school students (Capron Puozzo & Audrin, 2021; Magenes et al., 2022; Taşdelen Baş et al., 2022). This condition raises new challenges for teachers, namely developing effective teaching to instill creative thinking skills in vocational school students.

The literature generally discusses four dimensions of creative thinking talent: fluency, originality, elaboration, and flexibility (Torrance, 1969). Fluency is a thinking ability that shows the ability to think diversely to solve various situations or problems (Torrance, 1964). In addition, originality indicates that a concept differs from others and has not been replicated (Torrance, 1964). The originality of thought and its external value is the essence of creativity (Eysenck, 1998). Still, according to Torrance (1964), elaboration is expanding an idea by making it more complicated, interesting, or complicated. Lastly, flexibility refers to the ability to adapt to new circumstances, to change course quickly when finding a solution becomes difficult, and to abandon existing relationships between events, facts, and concepts in favor of new ones (Torrance, 1964).

Rhodes (1961) was the first to propose the 4P model of creativity, which states that creativity can be explained by four factors: creative personality (Person), creative thinking (Process), creative results (Product), and creative environment (Press). From this perspective, creativity is an individual's thinking process or ability to think. Patrício, Moreira, and Zurlo (2018) stated that creative thinking involves cognitive processes that will contribute to the emergence of innovative ideas or actions. Beside that, studies have indicated that self-efficacy is essential for tolerating the risks of failure and overcoming obstacles that often accompany creative endeavors (Byrge & Tang, 2015). Moreover, research has shown a positive correlation between self-efficacy and creative thinking skills, where individuals with high self-efficacy are more likely to engage in creative tasks and persist in the face of challenges (Jatisunda et al., 2020). This suggests that self-efficacy is not only linked to creative performance but also influences individuals' motivation and willingness to tackle creative tasks, ultimately enhancing their creative thinking skills in vocational education settings.

2.2 The Role of Teaching Quality to Foster Creative Thinking

Studies exploring factors that influence educational outcomes enable the development of optimal learning environments and improve student performance (Hattie, 2009). Scholars agree that teaching quality is very important for learning (Fauth et al., 2019; Rimm-Kaufman & Hamre, 2010) and has a positive relationship with student learning outcomes (Muijs et al., 2014). One of the student learning outcomes is mastery of creative thinking skills. The ability to think creatively has become a hot topic in educational institutions. Various policies have been implemented to strengthen programs to strengthen creative thinking skills for students. Because, in principle, creative thinking can be taught, learned and improved through education and training (Scott et al., 2004). Empirically, individuals experience increased creativity after participating in activity (Karwowski & Soszynski, 2008).

Theoretically, teaching quality is a social practice that students and teachers build together around content to improve student learning (Berliner, 2005; Praetorius et al., 2018). According to meta-analytic results, teachers are a significant source of variation in school student development (Hattie, 2009) and are also responsible for developing creativity (Manalo & Kapur, 2018). Teachers significantly influence whether or not their students' creativity develops at school (Burnard & White, 2008). Teachers must have creative thinking skills to encourage student creativity (Couger et al., 1993). From this understanding, we can conclude that the quality of teacher teaching has a vital role in cultivating students' creative thinking abilities. Heuristic education can develop students' creativity and critical issue abilities (Amudha & Narayanasamy, 2018). Previous studies state that determining teaching strategies is needed to promote students' creative thinking skills (Rivas, 2017).

Referring to existing literature, we believe that the quality of teaching can encourage increased students' creative thinking. There is several literature that explains teaching quality; for example, teaching quality is described as having three fundamental dimensions: effective classroom management, supportive classroom climate, and cognitive activation potential (Kunter & Voss, 2013; Pianta et al., 2008; Praetorius et al., 2014). In addition, critical aspects of teacher teaching quality include close monitoring, classroom management, clarity of presentation, instructional comprehensiveness, and a suitable classroom climate (Hattie, 2009; Muijs & Reynolds, 2007). Other scholars consider teacher knowledge and pedagogical content knowledge as measures of teaching quality (Kleickmann et al., 2012). The Improving the Quality of Education for All (IQEA) states that four essential elements in teaching include teaching relationships, teaching models, teaching skills, and teaching reflection (Hopkins, 2014). Furthermore, the same concept but developed in the context of vocational education, Faraday, Overton, and Cooper (2011) added the element of teaching context.

Empirically, an effective teaching process positively influences students' psychological capital (for example, self-efficacy) (Wang et al., 2014). One aspect of psychology that is considered necessary in building individual psychological capital is self-efficacy (Luthans et al., 2007). Teaching quality is regarded as one of the school-related aspects that most influence students' cognitive (e.g., achievement) and non-cognitive (e.g., interest or self-efficacy) outcomes (Muijs et al., 2014; Seidel & Shavelson, 2007). Another study investigated how teaching strategies influence students' self-efficacy (Tseng et al., 2022). Although teaching aspects are essential in improving students' creative thinking, we could not find any reports in the literature about how teaching quality affects creative self-efficacy and creative thinking. Therefore, this study will investigate the influence of teaching quality on vocational school students' creative self-efficacy and creative thinking.

H1: Teaching quality has a positive influence on vocational school students' creative self-efficacy
H2: Teaching quality has a positive influence on creative thinking of vocational school students

2.3 Student Social Support: Support from Teachers, Family, and Friends

Social support, which Hobfoll and Stokes (1988) defined as "social interactions or relationships that provide people with tangible assistance or with feelings of attachment to a person or group who appears caring or loving," plays a significant role in their educational success. The information and support students receive from their family, friends, and teachers influences their ability to face challenges related to their school life (Mackinnon, 2012; Ray & Miller, 1994). Two elements of social support were identified by Lakey and Cohen (2000): received social support (i.e., the frequency of supportive actions from others, such as guidance and reassurance) and perceived social support (i.e., the perception of how much social support a person has available if needed). This study used perceived social support to describe students' social support.

Social support plays a crucial role in instilling creative thinking in vocational students because it provides the emotional foundation and motivation they need to innovate. A supportive environment, which includes support from family, friends, and teachers, helps students feel valued and confident in exploring new ideas (Zhao & Yang, 2021). In the context of the world of work, vocational workers who can think creatively are needed because they are able to offer innovative and adaptive solutions to ever-changing industrial challenges (Wu et al., 2018). Vocational workforce qualifications include not only technical skills but also the ability to think critically and creatively, which allows them to develop more efficient work processes and create superior products or

services. Strong social support strengthens students' self-confidence in developing these skills so that they are better prepared and competitive in the job market.

Many studies have investigated that social support is vital for increasing individual creative thinking. For example, social support from the family has been shown to have an essential role in fostering innovative thinking (Zhao & Yang, 2021). Apart from that, social support that comes from teachers has also been proven to increase student creativity. Zhang et al. (2020) revealed that perceived teacher support predicts creative self-efficacy and is positively related to students' innovative thinking. Empirically, teacher support influences students' creative self-efficacy (X. Liu et al., 2021). And finally, social support from friendship also encourages the development of individual creativity (Ahmadi et al., 2019; Boekhorst et al., 2021). Referring to existing literature, this study can suspect that social support positively influences creative self-efficacy and ultimately influences vocational school students' creative thinking.

H3: Social support has a positive influence on vocational school students' creative self-efficacy
H4: Social support has a positive influence on vocational school students' creative thinking

2.4 The Role of Creative Self-efficacy Mediators

The term "Self-Efficacy," originally introduced by psychologist Albert Bandura (1997), pertains to an individual's confidence in their ability to formulate and implement effective methods in order to achieve desired goals. According to a recent study by Tierney and Farmer (2002), creative self-efficacy can be described as an individual's belief in their own ability to generate innovative outcomes. According to Kelley and Kelley (2013), there have been suggestions put out by other scholars on its role as a mechanism facilitating efficient cognitive resource management in humans, specifically in the context of creative outcomes within social situations.

Prior research has indicated that individuals who exhibit elevated levels of creative self-efficacy are more likely to generate inventive ideas, solutions, and adaptive behaviors (Beghetto, 2006). According to Tang et al. (2017), creative self-efficacy plays a crucial role in enabling individuals to reframe intricate and demanding circumstances, effectively manage stress and threats to their identity, capitalize on opportunities, and adjust their strategies to overcome hurdles and approach problems with creativity and innovation. According to Karwowski et al. (2018), there exists a favorable correlation between creative self-efficacy and creative thinking. Furthermore, it has been found that creative self-efficacy has the ability to forecast an individual's creative performance, as demonstrated by Huang et al. (2020).

