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| **CREATIVE AND CRITICAL THINKING STYLES AMONG PRE-SERVICE TEACHERS  IN THE INSTITUTES OF TEACHER EDUCATION** |
| Ahmad Najmuddin Azmi ͣ¹, Azlina Abdul Rani²,  Chua Yan Piawᵇ³, Loo Fung Ying 4  *ͣ Institute of Teacher Education, Ilmu Khas Campus, Kuala Lumpur*  *ᵇUniversity of Malaya, Kuala Lumpur*   |  |  |  | | --- | --- | --- | | ARTICLE INFO |  | ABSTRACT | | *Article history:*  Received 12 September 2024  Accepted 25 September 2024  Published 15 November 2024 |  | For decades, teachers have been known to be more creative and critical in order to engage students in teaching and learning. In fact, gender plays a role in determining creative and critical thinking through their achievements, which has a big impact on educational institutions. At the same time, the need for creative and critical-thinking teachers has become a crucial phenomenon. Based on these issues, a study has been employed in three institutes of teacher education to discuss the creative and critical thinking among pre-service teachers (N = 331) in the urban area. In this study, respondents have been selected based on gender and their study programmes, which involve a *Program Persediaan Ijazah Sarjana Muda Perguruan* and *Program Ijazah Sarjana Muda Perguruan*. Using inferential analysis, this study has found that the majority of young female pre-service teachers possess critical thinking styles. However, the study did not anticipate the results that creative thinkers have declined through the time spent in their teachers' training programs. Perhaps this indicates the need to prioritise the development of many young talents in creative thinking, preparing pre-service teachers for enhanced student learning in the future. | | *Keywords:*  Creative thinking  Critical thinking  Gender and education  Pre-service teachers  \* Corresponding author. *E-mail address*: najmuddin@ipgkik.edu.my |  | | |

# INTRODUCTION

In the dynamic fields of education, teachers are increasingly required to adapt and innovate in teaching and learning to meet the diverse needs of students. This challenge comes when teachers are required to play a role, which can attract students to become more attentive to learning. Therefore, creative and critical thinking are important in this aspect to ensure teachers always have new ideas on how to teach interestingly.Creative thinking enables teachers to devise engaging and novel instructional methods, while critical thinking ensures a methodical evaluation of these methods to ascertain their effectiveness. On the other hand, teaching profession has been dominated by female (ElAtia et al., 2024; Burns et al., 2022; Fattali & Smith, 2023) showing that both thinking skills is importan in 21st century learning (Oner & Aggul, 2023; Thornhill-Miller et al., 2023; Tohani & Aulia, 2022). Therefore, the impotance of creative and critical-thinking among pre-service teachers has always being a priority to be measured in order to ensure all teachers are fully equipped when the new generation facing the teaching profession.

When it comes to measuring creative and critical thinking, the sceptical view that female teachers are more creative and critical in teaching students (Anderson et al., 2021; Pazin et al., 2022) was always a statement that related that the teaching profession is dominated by women. In contrast, a handful of literature has also found that creative and critical thinking skills among teachers have been dominated by men since they have the ability to show their creative and critical thinking skills (Arce-Saavedra & Blumen, 2022; Chang et al., 2021; Hora et al., 2022).Derive form this uncertainty, study examines the creative and critical thinking styles of pre-service teachers in Institutes of Teacher Education (ITE), aiming to provide insights that can inform the design of teacher training programs.

# LITERATURE REVIEW

Creative thinking is characterized by the ability to generate new and original ideas, approaches, and solutions. It involves divergent thinking, problem-solving, and viewing situations from multiple perspectives (Peterson & Pattie, 2024). Creativity in teaching is crucial for developing engaging lesson plans, fostering a stimulating learning environment, and catering to diverse learning needs (Fan & Chai, 2022). A handful of studies show that teachers who employ creative thinking strategies can significantly enhance student motivation and achievement (Tang et al., 2022). In conjunction with the the concepts of creative and critical thinking in educational settings, the literatures has indicated that the differences in creative and critical thinking among teachers is based on gender. This is suitable where this thinking skills influencing teaching methods, student engagement, and learning outcomes.

