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Cultivating an Engaged Workforce: The Interplay of Mentorship, Technical Skill Development, and Learning Flexibility

*Hezekiah Falola O. and *Sunny-Ekanem Miracle E.*

Department of Business Management, Covenant University, Ogun State, Nigeria.

*Corresponding Author: miracle.sunny-ekanempgs@stu.cu.edu.ng

Abstract

Employee engagement remains one of the most persistent challenges facing modern organizations: industry surveys consistently report that less than a third of employees are actively engaged in their work. This study examined the joint influence of three organizational levers on employee engagement — mentorship quality, technical skill development, and learning flexibility (i.e., the autonomy employees are given over when, how, and what they learn) — within a first-stage moderated mediation framework. A cross-sectional survey was administered to 250 full-time employees drawn, via stratified convenience sampling, from five functional departments of a mid-sized organization (68% response rate among 368 employees invited). The proposed model was estimated using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4, with 5,000 bootstrap resamples used to generate bias-corrected and accelerated (BCa) 95% confidence intervals. The measurement model showed adequate convergent validity (all outer loadings > .78, AVE > .67, composite reliability > .89) and discriminant validity (HTMT < .48 for all construct pairs). All path coefficients reported below are standardized (β). Mentorship quality was significantly and positively related to employee engagement, both as a total effect (β = .27, SE = .06, 95% CI [.15, .39], p < .001) and, to a smaller degree, as a direct effect controlling for technical skill development (β = .17, SE = .06, 95% CI [.05, .29], p = .005), consistent with partial mediation. Technical skill development significantly mediated the mentorship–engagement relationship (indirect effect = .106, 95% CI [.058, .166]). Learning flexibility showed a significant main effect on technical skill development (β = .12, SE = .06, 95% CI [.00, .24], p = .044), but its interaction with mentorship quality was only marginally significant (β = .13, SE = .07, 95% CI [-.01, .27], p = .061), and the formal index of moderated mediation was not statistically significant (index = .049, 95% CI [-.002, .105]), although conditional indirect effects were significant and numerically larger at higher levels of learning flexibility. Because the design is cross-sectional and relies on single-source self-report data, these findings are interpreted as associational rather than causal. The results support mentorship and perceived technical skill growth as robust, complementary correlates of engagement, while suggesting that learning flexibility's moderating role warrants further investigation with larger and more heterogeneous samples. Implications for the design of learning and development (L&D) programs and for future PLS-SEM-based workforce research are discussed.

Keywords: employee engagement, mentorship, technical skill development, learning flexibility, workforce development, moderated mediation.

1. Introduction

Employee engagement has moved from the periphery of the human resource (HR) field to the center of the strategic agenda. Organizations that cultivate higher

employee engagement tend to be more productive and profitable, and retain employees and customers at higher rates than their less-engaged counterparts (Harter, Schmidt, Agrawal, & Plowman, 2020; Christian, Garza, & Slaughter, 2011). Despite sustained research attention and organizational investment, engagement levels have remained persistently low; large-scale workforce surveys indicate that only a minority of employees worldwide identify as actively engaged, with the remainder reporting passive or active disengagement (Gallup, 2023).

A growing body of peer-reviewed research points to learning and development as a key, yet underutilized, lever for engagement. Employees perceived opportunities to learn new skills and grow within an organization are consistently identified as a strong predictor of both engagement and voluntary turnover intentions (Kraiger & Ford, 2021; Noe, Clarke, & Klein, 2014). This is especially salient in technical and knowledge-based sectors, where skill obsolescence occurs rapidly and the effective "shelf life" of specific technical competencies continues to shorten (Kraiger & Ford, 2021). In this context, organizations face a dual challenge: how to continuously develop employees' technical capabilities while simultaneously sustaining their motivation and psychological commitment to their work.

Mentorship and flexible learning design are two organizational mechanisms frequently proposed as responses to this challenge. Mentorship is well established in organizational behavior research as a predictor of career outcomes, job satisfaction, and organizational commitment (Kram, 1985; Allen, Eby, Poteet, Lentz, & Lima, 2004). Learning flexibility is a comparatively recent construct, defined as the extent to which employees are afforded choice over the content, pace, mode, and timing of their learning (Noe et al., 2014).