Numerous scholarly investigations have elucidated the advantageous impacts of self-efficacy on the cognitive process of generating novel and innovative ideas (Farmer & Tierney, 2017). However, alternative investigations present conflicting investigative findings. Jaussi, Randel, and Dionne (2007) conducted a study which shown that self-efficacy did not yield a favorable influence on creative thinking. Additionally, their findings indicated that creative self-efficacy functions as a mediator in this relationship. Self-efficacy beliefs are defined as a socio-cognitive mechanism that serves as an intermediary between the manifestation of personality traits and their impact on diverse outcomes in life (Fino & Sun, 2022). Based on the theoretical framework presented in this reference, it is hypothesized that the presence of creative self-efficacy mediators may enhance the impact of external variables, such as teaching quality and social support, on the development of creative thinking among students in vocational schools.

H5: Creative self-efficacy mediates the influence of teaching quality on vocational school students' creative thinking
H6: Creative self-efficacy mediates the influence of social support on vocational school students' creative thinking

A conceptual model of how to improve creative thinking skills by optimizing the role of creative self-efficacy, teaching quality, and social support is shown in Figure 1.
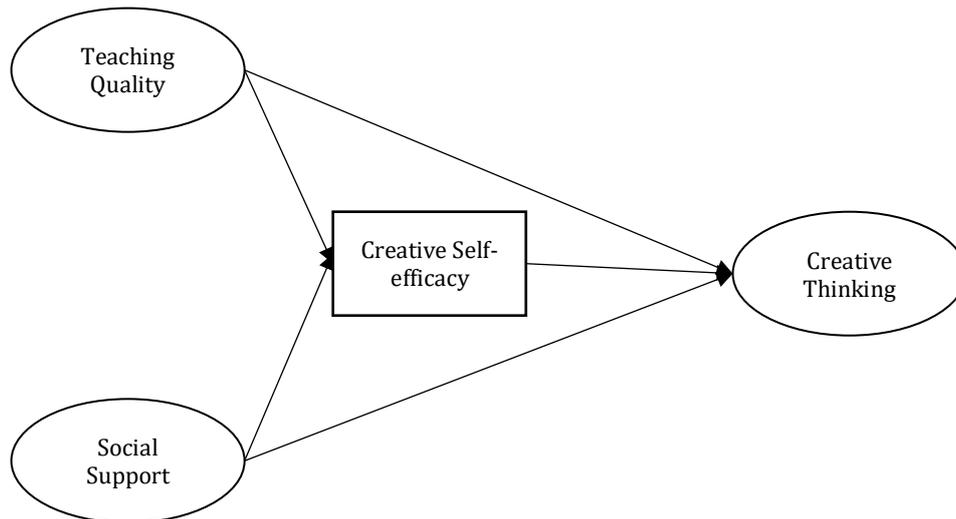
Fig. 1 *Conceptual model*

3. Method

3.1 Participant

This study includes the participation of 342 vocational school students specializing in culinary arts in East Kalimantan Province for data collection purposes. Among the total population under consideration, 78.1% are comprised of female students, while the remaining 21.9% are male students falling between the age range of 15 to 20 years. Table 1 displays the demographic characteristics of the study participants. To ensure the dependability of the results, the participants were deliberately kept unaware of the true goal of the experiment. Prior to the commencement of the experimental procedures, all participants provided their informed consent.

Upon graduation, students exhibit diverse aspirations, encompassing employment (44.7%), entrepreneurship (13.2%), and further academic pursuits (42.1%). When surveyed, the student participants were posed with the question, "To what extent are creative thinking skills necessary in your scientific discipline?" The findings revealed that a significant majority (95.6%) of respondents acknowledged the indispensability of creative thinking abilities for advancing scientific progress within the culinary arts domain. The demographic characteristics of the participants are presented in Table 1.

Table 1 *Respondent demographics*

Attribute	Categories	N	%
Gender	Male	75	21.9
	Female	267	78.1
Class	Class 1	70	20.5
	Class 2	21	6.1
	Class 3	251	73.4
Age	15 years old	26	7.6
	16 years old	125	36.5
	17 years old	118	34.5
	18 years old	64	18.7
	19 years old	7	2
	20 years old	2	0.6
School	State Vocational High School A	24	7
	State Vocational High School B	31	9.1
	State Vocational High School C	100	29.2

Attribute	Categories	N	%
	State Vocational High School D	30	8.8
	State Vocational High School E	13	3.8
	State Vocational High School F	20	5.8
	State Vocational High School G	40	11.7
	State Vocational High School H	84	24.6
Family Residence	Urban	132	38.6
	Rural	210	61.4
Reason for Study	Personal Choice	285	83.3
	Parental Choice	37	10.8
	Teachers Suggestions	20	5.8
Are creative thinking skills needed in your scientific field?	Yes	327	95.6
	No	15	4.4
Career Plan	Work	153	44.7
	Entrepreneurship	45	13.2
	Continuing Studies	144	42.1

3.2 Procedure

The study gathered self-reported data on vocational school students' judgments of teaching quality, social support, creative self-efficacy, and creative thinking. The participants expressed their perspectives autonomously by means of an online survey administered via the Google Form platform. The data collection process had a duration of one month, commencing in January and concluding in March of 2023. The assistance of educators at each educational institution was enlisted to facilitate the dissemination of online questionnaires to the student population. Teachers employed several strategies to enhance student engagement and participation through the distribution of online questionnaires. One such approach is disseminating questionnaire links using popular communication platforms such as WhatsApp groups and social media tools. In addition to this, this study provide arbitrary incentives to students who have completed the online survey. The online questionnaire utilized in this study required an average completion time of around seven minutes.

3.3 Data Collection Tools

3.3.1. Social Support Questionnaire

The researchers employed the social support questionnaire, initially devised by Ray and Miller (1994), as a tool to assess vocational school students' assessments of their social support. The questionnaire has three factors, specifically family support, teacher support, and friend support. The questionnaire comprises a total of 18 items, which are divided into three categories: family support, teacher support, and peer support. Each category consists of six items. For instance, the family support items assess the extent to which individuals perceive their family as a reliable source of assistance during challenging situations on campus.

Similarly, the teacher support items gauge individuals' perceptions of their teachers' dependability when faced with difficulties at school. Lastly, the peer support items evaluate the extent to which individuals feel that their friends allocate time to alleviate the challenges they face in their lives. The researchers evaluated the students' opinions of social support by employing a Likert Scale consisting of five points, ranging from 1 (strongly disagree) to 5 (strongly agree). The suitability of the CFA Social Support Questionnaire was assessed using various indices. The results reveal that the $\chi 2 / df$ = 2.426, RMSEA = 0.065, CFI = 0.953, GFI = 0.921, TLI = 0.941, IFI = 0.953, AGFI = 0.890, and RMR = 0.038. These values suggest that the questionnaire is either perfectly suitable or acceptable for the intended purpose. The Cronbach's alpha dependability coefficient demonstrated a high level of internal consistency, with a value of 0.961.

3.3.2. Teaching Quality Questionnaire

A vocational teaching quality questionnaire was constructed by drawing upon references from prior studies (Faraday et al., 2011). The study posits that the quality of teaching can be elucidated through the examination of four key indicators: teaching model, teaching skills, teaching relationships, teaching context, and teaching reflection. Nevertheless, a vocational teaching quality questionnaire has not been developed by Faraday et al. (2011). The teaching quality questionnaire comprises a total of 21 items, which are further divided into five

categories. These categories include five items related to teaching models, such as the encouragement of creative thinking through learning activities at school.

Additionally, there are four items pertaining to teaching skills, such as the ease of understanding the subject matter explained by the teacher. Furthermore, four items are dedicated to teaching relationships, such as the teacher's attentiveness during the teaching and learning process in class. Moreover, four items are allocated to the teaching context, such as the exploration of real-life problems from daily life or vocational practice while studying. Lastly, four items are focused on teaching reflection, such as the provision of feedback on the results of learning assignments by the teacher. The analysis of the model fit index indicates that the model fit criteria are satisfactory, as evidenced by the following values: $\chi2 / df = 2.209$, RMSEA = 0.060, CFI = 0.951, GFI = 0.910, TLI = 0.941, IFI = 0.952, AGFI = 0.879, and RMR = 0.027. Furthermore, the Cronbach's alpha reliability coefficient exhibited a commendable value of 0.972.

