

Full Length Research Paper

The impact of preschool teachers' dual learning on creativity

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This study aims to explore the impact of dual learning on preschool teachers' thriving at work and creative performance, and whether preschool teachers' thriving at work acts as a mediating factor in the relationship between dual learning and teachers' creative work. The participants were preschool teachers from Taiwan. Convenience sampling was used, resulting in a sample size of 388 people. The study results found that preschool teachers' dual learning, which includes both exploitative and exploratory learning, can improve the novelty and usefulness of their work and creativity. Furthermore, the study found that preschool teachers' thriving at work mediates the relationship between dual learning and creativity. This study also discovered that dual learning should combine and complement both exploitative and exploratory learning to achieve balance and the most significant effect. Therefore, it is essential to first help preschool teachers engage in both exploitative and exploratory learning. Schools and kindergartens can also provide relevant courses to help teachers combine these two learning methods. By integrating and complementing their advantages and disadvantages, a balance in learning can be achieved, thereby promoting teachers' creativity in their work.

Key words: Dual learning, thriving at work, creativity.

INTRODUCTION

Teachers are the primary implementers of all schoolwork, the core resources of the school, and they play a significant role in its development (Ali et al., 2018). Building teams of high-quality teachers is critical for improving school education and teaching standards. The construction of a teaching team requires mutual exchange and learning; therefore, it cannot maintain absolute stability (Anjum et al., 2016). Orderly teacher mobility can maintain the teaching enthusiasm and creativity of the teaching team, which has a particular

impact on teachers' personal abilities. Innovation in teaching talent has a positive effect. The exchange of teaching innovations among teachers from different regions can promote mutual learning and improve educational standards. Teachers emphasize individual autonomy and learning motivation through active learning and encourage them to participate actively in continuous learning and professional growth (Han et al., 2022). This form of learning can help teachers better understand students' needs, explore innovative teaching strategies,

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and improve their reflective and adaptive abilities (Ibiam and Harrop, 2022). Teachers also need to cultivate an awareness of independent and continuous learning, proactively discover and solve problems at work, and seek opportunities for learning and growth (Khodabandelou, 2022). Teachers can reflect on their teaching practices, adjust teaching strategies, continue to learn, and experiment with new teaching methods (Lyman et al., 2022). This sense of prosperity originates in jobs that provide challenging tasks, meaningful goals, and good working conditions. The tasks and projects encountered at work are challenging and require employees to continuously use their talents and abilities to learn and grow (Nakanishi, 2023).

Teachers' adoption of dual learning paves the way for thriving work environments. By introspecting and adjusting their teaching methods and approaches, teachers can continually enhance their teaching practices and deliver superior educational experiences to their students (Yu et al., 2022). This approach, which combines dual learning with practical applications, augments teachers' learning motivation and goal awareness (Huafei and Zhang, 2019). When teachers experience thriving at work, they develop a profound sense of the meaning and mission of their work, leading to a sense of satisfaction and accomplishment (Volmer et al., 2012). Through dual learning and continuous professional growth, teachers can cultivate a sense of personal accomplishment and affirmation of self-worth, thereby boosting job satisfaction and emotional investment. Therefore, this study aims to explore the impact of dual learning on preschool teachers' thriving at work and creative performance, and whether preschool teachers' thriving at work acts as a mediating factor in the relationship between dual learning and teachers' creative work. The findings of this study hold promise for schools to provide dual learning opportunities for teachers, thereby enhancing their motivation and fostering work creativity.

LITERATURE

Dual learning and creativity

According to March (1991), organizational ambidextrous learning theory divides ambidextrous learning into two dimensions: exploitative and exploratory learning. Based on these two dimensions, learning behavior is used to achieve the ultimate learning goal. Exploitative and exploratory learning are collectively referred to as dual learning. Exploratory learning is defined as organizational behavior that actively seeks, acquires, and comprehends new knowledge, including "refining, screening, production, selection, implementation, execution," and other learning behaviors. Exploitative learning optimizes organizational management procedures, explores existing resources, and summarizes existing experiences. It includes learning behaviors such as "searching, changing,

taking risks, experimenting, trying, adapting, discovering, and innovating" (March, 1991).

