

Pre-service Teachers' Creative Mindsets, Creative Self-efficacy, Life Adaptability and Satisfaction with Life

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Abstract

With rapid advancements in science and technology, educational systems worldwide emphasize the need for teachers to integrate creativity and innovation into their teaching to better equip students for the future. Thus, pre-service teachers' beliefs about creativity and their willingness to embrace creative teaching practices are essential for both their own development and their students' learning. The current study examined the relationships among creative mindsets (fixed and growth), creative self-efficacy, life adaptability, and life satisfaction among 193 pre-service teachers in Singapore. Data were collected via an online questionnaire. Results from path analysis showed that creative growth mindset positively predicted creative self-efficacy, while creative fixed mindset had no significant relationship. Mediation analysis further revealed that creative growth mindset indirectly predicted life adaptability through creative self-efficacy, but not life satisfaction. These findings offer important insights for teacher education, highlighting the imperative of fostering creativity and adaptability among future educators.

Introduction

In the 21st century, rapid advancements in science and technology have reshaped global economies and transformed industries (Dicken, 2003). The COVID-19 pandemic further accelerated these shifts, heightening the demand for innovation and adaptability across sectors, including education (Kang, 2021). To nurture future-ready graduates and citizens, educational systems must evolve to become more collaborative, dialogic, inquiry-driven, and creative (Gore et al., 2004; Lee & Nie, 2024). In addition, in today's rapidly changing educational environments, adaptability and life satisfaction have emerged as key psychological resources (Oliveira et al., 2024). These qualities are especially critical for pre-service teachers, who must navigate complex academic, emotional, and professional demands (Zito et al., 2024). Pre-service teachers, who are in a formative stage of their professional development, face increasing expectations to adopt innovative pedagogies while mastering core teaching competencies (Aiyoo et al., 2025; Emo, 2015). The transition from training to full-time teaching is demanding, requiring them to acquire essential skills, respond to evolving educational landscapes, and navigate high professional expectations (Capello, 2020). They must juggle rigorous training, academic and practicum requirements, and the psychological pressures of performance standards, all of which can affect their well-being and confidence (Mansfield et al., 2016).

Given these challenges, cultivating a positive and adaptive mindset is essential for managing stress, fostering growth, and facilitating a smoother transition into the profession (Emo, 2015; Wong & Lee, 2025). A growth-oriented creative mindset enables pre-service teachers to view challenges as opportunities for learning and innovation (Orr & Kukner, 2015). Equally important is creative self-efficacy, which is the belief in one's capacity to develop and apply novel teaching

strategies, can empower them to experiment, engage learners, and meet diverse classroom needs with confidence (Bereczki & Kárpáti, 2018; Lee & Nie, 2024). Well-being also plays a pivotal role in maintaining motivation, building resilience, and sustaining long-term engagement in the profession, helping to prevent early burnout (Mansfield et al., 2016). Despite the significance of these factors, research on how creative mindsets and creative self-efficacy contribute to pre-service teachers' well-being remains limited. To address this gap, the present study examined the predictive relationships among creative mindsets (fixed and growth), creative self-efficacy, life adaptability, and satisfaction with life, providing insights into how psychological resources support pre-service teachers' transition into the teaching profession.

Research Question 1a: Would creative fixed mindset predict creative self-efficacy?

Research Question 1b: Would creative growth mindset predict creative self-efficacy?

Research Question 2a: Would creative self-efficacy predict life adaptability?

Research Question 2b: Would creative self-efficacy predict satisfaction with life?

Research Question 3: Would creative self-efficacy mediate the relationship between creative mindsets (fixed and growth) and life outcomes (in terms of life adaptability and satisfaction with life)?

Literature Review

Creative Mindsets (Fixed and Growth)

Mindsets are beliefs that individuals hold regarding their personality, intelligence, and abilities (Dweck & Leggett, 1988; Heslin & Keating, 2017; Keating & Heslin, 2015; Lee et al., 2020). According to the original formulation of implicit theories of intelligence, mindsets researchers believed that mindset could have a fixed nature or a growth (stable-versus-malleable) nature (Dweck & Leggett, 1988; Karwowski, 2014). In the educational settings, researchers have reported that mindsets (fixed and growth) can affect individual functioning, well-being, learning goals, and school satisfaction (Dweck & Leggett, 1988). Karwowski (2014) later expanded on the notion of the stable-versus-malleable mindsets to develop the concept of creative mindset.

According to Karwowski (2014), creative mindsets refer to individuals' beliefs about whether creativity is a fixed trait or a malleable ability. These mindsets are categorized into two dimensions: creative fixed mindset and creative growth mindset. A creative fixed mindset is the belief that creativity is an inherent trait—one that individuals either possess or lack (Hass et al., 2016; Karwowski, 2014). This perspective assumes that creativity remains stable over time, making it difficult for individuals to develop their creative potential. Research suggests that a creative fixed mindset has a limited impact on problem-solving and divergent thinking (Jia et al., 2023; Reiter-Palmon et al., 2019) and tends to reduce individuals' willingness to engage in creative activities, leading to negative performance outcomes (Beghetto, 2006; Beghetto & Dilley, 2016). Individuals with a creative fixed mindset are generally less inclined to explore new ideas or embrace change, making them less likely to actively cultivate their creativity (Intasao & Hao, 2018). Since they avoid the uncertainty and discomfort associated with creative work, they may experience lower levels of stress and tension, resulting in greater life satisfaction and contentment with the status quo (Wang, 2022). In contrast, a creative growth mindset is the belief that creativity can be developed and refined over time through effort and practice (Karwowski, 2014; Lee et al., 2020). This mindset enables individuals to cultivate creativity and enhance their intellectual abilities

through deliberate strategies and learning experiences. Studies indicate that a creative growth mindset positively influences various aspects of self-perception and achievement, including creative self-esteem, creative self-efficacy, and overall performance (Dweck & Leggett, 1988; Pretz & Nelson, 2017; Puente-Díaz & Cavazos-Arroyo, 2017).

Karwowski (2014) further highlights that individuals with a creative growth mindset are more likely to generate innovative solutions in problem-solving situations and actively engage in creative tasks. They are also more open to exploring new ideas, adapting to change, and taking risks to foster innovation (Choi, 2019; Lee et al., 2020). However, engaging in creative endeavors often involves navigating creative tension, which arises from the uncertainty and challenges of pursuing novel ideas (Smith & Lewis, 2022). As a result, individuals with a creative growth mindset may experience higher levels of stress and anxiety during the creative process. Their dissatisfaction with the status quo and persistent drive for innovation can also contribute to lower life satisfaction compared to those who adopt a fixed mindset (Wang, 2022).

