PERSONALIZED TRAINING'S IMPACT ON JOB PERFORMANCE: SERIAL MEDIATION OF LEARNING EFFECTIVENESS AND SKILL DEVELOPMENT

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Abstract

In today's dynamic business landscape, organizations seek strategies to enhance employee performance. This study investigates the influence of personalized training programs on job performance, focusing on the mediating roles of learning effectiveness and skill development. Data collected from 366 employees across diverse industries revealed a significant positive impact of personalized training on job performance through the serial mediation of enhanced learning effectiveness and skill development. Both direct and indirect effects contributed to job performance, underscoring the value of tailored training interventions. These findings offer valuable insights for organizations and HR professionals, suggesting that investments in personalized training can yield workforce capabilities and long-term performance benefits. Practical recommendations emphasize adaptive training strategies to meet individual learning needs. This research advocates for personalized training programs to maximize employee potential and drive organizational success.
Keywords: Personalized Training, Job Performance, Learning Effectiveness, Skill Development, Mediation Analysis

Introduction

Presently, advancements in technology have significantly influenced various areas, which include human resource development (HRD) and performance training. Competitive and rapidly changing in business environments, several organizations are aware of the importance of enhancing employee training programs to increase performance and maintain a sustainable competitive advantage. Traditional training programs had often been criticized for rigidity, inefficiency, and inability to support individual learning needs (Salas et al., 2012; Wang & Siau, 2019). In addition, each employee is more likely to have different learning preferences, levels of knowledge, and skills, so training programs should be adjustable. As a result, many organizations have adopted customized training programs that aim at adapting learning materials, approaches, and systems to meet the needs of each employee. By offering individualized, data-driven, and adaptive training programs that improve learning efficacy, skill development, and overall job performance, technological advancements in learning systems are revolutionizing workforce development (Chatterjee & Bhattacharjee, 2020; Brown & Sitzmann, 2011).

Technological advancements (e.g., machine learning or predictive analysis) can generate learning experiences that are based on employee needs and preferences to support them in achieving their performance (Dwivedi et al., 2021). While the traditional training programs emphasized a one-size-fits-all method, personalized training programs enhanced real-time feedback, automated assessment, and adaptive learning paths to improve knowledge retention and competency development (Zhou et al., 2022). The integration between technological advancement and HRD is particularly valuable in the context of continuous learning, hybrid work environments, and job performance (Zawacki-Richter et al., 2019).

Personalized training programs enhanced various approaches (e.g., competency-based training, self-directed learning modules, and adaptive learning technology) to respond to the specific learning needs of each employee (Kraiger & Ford, 2021). Previous research highlighted that personalized training programs improved job satisfaction, motivation, and employee engagement, which directed them to enhance their performance (Noe et al., 2014). In addition, Beier & Kanfer (2009) found that personalized training programs enhanced the relationship between the learning process and job roles that have an impact on the transfer of skills to the workplace. Additionally, organizations that integrate personalized training programs into employee development strategies may increase their productivity because employees are more capable and self-assured in their ability to complete jobs effectively. Personalized training programs may have several benefits, but their impact on job performance could be mediated or moderated by other factors such as learning effectiveness and skill development.

Personalized training programs are becoming more popular, and the literature still shows numerous important gaps. While previous studies showed the benefits of personalized training programs, there is limited empirical research that examines the mechanisms by which personalized training programs influence job performance. Especially, the role of serial mediating factors (e.g., learning effectiveness and skill development) in the relationship between personalized training programs and job performance still remains underexplored (Chiaburu & Lindsay, 2008; Tannenbaum et al., 2010). To address these gaps, it is necessary to develop a comprehensive understanding of how personalized training programs contribute to workforce development and organizational success.

This study aimed to examine the impact of personalized training programs on job performance, which is serially mediated by learning effectiveness and skill development. While learning effectiveness plays a role in determining how well employees apply new knowledge that they have gained from training programs (Chiaburu & Lindsay, 2008), skill development is another important component that includes gaining the interpersonal and technical abilities to apply for effective job performance (Tannenbaum et al., 2010). By investigating these relationships, this

study looks for empirical insights that will help and support organizations to maximize the return on investment in personalized training programs through strategic workforce development.

This study's findings will contribute to the existing body of knowledge by presenting a deeper understanding and comprehension of how personalized training programs affect job performance through the serial mediating factors. These insights will be valuable for HR professionals, corporate trainers, and policymakers in designing and implementing effective training programs that improve employees' performance and contribute to organizational success.