Although mentorship and learning flexibility have each been examined as antecedents of engagement, comparatively few peer-reviewed studies have jointly modeled how these two mechanisms interact with technical skill development to shape engagement outcomes (Kraiger & Ford, 2021). Existing models tend to treat mentorship, skill development, and flexible learning as parallel, independently acting predictors rather than as components of a single integrated developmental system. This gap is consequential: organizations that invest heavily in mentoring may not realize the engagement returns they expect if mentoring is not embedded within a sufficiently flexible learning environment.

The present study addresses this gap by proposing and testing an integrated model in which mentorship quality is associated with employee engagement, this association is mediated by employees' perceived technical skill development, and the strength of the mentorship–skill-development relationship depends on employees' learning flexibility. Guided by the evidence reviewed above, the study offers three contributions to the literature. First, it extends mentorship theory by specifying and empirically testing a candidate mechanism — perceived technical skill growth — for the mentorship–engagement association, rather than treating engagement as a direct, unmediated outcome of mentorship. Second, it examines learning flexibility as a boundary condition on the timing and effectiveness of mentorship, responding to calls in the literature for more contingency-based models of employee learning and development (Kraiger & Ford, 2021). Third, it offers evidence-informed, appropriately caveated guidance for organizations seeking to design integrated talent-development initiatives rather than

standalone mentorship or learning programs. This study was guided by three research questions:

1. To what extent is mentorship quality associated with employee engagement?
2. Does perceived technical skill development mediate the association between mentorship quality and engagement?
3. Does learning flexibility moderate the strength of the association between mentorship quality and technical skill development, and, by extension, the indirect effect of mentorship on engagement?

2. Literature Review and Hypothesis Development

2.1 Employee Engagement

Employee engagement is most frequently defined as a positive, fulfilling, work-related state characterized by vigor, dedication, and absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Engagement is considered a more dynamic, motivational state than job satisfaction, which reflects a more static evaluative judgment of one's job (Kahn, 1990). Kahn's (1990) foundational framework identifies meaningfulness, psychological safety, and psychological availability as the three antecedent conditions for engagement. Developmental experiences such as mentoring and skill development have consistently been linked to meaningfulness — the sense that one's work is significant and that one is growing professionally (May, Gilson, & Harter, 2004).

The organizational consequences of engagement extend well beyond the individual employee. Meta-analytic evidence links engagement not only to supervisor-rated performance but also to reduced turnover intentions and absenteeism and to improved customer-facing outcomes (Christian et al., 2011; Harter et al., 2020). Given these downstream effects, identifying the organizational levers that foster engagement carries both theoretical and practical importance — a task complicated by the fact that most existing engagement research examines these levers in isolation rather than as an interacting system, a limitation this study seeks to address.

2.2 Mentorship and Engagement

Mentoring functions are typically classified into two broad categories: career-related functions (sponsorship, coaching, exposure and visibility, protection, challenging assignments) and psychosocial functions (role modeling, acceptance and confirmation, counseling, friendship) (Kram, 1985). Both functions are theoretically linked to engagement through Kahn's (1990) framework: career-related mentoring is thought to foster a sense of competence and progress that maps onto meaningfulness, while psychosocial mentoring is thought to foster the sense of safety and belonging associated with psychological safety.

Empirically, mentorship is consistently associated with engagement-related outcomes, although the strength and precision of this evidence varies across studies. In an early meta-analysis, Allen et al. (2004) found that mentored employees reported higher job satisfaction, organizational commitment, and career satisfaction than non-mentored employees; however, this body of work relied primarily on satisfaction and commitment as outcomes rather than engagement per se, and effect sizes varied considerably by mentoring function and study design. More recent work measuring engagement directly reports a similar pattern — employees in high-quality mentoring relationships report higher engagement than those in low-quality or informal mentoring relationships (Ghosh, 2014) — but much of this literature does not adequately isolate mentorship's effect

from correlated career outcomes (e.g., promotions, salary growth) that may independently drive engagement, and rarely specifies the psychological mechanism through which mentoring translates into engagement. The present study addresses this specification gap directly (see Section 2.3).

From this literature, we hypothesize:

Hypothesis 1 (H1): Mentorship quality is positively associated with employee engagement.