Within creativity research, numerous studies have examined how creative mindsets influence creative engagement and performance. Amabile et al. (2018) reported that business students with a creative growth mindset were more engaged in training programmes that enhanced their thinking skills, leading to increased motivation for creative work. Conversely, individuals with a creative fixed mindset are less likely to engage in self-improvement efforts, particularly through independent learning (Yeh et al., 2023). Unlike those with a growth mindset, individuals who hold a fixed view of creativity find it challenging to improve even in environments that provide strong learning support (Yeh et al., 2023). Moreover, a creative fixed mindset has been linked to lower levels of creative achievement (Karwowski & Beghetto, 2019), as individuals with this mindset tend to have lower confidence in their creative potential and less interest in thinking creatively (O'Connor et al., 2013; Pretz & Nelson, 2017).

Pre-service teachers are in a critical phase of their professional development, preparing to become full-fledged educators (Mansfield et al., 2016). Given the significant role of creative mindsets in personal and professional growth, it is essential for pre-service teachers to cultivate a creative growth mindset (Wong & Lee, 2025). Developing this mindset can enhance their willingness to explore creative teaching strategies, refine their instructional approaches, and improve their overall teaching effectiveness. Additionally, adopting a creative growth mindset fosters stronger problem-solving and divergent thinking skills, both of which are vital for adapting to the dynamic challenges of the teaching profession (Lucas & Spencer, 2017). For instance, Yamazaki and Kumar (2013) found that a creative growth mindset positively influences teachers' academic risk-taking behaviors while reducing school-related stress. Their findings suggest that individuals with an incremental belief in creativity, the belief that creativity can be developed, experience lower levels of academic stress than those with an entity belief in creativity, which views creativity as a fixed trait. Encouraging pre-service teachers to embrace a creative growth mindset can therefore not only enhance their ability to innovate in the classroom but also support their psychological well-being and resilience in their teaching careers.

Creative Self-efficacy

According to Bandura (1977), self-efficacy refers to an individual's belief in their ability to execute behaviors necessary to achieve specific performance outcomes. Thus, self-efficacy cultivates intrinsic motivation by enhancing perceptions of self-competence (Bandura, 1986). Expanding on this concept, Yu (2013) defined creative self-efficacy as an individual's belief in their capacity to successfully transform new or existing ideas into action. This construct is crucial

for understanding creativity (Puente-Díaz, 2015), as it instills confidence in one's creative potential. Individuals with strong creative self-efficacy are more likely to engage in creative behaviors, demonstrating a greater willingness to experiment with innovative ideas. Research has shown that creative self-efficacy serves as a driving force in fostering creativity, enhancing individuals' perceptions of success, and increasing their likelihood of achieving creative outcomes (Azka et al., 2011; Tierney & Farmer, 2002; Yu, 2013). Ford (1996) identified creative self-efficacy as a key determinant of creative achievement, while Tierney and Farmer (2002) established a strong link between high creative self-efficacy and strong creative performance. Beghetto (2011) further emphasized that creative self-efficacy enables individuals to develop their creative potential and overcome challenges associated with the creative process.

In the field of education, creative self-efficacy strengthens educators' confidence to navigate challenges, adapt to change, and implement innovative ideas effectively (Puozzo & Audrin, 2021). This is particularly important in Singapore, where high-stakes accountability systems emphasise standardised assessments and student performance (Gregory & Clarke, 2003). Additionally, Singaporean classrooms are culturally diverse, with students from varied linguistic and ethnic backgrounds (Ho et al., 2017). High creative self-efficacy fosters resilience against stress and burnout in such high-pressure environments (Dhamit et al., 2020), while promoting flexibility and adaptive communication in multicultural settings (Puozzo & Audrin, 2021). For pre-service teachers, creative self-efficacy is especially valuable as it empowers them to think innovatively, tailor strategies to diverse learners, and maintain confidence in designing engaging lessons. As future educators, they play a vital role in shaping students to become creative, adaptable individuals in a rapidly changing world (Özmuş, 2012). Moreover, a strong sense of creative self-efficacy enhances their ability to generate and apply novel instructional strategies, contributing to more effective and engaging teaching practices (Eyüp, 2023; Lemon & Garvis, 2015).

Relationships between Creative Mindsets (Fixed and Growth) and Creative Self-efficacy

In the existing literature, studies have examined how creative mindsets (fixed and growth) relate to creative self-efficacy. Several studies showed that creative growth mindset, as opposed to creative fixed mindset, is positively related to creative self-efficacy (Hass et al., 2016; Puente-Díaz & Cavazos-Arroyo, 2017; Ting & Yeh, 2023). Puente-Díaz and Cavazos-Arroyo (2017) conducted a study with 478 college business students from Mexico to examine the relationship between creative growth mindset and creative self-efficacy. The result of the study showed that creative growth mindset was positively related to creative self-efficacy. However, there was no relationship between creative fixed mindset and creative self-efficacy. Additionally, the study also reported that one's belief to develop his or her creative skills influences students' beliefs to enhance their abilities for useful ideas.

Similarly, Hass et al. (2016) conducted a study to explore the relationship between creative mindsets (fixed and growth) and creative self-efficacy. The study sample consisted of 648 participants from two large state universities in the United States, and the average age was 20.84 years. Most of the participants were Caucasians and African Americans. The researchers revealed a positive correlation between creative growth mindset and creative self-efficacy, but creative fixed mindset did not relate to creative self-efficacy. This study further explained that if people have more positive creative experiences, they can develop creative self-efficacy. More recently in another context, Ting and Yeh (2023) examined a sample of 281 students in third and sixth grades

in Taiwan. Their study examined the relationship between creative mindsets (fixed and growth) and creative self-efficacy. In the study, creative growth mindset was found to be positively related to creative self-efficacy. Conversely, creative fixed mindset was negatively related to creative self-efficacy. This study involved administering pre-test and post-test to the experimental group, along with a game-based learning intervention. With pre-test and intervention, the study found that participants' creative fixed mindset declined over time with the game-based learning intervention and the relationship between creative fixed mindset and creative self-efficacy was found to be negative (Ting & Yeh, 2023). It was highlighted that the participants in the study with strong creative fixed mindset tended to find it difficult to believe in hope to enhance their creative self-efficacy.