3.3.3. Short Scale of Creative Self (SSCS)

This study used the Short Scale of Creative Self (SSCS) (Karwowski et al., 2018) to measure vocational school students' creative self-efficacy. The total number of items in this questionnaire is 6 items (for example, I believe in my creative abilities). The SSCS has been used extensively in research examining creative self-efficacy in school settings. A number of studies, including those conducted by Karwowski (2012, 2014) and Karwowski et al. (2013), have provided substantial evidence supporting the reliability and validity of this scale. Testing the model fit index shows that the model fit criteria are good with the criteria $\chi2 / df = 1.200$, RMSEA = 0.024, CFI = 0.998, GFI = 0.991, TLI = 0.996, IFI = 0.998, AGFI = 0.975, and RMR = 0.011. In addition, the overall Cronbach's alpha reliability coefficient was 0.890.

3.3.4. Creative Thinking Questionnaire

Finally, students' perceptions regarding creative thinking were measured using a questionnaire adapted from Kaufman, J. C., & Baer, J. (2006). The creative thinking questionnaire consists of 3 fluency items (for example, I usually have many ideas that can be worked on in developing scientific knowledge in my field), five flexibility items (for example, I am flexible in thinking and responding), four originality items (for example, I find it easy to find unique ideas or ideas in my practical assignments), and five elaboration items (for example, I gather a lot of information before creating a new idea or ideas). The measurement scale for all variables uses a 5-level Likert scale, namely strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1). Testing the model fit index shows that the model-appropriate criteria are good with the standards $\chi2 / df = 3.054$, RMSEA = 0.078, CFI = 0.915, GFI = 0.899, TLI = 0.894, IFI = 0.916, AGFI = 0.858, and RMR = 0.033. Also, the overall Cronbach's alpha reliability coefficient was 0.967.

3.3.5. Data Analysis

Data analysis in this study uses structural equation modeling (SEM), which allows testing the relationship between variable constructs, both exogenous and endogenous variables, while still paying attention to measurement error (Bollen, 1989). The SEM analysis tool in this study uses Amos 18 software, which is known to have advantages because of its user-friendly graphical interface. The Amos program requires a minimum number of samples of 100 to get a good model, although some experts require a minimum of 200 samples (Ghozali, 2017; Kline, 2011). The minimum criteria that can be used to determine whether a structural model is fit or not are shown in Table 2.

Table 2 *Summary of model fit statistics*

Fit Index	Recommendation Value	Source
Chi-square	The accepted value is Chi-square < 2 db	Arbuckle (1997)
p-value (probabilitas)	P value > 0.05	Phedazur (1997); Ferdinand (2002)
Cmin/df	≤ 5	Wheaton, Muthen, Alwin, and Summer (1977)
Goodness of Index (GFI)	Scores range from 0-1, with higher scores being better. GFI ≥ 0.90 is a good fit, while 0.80 ≤ GFI < 0.90 is a marginal fit.	Phedazur (1997); Ferdinand (2002)
Adjusted Goodness of Index (AGFI)	Scores range from 0-1, with higher scores being better. AGFI ≥ 0.90 is a good fit, while 0.80 ≤ AGFI < 0.90 is a marginal fit.	Phedazur (1997); Ferdinand (2002)

Fit Index	Recommendation Value	Source
Root Mean Square Error of Approximation (RMSEA)	RMSEA ≤ 0.05 is a close fit; 0.05 > RMSEA ≤ 0.08 is a good fit; 0.08 > RMSEA ≤ 0.1 is a marginal fit; and RMSEA > 0.1 poor fit.	Phedazur (1997); Ferdinand (2002)
RMR	< 0.05	Phedazur (1997); Ferdinand (2002)
Tucker-Lewis Index (TLI)	Scores range from 0-1, with higher scores being better. TLI ≥ 0.90 is a good fit, while 0.80 ≤ TLI < 0.90 is a marginal fit.	Phedazur (1997); Ferdinand (2002)
Comparative Fit Index (CFI)	Scores range from 0-1, with higher scores being better. CFI ≥ 0.90 is a good fit, while 0.80 ≤ CFI < 0.90 is a marginal fit.	Phedazur (1997); Ferdinand (2002)
Normed Fit Index (NFI)	Scores range from 0-1, with higher scores being better. NFI ≥ 0.90 is a good fit, while 0.80 ≤ NFI < 0.90 is a marginal fit.	Phedazur (1997); Ferdinand (2002)

4. Result

4.1 Test Model Fit

The objective of this study is to conduct hypothesis testing on the factors that precede the creative thinking abilities of vocational school students. These factors encompass educational quality, social support, and creative self-efficacy. In addition to the aforementioned, this study also investigates the impact of creative self-efficacy on students enrolled in vocational schools, as well as the role of creative self-efficacy as a mediator within the proposed research framework. Prior to conducting hypothesis testing, it is imperative to evaluate the appropriateness of the study model. Figure 2 displays the outcomes of the structural equation modeling (SEM) study conducted using SPSS Amos 21 for Windows. The results presented in Figure 2 indicate the model fit values as follows: $\chi 2$ / df = 3.084, RMSEA = 0.078, CFI = 0.953, GFI = 0.921, TLI = 0.939, IFI = 0.954, AGFI = 0.881, and RMR = 0.391. The current model satisfies the model fit criteria, however, there is potential for further optimization. Hence, it is important to execute the altered model.
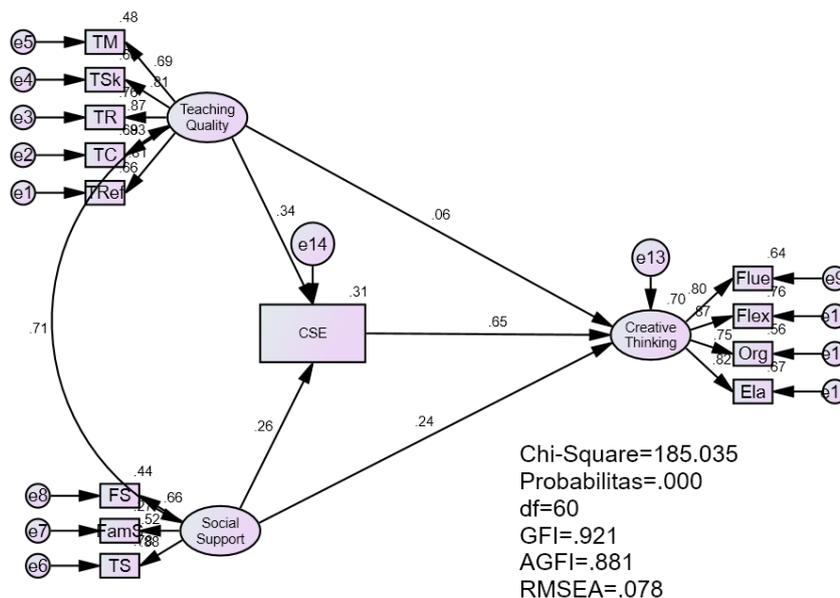

Fig. 2 *First running model*

Note: CSE= creative self-efficacy, TM= teaching model, TSk= teaching skills, TR= teaching relationships, TC= teaching context, TRef= teaching reflections, FS= friend support, FamS= family support, TS= teacher support, Flue= fluency, Flex= flexibility, Org= originality, Ela= elaboration

Upon evaluating the adjusted model depicted in Figure 3, it becomes evident that the model has successfully met the criteria for model fit. This is indicated by the values of various model fit indices, including χ2 / df = 2.805, RMSEA = 0.073, CFI = 0.960, GFI = 0.932, TLI = 0.948, IFI = 0.961, AGFI = 0.894, and RMR = 0.388. Therefore, this adapted model can be utilized for subsequent analysis to test research hypotheses.
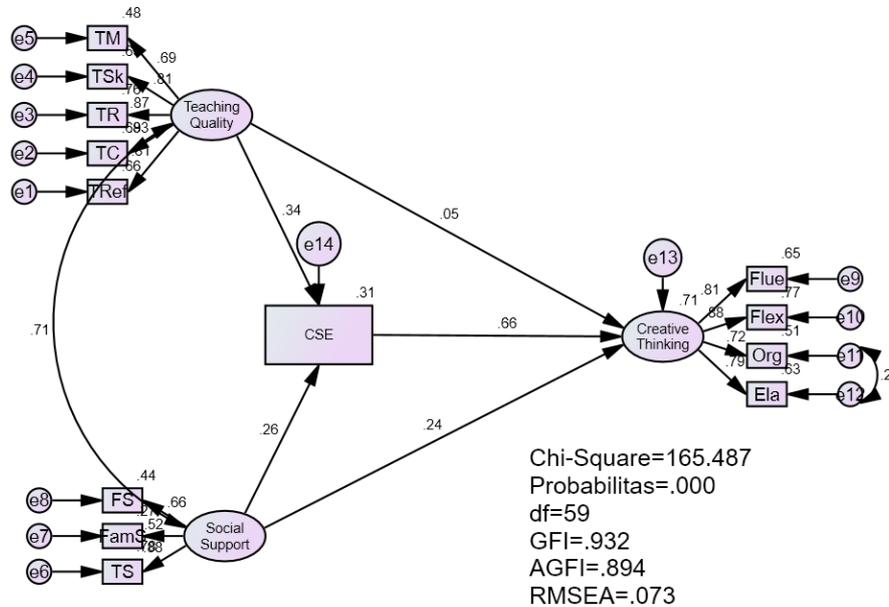