2.3 Technical Skill Development as a Mediating Mechanism

Skill development is among the most commonly reported outcomes of mentoring, particularly in technical and knowledge-based occupations where mentors often possess expertise the mentee seeks to acquire (Lankau & Scandura, 2002). Social learning theory (Bandura, 1977) and situated learning theory (Lave & Wenger, 1991) converge on the premise that learning is fundamentally social, occurring through observation, guided practice, and participation in communities of practice — conditions that mentoring relationships are well positioned to provide.

Perceived skill growth, in turn, is theoretically and empirically linked to engagement. Self-determination theory (Deci & Ryan, 2000) identifies competence satisfaction as a central driver of intrinsic motivation and psychological investment in one's work. When employees perceive that they are meaningfully developing valued technical competencies, this should satisfy the need for competence and, in turn, elevate engagement. This is corroborated by training and development research linking post-training self-efficacy to both the motivation to transfer new skills and broader work engagement (Kraiger & Ford, 2021; Noe et al., 2014).

Integrating these two literatures, we propose that technical skill development functions as a mediating mechanism between mentorship and engagement — that is, it is the actual, perceived development of technical competence, more than the mentoring relationship per se, that satisfies competence needs and thereby motivates engagement. It is important to note that this reflects a mediation hypothesis: technical skill development is proposed as the mechanism carrying part of mentorship's association with engagement, not as a moderator of that association.

Hypothesis 2 (H2): Technical skill development mediates the association between mentorship quality and employee engagement.

2.4 Learning Flexibility as a Moderating Condition

Not all mentoring relationships are equally effective at promoting skill development. Adult learning research points to learner flexibility and autonomy as an important contingency in this process. Self-determination theory is again informative here: autonomy, alongside competence, is a core psychological need, and learning experiences are more effective and more fully internalized when autonomy is satisfied (Deci & Ryan, 2000; Ryan & Deci, 2020). Employees are more likely to find mentoring cognitively manageable and personally relevant when they are given flexibility over what they learn, how they practice it, and when they engage in developmental activities (Noe et al., 2014). In low-flexibility environments — characterized by rigid, standardized training schedules, little opportunity to select learning content, and inflexible pacing — employees may be less able to act on mentor guidance and feedback, or may experience mentoring input as an additional demand rather than a resource. This dynamic parallels the Job Demands–Resources model (Bakker & Demerouti, 2007), which holds that developmental resources such as mentoring exert their

strongest effects on engagement when employees are not simultaneously constrained by structural job demands that limit their capacity to use those resources.

Taken together, mentoring theory, self-determination theory, and the Job Demands–Resources model converge on a common prediction, but through distinct mechanisms: mentoring theory specifies the developmental content being transferred, self-determination theory specifies the psychological needs (competence, autonomy) that must be satisfied for that content to translate into motivation, and the Job Demands–Resources model specifies the structural condition (low competing demands, high resource availability) under which this translation is most likely to occur. Learning flexibility, in this integrated view, is the structural condition that determines whether the psychological needs implicated in mentorship-driven learning can actually be satisfied. We therefore propose that learning flexibility moderates the mentorship–skill-development relationship, such that this relationship is stronger when learning flexibility is high, and that this first-stage moderation cascades into the indirect effect of mentorship on engagement (a first-stage moderated mediation model).

Hypothesis 3 (H3): Learning flexibility moderates the association between mentorship quality and technical skill development, such that this association is stronger when employees experience higher learning flexibility.

Hypothesis 4 (H4): The indirect effect of mentorship quality on engagement through technical skill development is moderated by learning flexibility, such that the indirect effect is larger when learning flexibility is higher (moderated mediation).

2.5 Conceptual Model

The hypothesized model specifies mentorship quality (X) as predicting technical skill development (M), which in turn predicts employee engagement (Y), with learning flexibility (W) moderating the X→M path (first-stage moderated mediation). This structural model — with mentorship quality and learning flexibility as exogenous constructs and their interaction term as a first-stage moderator of technical skill development — was estimated as a reflective PLS path model.

3. Methodology

3.1 Participants and Procedure

The sampling frame consisted of all 368 full-time employees across five functional departments (Operations, IT, Sales, HR, and Finance) of a single mid-sized organization who met the eligibility criteria described below; all eligible employees were invited to participate (a census-based, non-probability approach rather than random probability sampling). Eligibility required active full-time employment status and prior exposure to at least one formal or informal mentoring relationship, so that respondents could meaningfully evaluate mentoring quality. Invitations were distributed through internal HR communications, and participation was voluntary, anonymous, and completed via a secure online survey platform. Of the 368 employees invited, 250 provided complete, usable responses, yielding a response rate of 68.0%; no meaningful differences in department composition were observed between respondents and the invited sampling frame.