Baum et al. (2000) believe that the characteristics of exploitative learning are reflected in local searches, experience refining, and the selection and reuse of existing routines. Exploratory learning involves the use of network relationships to acquire new knowledge to cultivate new products or introduce new technologies to improve innovation performance.

Lee (2014) also pointed out that exploratory learning makes full use of existing knowledge stocks to ensure the "micro-innovation" activities of enterprises; exploitative learning is the exploration of new knowledge to adapt to the dynamic changes of the organization and environment. Exploitative learning actively perceives changes in the internal and external environment and acquires the latest knowledge to implement structural and strategic changes in the organization itself, while exploratory learning actively pays attention to the existing knowledge within the organization and updates and improves it to promote organizational change. Lyman et al. (2022) proposed that exploitative learning in an organization actively discovers and utilizes new knowledge, whereas exploratory learning profoundly cultivates old knowledge. The aforementioned literature shows that dual learning contributes to the development of creativity.

Thriving at work and creativity

Spreitzer (2005) pointed out that thriving at work occurs when an individual experiences two states: "vitality" and "learning" at work. Thriving at work includes two components: the emotional and cognitive components of an individual. "Vitality" represents the emotional component, describing an individual's experience of being full of energy and enthusiasm at work; "learning" belongs to the cognitive component, described as the experience in which an individual can acquire and apply knowledge and skills at work. Vitality and learning complement one another and constitute thriving at work, both of which are indispensable. Satisfying individuals' psychological needs for autonomy and competence can promote thriving at work (Spreitzer and Porath, 2014). Thriving at work is a dynamic process that changes over time. It is not a stable state but an immediate psychological state that changes, increases, or decreases as the work environment changes.

Work creativity is a critical factor in achieving creative output and is the degree of effort an individual puts into creative work (Carmeli and Schaubroeck, 2007). Work creativity is closely related to creativity, though there are some differences. Creativity refers to the novel and valuable ideas generated by an individual that reflect actual work results, while work creativity is the subjective evaluation of an individual's input into creative work (Volmer et al., 2012).

However, creativity results not only from individual efforts but also from the influence of multiple factors (Shin and Zhou, 2007), and creativity far exceeds the controllable scope of the individual (Litchfield et al., 2014).

Reiter and Illies (2004) summarize the process of creative problem solving in three steps: problem definition, information encoding, and selection of alternatives. Creative work refers to all behaviors related to the generation of innovative ideas. Employees' creative work can be viewed by distinguishing between creativity and innovation. However, these studies ignore two characteristics of creative activities: novelty and usefulness. Novelty emphasizes uniqueness and unusualness, as well as concrete practicality. Novelty and usefulness belong to different parts of the creativity goal system, and forming this distinction helps guide employees in creating appropriate outputs for specific work situations (Litchfield, 2008). The higher an individual's internal level of thriving at work, the easier it is to generate creative ideas (Wallace et al., 2016).

Dual learning, thriving at work, and creativity

According to organizational learning theory, exploitative and exploratory learning are two learning methods that involve different innovation strategies, goals, and structures (Lavie et al., 2010; Li et al., 2010). However, they are considered complementary rather than exclusive (Su et al., 2011). Their complementary effects and balance are crucial to innovation (O'Reilly and Tushman, 2008). Organizational ambidexterity suggests that pursuing both simultaneously is the most productive approach (O'Reilly and Tushman, 2008). Exploratory learning is essential for exploring new knowledge and learning, whereas exploitative learning helps enhance existing knowledge and learning (Dost et al., 2019; Lavie et al., 2010). Employees can balance the conflicting needs of exploratory and exploitative learning (Raisch and Birkinshaw, 2008), which are also sources of employee creativity. These behaviors reinforce each other, and employees engage in innovative activities by balancing them (Caniels and Veld, 2019). Situational duality is related to an individual's efforts to maintain balance, and its exploitative content is related to creativity (Gibson and Birkinshaw, 2004). Exploratory and exploitative learning positively impact personal creativity (Caniels and Veld, 2019; Rosing and Zacher, 2017; Younis et al., 2023). Exploitative learning focuses on thinking outside the box, engaging in experimentation, and finding new ways to enhance creativity (Radomska and Wolczek, 2020). Exploratory learning involves avoiding risk, following rules, and encouraging employees to be creative.