Fig. 3 *Modified running model*

4.2 Hypothesis Testing

The conditions for assessing the fit of the model have been satisfied. To further the research, it is imperative to conduct tests on the hypothesis, specifically examining the impact of antecedent factors on creative thinking capacity, antecedent factors on creative self-efficacy, and the mediating function of creative self-efficacy. The study hypothesis is tested to assess the significance of the impact of exogenous variables on endogenous variables by utilizing the reference value of Regression Weights (p-value) on each regression line. Within the framework of this study, there exists a total of seven hypotheses that will be subjected to examination through the acquisition of Regression Weights, explicitly focusing on the p-value. Table 3 displays the outcomes of the regression test analysis conducted on the seven study hypotheses.

Table 3 *Results of path analysis (standardized regression weights) Full Model SEM*

Path	Estimate	S.E.	C.R.	P
TQ → CSE	0.342	0.144	4.169	***
SS → CSE	0.261	0.096	2.919	0.004
TQ → CT	0.052	0.047	0.827	0.408
SS → CT	0.238	0.032	3.377	***
CSE → CT	0.663	0.022	12.825	***

Note: TQ= teaching quality; CSE = creative self-efficacy; SS= social support; CT= creative thinking

*** The p-value is very small (smaller than 0.001)

The results of testing the first hypothesis are presented in Table 3, indicating an estimated value of 0.342 and a p-value of *** (p-value <0.05). This outcome suggests that the first hypothesis can be accepted. Hence, the impact of instruction quality on the creative self-efficacy of students attending vocational schools is notably beneficial. In addition, examining the second hypothesis about the effects of instructional quality on the creative thinking capacities of vocational school students revealed an estimated score of 0.052 and a p-value of 0.408. The results indicate that the p-value, which exceeds the threshold of 0.05, leads to the rejection of the second hypothesis. Consequently, it can be concluded that there is no statistically significant positive impact of teaching quality on the creative thinking abilities of vocational school students.

The third hypothesis test aims to examine the impact of social support on the creative self-efficacy of students enrolled in vocational schools. The study results demonstrate a substantial positive relationship between social support and creative self-efficacy among vocational school students (estimate=0.261; p-value=0.004). Therefore, the acceptance of the third hypothesis is warranted. In addition to this, it is shown that social support plays a crucial role in fostering creative thinking among vocational school students. The estimated coefficient for this relationship is 0.238, indicating a positive and statistically significant influence. Consequently, the fourth hypothesis is supported based on the p-value (***).

The present study employed the estimated bootstrapping confidence interval analysis technique to examine the mediation function. The current investigation used 200 bootstrap samples, each with a confidence level of 90%. The aforementioned analytical methodology is employed to explore the fifth and sixth hypotheses. Table 4 displays the outcomes of the significance test conducted to assess the relevance of mediation utilizing the bootstrapping approach.

Table 4 *Standardized effect and bootstrapping in full SEM model*

Path	Standardized direct effect		Standardized indirect effect		Standardized total effect	
	Estimate	P-value	Estimate	P-value	Estimate	P-value
TQ → CSE	0.342	0.007	-	-	0.342	0.007
SS → CSE	0.261	0.019	-	-	0.261	0.019
TQ → CT	0.052	0.842	0.227	0.005	0.279	0.014
SS → CT	0.238	0.011	0.173	0.012	0.411	0.016
CSE → CT	0.663	0.008	-	-	0.663	0.008

Note: TQ= teaching quality; CSE = creative self-efficacy; SS= social support; CT= creative thinking

The testing of the fifth hypothesis assumes that creative self-efficacy substantially mediates the effect of teaching quality on the creative thinking of vocational school students. Using a significance level (α) of 0.05, this hypothesis was tested by examining the p-value obtained from the standardized indirect effect regression path. The estimated standardized indirect effect value is 0.275 (p-value = 0.005; Confidence Interval/CI = 0.110 0.345) based on the results of the SEM analysis with Amos presented in Table 4. The obtained p-value is less than the threshold for hypothesis acceptance (p-value 0.05). Thus, the fifth hypothesis (H5) is supported (p-value 0.05), indicating that creative self-efficacy significantly mediates the effect of teaching quality on the innovative thinking of vocational school students. This study concludes by testing the hypothesis regarding the mediating role of creative self-efficacy on the influence of social support on the creative thinking of vocational school students (H6). The results indicate that the estimated score was 0.172 (p-value = 0.012), thus confirming the sixth hypothesis. Thus, creative self-efficacy significantly mediates the effect of social support on the creative thinking of vocational school students.

5. Discussion

For vocational school students in the field of culinary expertise, mastery of creative thinking skills is an unavoidable requirement in preparation for future job competition. In an ever-changing and competitive culinary industry, the ability to think creatively enables students to find innovative solutions to daily challenges, develop distinctive dishes that attract customers, and establish successful culinary businesses. With these skills, they will be better prepared to compete in an increasingly tight employment market, become a valuable asset for culinary companies, and help lead the industry towards more advanced and sustainable development. Involving social support factors and creative self-efficacy in vocational school students' learning processes in order to cultivate creative thinking is, therefore, a crucial topic of research. This study seeks to investigate the simultaneous effects of teaching quality, social support, and creative self-efficacy on the creative thinking of vocational school students.

Also, what role does creative self-efficacy play in enhancing the influence of teaching quality and social support on the creative thinking of vocational school students?

5.1 Antecedent Factors for the Formation of Creative Thinking in Vocational School Students

The findings obtained via the use of Structural Equation Modeling (SEM) indicated that both social support and creative self-efficacy impacted the creative thinking abilities of vocational school students. The present study's results further reinforce prior research that has posited the significance of social support in facilitating creative cognition, including familial support (Zhao & Yang, 2021), support from educators (H. Zhang et al., 2020), and support from peers (Ahmadi et al., 2019; Boekhorst et al., 2021). This discovery suggests that increased perceived social support is associated with enhanced creative thinking abilities among students. The presence of social support significantly influences the development of creative thinking skills among students enrolled in vocational schools. When student perceive a sense of support from their educators, peers, and family members, they are more likely to exhibit increased self-assurance in generating novel ideas and displaying a willingness to engage in diverse endeavors. Social support fosters an atmosphere conducive to exchanging ideas, acquiring knowledge from others' experiences, and facilitating open expression of viewpoints among students. This presents a valuable chance for students to gain exposure to many perspectives and enhance their critical and imaginative thinking capacity. The provision of social support has been found to significantly impact motivation (Vatankhah & Tanbakooei, 2014; Zhou et al., 2019). It aids students in overcoming obstacles and maintaining high levels of morale, which are essential for cultivating creative thinking abilities necessary for their future success in the culinary sector.

Another finding demonstrated that creative self-efficacy is crucial in developing creative thinking abilities among vocational school students. According to Beghetto (2006), those with high creative self-efficacy are more likely to generate innovative ideas, solutions, and adaptive behavior. Tierney and Farmer (2002) stated that creative self-efficacy is the belief that an individual can produce creative results. The results of this study are theoretically pertinent. When students believe they can generate innovative ideas and overcome obstacles in a culinary context, they are more likely to be motivated to attempt new things and develop their creative thinking skills (Bandura, 1997; Ford, 1996). This creative self-assurance also assists students in overcoming the dread of failure, which frequently impedes the creative process (Redifer et al., 2021). When students have confidence in their creative abilities, they are more likely to be risk-takers and explore novel concepts and approaches to culinary tasks. In other words, creative self-efficacy encourages students to develop and utilize their creative thinking abilities more effectively.