This literatures synthesize existing research to provide a comprehensive understanding of how gender may influence these cognitive processes in teaching professionals. Recent studies suggest that female teachers tend to score higher on measures of creative thinking compared to their male counterparts (Soeharto et al., 2024). This might be attributed to differences in cognitive styles, socialization, and educational experiences.For instance, a study by Hora et al. (2022) indicated that women often excel in tasks requiring verbal creativity, while men may perform better in visual-spatial creative tasks. In contrast, a study by Silva et al. (2022) shows no significant gender differences in overall creativity but suggests that the type of creative task can influence outcomes. Therefore, this article aims to explore the differences in thinking styles between genders among pre-service teachers.

Education also plays an important role in determining individual abilities in creative and critical thinking (Wang et al., 2022). Through this theory, previous literature has shown that teacher education programmes play a significant role in developing creative and critical thinking skills. Literature indicates that coursework focusing on instructional strategies, educational psychology, and subject-specific pedagogy enhances teachers' abilities to think creatively and critically (Cremin, 2022). For instance, a study by Ata-Akturk and Sevimli-Celik (2023) found that teachers who participated in professional development programmes emphasising creative teaching methods demonstrated significantly higher levels of creative thinking in their instructional practices.

# METHODOLOGY

This article reviews the gender and educational demographic factors as determinants of creative and critical thinking among pre-service teachers within their training. Grounded by the gap between gender and education in determining the types of thinking styles among pre-service teachers in ITE, a quantitative method has been employed to discover which genders possess types of creative and critical thinking. Proportional stratified random sampling was used to pick 331 samples from three ITEs, namely ITE A, ITE B, and ITE C, in an urban area with different characteristics. From a total population of 2344, which is 831 in ITE A, 768 in ITE B, and 745 in ITE C, The study has chosen 117 samples to represent ITE A, 109 for ITE B, and 105 for ITE C, as shown in Table 1 below. All of these respondents are in *Program Persediaan Ijazah Sarjana Muda Perguruan* (PPISMP) and *Program Ijazah Sarjana Muda Perguruan* (PISMP).

Table 1

*Sample of respondents involved in the study*

|  |  |  |
| --- | --- | --- |
| **Place of Populations** | **Population** | **Proportional Stratified  Random Sampling** |
| ITE A | 831 | 117 |
| ITE B | 768 | 109 |
| ITE C | 745 | 105 |
| Total population | 2344 | 331 |

The instrument used in this article is YCreative-Critical test, which has 32 multiple-choice items. This instrument is derived from three thinking traits that form creative and critical thinking styles. It involves the perspectives of creative thinking as a person, creative thinking as a product, and creative thinking as a process. This thinking style requires the left, right, and whole brain hemispheres to be used in thinking (Azmi et al., 2023; Chua, 2018). The validity recorded for this instrument was α=.90 using the product-moment reliability test. The sample of the instrument items was recorded as shown in the Figure 1 below.