Thriving at work is an adaptive process in which Employees can self-regulate and measure their development based on their feelings to improve their short-term personal functioning and long-term adaptation to the work environment (Spreitzer et al., 2005). Vitality

includes feeling energetic and enthusiastic about one's work (Nix et al., 1999). Learning refers to acquiring and applying skills or knowledge to develop competence and confidence (Edmondson, 1999). It can help employees adapt to their work environment and promote personal development and growth (Wallace et al., 2016).

While learning and growing on the job, individuals are in an excellent position to recognize and apply new solutions to problems. Furthermore, learning enables individuals to acquire new expertise, thereby promoting the generation of new ideas and increasing confidence in changing the status quo. When energized at work, individuals have a higher motivation to engage in innovative behaviors (Kark and Carmeli, 2009). Yang et al. (2021) pointed out that thriving at work can help improve creativity, and the dyadic learning of exploration and exploitation can also improve employee creativity (Li et al., 2023). Therefore, through dyadic learning, teachers can adapt to the work environment and develop thinking skills that can help with creativity. This study hypothesized that preschool teachers' thriving at work mediates the relationship between dyadic learning and creativity.

RESEARCH METHODOLOGY

Research framework

According to the research purpose and literature review, this study aims to understand the impact of preschool teachers' dual learning and thriving at work on their creativity, and whether thriving at work can mediate the relationship between dual learning and creativity. Therefore, a research framework was proposed, as shown in Figure 1.

Objects

The participants in this study were Taiwanese preschool teachers. Ten public and ten private kindergartens were selected, with 20 preschool teachers from each kindergarten participating in a questionnaire survey. Memon et al. (2020) proposed that the number of formal questionnaire subjects should be at least ten times the total number of questions on the scale. The questionnaire consisted of 32 questions, so the formal sample comprised at least 320 questionnaires. Considering the possibility of invalid responses, 400 questionnaires were distributed to 400 Taiwanese preschool teachers using convenience sampling. The respondents were informed of the study's purpose in advance, and after obtaining their consent, they were allowed to complete the questionnaire. The testing period was from January 10 to January 31, 2024. Of the 391 questionnaires collected, three were invalid, resulting in 388 valid responses. Among the participants, there were 127 male teachers (33%) and 261 female teachers (67%). In terms of age distribution, 36 were over 45 years old, 162 were between 35 and 45 years old, and 190 were under 35 years old.

Research tools

Dual learning scale

The dual-learning scale was adopted from Atuahene-Gima and Murra (2007) and includes two aspects: exploitative and exploratory learning, comprising a total of 10 questions. A 5-point Likert scale

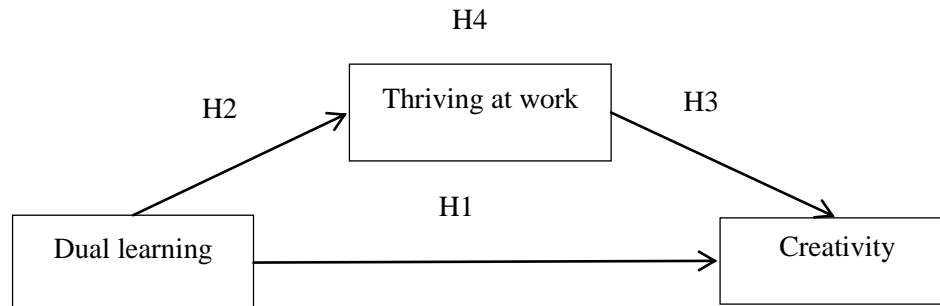


Figure 1. Research framework.