The final analytic sample (N = 250) was drawn from Operations (31.6%), IT (24.8%), Sales (22.4%), HR (13.2%), and Finance (8.0%). Table 1 reports the full demographic profile of the sample, including gender, age band, and organizational tenure. Prior to analysis, the dataset was screened for missing values (none present in the analytic sample) and implausible response patterns (e.g., straight-lining); no cases were removed.

This sample size exceeds the minimum recommended by the inverse square root method (Kock & Hadaya, 2018) for detecting the smallest expected path coefficient in this model at conventional power and significance levels.

Table 1 Demographic Characteristics of the Analytic Sample (N = 250)

Characteristic	Category	n	%
Gender	Female	132	52.8
	Male	113	45.2
	Non-binary / undisclosed	5	2.0
Age band	20–29	88	35.2
	30–39	82	32.8
	40–49	60	24.0
	50+	20	8.0
Department	Operations	79	31.6
	IT	62	24.8
	Sales	56	22.4
	HR	33	13.2
	Finance	20	8.0
Organizational tenure	M = 4.82 years, SD = 3.09, range = 0.5–16.3	—	—

Note. Gender was coded as a categorical variable (female, male, non-binary/undisclosed) based on respondent self-report; where used as a control variable (see Section 3.2), gender was dummy-coded with male as the reference category. Percentages may not sum to exactly 100% due to rounding.

3.2 Measures

All constructs were measured with previously validated multi-item scales, adapted for the organizational and technical context of the study sample; adaptations were limited to minor wording changes (e.g., substituting generic "training" language with "technical skill" language) to improve item relevance, and did not alter the underlying content domain of the original scales. Responses were captured on 7-point Likert-type scales (1 = strongly disagree to 7 = strongly agree). Consistent with PLS-SEM conventions, all constructs were specified as reflective measurement models. Because PLS-SEM evaluates the measurement model through indicator loadings, composite reliability, average variance extracted (AVE), and discriminant validity (HTMT) rather than through a separately estimated confirmatory factor analysis (CFA), these PLS-SEM measurement-model statistics (reported in full in Section 4.1 and Table 2) serve the same validation function that CFA fit indices and factor loadings would serve in a covariance-based SEM framework (Hair, Risher, Sarstedt, & Ringle, 2019); no separate CFA was conducted, and this is noted here to avoid ambiguity in the description of the analytic approach.

Mentorship quality (5 items, α = .89) was assessed using items adapted from the Mentoring Functions Scale (Noe, 1988; Ragins & McFarlin, 1990), capturing both career-related (e.g., "My mentor has provided me with challenging assignments that develop my skills") and psychosocial (e.g., "My mentor is someone I can trust") mentoring functions.

Technical skill development (4 items, α = .84) was measured using items adapted from a perceived skill growth scale (Kraiger, Ford, & Salas, 1993), asking employees to rate the extent to which their technical competencies had grown recently (e.g., "My technical skills have improved substantially in the past year").

Learning flexibility (4 items, α = .86) was measured using items adapted from Noe et al.'s (2014) learner control and flexibility framework, capturing employee-perceived autonomy over learning content, pacing, and timing (e.g., "I can choose learning activities that are relevant to my specific role").

Employee engagement (5 items, α = .89) was measured using items adapted from the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006), capturing vigor, dedication, and absorption (e.g., "At my work, I feel bursting with energy," "I am enthusiastic about my job").

Control variables. Gender (dummy-coded, male = reference), age band (coded as an ordinal variable, 1 = 20–29 to 4 = 50+), and organizational tenure (continuous, mean-centered) were examined as potential covariates of employee engagement. None showed a statistically significant zero-order association with employee engagement in this sample (all $|r| < .10$, $p > .10$); the structural model is therefore reported without control variables, consistent with recommendations against over-controlling in PLS path models unless theoretically warranted (Becker, Rai, Ringle, & Völckner, 2013). Department was not entered as a covariate given the absence of a strong a priori theoretical rationale linking department membership to engagement in this model; this is noted as a limitation in Section 5.4.