Previous studies have examined the relationship between creative mindsets (fixed and growth) and creative self-efficacy (Hass et al., 2016; Puente-Díaz & Cavazos-Arroyo, 2017; Ting & Yeh, 2023). While Ting and Yeh (2023) found a negative correlation between a fixed creative mindset and creative self-efficacy, other studies reported no significant relationship (Hass et al., 2016; Puente-Díaz & Cavazos-Arroyo, 2017). Given the limited research in this area, particularly within the Singapore context, the present study aimed to deepen understanding by examining these relationships among pre-service teachers in Singapore.

- **Research Question 1a:** Would creative fixed mindset predict creative self-efficacy?
- **Hypothesis 1a:** Creative fixed mindset would negatively predict creative self-efficacy.
- **Research Question 1b:** Would creative growth mindset predict creative self-efficacy?
- **Hypothesis 1b:** Creative growth mindset would positively predict creative self-efficacy.

Life Adaptability

Life adaptability refers to an individual's ability to embrace and respond effectively to changes in their life and circumstances (Lee et al., 2020; Rottinghaus et al., 2005). It involves the capacity, willingness, and motivation to adjust to various task-related, social, or environmental demands (Lee et al. 2020; Ployhart & Bliese, 2006; Savickas, 1997). As a critical psychological resource, life adaptability facilitates behavioral, cognitive, and emotional adjustments in the face of uncertainty and change (Waldeck et al., 2021). The ability to adapt is essential for navigating transitions and overcoming unexpected challenges, yet some individuals may perceive change as overwhelming, leading to resistance or adversity. While research on this topic remains limited, empirical findings suggest a positive relationship between mindfulness and life adaptability (Elphinstone et al., 2019). Additionally, studies have shown that adolescents with low levels of adaptability are more susceptible to poor mental health and well-being outcomes.

In the context of teacher education, the rapidly evolving knowledge economy and shifting curricula underscore the importance of adaptability in teacher training (Yager, 2009). Pre-service teachers must navigate the dual demands of theoretical learning and practical application, which can be a significant source of stress (Anspal et al., 2018). Life adaptability is particularly critical for pre-service teachers as they face challenges such as examinations, unexpected curriculum changes, and evolving teaching environments. Developing adaptability not only helps them manage these challenges effectively but also equips them with the resilience necessary for success in both their academic pursuits and future teaching careers (Shen, 2009). Strengthening

adaptability enables pre-service teachers to cope with uncertainty and high-stress situations, particularly when encountering unfamiliar classroom dynamics and professional expectations.

Life adaptability has been linked to a range of positive outcomes for teachers (Granziera et al., 2019). For instance, Collie and Martin (2016) found that teachers with higher levels of adaptability reported greater well-being and stronger organizational commitment. These findings highlight the importance of fostering adaptability in pre-service teachers, as it can enhance their ability to manage stress, sustain motivation, and thrive in their professional roles. Furthermore, Wu et al. (2013) found that higher adaptability significantly reduces stress and strengthens resilience, reinforcing the idea that adaptability is a crucial resource for both professional success and personal growth.

Relationship between Creative Self-efficacy and Life Adaptability

To date, there are limited empirical research that has directly examined the relationship between creative self-efficacy and life adaptability. Among the few related studies, Lee et al. (2020) investigated the link between creative growth mindset and life adaptability among a sample of 130 adults aged 40 and above in Singapore. Their findings revealed that a creative growth mindset significantly predicted life adaptability, suggesting that individuals who believe in the malleability of creativity are better equipped to embrace change and navigate unexpected challenges. Notably, the study also found that among older adults, a creative growth mindset contributed to healthier and more successful aging, providing greater opportunities for individuals to develop adaptability across different aspects of life.

While limited research has specifically examined the direct connection between creative self-efficacy and life adaptability, studies on creative self-efficacy and resilience may offer insights into understanding their potential relationship. Although resilience and life adaptability are distinct constructs, they share similarities in enabling individuals to navigate challenges and adapt to change. González and Molero (2023) examined the relationship between creative self-efficacy and resilience among 743 secondary school students in Spain, aged 14 to 19. Their study found that creative self-efficacy was positively correlated with resilience, reinforcing the idea that creativity, particularly as a problem-solving ability is linked to positive emotional states. While resilience and life adaptability are distinct constructs, they both involve the ability to adjust to challenges and uncertainties. The findings from this study suggest that creative self-efficacy may contribute to life adaptability by fostering resilience, confidence, and problem-solving skills, which are essential for individuals to respond effectively to change.

Taken together, these studies indicate that both creative growth mindset and creative self-efficacy play a role in enhancing adaptability, whether through direct associations with life adaptability or indirectly through resilience. Given that pre-service teachers must navigate a rapidly evolving educational landscape, it is essential to understand how creative self-efficacy contributes to pre-service teachers' life adaptability. To address this gap, the present study examined the relationship between creative self-efficacy and life adaptability among a sample of pre-service teachers in Singapore.

- **Research Question 2a:** Would creative self-efficacy predict life adaptability?
- **Hypothesis 2a:** Creative self-efficacy would positively predict life adaptability.

Satisfaction with Life

Satisfaction with life refers to an individual's self-evaluation of their quality of life based on personal choices and experiences (Pavot & Diener, 1993; Shin & Johnson, 1978; Lee et al., 2020). According to Cohn et al. (2009), satisfaction with life is closely linked to daily positive emotions, which contribute to overall well-being and the development of psychological resources. Kapteyn et al. (2009) identified four key domains that influence one's satisfaction with life: employment or daily activities, social relationships (including family and friends), health, and income. Additionally, research has shown that engaging in leisure activities significantly enhances happiness and satisfaction with life in older adults (Lee et al., 2020). These findings suggest that common daily activities and repeated positive emotional experiences contribute to an individual's overall sense of satisfaction with life.

For pre-service teachers, satisfaction with life is particularly important, as those who experience higher levels of satisfaction tend to adopt a positive attitude toward the teaching profession and demonstrate a strong sense of responsibility as future educators (Eliusuk, 2016). Moreover, pre-service teachers' positive attitudes can significantly impact their teaching performance and influence their interactions with students (Gülbahar et al., 2023). Research by Lau et al. (2022) found that Chinese teachers with higher levels of well-being had a positive impact on their students' well-being, highlighting the importance of teacher satisfaction in shaping students' educational experiences. Similarly, teachers who experience life satisfaction are more likely to support students' personal development and contribute to their overall well-being (Gradišek, 2012).