Table 1. Pearson correlation analysis table.

Variable	Dual learning	Thriving at work	Creativity
Dual learning	1		
Thriving at work	0.528***	1	
Creativity	0.714***	0.530***	1
Mean	3.412	3.828	3.373
SD	0.492	0.620	0.539

*** $P < .001$.

was used to assess the level of dual learning.

Regarding the reliability analysis, Cronbach's α for exploitative learning is 0.856, for exploratory learning is 0.773, and for overall dual learning is 0.879. In terms of Confirmatory Factor Analysis (CFA), the factor loadings of all questions range between 0.472 and 0.817. The goodness-of-fit test measures of absolute fit are as follows: $\chi^2 = 103.593$, $\chi^2/df = 3.047$, RMSEA = 0.073, GFI = 0.948, AGFI = 0.916, SRMR = 0.0386; incremental fit measures include CFI = 0.956, IFI = 0.956, NFI = 0.936; and parsimonious fit measures are PNFI = 0.707, PGFI = 0.586.

Creativity scale

The Creativity scale developed by Sue-Chan and Hempel (2016) was adopted, which is divided into two dimensions: novelty and usefulness. There were six questions for each dimension, resulting in a total of 12 questions. A 5-point Likert scale was used to assess creativity. In terms of the reliability analysis, Cronbach's α for novelty is 0.916, for usefulness is 0.857, and for overall creativity is 0.833. Regarding the confirmatory factor analysis (CFA), the factor loadings of all questions ranged from 0.612 to .851. The goodness-of-fit test measures of absolute fit were as follows: $\chi^2 = 269.535$, $\chi^2/df = 6.268$, RMSEA = .117, GFI = 0.883, AGFI = 0.821, SRMR = 0.047. The incremental fit measures included CFI = 0.921, IFI = 0.922, and NFI = .908, while the parsimonious fit measures were PNFI = 0.710 and PGFI = 0.575.

Thriving at work scale

The Thriving at Work scale is based on Porath et al. (2012) scale and consists of 11 questions. A 5-point Likert scale was used to assess the level of thriving at work. The reliability analysis showed that Cronbach's α is 0.967. In terms of confirmatory factor analysis (CFA), the factor loadings of all questions ranged from 0.687 to

0.890. The goodness-of-fit test measures of absolute fit were as follows: $\chi^2 = 338.654$, $\chi^2/df = 7.697$, RMSEA = 0.132, GFI = 0.862, AGFI = 0.793, SRMR = 0.0337. The incremental fit measures included CFI = 0.936, IFI = 0.936, and NFI = 0.927, while the parsimonious fit measures were PNFI = 0.742 and PGFI = 0.575.

RESULTS

Correlation analysis

Pearson correlation was used to analyze the relationships between the variables. As shown in Table 1, the mean values, standard deviations, and correlation coefficients indicate that the mean values of dual learning, thriving at work, and creativity are 3.412, 3.828, and 3.373, respectively. The correlations among the variables range from 0.528 to 0.714, all of which are statistically significant (Table 1). This indicates that correlations exist among the three variables, which can be further verified by examining their causal relationships.

Multiple regression analysis

To test the mediating effect of teachers' thriving at work on the relationship between dual learning and creativity, this study referred to Baron and Kenny (1986) and proposed a mediating effect test method. Additionally, the Sobel test was used to determine whether the effect

Table 2. Multiple regression analysis.