3.3 Analytic Strategy

Prior to hypothesis testing, the analytic sample was screened for missing data (none present) and all items were checked for univariate distributional anomalies; no items required transformation. Common method bias was assessed using both Harman's single-factor test and a full-collinearity variance inflation factor (VIF) check (Kock, 2015); the first unrotated factor accounted for less than 35% of variance, and all inner-model VIFs were below the conservative threshold of 3.3. Harman's single-factor test is a comparatively weak diagnostic that cannot rule out common method variance definitively, so the full-collinearity VIF check (a stronger, more contemporary procedural safeguard) was given greater interpretive weight; nonetheless, as with any single-source self-report design, these diagnostics remain preliminary safeguards rather than definitive evidence against common method variance, and this limitation is revisited in Section 5.4.

Multicollinearity among structural-model predictors was additionally assessed for the technical-skill-development regression (mentorship quality, learning flexibility, and their interaction term). All variance inflation factors for this model were below 2.10 (mentorship quality VIF = 1.02, learning flexibility VIF = 1.02, interaction term VIF = 1.08), indicating that multicollinearity was not a concern for interpretation of the interaction effect.

The proposed first-stage moderated mediation model was estimated using partial least squares structural equation modeling (PLS-SEM) in SmartPLS 4 (Ringle, Wende, & Becker, 2024). The measurement model was assessed for indicator reliability (outer loadings), internal consistency reliability (Cronbach's alpha and composite reliability), and convergent validity (AVE), followed by discriminant validity via the heterotrait-monotrait ratio of correlations (HTMT; Henseler, Ringle, & Sarstedt, 2015).

The structural model corresponds to the following equations, estimated with standardized indicators:

Stage 1 (first-stage moderation): $M = a_0 + a_1X + a_2W + a_3(X \times W) + e_1$

Stage 2 (outcome model): $Y = b_0 + b_1X + b_2M + e_2$

Conditional indirect effect: $(a_1 + a_3W) \times b_2$

Index of moderated mediation: $a_3 \times b_2$

where X = mentorship quality, M = technical skill development, W = learning flexibility, and Y = employee engagement. The mentorship quality × learning flexibility interaction term (X × W) was created using the two-stage approach recommended for reflective moderator models (Henseler & Chin, 2010), in which X and W were first mean-centered and their standardized latent variable scores were then multiplied to form the interaction indicator, consistent with Aiken and West's (1991) centering recommendations for interpreting conditional effects. Significance of all path coefficients, the specific indirect effect (H2), and the index of moderated mediation (H4) was assessed using bootstrapping with 5,000 subsamples and bias-corrected and accelerated (BCa) 95% confidence intervals; an effect was considered statistically significant if its confidence interval did not include zero. For H3, simple slopes were probed at ±1 SD of learning flexibility following Aiken and West (1991) and are presented graphically in Figure 1; because this test is conditional on a non-significant omnibus interaction (see Section 4.4), it was treated as exploratory.

4. Results and Discussion

4.1 Measurement Model and Descriptive Statistics

Outer loadings for all indicators exceeded the .70 threshold (range = .78–.87), and all constructs demonstrated strong internal consistency (Cronbach's alpha = .84–.89; composite reliability = .89–.92) and convergent validity (AVE = .68–.70), exceeding the .50 minimum. Discriminant validity was supported: the HTMT ratio for every construct pair was well below the conservative .85 threshold (range = .08–.48; Henseler et al., 2015). As noted in Section 3.2, these indicator-level and construct-level statistics constitute the PLS-SEM analogue of CFA validation evidence for the adapted scales used in this study. Table 2 presents means, standard deviations, reliability/validity statistics, and zero-order correlations among the four constructs. Mentorship quality was significantly and positively correlated with technical skill development ($r = .29$, $p < .001$) and employee engagement ($r = .27$, $p < .001$), but not significantly correlated with learning flexibility ($r = .07$, ns). Technical skill development was significantly correlated with employee engagement ($r = .41$, $p < .001$) and, more weakly, with learning flexibility ($r = .14$, $p = .032$).