Literature Reviews

Personalized Training Program

Personalized training programs are designed to customize learning experiences to the specific employee needs, integrating personalized content, adaptive learning approaches, and individualized instructional methods (Kraiger & Ford, 2021). Personalized training programs are grounded in experiential learning theory and human capital theory, which provide a strong theoretical foundation to understand how personalized training programs influence job performance (Becker, 1964; Kolb, 1984).

Experiential learning theory suggested that individuals learned via a continuous cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Personalized training programs fit this approach by allowing individuals to participate in personalized learning experiences that fit their learning styles to enhance learning effectiveness and skill development. Additionally, human capital theory suggested that the investment in employee training and education can enhance organizational productivity and overall job performance (Becker, 1964). This framework supports the notion that personalized training programs contribute to the development of human capital and benefit organizational performance.

Empirical research supported these theoretical foundations that personalized training programs had increased intrinsic and extrinsic motivations, knowledge retention, and job performance by aligning training content to employees' individual responsibilities and career goals (Noe et al., 2014). Furthermore, Bell & Kozlowski (2008) found that the intervention of personalized training programs can significantly enhance employees' task competence, problem-solving skills, and adaptability, leading to better job performance. Empirical studies found that organizations that invested in personalized training programs found improvements in several areas, such as employee engagement, employee retention, and job satisfaction (Aguinis & Kraiger, 2009). Additionally, advancements in technology, such as machine learning, would enhance the effectiveness of personalized training programs by adjusting training content that is based on employees' needs and learning style preferences (Bersin, 2017).

Learning Effectiveness

Learning effectiveness is a significant component in determining how well individuals will be successful in applying new knowledge from training programs in their work environment (Chiaburu & Lindsay, 2008). Previous research indicated that personalized training programs improved learning effectiveness and knowledge application by responding to individual learning styles (Kolb, 2015). Additionally, Salas & Cannon-Bowers (2001) highlighted that personalized training programs, such as microlearning and scenario-based training, can improve learning retention and effectiveness. Moreover, Sitzmann et al. (2008) found that individuals who had participated in personalized training programs were more confident in their capability to apply new knowledge and skills to better perform job-related tasks and enhance job performance. Thus, previous research findings implied that learning effectiveness plays the role of a mediator between personalized training programs and job performance.

Skill Development
Skill development is another significantly mediating factor that plays a crucial role in adopting training to improve job performance. Previous research indicated that individuals who participated in a personalized training program improved hard and soft skills (Aguinis & Kraiger, 2009). In addition, personalized training programs often offer opportunities for skill development to ensure that individuals directly improve job-related roles (Beier & Kanfer, 2009). Another previous study found that individuals who took part in personalized training programs showed the results of better increasing in their leadership, communication, and problem-solving abilities, which contributed to improving their job performances (Tannenbaum et al., 2010). These previous findings suggested that skill development also plays a mediating role in the relationship between personalized training programs and job performance.

The Relationship between Learning Effectiveness and Skill Development
Learning effectiveness is deeply related to skill development, and a recent study highlighted the role of learning approaches to enhance cognitive and practical skills. Previous research showed that learning strategies such as experiential learning and project-based learning significantly enhance individuals' ability to develop long-term competencies (Biggs, 2003). A recent experimental study found that experiential learning led to high teamwork abilities and individual achievement levels, reinforcing the notion that learning effectiveness enhances collaborative and skill development (Intun, 2024).

Furthermore, skill development has been empirically related to improving productivity. In a previous study, structured training programs significantly increased participants' productivity, demonstrating that skill development contributed to professional and performance outcomes (Haleem et al., 2023). Similarly, the past study examined the integration of technology-enabled project-based learning, which the results showed that these approaches significantly enhanced individual motivation and skill development (Misra et al., 2024).

Conceptual Framework and Research Hypotheses
Based on the above theoretical and empirical foundations, this study proposes a conceptual framework that shows personalized training programs influence job performance via the serial mediating roles of learning effectiveness and skill development. The proposed framework is supported by experiential learning theory and human capital theory, which explain how personalized learning experiences and investments in individual development contribute to better job performance. Based on the above reasoning and empirical evidence, the author proposes that

Hypothesis 1: Personalized training programs will be positively related to job performance.

Hypothesis 2: Learning effectiveness will positively mediate the relationship between personalized training programs and job performance.