This study also demonstrates that the quality of instruction has no effect on the development of creative thinking abilities in vocational school students. This finding contradicts the conclusion of previous research (Burnard & White, 2008) that the role of teacher teaching quality is crucial in fostering students' creative thinking abilities. Theoretically, the quality of instruction will play a significant role in developing the creative reasoning skills of vocational school students. However, the results of this study indicate otherwise. In this context, it is clear that the quality of instruction is not the only factor that influences the development of students' creative thinking skills. The process of changing student behavior, particularly their creative thinking abilities, is complex. Other factors, such as student motivation, the learning environment, social support, and creative self-confidence, may play a larger role in the development of creative thinking abilities among vocational school students. This highlights the need for a holistic approach to assisting vocational school students in developing their creative potential, by paying attention to a variety of factors that can affect their ability to think creatively.

5.2 Antecedent Factors of Creative Self-efficacy of Vocational School Students

This study's testing of the hypothesis of creative self-efficacy antecedent factors revealed that social support and teaching quality were successful antecedent factors that influenced the creative self-efficacy of vocational school students. This indicates that the greater the social support and teaching quality, the greater the student's confidence in creative thinking abilities. This finding is also supported by prior research indicating that effective teaching processes positively impact students' psychological capital (such as self-efficacy; Wang et al., 2014). Similar studies also reveal that teaching strategies influence students' self-efficacy (Tseng et al., 2022). Moreover, teacher support, a social support component, can predict creative self-efficacy (H. Zhang et al., 2020).

This study indicates that social support and teaching quality play a crucial role in shaping the creative self-efficacy of vocational school students. Quality teachers can provide guidance and positive feedback to students, enabling them to develop creative thinking skills confidently (H. Zhang et al., 2020). The teaching quality is a crucial factor in shaping the creative self-efficacy of vocational school students. Previous studies highlight that creativity can be fostered through various teaching strategies and creative thinking skills (Michael et al., 2011). Additionally, Zhang et al. (2022) emphasize the importance of teacher responsiveness in increasing students' creative self-efficacy, which in turn contributes to the development of creativity. Effective teaching practices that

encourage creative thinking and offer support and guidance to students can significantly increase their self-efficacy beliefs, enabling them to confidently handle creative tasks and overcome challenges in vocational education environments. This underlines the important role of teaching quality in cultivating vocational students' creative self-efficacy and ultimately improving their creative thinking abilities (Michael et al., 2011; Y. Zhang et al., 2022). Moreover, social support from teachers, classmates, and family members fosters an environment that encourages students to attempt new things and overcomes their fear of failure (Op den Kamp et al., 2020; Sözbilir, 2018; Suseno et al., 2020). When students believe they receive adequate support and direction, they tend to feel more capable of tackling creative tasks. This boosts their creative self-efficacy, which influences the development of their creative thinking abilities.

5.3 The Mediating Role of Vocational School Students' Creative Self-efficacy

This study also demonstrate that creative self-efficacy functions as a mediator in this study. This indicates that creative self-efficacy successfully mediated the effect of teaching quality on the creative thinking skills of vocational school students. According to Fino and Sun (2022), self-efficacy beliefs are conceptualized as a sociocognitive mechanism that mediates the effect of personality traits on numerous life outcomes. These results demonstrate a significant relationship between creative self-confidence and the influence of teacher teaching quality on the development of creative thinking skills. Students are typically more confident in their ability to think creatively when they receive quality instruction (H. Zhang et al., 2020). This self-assurance, in turn, motivates them to actively attempt new things, approach challenges with a positive attitude, and think creatively. In other words, creative self-efficacy acts as an intermediary that connects the influence of teaching quality with the development of vocational school students' creative thinking skills, creating a positive circle that advances their abilities in terms of innovation and creativity in the culinary world.

In addition, creative self-efficacy substantially mediates the effect of social support on the creative thinking skills of vocational school students. These results bolster previous research indicating that perceived teacher support predicts creative self-efficacy and is positively associated with students' innovative thinking (H. Zhang et al., 2020). This study demonstrates that students' confidence in their creative thinking abilities increases when they experience social support from instructors, classmates, and family. This creative self-efficacy, in turn, increases students' motivation to be more actively involved in the creative learning process and develop new ideas (Tierney & Farmer, 2002). Positive social support fosters an atmosphere in which students feel secure sharing ideas, experimenting, and fostering the growth of their creative thinking (Op den Kamp et al., 2020; H. Zhang et al., 2020). Thus, creative self-efficacy mediates social support and the capacity to think creatively in vocational schools' learning environments.

According to the findings of this study, vocational schools must strengthen their various teaching programs intended at fostering creative thinking. Even though teaching quality does not have a direct effect on creative thinking abilities, it is still necessary for enhancing the creative self-efficacy of vocational school students. There are additional factors, such as social support, that influence creative thinking skills in addition to the quality of instruction. Considered crucial is the development of social support for vocational school students from teachers, family, and friends. Through vocational students' creative self-efficacy, positive reinforcement will expedite the development of their creative thinking skills.

6. Conclusion

This study, based on students' perceptions, proves that both vocational school students' social support and creative self-efficacy significantly influence their creative thinking skills. Meanwhile, these students don't recognize the teaching quality significantly influence their creative thinking skills. This study additionally reveals a crucial mediator role of creative self-efficacy indicating either teaching quality or social support could not directly enhance vocational students' creative thinking skills unless these components can instigate their creative self-efficacy then enhance creative thinking skills. That is, synthetically, it is a dominantly important approach to enhance students' creative thinking skills through promoting their creative self-efficacy.

This study might result in some important implications for vocational school teachers to develop effective teaching programs purporting to improve students' creative thinking skills. Currently, the Indonesian government's policy supports strengthening creative thinking skills, namely implementing project-based learning. Teachers can apply this learning model by collaborating with other relevant subjects to work on product and service-based projects focusing on meaningful teaching and inspiring students' creative self-efficacy which significantly enhance students' creative thinking skills. Subsequently, it is urgently important to further investigate project-based learning approaches to cultivate young students' creative thinking skills in the future research. This study realize that the number of respondents involved in the research is still limited. Thus, future research needs to expand the number of respondents based on region and can even involve vocational school students from other fields of expertise besides culinary.

Acknowledgement

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

*The authors confirm contribution to the paper as follows: **study conception and design:** Tuatul Mahfud,* Mingchang Wu; ***data collection:*** *Henry Winnarko, Channa Khieng;* ***analysis and interpretation of results:*** *Tuatul Mahfud;* ***draft manuscript preparation:*** *Tuatul Mahfud,* Mingchang Wu*. All authors reviewed the results and approved the final version of the manuscript.*

References

Abidin, M. R. Z., Ishak, F. A. C., Ismail, I. A., & Juhari, N. H. (2022). Explicating chefs' creativity in utilising Malaysian local herbs toward the development of modern Malaysian cuisine: A proposition of a conceptual framework for creative culinary process. *Thinking Skills and Creativity*, *46*, 101133. https://doi.org/https://doi.org/10.1016/j.tsc.2022.101133

Agustiana, I. G. A. T., Tika, I. N., & Wibawa, M. C. (2021). Improving Creative Thinking Through Creative Responsibility Based Learning (CRBL) Model. *International Journal of Elementary Education*, *5*(4), 547–553. https://doi.org/https://doi.org/10.23887/ijee.v5i4.41277

Ahmadi, N., Peter, L., Lubart, T., & Besançon, M. (2019). *School Environments: Friend or Foe for Creativity Education and Research? BT - Creativity Under Duress in Education? Resistive Theories, Practices, and Actions* (C. A. Mullen (ed.); pp. 255–266). Springer International Publishing. https://doi.org/10.1007/978-3-319-90272-2_14

Aizikovitsh-Udi, E., & Amit, M. (2011). Developing the skills of critical and creative thinking by probability teaching. *Procedia - Social and Behavioral Sciences*, *15*, 1087–1091. https://doi.org/https://doi.org/10.1016/j.sbspro.2011.03.243

Amudha, G., & Narayanasamy, P. (2018). Distributed Location and Trust Based Replica Detection in Wireless Sensor Networks. *Wirel. Pers. Commun.*, *102*(4), 3303–3321. https://doi.org/10.1007/s11277-018-5369-2

Arbuckle, J. L. (1997). *Amos users' guide: version 3.6*. Small waters corporation.