Figure 1. Sample of Self Scoring Yan Piaw Creative -Critical Styles Test

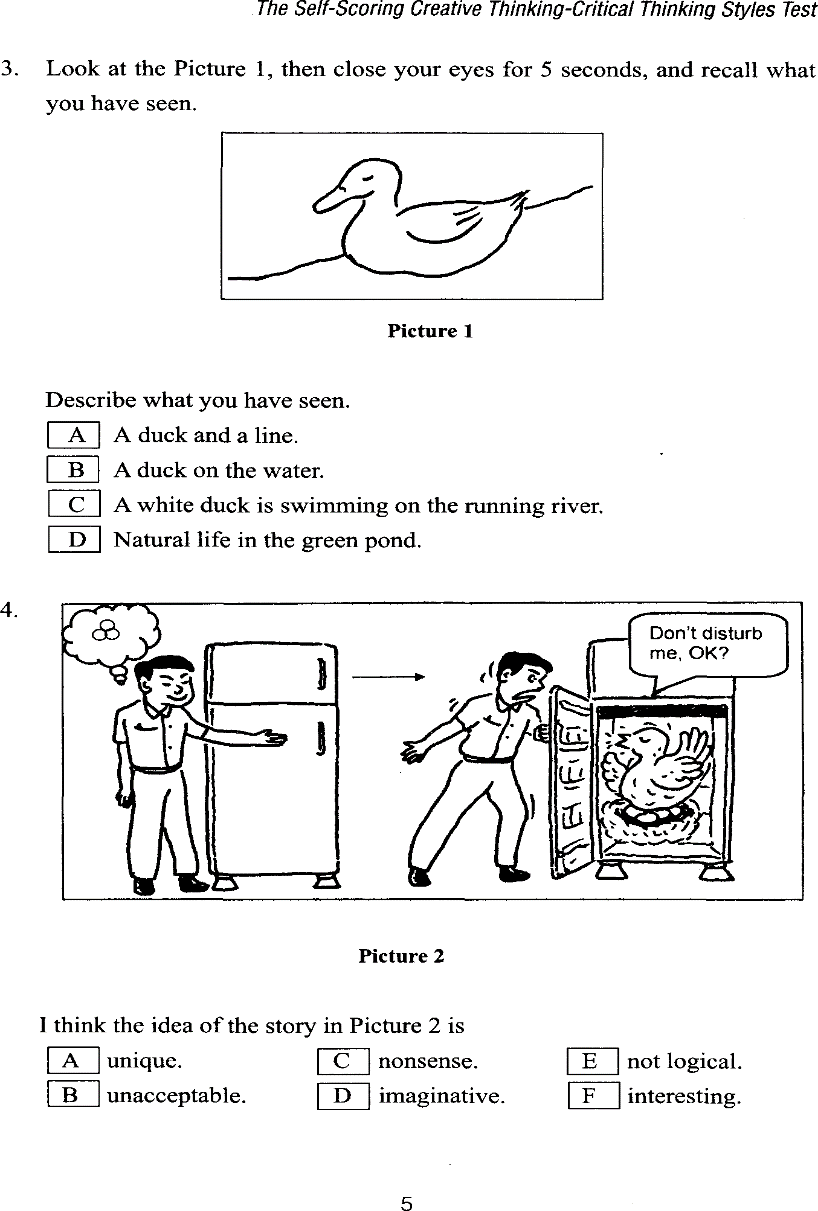


Table 2

*The Indicators of YCreative-Criticals Test*

The instruments used self-scoring items, which respondents answered to describe their thinking style. Every item has its own point, which can be calculated and divided to find the range score in deciding which thinking styles the respondents possess. The point score is indicated in Table 2 below.

|  |  |
| --- | --- |
| **Points Score** | **Thinking Styles** |
| 1.00 -1.99 | Superior Creative Thinking Styles |
| 2.00 - 4.49 | Creative Thinking Styles |
| 4.50 - 5.49 | Balanced Thinking Styles |
| 5.50 - 7.99 | Critical Thinking Styles |
| 8.00 - 8.99 | Superior Critical Thinking Styles |

# FINDINGS

There are five thinking styles that have been categorised using the Ycreative-Critical test: superior creative, creative, balanced, critical, and superior critical thinking styles. Based on the score results, none of the respondents have a superior creative thinking style. The minority of respondents are concentrated in the creative thinking styles   
(*f* = 46, 13.9%), with the lowest percentage among responses. The second majority of respondents possess critical thinking styles (*f* = 124, 37.5%), and the majority of thinking styles possessed by pre-service teachers in the ITEs are critical thinking styles (*f* = 161, 48.6%). Referring to Table 3 below, there were no respondents who possessed superior critical thinking styles as per displays.

Table 3

*Thinking Styles of Pre-service Teachers*

|  |  |  |
| --- | --- | --- |
| **Thinking Styles** | **Frequency (*f*)** | **Percentage (%)** |
| Creative Thinking Style | 46 | 13.9 |
| Balance Thinking Style | 124 | 37.5 |
| Critical Thinking Style | 161 | 48.6 |
| Total | 331 | 100.0 |

When it comes to gender, *f* = 12 respondents represent the minority of male pre-service teachers who possess creative thinking styles, with the lowest percentage of 3.6% among respondents. As seen in the result, *f* = 47 males in the majority of respondents possess critical thinking styles, accounting for 14.2% of the total. Continually, female respondents have shown the same trend, where only *f* = 34 represents 10.3% of respondents who possess creative thinking styles, and the majority are placed in the critical thinking styles with a *f* = 114 and a reading of 34.4%. The remaining respondents for both genders possess balanced thinking styles, which are *f* = 34, 10.3% males, and *f* = 90, 27.2% females.