Hypothesis 3: Skill development will positively mediate the relationship between personalized training programs and job performance.

Hypothesis 4: Learning effectiveness and skill development will be serially positive and mediate the relationship between the personalized training program and job performance.

By integrating theoretical perspectives and empirical evidence, this study aims to provide a comprehensive understanding of the mechanisms by which personalized training programs impact job performance. These insights will contribute to academic and practical implications in organizational training and development strategies.
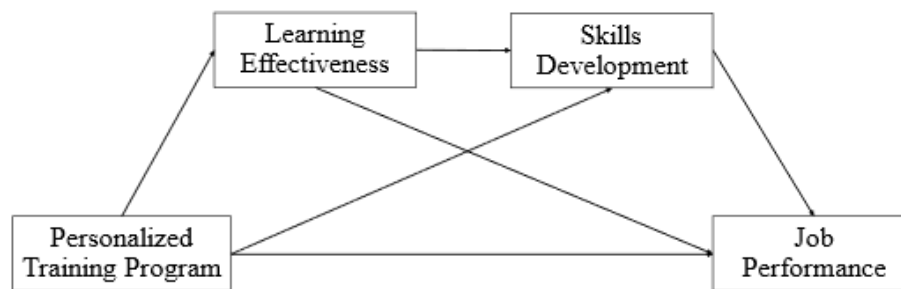
Figure 1 Conceptual Model

Research Methodology

Sample and Data Collection

To test these hypotheses, the author collected data from employees who are working at leading private organizations in Songkhla province and participated in personalized training programs. These respondents were selected because they had firsthand experience with the training to make them suitable for evaluating its impact on learning effectiveness, skill development, and job performance. The inclusion criteria required respondents to be employees who were actively engaged in at least one personalized training program that was arranged by their organization. The exclusion criteria included employees who had never participated in personalized training programs to ensure that only relevant experiences were analyzed. Due to the unknown population size, this study followed Hair et al.'s (2020) sample size guideline, which suggested a minimum of 200-400 participants for statistical analysis. Furthermore, this study also defined the recommended ratio of 15 respondents per observed variable. The number of observed variables was 21, meaning the sample size could be 315 respondents. The author collected 366 respondents, which exceeded the sample size guideline, reaching a ratio of 17 respondents per observed variable.

A non-probability sampling method (convenience sampling) was employed. This method was chosen because of the accessibility of participants who met the study's inclusion criteria and the feasibility of data collection within the given timeframe and resources. The data was collected through an online survey, which was facilitated by authorized individuals in the target organizations. The survey was conducted over a specified period to ensure a sufficient response rate. Participants were asked to complete the survey voluntarily to ensure confidentiality and anonymity. This study adopted a cross-sectional design. It aimed to assess the relationships between personalized training programs, learning effectiveness, skill development, and job performance at a single point in time. This design was appropriate to capture correlational data and identify potential associations between variables.

The majority of respondents were female (64.5%). Most were 20-40 years old (96.7%). Most graduated with a bachelor's degree (94.5%). The majority were single (90.7%). Most respondents were involved in or participated in personalized training programs five times or more per year (31.2%).

Measurement

All measurements were based on Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). Personalized training programs were measured by using 4 items adapted from Matolić et al. (2023). Learning effectiveness was assessed by applying 5 items adapted from Bloom (1956), Kirkpatrick & Kirkpatrick (2006), Ryan & Deci (2000), Daft & Lengel (1986), and Hackman & Oldham (1976). Skill development was measured by using 8 items adapted from Noe & Schmitt (1986) and Holton III (1996). Job performance was assessed by applying 4 items adapted from Ramos-Villagrasa et al. (2019).

Analytic Procedures
First, the author conducted a bivariate correlation and tested the reliability and discriminant validity. Discriminant validity was measured by correlation (r), and reliability was measured by Cronbach's Alpha (α). Next, the author tested the hypothesized model by applying Hayes' Process Macro and using Hayes' PROCESS Model 6 to test direct and indirect effects. Finally, all analyses were measured using SPSS version 23.