Model	Model 1 creativity		Model 2 thriving at work		Model 3 creativity	
Independent variable	Beta	t	Beta	t	Beta	t
Dual learning	0.714	20.053***	0.528	12.200***	0.602	14.847***
Mediating variable						
Thriving at work	—		—		0.212	5.236***
R ²	0.510		0.278		0.543	
Adj R ²	0.509		0.276		0.540	
ΔR ²	-		-		0.033	
F	402.106***		148.840***		228.518***	
Sobel Test	z-value		SE		p	
	4.856		0.025		0.000	

***p<0.001.

of the independent variable significantly decreased after adding the mediating variable to the model, thereby assessing the statistical significance of the mediating effect (Hayes, 2009). Thus, the Sobel test was ultimately employed to test the mediating effect.

The results in Table 2 show that in Model 1, the F value is 402.106, $p < 0.001$, indicating significance. The standardized regression coefficient for dual learning is $\beta = 0.714$ ($p < 0.001$), with $R^2 = 0.510$, suggesting that dual learning has a significant impact on creativity and can explain 51% of the variance in creativity. In Model 2, the F value is 148.840, $p < 0.001$, also reaching significance. Here, the standardized regression coefficient for dual learning is $\beta = .528$ ($p < 0.001$), with $R^2 = 0.278$, indicating that dual learning positively affects teachers' thriving at work, explaining 27.8% of the variance.

In Model 3, where dual learning and thriving at work were included simultaneously, the F value is 228.518, $p < 0.001$, confirming significance. The standardized regression coefficient for dual learning is $\beta = 0.602$ ($p < 0.001$) and for thriving at work is $\beta = 0.212$ ($p < 0.001$), with $R^2 = 0.543$. This indicates that both dual learning and thriving at work positively impact creativity, collectively explaining 54.3% of the variance. Compared with Model 1, the explained variation increased by 3.3%, and the standardized coefficient for dual learning dropped to $\beta = 0.602$.

After conducting the Sobel test, the result was $Z = 4.856$, $p < 0.001$, indicating that the effect of dual learning was significantly reduced after adding thriving at work as a mediating variable. Therefore, teachers' thriving at work mediated the relationship between dual learning and creativity, supporting the establishment of H3.

DISCUSSION

This study aimed to understand the impact of preschool teachers' dual learning on thriving at work and creativity, as well as the mediating role of thriving at work between

dual learning and creativity. The results indicated that preschool teachers' dual learning positively and significantly affects thriving at work. Additionally, dual learning also positively and significantly impacts creativity, with thriving at work serving as a mediating factor between dual learning and creativity.

Specifically, preschool teachers' dual learning can enhance both thriving at work and creativity. This suggests that when preschool teachers engage in both exploratory and exploitative learning, they can break out of conventional thinking modes; exploitative learning fosters exploration, experimentation, adaptation, and innovation (Baum, 2000; Lee, 2014; March, 1991), while exploratory learning primarily focuses on risk avoidance and adherence to established learning rules.

By combining these two learning approaches, teachers can achieve a balance that enhances their ability to thrive at work and boosts their creativity, leading to improvements in both the novelty and usefulness of their work (Lavie et al., 2010; Su et al., 2011). Moreover, preschool teachers' dual exploitative and exploratory learning can be further enhanced through thriving at work, providing them with greater opportunities to perform, allowing for free development, and facilitating the generation of new ideas and practical applications of innovative teaching methods, thereby enhancing the creativity of early childhood educators.

RECOMMENDATIONS

Based on the above conclusions, it is evident that preschool teachers' dual learning can enhance their thriving at work and creativity. Therefore, it is essential to support preschool teachers in engaging in both exploitative and exploratory learning. Schools and kindergartens should provide relevant courses to help teachers effectively integrate these two learning methods. By combining their advantages and addressing their limitations, teachers can achieve a balance that promotes

creativity in their work. Additionally, it is crucial to support preschool teachers in thriving at work, as this not only improves creativity but also mediates the relationship between dual learning and creativity. Thus, efforts should be made to help preschool teachers adapt smoothly to their work environments and boost their energy and enthusiasm.

CONFLICT OF INTERESTS

The author declares that there is no conflict of interest.

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