Ayyildiz, P., & Yilmaz, A. (2021). 'Moving the Kaleidoscope' to see the effect of creative personality traits on creative thinking dispositions of preservice teachers: The mediating effect of creative learning environments and teachers' creativity fostering behavior. *Thinking Skills and Creativity*, *41*, 100879. https://doi.org/https://doi.org/10.1016/j.tsc.2021.100879

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Barbot, B., & Heuser, B. (2017). Creativity and identity formation in adolescence: A developmental perspective. In *The creative self: Effect of beliefs, self-efficacy, mindset, and identity.* (pp. 87–98). Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-809790-8.00005-4

Beghetto, R. A. (2006). Creative Self-Efficacy: Correlates in Middle and Secondary Students. *Creativity Research Journal*, *18*(4), 447–457. https://doi.org/10.1207/s15326934crj1804_4

Beghetto, R. A., & Dilley, A. E. (2016). Creative aspirations or pipe dreams? Toward understanding creative mortification in children and adolescents. In *Perspectives on creativity development.* (pp. 85–95). Jossey-Bass/Wiley.

Berliner, D. C. (2005). The Near Impossibility of Testing for Teacher Quality. *Journal of Teacher Education*, *56*(3), 205–213. https://doi.org/10.1177/0022487105275904

Billet, S. (2011). *Vocational education: Purpose, tradition and prospects.* Springer.

Boekhorst, J. A., Halinski, M., & Good, J. R. L. (2021). Fun, Friends, and Creativity: A Social Capital Perspective. *The Journal of Creative Behavior*, *55*(4), 970–983. https://doi.org/https://doi.org/10.1002/jocb.502

Bollen, K. A. (1989). *Structural equations with latents variabel*. Wiley.

Bowden, E. M., Jung-Beeman, M., Fleck, J., & Kounios, J. (2005). New approaches to demystifying insight. *Trends in Cognitive Sciences*, *9*(7), 322–328. https://doi.org/10.1016/j.tics.2005.05.012

Burnard, P., & White, J. (2008). Creativity and performativity: counterpoints in British and Australian education. *British Educational Research Journal*, *34*(5), 667–682. https://doi.org/10.1080/01411920802224238

Byrge, C., & Tang, C. (2015). Embodied creativity training: Effects on creative self-efficacy and creative production. *Thinking Skills and Creativity*, *16*, 51–61. https://doi.org/https://doi.org/10.1016/j.tsc.2015.01.002

Capron Puozzo, I., & Audrin, C. (2021). Improving self-efficacy and creative self-efficacy to foster creativity and learning in schools. *Thinking Skills and Creativity*, *42*, 100966. https://doi.org/https://doi.org/10.1016/j.tsc.2021.100966

Chang, Y., Kao, J.-Y., & Wang, Y.-Y. (2022). Influences of virtual reality on design creativity and design thinking. *Thinking Skills and Creativity*, *46*, 101127. https://doi.org/https://doi.org/10.1016/j.tsc.2022.101127

Coordinating Ministry for Economic Affairs of the Republic of Indonesia. (2015). *Creativity and Innovation Based Economy as Indonesia's New Economic Power (Indonesian Version)*. https://ekon.go.id/publikasi/detail/3874/ekonomi-berbasis-kreativitas-dan-inovasi-sebagai-kekuatan-baru-ekonomi-indonesia

Couger, J. D., Higgins, L. F., & McIntyre, S. C. (1993). (Un)Structured Creativity in Information Systems Organizations. *MIS Quarterly*, *17*(4), 375–397. https://doi.org/10.2307/249584

Das, K., Wibowo, P., Chui, M., Agarwal, V., & Lath, V. (2019). *Automation and the future of work in Indonesia Jobs lost, jobs gained, jobs changed*.

Dewi, D. P., Soekopitojo, S., Larasati, A., Kurniawan, M. F., & Hartanti, E. R. S. (2020). Developing Instrument to Measure Student's Capability for Future Work in Industry 4.0 at Vocational Education Culinary Program. *International Journal of Interactive Mobile Technologies*, *14*(12), 110–121.

Du, D. (2022). RETRACTED: Using mobile apps in vocal training to develop creative thinking. *Thinking Skills and Creativity*, *44*, 101020. https://doi.org/https://doi.org/10.1016/j.tsc.2022.101020

Eysenck, H. J. (1998). *Intelligence: A new look*. Transaction Publishers.

Faraday, S., Overton, C., & Cooper, S. (2011). *Effective teaching and learning in vocational education*. LSN Learning. https://doi.org/http://www.skillsdevelopment.org/pdf/Effective_teaching_and_learning_in_VE_report.pdf

Farmer, S. M., & Tierney, P. (2017). Chapter 2 - Considering Creative Self-Efficacy: Its Current State and Ideas for Future Inquiry. In M. Karwowski & J. C. B. T.-T. C. S. Kaufman (Eds.), *Explorations in Creativity Research* (pp. 23–47). Academic Press. https://doi.org/https://doi.org/10.1016/B978-0-12-809790-8.00002-9

Fauth, B., Decristan, J., Decker, A.-T., Büttner, G., Hardy, I., Klieme, E., & Kunter, M. (2019). The effects of teacher competence on student outcomes in elementary science education: The mediating role of teaching quality. *Teaching and Teacher Education*, *86*, 102882. https://doi.org/https://doi.org/10.1016/j.tate.2019.102882

Ferdinand, A. (2002). *Structural equation modeling dalam penelitian manajemen: Aplikasi model-model rumit dalam penelitian untuk skripsi, tesis, dan disertasi*. Badan Penerbit Universitas Diponegoro.

Fino, E., & Sun, S. (2022). "Let us create!": The mediating role of Creative Self-Efficacy between personality and Mental Well-Being in university students. *Personality and Individual Differences*, *188*, 111444. https://doi.org/https://doi.org/10.1016/j.paid.2021.111444

Flor, R. K., Bita, A., Monir, K. C., & Zohreh, Z. Z. (2013). The Effect of Teaching Critical and Creative Thinking Skills on the Locus of Control and Psychological Well-being in Adolescents. *Procedia - Social and Behavioral Sciences*, *82*, 51–56. https://doi.org/https://doi.org/10.1016/j.sbspro.2013.06.223

Ford, C. M. (1996). A Theory of Individual Creative Action in Multiple Social Domains. *The Academy of Management Review*, *21*(4), 1112–1142. https://doi.org/10.2307/259166

Ford, C. M., & Gioia, D. A. (2000). Factors influencing creativity in the domain of managerial decision making. *Journal of Management*, *26*(4), 705–732. https://doi.org/https://doi.org/10.1016/S0149-2063(00)00053-2

Fox, J. E., & Schirrmacher, R. (2014). *Art and Creative Development for Young Children* (8th ed.). Cengage Learning.

Fredagsvik, M. S. (2023). The challenge of supporting creativity in problem-solving projects in science: a study of teachers' conversational practices with students. *Research in Science & Technological Education*, *41*(1), 289–305. https://doi.org/10.1080/02635143.2021.1898359

Ghozali, I. (2017). *Structural equation models: Concepts and applications with the AMOS 24 bayesian SEM update program (Indonesian version)* (Edisi 7). Badan Penerbit Universitas Diponegoro.

Greiff, S., Niepel, C., & Wüstenberg, S. (2015). 21st century skills: International advancements and recent developments. *Thinking Skills and Creativity*, *18*, 1–3. https://doi.org/10.1016/j.tsc.2015.04.007

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

Hobfoll, S. E., & Stokes, J. P. (1988). The process and mechanics of social support. In *Handbook of personal relationships: Theory, research and interventions.* (pp. 497–517). John Wiley & Sons.

Hopkins, D. (2014). *Every school a great school Meeting the challenge of large scale , long term educational reform* (Issue May). Specialist Schools and Academies Trust. https://doi.org/10.1007/978-90-481-2660-6

Huang, N., Chang, Y., & Chou, C. (2020). Effects of creative thinking, psychomotor skills, and creative self-efficacy on engineering design creativity. *Thinking Skills and Creativity*, *37*, 100695. https://doi.org/https://doi.org/10.1016/j.tsc.2020.100695

Jatisunda, M. G., Suciawati, V., & Nahdi, D. S. (2020). Discovery Learning with Scaffolding To Promote Mathematical Creative Thinking Ability And Self-Efficacy. *Al-Jabar : Jurnal Pendidikan Matematika*, *11*(2), 351–370.