Research Findings

Bivariate Correlations
From Table 1, the results of bivariate correlations indicated that personalized training programs were positively correlated with learning effectiveness ($r = .65$, $p < .01$), skill development ($r = .57$, $p < .01$), and job performance ($r = .55$, $p < .01$). Furthermore, learning effectiveness was positively correlated with skill development ($r = .67$, $p < .01$) and job performance ($r = .62$, $p < .01$). Finally, skill development was positively correlated with job performance ($r = .53$, $p < .01$). The bivariate correlations among these variables fell within an acceptable range ($r < .70$), multicollinearity was not likely to be a problem. Cronbach's Alpha estimated the reliability; all values were acceptable ($\alpha < .80$).

Table 1 Bivariate Correlation, Mean, Standard Deviation, and Reliabilities

	Mean	SD	1	2	3	4
1) Personalized Training Program	4.17	.68	(.84)			
2) Learning Effectiveness	4.16	.60	.65**	(.86)		
3) Skill Development	3.87	.67	.57**	.67**	(.91)	
4) Job Performance	4.25	.66	.55**	.62**	.53**	(.84)

Note: n = 366; ** $p < .01$; Value in the parentheses are Cronbach's alphas.

Mediation Model
As shown in Table 2 (Model 1), the results indicated that the personalized training program ($b = .58***$, $p < .001$) had a significant positive impact on learning effectiveness. In Model 2, the results found that the personalized training program ($b = .23***$, $p < .001$) and learning effectiveness ($b = .57***$, $p < .001$) were significantly positively related to skill development. Finally, personalized training programs ($b = .21***$, $p < .001$), learning effectiveness ($b = .41***$, $p < .001$), and skill development ($b = .15**$, $p < .01$) had a significant positive impact on job performance in Model 3.

Table 2 Mediation Results

	Model 1 Learning Effectiveness			Model 2 Skill Development			Model 3 Job Performance		
	b	SE	p	b	SE	p	b	SE	p
Constant	1.74***	.14	.00	.50**	.18	.00	1.01***	.19	.00
Main Variables									
Personalized Training Program	.58***	.03	.00	.23***	.04	.00	.21***	.05	.00
Learning Effectiveness	-	-	-	.57***	.05	.00	.41***	.06	.00
Skill Development	-	-	-	-	-	-	.15**	.05	.00
F-Test	279.51***			169.94***			95.22***		
R-Square	.43			.48			.44		

Note: n = 366; *** $p < .001$, ** $p < .01$, * $p < .05$

Direct and Indirect Effects

Table 3 Direct Effect

	Direct Effect			Bootstrap (95%)	
	Effect	*SE*	*P value*	*BootLLCI*	*BootULCI*
Job Performance	.21	.05	.00	.11	.31

Note: LLCI means Lower Limit Confident Interval; ULCI means Upper Limit Confident Interval

This study assessed the serial mediation of learning effectiveness and skill development, serially mediating the relationship between the personalized training program and job performance. The results revealed a significant indirect effect of the personalized training program on job performance through learning effectiveness and skill development (Effect = .05, SE = .01, 95% CI = [.01, .09]). Furthermore, the results indicated that a significant indirect effect of the personalized training program on job performance is through learning effectiveness (Effect = .24, SE = .04, 95% CI = [.15, .33]) and skill development (Effect = .03, SE = .01, 95% CI = [.00, .07]) as the single mediation. Furthermore, the direct effect of the personalized training program on job performance in the presence of the mediators was also found to be significant (Effect = .21, SE = .05, p < .00, 95% CI = [.11, .68]). Not surprisingly, this can explain why individuals who were involved or participated in a personalized training program could have better job performance. Hence, there was the partial serial mediation of learning effectiveness and skill development on the relationship between the personalized training program and job performance, and all hypotheses were supported.

Table 4 Indirect Effect

	Indirect Effect		Bootstrap (95%)	
	Effect	*BootSE*	*BootLLCI*	*BootULCI*
PTP -> LE -> JP	.24	.04	.15	.33
PTP -> SD -> JP	.03	.01	.00	.07
PTP -> LE -> SD -> JP	.05	.01	.01	.09
Total	**.32**	**.04**	**.24**	**.42**

Note: LLCI means Lower Limit Confidence Interval; ULCI means Upper Limit Confidence Interval; PTP is Personalized Training Program; LE is Learning Effectiveness; SD is Skill Development; JP is Job Performance

Conclusion and Discussion

This research highlighted the key point of personalized training programs to increase individuals' job performance via the serial mediating mechanisms of learning effectiveness and skill development. First, personalized training programs significantly enhanced and directly improved individual performance. This means that individuals who often participate in training programs (especially personalized training programs) always perform their job better than individuals who do not participate or are not interested in training programs. It is related to a previous study that found that employees who actively engage in self-directed learning within the framework of personal development plans demonstrate improved job performance (Lejeune et al., 2021). Also, the result of the direct effect was aligned with previous studies that focused on the importance of tailored learning experiences to enhance workforce capabilities (Aguinis & Kraiger, 2009; Salas et al., 2012).