Relationship between Creative Self-efficacy and Satisfaction with Life

Several studies have demonstrated a relationship between creative self-efficacy and satisfaction with life. For instance, Hill et al. (2008) examined a sample of 416 high school students aged 12 to 16 who were attending British-style education in Singapore. Their findings revealed a positive relationship between creative self-efficacy and satisfaction with life, suggesting that positive emotions facilitate creativity, which in turn contributes to greater life satisfaction. Similarly, Tan and Majid (2011) investigated the relationship between creative self-efficacy and satisfaction with life among 100 teachers in Singapore. Their study demonstrated a significant and positive correlation between these two constructs, reinforcing the idea that higher creative self-efficacy is linked to greater life satisfaction. More recently, Ng (2019) conducted a study involving 232 participants across various industries. The study found a direct and significant relationship between creative self-efficacy and satisfaction with life, suggesting that higher levels of life satisfaction are associated with increased creative self-efficacy. Additionally, the study highlighted that positive affect enhances individuals' ability to think and act wisely, thereby improving their problem-solving capacities and overall sense of well-being.

Despite these findings, empirical research examining the relationship between creative self-efficacy and satisfaction with life remains relatively scarce, with no known studies focusing specifically on pre-service teachers. Given the importance of both constructs in the professional and personal development of future educators, the present study aims to explore their relationship within a sample of pre-service teachers in Singapore.

- **Research Question 2b:** Would creative self-efficacy predict satisfaction with life?
- **Hypothesis 2b:** Creative self-efficacy would positively predict satisfaction with life.

Creative Self-efficacy as a Mediating Variable

In psychological research, a mediator variable explains the process through which an independent (predictor) variable influences a dependent (criterion) variable (Baron & Kenny, 1986). Mediators are essential for uncovering underlying psychological mechanisms, providing insight into how and why independent variables affect dependent variables in specific contexts (Frazier et al., 2004). While independent variables can have direct effects on dependent variables (Lok, 2016), mediators serve as intermediaries, shaping the nature of this relationship (Pirlott & MacKinnon, 2016). This mediating function enhances understanding of variable interactions and clarifies their psychological and behavioural dynamics.

In creativity research, creative self-efficacy has been widely recognized as a significant mediator in various studies (Capron et al., 2021; Haase et al., 2018; Meinel et al., 2018). As a mediator, creative self-efficacy serves as an underlying psychological mechanism that clarifies the relationship between predictor and criterion variables (Azka, 2011). It fosters perceptions of self-competence, thereby enhancing intrinsic motivation to engage in creative activities (Bandura, 1986; Deci & Ryan, 2008; Gong et al., 2009). For instance, a study conducted by Royston and Reiter-Palmon (2017) examined the relationship between creative mindsets (fixed and growth) and creative problem-solving, identifying creative self-efficacy as a key mediator. The study sampled 152 undergraduate students from a Midwestern university. The results indicated that creative growth mindset predicted both solution quality and solution originality, with creative self-efficacy mediating this relationship. Additionally, creative self-efficacy mediated the negative relationship between creative fixed mindset and creative problem-solving, suggesting that higher creative self-efficacy buffers against the limitations of a fixed creative mindset. Similarly, Zhang et al. (2019) investigated the relationship between optimism and social creativity, examining a sample of 766 Chinese college students. The study found that creative self-efficacy mediated the relationship between optimism and social creativity, indicating that optimism fosters intrinsic motivation, which in turn strengthens creative self-efficacy and enhances problem-solving abilities. More recently, Fino and Sun (2022) explored whether creative self-efficacy mediated the relationship between the Big Five personality traits and mental well-being in a sample of 248 Chinese undergraduate students aged 18 to 23. Their findings revealed that creative self-efficacy fully mediated the relationship between openness and mental well-being and partially mediated the relationship between conscientiousness and mental well-being. However, no indirect relationship was found between extraversion, agreeableness, neuroticism, and mental well-being via creative self-efficacy, indicating that its mediating role may be specific to particular personality dimensions.

Despite these findings, no known study has specifically examined the mediating role of creative self-efficacy in the relationship between creative mindsets (fixed and growth) and life outcomes, such as life adaptability and satisfaction with life. Addressing this gap, the present study aims to contribute to the field by further exploring creative self-efficacy as a psychological mechanism, thereby expanding existing research. Specifically, this study will examine the mediating role of creative self-efficacy in the relationship between creative mindsets (fixed and growth) and life outcomes (life adaptability and satisfaction with life) within the Singapore pre-service education context.

- **Research Question 3:** Would creative self-efficacy mediate the relationship between creative mindsets (fixed and growth) and life outcomes (in terms of life adaptability and satisfaction with life)?

- **Hypothesis 3:** Creative self-efficacy would mediate the relationship between creative mindsets (fixed and growth) and life outcomes (in terms of life adaptability and satisfaction with life).

Method

Research Sample

A convenience sample consisted of 193 participants who were pursuing pre-service teacher training programmes in Singapore voluntarily participated in the current study. 59.1% of the participants were females and 40.9% were males. All the participants were aged 21 years old and above. 86% of the participants were aged between 21 and 30 years old and 14% of them were aged between 31 and 40 years old. At the point of data collection, 82.4% of the participants were pursuing an undergraduate degree, 15.5% of them were pursuing a post-graduate diploma and 2.1% were of them pursuing a diploma.

Measures

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were performed to determine the underlying factor structure of the main variables of the study and evaluate each variable's internal reliability. EFA and CFA were carried out using IBM SPSS Statistics 28 and IBM AMOS 28, respectively.

First, all items of the five main variables (Creative Fixed Mindset, Creative Growth Mindset, Creative Self-efficacy, Life Adaptability and Satisfaction with Life) were included in the initial round of EFA analysis. Putting all the five main variables together in the EFA analysis could help to minimize double or cross-loadings to ensure all the five main variables were distinct from each other. Items with cross-loadings among the variables were removed in subsequent EFA analyses. Items with factor loadings below 0.35 were also omitted. Finally, the EFA generated a distinct five-factor structure with no cross-loadings, consisting of 21 items. The 21 items consisted of three items for Creative Fixed Mindset, three items for Creative Growth Mindset, five items for Creative Self-efficacy, six items for Life Adaptability and four items for Satisfaction with Life. The five-factor structure accounted for 65.84% of the total variance.