Jaussi, K. S., & Randel, A. E. (2014). Where to Look? Creative Self-Efficacy, Knowledge Retrieval, and Incremental and Radical Creativity. *Creativity Research Journal*, *26*(4), 400–410. https://doi.org/10.1080/10400419.2014.961772

Jaussi, K. S., Randel, A. E., & Dionne, S. D. (2007). I Am, I Think I Can, and I Do: The Role of Personal Identity, Self-Efficacy, and Cross-Application of Experiences in Creativity at Work. *Creativity Research Journal*, *19*(2–3), 247–258. https://doi.org/10.1080/10400410701397339

Karpova, E., Marcketti, S. B., & Barker, J. (2011). The Efficacy of Teaching Creativity: Assessment of Student Creative Thinking Before and After Exercises. *Clothing and Textiles Research Journal*, *29*(1), 52–66. https://doi.org/10.1177/0887302X11400065

Karpova, E., Marcketti, S., & Kamm, C. (2013). Fashion industry professionals' viewpoints on creative traits and, strategies for creativity development. *Thinking Skills and Creativity*, *10*, 159–167. https://doi.org/https://doi.org/10.1016/j.tsc.2013.09.001

Karwowski, M. (2012). Did Curiosity Kill the Cat? Relationship Between Trait Curiosity, Creative Self-Efficacy and Creative Personal Identity. *Europe's Journal of Psychology*, *8*(4), 547–558. https://doi.org/10.5964/ejop.v8i4.513

Karwowski, M. (2014). Creative mindsets: Measurement, correlates, consequences. *Psychology of Aesthetics, Creativity, and the Arts*, *8*(1), 62–70. https://doi.org/10.1037/a0034898

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

Karwowski, M., Lebuda, I., Wisniewska, E., & Gralewski, J. (2013). Big five personality traits as the predictors of creative self-efficacy and creative personal identity: Does gender matter? *The Journal of Creative Behavior*, *47*(3), 215–232. https://doi.org/10.1002/jocb.32

Karwowski, M., & Soszynski, M. (2008). How to develop creative imagination?: Assumptions, aims and effectiveness of Role Play Training in Creativity (RPTC). *Thinking Skills and Creativity*, *3*(2), 163–171. https://doi.org/https://doi.org/10.1016/j.tsc.2008.07.001

Kaufman, J. C., & Baer, J. (2006). An Introduction to the Special Issue : A Tribute to An Introduction to the Special Issue : A Tribute to E . Paul Torrance. *Creativity Research Journal*, *18*(1), 1–2. https://doi.org/10.1207/s15326934crj1801

Kelley, T., & Kelley, D. (2013). *Creative confidence: Unleashing the creative potential within us all*. William Collins.

Kleickmann, T., Richter, D., Kunter, M., Elsner, J., Besser, M., Krauss, S., & Baumert, J. (2012). Teachers' Content Knowledge and Pedagogical Content Knowledge: The Role of Structural Differences in Teacher Education. *Journal of Teacher Education*, *64*(1), 90–106. https://doi.org/10.1177/0022487112460398

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. Guilford.

Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory Into Practice*, *41*(4), 212–218. https://doi.org/10.1207/s15430421tip4104_2

Kunter, M., & Voss, T. (2013). The model of instructional quality in COACTIV: A multicriteria analysis. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive activation in the mathematics classroom and professional competence of teachers. Results from the COACTIV project* (pp. 97–124). Springer.

Lakey, B., & Cohen, S. (2000). Social support theory and measurement. In *Social support measurement and intervention: A guide for health and social scientists.* (pp. 29–52). Oxford University Press. https://doi.org/10.1093/med:psych/9780195126709.003.0002

Liu, W., Pan, Y., Luo, X., Wang, L., & Pang, W. (2017). Active procrastination and creative ideation: The mediating role of creative self-efficacy. *Personality and Individual Differences*, *119*, 227–229. https://doi.org/https://doi.org/10.1016/j.paid.2017.07.033

Liu, X., Gong, S.-Y., Zhang, H., Yu, Q., & Zhou, Z. (2021). Perceived teacher support and creative self-efficacy: The mediating roles of autonomous motivation and achievement emotions in Chinese junior high school students. *Thinking Skills and Creativity*, *39*, 100752. https://doi.org/https://doi.org/10.1016/j.tsc.2020.100752

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology*, *60*, 541–572.

Lychuk, M. I., & Nozhovnik, O. M. (2020). Fostering cognitive and creative thinking styles through the use of innovative pedagogical technologies in the process of vocational training. *International Journal of Philology*, *11*(4), 132–139.

Mackinnon, S. P. (2012). Perceived social support and academic achievement: cross-lagged panel and bivariate growth curve analyses. *Journal of Youth and Adolescence*, *41*(4), 474–485. https://doi.org/10.1007/s10964-011-9691-1

Madar, A. R., Sun, C. E., & Hamid, H. (2019). Facilitating Torrance Tests of Creative Thinking Use in Malaysian TVET Research: The Initial Step Of Inter-Rater Reliability Determination. *Journal of Technical Education and Training*, *11*(1), 100–108.

Magenes, S., Cancer, A., Curti, S., Pradella, C., & Antonietti, A. (2022). Learning skills, creativity, and self-efficacy in vocational school students. *Learning and Motivation*, *79*, 101829. https://doi.org/https://doi.org/10.1016/j.lmot.2022.101829

Manalo, E., & Kapur, M. (2018). The role of failure in promoting thinking skills and creativity: New findings and insights about how failure can be beneficial for learning. *Thinking Skills and Creativity*, *30*, 1–6. https://doi.org/https://doi.org/10.1016/j.tsc.2018.06.001

Michael, L. H., Sheng, T. H., & Hsueh, L. F. (2011). Creative self efficacy and innovative behavior in a service setting: optimism as a moderator. *Journal of Creative Behavior*, *1*, 104–154.

Ministry of Education, Culture, R. and T. (2020). *Freedom of Learning Becomes a Ground for Growing Creativity in Education Units (Indonesian Version)*. https://www.kemdikbud.go.id/main/blog/2020/05/merdeka-belajar-jadi-lahan-tumbuhkan-kreativitas-di-satuan-pendidikan

Muijs, D., Kyriakides, L., van der Werf, G., Creemers, B., Timperley, H., & Earl, L. (2014). State of the art – teacher effectiveness and professional learning. *School Effectiveness and School Improvement*, *25*(2), 231–256. https://doi.org/10.1080/09243453.2014.885451

Muijs, D., & Reynolds, D. (2007). *Effective teaching: Evidence and practice*. Sage.

National Bureau of Economic Research. (2019). *Innovation Policy and the Economy 2019*. https://www.nber.org/conferences/innovation-policy-and-economy-2019

OECD. (2019). *PISA 2021 Creative thinking framework: Third draft*. OECD Publishing.

Olszewski-Kubilius, P. (2000). The transition from childhood giftedness to adult creative productiveness: Psychological characteristics and social supports. *Roeper Review*, *23*(2), 65–71. https://doi.org/10.1080/02783190009554068

Op den Kamp, E. M., Bakker, A. B., Tims, M., & Demerouti, E. (2020). Proactive Vitality Management and Creative Work Performance: The Role of Self-Insight and Social Support. *The Journal of Creative Behavior*, *54*(2), 323–336. https://doi.org/https://doi.org/10.1002/jocb.368

Patrício, R., Moreira, A. C., & Zurlo, F. (2018). Gamification approaches to the early stage of innovation. *Creativity and Innovation Management*, *27*(4), 499–511. https://doi.org/https://doi.org/10.1111/caim.12284

Perry, A., & Karpova, E. (2017). Efficacy of teaching creative thinking skills: A comparison of multiple creativity assessments. *Thinking Skills and Creativity*, *24*, 118–126. https://doi.org/https://doi.org/10.1016/j.tsc.2017.02.017

Phedazur, E. J. (1997). *Multiple regression in behavioral research*. Thomson Learning.

Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *Classroom assessment scoring System: Manual K-3*. Paul H Brookes Publishing.