Table 4

*Thinking Styles Based on Gender*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Thinking Styles** | | **Gender** | | | | |
| **Male** | **Percentage(%)** | **Female** | | **Percentage(%)** |
| Creative Thinking Style | 12 | | 3.6 | 34 | 10.3 | |
| Balance Thinking Style | 34 | | 10.3 | 90 | 27.2 | |
| Critical Thinking Style | 47 | | 14.2 | 114 | 34.4 | |
| Total | 93 | | 28.1 | 238 | 71.9 | |

In contrast, based on the education background, trends show that the minority of respondents in the preparatory programme (PPISMP) and degree programme (PISMP) score the same number in identifying who possesses creative thinking styles (*f* = 23, 6.9%). In comparison, different results show that PPISMP pre-service teachers possess a higher volume of balanced thinking styles (*f* = 75, 22.7%) compared to the PISMP programme (*f* = 49, 14.8%). Critical thinking styles among both PPISMP (*f* = 91, 27.5%) and the PISMP programme (*f* = 70, 21.2%) are the highest number in the responses, but the majority of critical thinking style thinkers are among PPISMP pre-service teachers. The trends showing that the majority of PPISMP and PISMP pre-service teachers possess critical thinking styles are shown in Table 5.

Table 5

*Thinking Style Based on Education Level*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Thinking Styles** | **Education** | | |  |
| **PPISMP** | **Percentage (%)** | **PISMP** | **Percentage (%)** |
| Creative Thinking Style | 23 | 6.9 | 23 | 6.9 |
| Balance Thinking Style | 75 | 22.7 | 49 | 14.8 |
| Critical Thinking Style | 91 | 27.5 | 70 | 21.2 |
| Total | 189 | 57.1 | 142 | 42.9 |

It is clear that based on gender, both genders show the lowest number of respondents possessing creative thinking styles, and the majority of genders possess critical thinking styles. In the education background, both programmes recorded the same minority reading: respondents possess creative thinking, and the majority possess critical thinking styles. Again, in all respondents scores, none possess superior creative and superior critical thinking styles among pre-service teachers involved, classified by gender and education background.

**DISCUSSION AND CONCLUSION**

The ability to possess creative and critical thinking styles might be beneficial to learning as pre-service teachers. This is important since the requirement of being creative and critical-thinking teachers is important to help pre-service teachers prepare themselves to be successful teachers in the future (Belda-Medina, 2022; Dilekçi & Karatay, 2023; Razak et al., 2023). At the same time, measuring genders and education backgrounds is also essential when involved in gender-dominated and education-important professions (Codd, 2023; Maguire & Weiner, 2023; Pugach, 2023). In this article, the results show that among respondents in three ITEs that have been prospectively selected, none of the respondents among pre-service teachers possess superior creative and critical thinking skills. The majority of pre-service teachers possess critical thinking styles, which filled nearly half the sample population. This is important to review since the second-largest group in this study also possesses balanced thinking styles. The concern that needs to be brought to light is the number of creative thinkers, which does not even reach a quarter of the samples in this study.

Referring to the gender demographic factor, the same trends show that the majority of pre-service teachers possess critical thinking styles rather than balanced and creative thinking styles. Not to mention that balance in thinking styles is important as a teacher in 21st century skills (Bambang, 2022; Park & Niu, 2023; Tiong & Bakar, 2022). Therefore, the trends that show a sign that the majority of male and female pre-service teachers only possess critical and balanced thinking styles suggest immediate action since this is a possible cause of serious issues. When it comes to measuring thinking styles according to pre-service teachers education, it is surprising that the number of creative thinkers is the lowest in both groups. This number increased when it changed to balance thinking styles and peaked at critical thinking styles. Comparing the two groups, it is already known that PPISMP is the beginning of the programme of PISMP, and results have shown that in both programmes, creative thinkers remain the lowest and critical thinkers are the largest in possessing thinking styles. Perhaps there is a possibility that education might influence the development of critical thinking styles among pre-service teachers.