Next, CFA was performed with the five-factor structure consisting of 21 items. According to recommendations by methodologists, a good model fit is indicated by a Chi square (χ^2/df) value of 2 to 3 or below, TLI and CFI value of .95 or higher, RMSEA value of .06 or lower (e.g., Hair et al. 2006; Hu & Bentler 1999; Kline 2005). In the current study, Promax rotation was used. A stable five-factor structure was obtained from CFA, demonstrating a good model-data fit: $\chi^2=282.387$, $df=179$, $p<.001$, $TLI=.931$, $CFI=.941$, $RMSEA=.055$.

Table 1 presents the final EFA and CFA factor loadings. Appendix A presents the final items used in this study.

Table 1.

Final EFA and CFA Factor Loadings

Factor	Item	EFA Factor Loadings	CFA Factor Loadings
Creative Fixed Mindset	B2	.919	.794
	B6	.818	.745
	B8	.768	.728
Creative Growth Mindset	B3	.894	.598
	B5	.710	.713
	B9	.440	.725
Creative Self-efficacy	C3	.650	.702
	C4	.680	.657
	C6	.868	.666
	C8	.740	.718
	C9	.762	.666
Life Adaptability	E2	.857	.727
	E3	.624	.764
	E4	.685	.762
	E5	.705	.684
	E6	.862	.717
	E8	.642	.544
Satisfaction With Life	E11	.893	.779
	E12	.887	.763
	E13	.840	.865
	E14	.857	.882

Creative mindsets (fixed and growth). Creative mindsets (fixed and growth) refer to the beliefs about the stable-versus-malleable character and the nature of creativity (Karwowski, 2014; Lee et al., 2020). Creative fixed mindset refers to the belief that creativity is a fixed entity such that an individual is either born with it or does not have it. On the other hand, creative growth mindset refers to the belief that creativity can be developed and refined over time with effort (Karwowski, 2014; Lee et al., 2020). The current study used Creative Mindset scale developed by Karwowski (2014). This scale initially consisted of five items measuring creative fixed mindset and five items measuring creative growth mindset. However, four items were removed after a series of EFA and CFA analyses due to low or cross-loadings. Finally, six items were used in this study consisting of three items from creative fixed mindset and three items from creative growth mindset. Cronbach alpha's coefficient for the three items of creative fixed mindset was $\alpha = .793$, and for the three items of creative growth mindset was $\alpha = .717$, respectively.

Creative self-efficacy. Creative self-efficacy refers to the belief that one's capacity to successfully take new or existing ideas and turn them into action (Yu, 2013). The Creative Self-efficacy scale developed by Yu (2013) was used to measure in this study. This scale originally consisted of 10 items. After a series of EFA and CFA, five items were removed due to low or cross-loadings. The rest of the five items were retained. Cronbach's alpha coefficient for creative self-efficacy was $\alpha=.811$.

Life adaptability. Life adaptability refers to one's capacity to adapt and deal with changes in life situations (Hamtaux et al., 2013; Lee et al., 2020). Life adaptability is linked to an individual's ability, skill and willingness to handle difficult tasks and environmental features (Lee et al., 2020; Ployhart & Bliese, 2006; Savickas, 1997). In this study, items measuring life adaptability was modified from items measuring career adaptability by Rottinghaus et al. (2005). In the current study, the items were modified by replacing the word 'career' in the original items to 'life'. The original scale consisted of 11 items. Five items were removed during EFA and CFA due to low or cross-loadings, resulting in six items being retained in this study. Cronbach alpha's coefficient for life adaptability was $\alpha=.845$.

Satisfaction with life. Satisfaction with life refers to one's self-evaluation of his or her quality of life based on he or she chooses (Pavot & Diener, 1993; Shin & Johnson, 1978; Lee et al., 2020). The current study used Satisfaction with Life Scale developed by Diener et al. (1985). The original scale consisted of five items, but one of the items was removed during EFA and CFA due to cross-loadings, resulting in four items being retained in this study. Cronbach alpha's coefficient for SWL was $\alpha=.894$.

Data Collection Procedures

Prior to data collection, ethics approval was obtained from the Ethics Review Board of the researchers' affiliated institution. Participants were recruited directly by research team members through personal contacts. They were provided with a link to an online questionnaire, where they could review the research invitation letter and consent form before deciding whether to participate. Participants who chose not to proceed simply exited the link without responding to the questionnaire. Those who agreed to participate proceeded to complete the anonymous online questionnaire. They were assured that their responses would remain confidential and anonymous. The questionnaire included demographic questions and items measuring the study's main variables. Participants rated all items on a 7-point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Completing the questionnaire took approximately 20 minutes. Data collection was conducted via Google Forms, and all responses were automatically recorded in a Google Spreadsheet. The collected data were then transferred to IBM SPSS Statistics 28 for further analysis, with password protection implemented to ensure data security.

Data Analysis Strategy

Data was screened and cleaned before any further analysis was conducted. Descriptive and bivariate correlation analyses were conducted with IBM SPSS Statistics 28. To address Research Questions 1, 2, and 3, path analysis was performed using IBM SPSS AMOS 28. Section 4 presents the results of the study.

Results

Descriptive Statistics

Data was screened and cleaned before any further analysis was conducted. Descriptive statistics such as means, standard deviations and bivariate correlation analyses were conducted with IBM SPSS Statistics 28. The skewness and kurtosis values of the five key variables were within acceptable range. The multicollinearity diagnostics (e.g., VIF values) were also within acceptable range, between 1.000 to 1.177 for all the five key variables.

Table 2 presents the means, standard deviations, skewness and kurtosis values as well as bivariate correlations of the main variables of the current study.

Table 2.

Means, Standard Deviations, Skewness and Kurtosis Values as well as Bivariate Correlations Among Creative Mindsets, Creative Self-efficacy, Life Adaptability and Satisfaction with Life

Variable	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Bivariate Correlations (<i>r</i>)				
					1	2	3	4	5
1. Creative Fixed Mindset	2.80	1.16	.712	.125	1				
2. Creative Growth Mindset	6.12	.70	-1.220	1.546	-.388**	1			
3. Creative Self-efficacy	5.57	.73	-.937	1.109	-.316**	.524**	1		
4. Life Adaptability	5.75	.77	-.115	-.591	-.382**	.571**	.615**	1	
5. Satisfaction with Life	3.81	1.18	.456	-.663	.135	-.147*	-.002	.127	1

Note: * Correlation is significant at the $p < .05$.