Pradana, Y., & Sundawa, D. (2023). Optimizing Vocational Civic Education For The Development of Student Character. *Journal of Social Science*, *2*(9), 807–813. https://doi.org/https://doi.org/10.57185/joss.v1i4.40

Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: the German framework of Three Basic Dimensions. *ZDM*, *50*(3), 407–426. https://doi.org/10.1007/s11858-018-0918-4

Praetorius, A.-K., Pauli, C., Reusser, K., Rakoczy, K., & Klieme, E. (2014). One lesson is all you need? Stability of instructional quality across lessons. *Learning and Instruction*, *31*, 2–12. https://doi.org/https://doi.org/10.1016/j.learninstruc.2013.12.002

Ray, E. B., & Miller, K. I. (1994). Social support, home/work stress, and burnout: Who can help? *Journal of Applied Behavioral Science*, *30*(3), 357–373. https://doi.org/https://doi.org/10.1177/002188639430300

Redifer, J. L., Bae, C. L., & Zhao, Q. (2021). Self-efficacy and performance feedback: Impacts on cognitive load during creative thinking. *Learning and Instruction*, *71*, 101395. https://doi.org/https://doi.org/10.1016/j.learninstruc.2020.101395

Renatovna, A. G., & Renatovna, A. S. (2021). Pedagogical and psychological conditions of preparing students for social relations on the basis of the development of critical thinking. *Psychology and Education Journal*, *58*(2), 4889–4902. https://doi.org/https://doi.org/10.17762/pae.v58i2.2886

Rhodes, M. (1961). An Analysis of Creativity. *The Phi Delta Kappan*, *42*(7), 305–310. http://www.jstor.org/stable/20342603

Rimm-Kaufman, S. E., & Hamre, B. K. (2010). The Role of Psychological and Developmental Science in Efforts to Improve Teacher Quality. *Teachers College Record*, *112*(12), 2988–3023. https://doi.org/10.1177/016146811011201204

Rivas, P. G. (2017). Strategies for Teaching and Dissemination of Artistic Heritage by Promoting Critical and Creative Thinking Among Future Primary Education Teachers. *Procedia - Social and Behavioral Sciences*, *237*, 717–722. https://doi.org/https://doi.org/10.1016/j.sbspro.2017.02.112

Scott, G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, *16*(4), 361–388. https://doi.org/10.1080/10400410409534549

Seidel, T., & Shavelson, R. J. (2007). Teaching Effectiveness Research in the Past Decade: The Role of Theory and Research Design in Disentangling Meta-Analysis Results. *Review of Educational Research*, *77*(4), 454–499. https://doi.org/10.3102/0034654307310317

Shi, L., Chen, S., & Zhou, Y. (2023). The influence of social capital on primary school teachers' creative teaching behavior: Mediating effects of knowledge sharing and creative teaching self-efficacy. *Thinking Skills and Creativity*, *47*, 101226. https://doi.org/https://doi.org/10.1016/j.tsc.2022.101226

Sözbilir, F. (2018). The interaction between social capital, creativity and efficiency in organizations. *Thinking Skills and Creativity*, *27*, 92–100. https://doi.org/https://doi.org/10.1016/j.tsc.2017.12.006

Sun, C., Zhou, Z., Yu, Q., Gong, S., Yi, L., & Cao, Y. (2021). Exploring the Effect of Perceived Teacher Support on Multiple Creativity Tasks: Based on the Expectancy–Value Model of Achievement Motivation. *The Journal of Creative Behavior*, *55*(1), 15–24. https://doi.org/https://doi.org/10.1002/jocb.430

Suseno, Y., Standing, C., Gengatharen, D., & Nguyen, D. (2020). Innovative work behaviour in the public sector: The roles of task characteristics, social support, and proactivity. *Australian Journal of Public Administration*, *79*(1), 41–59. https://doi.org/https://doi.org/10.1111/1467-8500.12378

Tang, M., Hu, W., & Zhang, H. (2017). Creative Self-Efficacy From the Chinese Perspective: Review of Studies in Mainland China, Hong Kong, Taiwan, and Singapore. In *The Creative Self: Effect of Beliefs, Self-Efficacy, Mindset, and Identity* (pp. 237–257). https://doi.org/10.1016/B978-0-12-809790-8.00013-3

Taşdelen Baş, M., Özpulat, F., Molu, B., & Dönmez, H. (2022). The effect of decorative arts course on nursing students' creativity and critical thinking dispositions. *Nurse Education Today*, *119*, 105584. https://doi.org/https://doi.org/10.1016/j.nedt.2022.105584

Tierney, P., & Farmer, S. M. (2002). Creative Self-Efficacy: Its Potential Antecedents and Relationship to Creative Performance. *The Academy of Management Journal*, *45*(6), 1137–1148. https://doi.org/10.2307/3069429

Torrance, E. P. (1964). Education and creativity. In C. W. Taylor (Ed.), *Creativity: Progress and potential* (pp. 49–128). McGraw-Hill.

Torrance, E. P. (1969). *Creativity. What Research Says to the Teacher, Series, No. 28*. National Education Association.

Trilling, B., & Fadel, C. (2009). *21st Century Skills: learning for Life in Our Times* (First Edit). Jossey-Bass.

Tseng, T.-J., Guo, S.-E., Hsieh, H.-W., & Lo, K.-W. (2022). The effect of a multidimensional teaching strategy on the self-efficacy and critical thinking dispositions of nursing students: A quasi-experimental study. *Nurse Education Today*, *119*, 105531. https://doi.org/https://doi.org/10.1016/j.nedt.2022.105531

Vatankhah, M., & Tanbakooei, N. (2014). The Role of Social Support on Intrinsic and Extrinsic Motivation among Iranian EFL Learners. *Procedia - Social and Behavioral Sciences*, *98*, 1912–1918. https://doi.org/https://doi.org/10.1016/j.sbspro.2014.03.622

Wang, J. H., Chen, Y. T., & Hsu, M. H. (2014). A case study on psychological capital and teaching effectiveness in elementary schools. *International Journal of Engineering and Technology*, *6*(4), 331–337. https://doi.org/10.7763/IJET.2014.V6.722

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing Reliability and Stability in Panel Models. *Sociological Methodology*, *8*, 84–136. https://doi.org/http://dx.doi.org/10.2307/270754

Winangun, K. (2017). Vocational education is the foundation of a nation facing globalization. *Jurnal Taman Vokasi*, *5*(1), 72–78.

Worwood, M., & Plucker, J. A. (2017). Domain generality and specificity in creative design thinking. In F. Darbellay, Z. Moody, & T. Lubart (Eds.), *Creativity, design thinking and interdisciplinarity. Creativity in The Twenty First Century*. Springer.

Wu, M., Siswanto, I., & Mahfud, T. (2018). The role of cognitive and affective behavior in predicting the creative thinking of university students. *International Journal of Innovation, Creativity and Change*, *4*(2), 90–103.

Wulanningtyas, N. D., & Fauzan, F. (2022). The influence of creativity and learning motivation on students' learning independence with friend support as moderating variables. *International Journal of Social and Management Studies*, *3*(1), 196–207. https://doi.org/https://doi.org/10.5555/ijosmas.v3i1.99

Xie, X., Yu, Y., & Wang, W. (2023). Impact of Vocational Core Competencies of Higher Vocational Students on Innovative Behavior: The Mediating Effect of Creative Self-Efficacy and Moderating Effect of Core Self-Evaluation. *Sage Open*, *13*(3), 21582440231196660. https://doi.org/10.1177/21582440231196661

Yang, Y.-T. C. (2015). Computers & Education Virtual CEOs : A blended approach to digital gaming for enhancing higher order thinking and academic achievement among vocational high school students. *Computers & Education*, *81*, 281–295. https://doi.org/10.1016/j.compedu.2014.10.004

Zhang, H., Sun, C., Liu, X., Gong, S., Yu, Q., & Zhou, Z. (2020). Boys benefit more from teacher support: Effects of perceived teacher support on primary students' creative thinking. *Thinking Skills and Creativity*, *37*, 100680. https://doi.org/https://doi.org/10.1016/j.tsc.2020.100680

Zhang, Y., Li, P., Zhang, Z. S., Zhang, X., & Shi, J. (2022). The Relationships of Parental Responsiveness, Teaching Responsiveness, and Creativity: The Mediating Role of Creative Self-Efficacy. *Frontiers in Psychology*, *12*, 1–9. https://doi.org/10.3389/fpsyg.2021.748321

Zhao, X., & Yang, J. (2021). Fostering creative thinking in the family: The importance of parenting styles. *Thinking Skills and Creativity*, *41*, 100920. https://doi.org/https://doi.org/10.1016/j.tsc.2021.100920

Zhou, L.-H., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2019). Effects of perceived autonomy support from social agents on motivation and engagement of Chinese primary school students: Psychological need satisfaction as mediator. *Contemporary Educational Psychology*, *58*, 323–330. https://doi.org/https://doi.org/10.1016/j.cedpsych.2019.05.001

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2