This paper suggests that ITE is at the forefront of preparing future educators to promote thinking creatively and critically. One of their primary contributions suggested is through curriculum design. These institutions need to integrate courses and modules specifically aimed at enhancing creative and critical thinking. ITE also should encourage interdisciplinary approaches, which require pre-service teachers to integrate knowledge from various subjects, thereby broadening their analytical perspectives. The adoption of innovative teaching methods might further bolster this development. Active learning strategies, such as problem-based, project-based, and inquiry-based learning, are employed to engage students in deep, reflective thought processes. Collaborative learning is also promoted, where group work and projects enable pre-service teachers to exchange ideas and learn from one another. Additionally, reflective practice is encouraged through the use of journals, discussions, and self-assessment, helping future teachers to continuously evaluate and improve their thinking processes.

With this new insight from this article, the Ministry of Education may complement the efforts of ITE through policy and resource support. Policy development is crucial, with the ministry formulating educational policies that prioritise creative and critical thinking. This might be achieved by setting curriculum standards that mandate the inclusion of these skills and by ensuring a consistent and unified approach across educational institutions. At the same time, research and evaluation conducted by the ministry provide valuable insights into effective methods for teaching creative and critical thinking. In research areas such as supporting educational research and evaluating teacher training programmes, the ministry ensures that best practices are identified and implemented. It is hoped that the knowledge that has been derived from this article might set a new vision for fostering creative and critical thinking among pre-service teachers in preparation to face their profession in the future.

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**REFERENCES**

Anderson, R. C., Bousselot, T., Katz-Buoincontro, J., & Todd, J. (2021). Generating buoyancy in a sea of uncertainty: Teachers creativity and well-being during the COVID-19 pandemic. *Frontiers in psychology*, 11, 614774.

Arce-Saavedra, B. J., & Blumen, S. (2022). Critical thinking, creativity, self-efficacy, and teaching practice in Peruvian teacher trainers. *Revista de Psicología*, *40*(1), 603-633.

Ata-Akturk, A., & Sevimli-Celik, S. (2023). Creativity in early childhood teacher education: beliefs and practices. *International Journal of Early Years Education*, *31*(1), 95-114.

Azmi, A. N., Chua Y. P., Loo, F. Y, & Md Zahir, N. (2023). Creative and Critical Thinking of Becoming a Teacher. *International Journal of Modern Education*, 5 (19), 280-290.

Bambang, S. A. (2022). The Comparison of STEM approach and SSCS Learning Model for Secondary School-Based on K-13 Curriculum: The Impact on Creative and Critical Thinking Ability. *Revista de Educación a Distancia*, *22*(70), 1-26.

Belda-Medina, J. (2022). Promoting inclusiveness, creativity and critical thinking through digital storytelling among EFL teacher candidates. *International Journal of Inclusive Education*, *26*(2), 109-123.

Burns, E., Gannon, S., Pierce, H., & Hugman, S. (2022). Corporeal generosity: Breastfeeding bodies and female‐dominated workplaces. *Gender, Work & Organization*, *29*(3), 778-799.

Chang, C. M., Hsieh, H. H., Chou, Y. H., & Huang, H. C. (2021). The relationship between physical education teachers’ perceptions of principals’ transformational leadership and creative teaching behavior at junior and senior high schools: A cross-level moderating effect on innovative school climates. *Sustainability* (Switzerland), 13(15). <https://doi.org/10.3390/su13158184>

Chua, Y. P. (2018). *The yanpiaw creative-critical styles test* (Issue August). https://www.researchgate.net/  
publication/326826705

Codd, J. (2023). Teachers as ‘managed professionals' in the global education industry: the New Zealand experience. In *Mapping the Field* (pp. 50-62). Routledge.

Cremin, T. (2022). Teaching english creatively. In *Teaching English Creatively* (pp. 1-11). Routledge.

Dilekçi, A., & Karatay, H. (2023). The effects of the 21st century skills curriculum on the development of students’ creative thinking skills. *Thinking skills and creativity*, *47*, 101229.

ElAtia, S., Gomez, L. N., & Corsi, E. (2024). If Teaching Is a Female Dominated Profession, Why Are So Few Leading the Profession?. *Journal of Research on Leadership Education*, *19*(1), 102-121.