** Correlation is significant at the $p < .01$.

Path Analyses

In the current study, the predictor variables were creative fixed mindset, and creative growth mindset, the mediator variable was creative self-efficacy and the criterion variables were life adaptability and satisfaction with life, respectively. Prior to conducting the path analysis, bivariate correlation analyses (Pearson's correlations) were conducted between the five main variables and the three demographic variables (age, gender and academic qualification). Due to significant correlations with the main variables of study, the demographic variables (age, gender and academic qualification) served as control variables in this study. Path analysis was performed using IBM SPSS AMOS 28. The path model showed a good model-data fit: $\chi^2 = 15.890$, $df = 15$, $p = .389$, TLI = .995, CFI = .997, RMSEA = .018.

Figure 1 presents the relations between the predictor variables, mediator variable and criterion variables. Table 3 presents the standardized direct, indirect effects, and total effects.

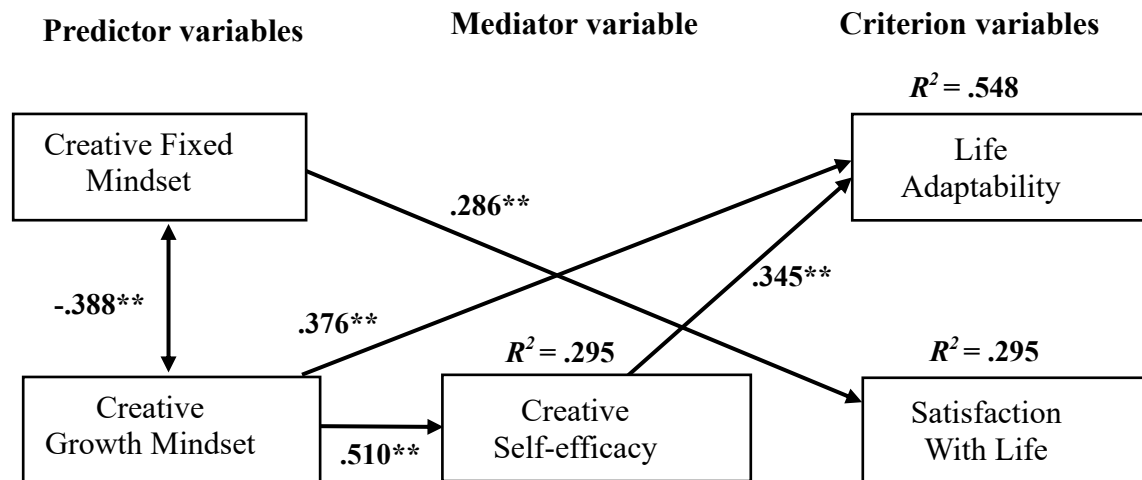


Figure 1. The Path Analysis Results for The Direct and Indirect Relations Among Creative Mindsets, Creative Self-efficacy, Life Adaptability and Satisfaction with Life

Note: **Denotes predictive relationship significant at $p < .01$.

Table 3.

Standardized Direct, Indirect Effects, and Total Effects

Predictor	Mediator	Direct Effect	Indirect Effect	Total Effect
Creative Growth Mindset	Creative Self-efficacy	.510	-	.510
	Life Adaptability	.376	.176	.551
	Satisfaction with Life	-	-	-
Creative Fixed Mindset	Creative Self-efficacy	-	-	-
	Life Adaptability	-	-	.286
	Satisfaction with Life	.286	-	-
Creative Self-efficacy	Life Adaptability	.345	-	.345
	Satisfaction with Life	-	-	-

Note. The term “effect” refers to non-causal predictive relationship.

Research Questions 1a and 1b: Relationship between creative mindsets (fixed and growth) and creative self-efficacy. Results revealed that creative fixed mindset had no significant relationship with creative self-efficacy but creative growth mindset positively predicted creative self-efficacy ($\beta = .510, p < .01, 95\% \text{ BC CI } [.373, .634]$). Hypothesis 1a was not supported, but Hypothesis 1b was supported.

Research Questions 2a and 2b: Relationship between creative self-efficacy and life outcomes (life adaptability and satisfaction with life). Results revealed that creative self-efficacy positively predicted life adaptability ($\beta = .345, p < .01, 95\% \text{ BC CI } [.194, .493]$). However, creative self-efficacy had no significant relationship with satisfaction with life. Hypothesis 2a was supported, but Hypothesis 2b was not supported.

Research Question 3: Mediating role of creative self-efficacy in the relationship between creative mindsets (fixed and growth) and life outcomes (life adaptability and satisfaction with life). Results revealed that creative fixed mindset had a significant direct and positive relationship with satisfaction with life ($\beta = .286, p < .01, 95\% \text{ BC CI } [.143, .421]$) but not life adaptability. On the other hand, creative growth mindset had a significant direct and positive relationship with life adaptability ($\beta = .376, p < .01, 95\% \text{ BC CI } [.240, .497]$) but not satisfaction with life.

Mediation analysis revealed that creative fixed mindset had no significant indirect relationship with life adaptability and satisfaction with life via creative self-efficacy. Mediation analysis also revealed that creative growth mindset indirectly and positively predicted life adaptability via creative self-efficacy. However, creative growth mindset did not predict satisfaction with life via creative self-efficacy. Hypothesis 3 was partially supported.

Discussion

The current study investigated the predictive relationships among pre-service teachers' creative mindsets (fixed and growth), creative self-efficacy, and life outcomes (life adaptability and satisfaction with life). The current study also examined the indirect relationship between creative mindsets (fixed and growth) and life outcomes (life adaptability and satisfaction with life) as mediated by creative self-efficacy.

Research Questions 1a and 1b: Relationships Between Creative Mindsets (Fixed and Growth) and Creative Self-efficacy

The results of the current study revealed that creative growth mindset positively predicted creative self-efficacy, whereas creative fixed mindset had no significant relationship with creative self-efficacy. These findings align with previous research (Hass et al., 2016; Puente-Díaz & Cavazos-Arroyo, 2017), which similarly found that while creative growth mindset fosters creative self-efficacy, creative fixed mindset does not significantly influence it. For instance, Hass et al. (2016) examined 648 university students in the United States and found no significant relationship between creative fixed mindset and creative self-efficacy. Their findings suggested that a fixed view of creativity discourages engagement in learning activities, ultimately hindering the development of creative self-efficacy. A similar conclusion was reached by Puente-Díaz and Cavazos-Arroyo (2017) in their study of 478 business students in Mexico, reinforcing the notion that a creative fixed mindset does not contribute to confidence in one's creative abilities. Conversely, both studies highlighted the positive role of creative growth mindset in enhancing creative self-efficacy. Puente-Díaz and Cavazos-Arroyo (2017) found that creative growth mindset significantly predicted creative self-efficacy, supporting the idea that creative ideas can be developed through ordinary mental operations. Similarly, Hass et al. (2016) reported a positive correlation between creative growth mindset and creative self-efficacy, suggesting that individuals with a growth-oriented perspective on creativity are more likely to engage in creative activities, thereby strengthening their creative self-efficacy. Their study further emphasized that positive experiences in creative engagement enhance creative self-efficacy, leading to greater confidence in one's creative abilities. Also, Royston and Reiter-Palmon (2017) reported similar findings among 152 undergraduate students from a Midwestern university, demonstrating a positive relationship between creative growth mindset and creative self-efficacy.