Next, the findings found that learning effectiveness and skill development also played a single mediating role as a key mechanism. Although personalized training programs may directly impact job performance, they also indirectly impact it via mediators, which are learning

effectiveness and skill development. Learning effectiveness refers to the extent to which training programs facilitate acquiring and retaining knowledge and skills. Personalized training aligns learning content with individual employee needs, enhancing engagement and comprehension. This tailored approach ensures that employees can effectively apply new knowledge to their roles, improving job performance. For instance, adaptive learning technologies that customize training experiences have been shown to boost employee performance by addressing specific learning gaps and preferences (Kriegel, 2025). Skill development involves acquiring new competencies or enhancing existing ones to perform job tasks more effectively. Personalized training programs focus on the specific skill requirements of employees, facilitating targeted development that directly impacts job performance. By addressing individual skill gaps, these programs enable employees to perform their duties more efficiently and with greater proficiency. For example, organizations leveraging AI tools to create personalized training materials have observed improvements in workforce capabilities and retention rates (Khalaf, 2024). Research has demonstrated that the relationship between training programs and job performance is often mediated by learning effectiveness and skill development factors. A study examining the role of training motivation found that effective training content, instructor roles, and supervisor support positively influenced training motivation, which enhanced job performance (Zainol et al., 2015). This suggests that personalized training programs that enhance learning effectiveness and skill development can improve job performance through these mediating factors.

Finally, this study also found that learning effectiveness and skill development significantly played serial mediating roles between personalized training and job performance. This finding was similar to a previous study that emphasized the importance of personalized training to enhance job performance through improved learning effectiveness and skill development. Personalized training enhanced the learning experience to fit individuals' needs by contributing to engagement and facilitating skill acquisition. This approach emphasized specific knowledge gaps and competency development, which was important in rapidly evolving industries (Kriegel, 2025). Moreover, effective training programs were related to increased job satisfaction and motivation, significantly contributing to improved job performance (Ullah & Asghar, 2024). To customize training programs to fit individuals' needs, organizations can cultivate a more proficient and satisfied workforce, which can ultimately lead to improved organizational outcomes.

Theoretical Implications

This study supported human capital theory (Becker, 1964), which proposed that investments in an individual's training can enhance and improve individual performance and productivity. Personalized training programs could support more skill development by addressing individual learning needs. So, reinforcing the assertion that focused training interventions help to develop job-related competencies (Noe et al., 2014). Moreover, the results still supported experiential learning theory (Kolb, 1984), emphasizing the importance of learning by experience, reflection, and active participation. Similarly, supporting the social cognitive theory (Bandura, 1986), the findings highlighted the role experienced learning and self-efficacy played in improving skills and job performance. Thus, this study expanded these theoretical perspectives by empirically proving that skill development and learning effectiveness were essential serial mediators that provided complex knowledge and how training programs can convert into better performances and productivity.

Practical Implications

From the author's standpoint, organizations should prioritize the appropriate training for each individual to maximize learning results and skill development. To consider the influences on job performance, organizations should design training modules adaptable to each individual's learning styles and needs, which advancements in technologies such as digital platforms, data-

driven approaches, and machine learning can contribute to personalized training content (Tannenbaum & Yukl, 1992). Additionally, HR professionals should prioritize continuous learning and development to maintain long-term performance improvement. Also, these results can be applied by policymakers in workplace development to promote training policies to facilitate employee-centered learning interventions to ensure sustainable professional growth.

Limitations

This study had several limitations to consider. First, the study sample was from private organizations in one province, which may limit the generalizability. Second, the data were cross-sectional, and they cannot show conclusive evidence of the long-term effect. A longitudinal research design would be applied in the future research to provide more confidence about the causality of the variables. Finally, the future research would be conducted to more explore organizational policies and practices in training programs for improving their employees.

In sum, this study's findings supported and emphasized the value of personalized training programs as strategic instruments to enhance workforce and individual performance. Organizations can build a more competent and high-performance workforce by acknowledging and taking advantage of the mediation role of learning effectiveness and skill development.

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