Fan, M., & Cai, W. (2022). How does a creative learning environment foster student creativity? An examination on multiple explanatory mechanisms. *Current Psychology*, *41*(7), 4667-4676.

Fattali, H., & Smith, Å. W. (2023). Learning from the outsiders-within: wearing the niqab in Swedish teacher profession and training. *Race Ethnicity and Education*, 1-15.

Hora, S., Badura, K. L., Lemoine, G. J., & Grijalva, E. (2022). A meta-analytic examination of the gender difference in creative performance. *Journal of Applied Psychology*, *107*(11), 1926.

Koivisto, M., & Grassini, S. (2023). Best humans still outperform artificial intelligence in a creative divergent thinking task. *Scientific reports*, *13*(1), 13601.

Maguire, M., & Weiner, G. (2023). The place of women in teacher education: Discourses of power. In *Mapping the Field* (pp. 23-40). Routledge.

Oner, D., & Aggul, Y. G. (2023). Critical thinking for teachers. In *Integrated Education and Learning* (pp. 319-336). Cham: Springer International Publishing.

Park, J. H., Li, Y., & Niu, W. (2023). Revisiting creativity and critical thinking through content analysis. *Journal of Creativity*, *33*(2), 100056.

Pazin, A. H., Maat, S. M., & Mahmud, M. S. (2022). Factors Influencing Teachers' Creative Teaching: A Systematic Review. *Cypriot Journal of Educational Sciences*, *17*(1), 240-254.

Peterson, D. R., & Pattie, M. W. (2024). Think outside and inside the box: The role of dual-pathway divergent thinking in creative idea generation. *Creativity Research Journal*, *36*(2), 272-290.

Pugach, M. C. (2023). *Because teaching matters: An introduction to the profession*. John Wiley & Sons.

Razak, A. A., Ramdan, M. R., Mahjom, N., Zabit, M. N. M., Muhammad, F., Hussin, M. Y. M., & Abdullah, N. L. (2022). Improving critical thinking skills in teaching through problem-based learning for students: A scoping review. *International Journal of Learning, Teaching and Educational Research*, *21*(2), 342-362.

Silva, H., Lopes, J., Dominguez, C., & Morais, E. (2022). Lecture, cooperative learning and concept mapping: any differences on critical and creative thinking development?. *International Journal of Instruction*, *15*(1), 765-780.

Soeharto, S., Singh, S. S., & Afriyanti, F. (2024). Associations between attitudes toward inclusive education and teaching for creativity for Indonesian pre-service teachers. *Thinking Skills and Creativity*, *51*, 101469.

Tang, C., Mao, S., Naumann, S. E., & Xing, Z. (2022). Improving student creativity through digital technology products: A literature review. *Thinking Skills and Creativity*, *44*, 101032.

Taylor, C. L., Said-Metwaly, S., Camarda, A., & Barbot, B. (2023). Gender differences and variability in creative ability: A systematic review and meta-analysis of the greater male variability hypothesis in creativity. Journal of Personality and Social Psychology. Advance online publication. [https://doi.org/10.1037/pspp0000484](https://psycnet.apa.org/doi/10.1037/pspp0000484)

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J. M., Morisseau, T., Bourgeois-Bougrine, S., ... & Lubart, T. (2023). Creativity, critical thinking, communication, and collaboration: assessment, certification, and promotion of 21st century skills for the future of work and education. *Journal of Intelligence*, *11*(3), 54.

Tiong, G. H., & Bakar, A. Y. A. (2022). The engagement of critical and creative thinking activities in the teaching and learning process. *ASEAN Journal of Educational Research and Technology*, *1*(2), 139-146.

Tohani, E., & Aulia, I. (2022). Effects of 21st Century Learning on the Development of Critical Thinking, Creativity, Communication, and Collaboration Skills. *Journal of Nonformal Education*, *8*(1), 46-53.

Wang, C., Mundorf, N., & Salzarulo-McGuigan, A. (2022). Entrepreneurship education enhances entrepreneurial creativity: The mediating role of entrepreneurial inspiration. *The International Journal of Management Education*, *20*(2), 100570.