Taken together, these findings suggest that while a creative fixed mindset does not support the development of creative self-efficacy, creative growth mindset plays a crucial role in fostering it. Individuals who believe that creativity can be cultivated through effort and experience are more

likely to actively engage in creative tasks, reinforcing their confidence in their creative potential. This highlights the importance of promoting creative growth mindset in educational and professional settings, as it encourages individuals to persist in creative endeavors and develop self-efficacy through continuous engagement and learning (Cleghorn, 2023). For pre-service teachers, academic demands and professional challenges can present significant stressors. Developing creative mindsets (fixed and growth) enables them to be more adaptable and inventive in solving academic and instructional challenges (Liu et al., 2023). Additionally, creative self-efficacy supports pre-service teachers in implementing innovative teaching strategies in diverse classroom settings (Simpson et al., 2023). Thus, the findings of the current study confirm the role of creative growth mindset in predicting creative self-efficacy, further validating existing literature and underscoring the importance of fostering a creative growth mindset to enhance individuals' creative capabilities.

Research Questions 2a and 2b: Relationships Between Creative Self-efficacy and Life Outcomes (Life Adaptability and Satisfaction with Life)

The results of the current study revealed that creative self-efficacy positively predicted life adaptability, supporting the idea that individuals with greater confidence in their creative abilities are more adaptable to changing circumstances (Ployhart & Bliese, 2006; Rottinghaus et al., 2005). Given the absence of research on creative self-efficacy and life adaptability in pre-service teacher education, this study fills a critical gap by exploring this previously under-examined relationship, making this study a novel contribution to the field. In contrast, the current study found no significant relationship between creative self-efficacy and satisfaction with life, contradicting previous research (Hill et al., 2008; Ng, 2019; Tan & Majid, 2011). Ng (2019) examined 232 workers from various industries and found that creative self-efficacy positively predicted satisfaction with life, attributing this to the role of positive emotions in shaping cognitive and motivational processes. Similarly, Tan and Majid (2011), in a study of 100 teachers aged 20 to 65 in Singapore, reported a positive correlation between creative self-efficacy and satisfaction with life, emphasizing that positive emotions influence cognitive functions such as creative and imaginative thinking.

While innovation is essential for enhancing student learning and intelligence (Thomas & Beauchamp, 2007), it also creates job-related stress, as teachers face pressure to perform at higher levels while being innovative and adaptable (Troman & Woods, 2000). Particularly, Robertson (2005) noted that continuous educational innovations drive new teaching methods, curricula, and instructional practices, requiring teachers to be increasingly creative and adaptable (Shkabarina et al., 2020). Hence, given these evolving demands, pre-service teachers may experience different stressors that affect their overall satisfaction with life, possibly explaining why creative self-efficacy did not significantly predict this outcome in the current study. As innovation and adaptability become increasingly central to teaching, future research should further explore the complex relationship between creative self-efficacy and life satisfaction, particularly within the changing landscape of education.

Research Question 3: Mediating Role of Creative Self-Efficacy in the Relationship Between Creative Mindsets (Fixed and Growth) and Life Outcomes (Life Adaptability and Satisfaction with Life)

The current study explored the relationship between creative mindsets (fixed and growth) and life outcomes among pre-service teachers mediated by creative self-efficacy. It found that creative

growth mindset directly and positively predicted life adaptability, but not satisfaction with life. At the same time, creative growth mindset also indirectly predicted life adaptability but not satisfaction with life, via creative self-efficacy. This result demonstrated that creative self-efficacy partially mediated the relationship between creative growth mindset and life adaptability, which is consistent with previous research that also reported that the mediating role of creative self-efficacy (Fino & Sun, 2022; Royston & Reiter-Palmon, 2017; Zhang et al., 2019). For instance, results from a study by Fino and Sun (2022) indicated that creative self-efficacy fully mediated the relationship between openness and mental well-being but partially mediated the relationship between conscientiousness and mental well-being in a sample of 248 Chinese undergraduate students. Additionally, Royston and Reiter-Palmon (2017) demonstrated in their study based on a sample of 152 undergraduate students from a Midwestern university that creative self-efficacy mediated the relationships between creative mindsets (fixed and growth) and solution originality and solution quality. Generally, creative self-efficacy, as a mediator, functions as a key psychological mechanism helps to strengthen individuals' sense of self-competence and thereby enhances their intrinsic motivation to participate in creative activities (Bandura, 1986; Deci & Ryan, 2008; Gong et al., 2009).

Conversely, the current study found that creative self-efficacy did not mediate the relationship between creative fixed mindset and either life adaptability or satisfaction with life. Instead, creative fixed mindset directly and positively predicted satisfaction with life but not life adaptability. The fixed mindset assessed in the present study is specific to creativity, not general ability. While creativity and innovation can enhance performance, the creative process often involves stress, uncertainty, and risk-taking, which may lower life satisfaction (Batlolona & Diantoro, 2019; Palanski & Vogelgesang, 2011). The pressure to meet personal or external standards of excellence (Darfler & Kalantari, 2022) and fear of negative feedback or failure (Roskes, 2015) can contribute to anxiety and emotional strain. Consequently, individuals striving to enhance creativity may face greater psychological challenges, leading to lower life satisfaction but increased adaptability and resilience in overcoming obstacles. Thus, those with a creative fixed mindset may experience greater satisfaction with life as they remain content with their current abilities and circumstances (Choi, 2019). By avoiding creative risks and focusing on stability, they experience less stress and pressure to innovate (Runco, 2015). Without the burden of external expectations, rejection, or creative performance anxiety, they can maintain a sense of control and comfort (Alquist & Baumeister, 2024). This preference for stability over change reduces the need for adaptability, yet fosters a greater sense of life satisfaction in familiar and predictable environments (Collie & Martin, 2016). Considering that we used a sample of pre-service teachers who were young and with limited professional experience in this study, they may experience heightened stress when navigating professional and academic challenges (Kasapoğlu & Didin, 2022). creative self-efficacy might not significantly have an impact on life satisfaction because of various stress-inducing factors such as uncertainty about the profession and academic pressure (Zito et al., 2024). Particularly in Singapore's performance-oriented and structured education system, a creative fixed mindset may reduce psychological strain by helping pre-service teachers accept their perceived creative limitations. This "acceptance" might reduce internal pressure to improve creatively, leading to lower frustration and greater life satisfaction. Nevertheless, given that this study is exploratory and to better clarify these relationships, future research should further investigate the dynamics between creative mindsets (fixed and growth) and satisfaction with life, particularly in different educational contexts and with different populations.

Implications for Research and Practice

The current study presents significant implications for both research and practice.

First, much of the existing research on creative mindsets has been conducted in Western contexts. This study provides new insights into the creative mindsets (fixed and growth) of pre-service teachers in Singapore, contributing to a broader understanding of pre-service teacher education in Asian contexts. Understanding how creative mindsets influence creative self-efficacy and teaching performance is valuable for teacher educators aiming to develop and support pre-service teachers' professional growth. For example, integrating mindfulness training, problem-solving workshops and creativity training into teacher education curricula could enhance pre-service teachers' creative growth mindset, equipping them to embrace challenges and adopt innovative teaching practices. Thus, these findings can inform the design of teacher education programmes that foster creative engagement and adaptability, ensuring that pre-service teachers develop the confidence and skills needed for dynamic educational environments.

Second, this study highlights creative self-efficacy as a key psychological mechanism that explains how creative mindsets influence pre-service teachers' adaptability and well-being. Given the limited research on this mediating role, the study sheds light on the connection between creative mindsets and life outcomes (life adaptability and satisfaction with life) through creative self-efficacy. By addressing this gap, this study enhances our understanding of the psychological processes that shape adaptability and well-being in pre-service teachers, offering valuable insights to pre-service teacher education research.

Third, the study provides new perspectives on life adaptability and satisfaction with life among pre-service teachers. By examining the relationships among creative mindsets, creative self-efficacy, life adaptability, and satisfaction with life, the findings contribute to a better understanding of pre-service teachers' psychological functioning and well-being. Pre-service teachers, often young and with limited teaching experience, may experience heightened stress when navigating professional and academic challenges (Kasapoğlu & Didin, 2022). To enhance their adaptability and life satisfaction, teacher training programmes could integrate well-being initiatives, such as mindfulness training and professional counselling services. Additionally, fostering self-awareness of personal strengths, including creativity, may further strengthen their resilience and coping strategies, preparing them for the evolving demands of the teaching profession.

Possible Limitations of Study and Suggestions for Future Research

Despite noteworthy contributions, there are a few limitations of the current study.

First, the sample size was small, so it is limited in generalisability. Furthermore, small sample size has the risk of random variability and lack of precision (Button et al., 2013). Using a larger sample size in future studies could provide for better generalisability of findings.

Second, the data collection method was entirely based on the self-reporting and the use of a cross-sectional data set, which may have unintentionally evoked common method bias in the current study (Podsakoff et al., 2003). The biases may due to length-time and same source. To counter this, multi-source data and multi-timepoint data could be used in future studies such that respondents will not notice retrieval cues nor will they be able to recall information from prior answers so as to reduce possible common method bias (Podsakoff et al., 2003).

Third, given Singapore's performance-driven and structured education system, the findings from this study which was based on a sample of pre-service teachers in Singapore may not be generalisable to other contexts. In future research, comparison studies could be conducted with

samples collected from different educational and cultural contexts. This would allow comparison analysis to explore if there are differences in findings in different educational and cultural samples.

Fourth, although some items were removed during the EFA due to cross-loadings, the CFA results indicated an acceptable model fit, and all five key variables demonstrated good internal consistency with Cronbach's alpha values above 0.70. As constructs such as creative mindsets, creative self-efficacy, and life adaptability are more commonly validated in Western contexts, this study contributes to a better understanding of their applicability in Singapore. Future research is encouraged to further examine the validity and cultural relevance of these measures in local settings.

Conclusion

This study examined the relationships between creative mindsets (fixed and growth), creative self-efficacy, life adaptability, and satisfaction with life among pre-service teachers in Singapore. The findings highlight the importance of adopting a creative growth mindset and developing creative self-efficacy to enhance both professional and personal well-being. Possessing a creative growth mindset and strong creative self-efficacy helps individuals navigate uncertainties and challenges, fostering resilience and adaptability. For pre-service teachers, these attributes are particularly valuable, as they support engagement in creative and innovative instructional approaches, ultimately enhancing their effectiveness as educators. Beyond professional development, cultivating creative self-efficacy also strengthens teachers' ability to adapt to change and manage adversity, especially in an era of rapid technological advancements. To better prepare future educators, teacher education programmes should prioritize fostering creative growth mindsets and self-efficacy, equipping pre-service teachers with the skills and confidence needed for a dynamic and evolving teaching profession.

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Appendix A: Finalised Items Used in the Questionnaire

Variable	Item
Creative Fixed Mindset	B2 You either are creative or you are not-even trying very hard you cannot change much.
	B6 Creativity can be developed, but one either is or is not a truly creative person.
	B8 Some people are creative, others aren't- and no practice can change.
Creative Growth Mindset	B3 Anyone can develop his or her creative abilities up to a certain level.
	B5 Practice makes perfect-perseverance and trying hard are the best ways to develop and expand one's capabilities.
	B9 It doesn't matter what creativity level one reveals-you can always increase it.
Creative self-efficacy	C3 I have confidence in my ability to solve problem creatively.
	C4 I feel I can resolve some problems with new methods.
	C6 I did always find new methods to do thing.
	C8 I am good at finding creative ways to solve problems.
	C9 I have the talent or expertise to do well in my study.
Life Adaptability	E2 I can adapt to change in my life plans.
	E3 I can overcome potential barriers that may exist in my life.
	E4 I enjoy trying new work-related tasks and challenges in life.
	E5 I can adapt to changes in my life.
	E6 I will adjust easily to shifting demands in my life.
	E8 My life success will be determined by my efforts.
Satisfaction with Life	E11 In most ways my life is close to my ideal.
	E12 The conditions of my life are excellent.
	E13 I am satisfied with my life.
	E14 So far I have gotten the important things I want in life.