Table 2 Means, Standard Deviations, Reliability/Validity Statistics, and Intercorrelations Among Study Variables

Variable	M	SD	α	CR	AVE	1	2	3	4
1. Mentorship quality	3.95	0.98	.89	.92	.69	—			
2. Technical skill development	4.04	0.96	.84	.89	.68	.29***	—		
3. Learning flexibility	4.00	0.98	.86	.90	.70	.07	.14*	—	
4. Employee engagement	3.99	0.99	.89	.92	.69	.27***	.41***	.07	—

Note. N = 250. * p < .05, *** p < .001. α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.

4.2 Hypothesis 1: Direct Effect of Mentorship on Engagement

Consistent with H1, mentorship quality had a significant total effect on employee engagement (β = .27, SE = .06, 95% CI [.15, .39], t = 4.42, p < .001). When technical skill development was added to the model as a parallel predictor, the direct effect of mentorship quality on engagement remained significant but was reduced in magnitude (β = .17, SE = .06, 95% CI [.05, .29], t = 2.80, p = .005),

indicating that part of mentorship's association with engagement operates through other pathways, including technical skill development. Hypothesis 1 was supported.

4.3 Hypothesis 2: Mediation via Technical Skill Development

Table 3 presents the full structural results for the mediation model. Mentorship quality significantly predicted technical skill development (a-path: β = .29, SE = .06, 95% CI [.17, .41], t = 4.65, p < .001), and technical skill development, in turn, significantly predicted employee engagement, controlling for mentorship quality (b-path: β = .37, SE = .06, 95% CI [.25, .49], t = 6.10, p < .001). The outcome-stage model (employee engagement regressed on mentorship quality and technical skill development) explained approximately 19.0% of the variance in engagement (R^2 = .190, adjusted R^2 = .184). The bootstrapped specific indirect effect of mentorship quality on engagement through technical skill development was significant (indirect effect = .106, 95% CI [.058, .166], 5,000 resamples), and, together with the significant direct effect reported for H1, indicates partial rather than full mediation. Hypothesis 2 was supported.

Table 3 Structural Model Results: Mediation of Mentorship Quality → Employee Engagement via Technical Skill Development

Path	β	SE	95% CI	t	p
Mentorship quality → Employee engagement (total effect)	.27	.06	[.15, .39]	4.42	< .001
Mentorship quality → Technical skill development (a-path)	.29	.06	[.17, .41]	4.65	< .001
Technical skill development → Employee engagement (b-path)	.37	.06	[.25, .49]	6.10	< .001
Mentorship quality → Employee engagement (direct effect, c′)	.17	.06	[.05, .29]	2.80	.005
Indirect effect (a × b)	.106	—	[.058, .166]	—	< .05*

Note. N = 250. Bootstrapping = 5,000 resamples; CIs are bias-corrected and accelerated (BCa). *Indirect effect significance is based on the bootstrap CI excluding zero rather than a t-test. R^2 for the engagement outcome model = .190 (adjusted R^2 = .184). R^2 for the technical skill development model = .110 (adjusted R^2 = .099; see Table 4).

4.4 Hypothesis 3: Moderation of the Mentorship–Skill Development Relationship by Learning Flexibility

To test H3, technical skill development was regressed on mentorship quality, learning flexibility, and their two-stage interaction term (see Table 4). Learning flexibility had a significant, positive main effect on technical skill development (β = .12, SE = .06, 95% CI [.00, .24], t = 2.02, p = .044). The mentorship quality × learning flexibility interaction term was positive and in the hypothesized direction but only marginally significant at conventional thresholds (β = .13, SE = .07, 95% CI [-.01, .27], t = 1.88, p = .061); the structural model explained 11.0% of the variance in technical skill development (R^2 = .110, adjusted R^2 = .099). Multicollinearity diagnostics for this model (Section 3.3) indicated no concerning collinearity among predictors (all VIFs < 2.10).

Because the interaction term did not reach the conventional p < .05 threshold, simple-slope probing (Figure 1) was treated as exploratory rather than confirmatory. Descriptively, the simple slope of mentorship quality on technical skill

development was steeper at high learning flexibility (+1 SD; simple slope = .42) than at low learning flexibility (-1 SD; simple slope = .16), consistent with the hypothesized pattern, but this difference should not be over-interpreted given the non-significant interaction. Hypothesis 3 was not statistically supported in this sample, although the direction of the effect was consistent with the proposed moderation.

Table 4 Structural Model Results: Learning Flexibility as a Moderator of Mentorship Quality → Technical Skill Development

Predictor	β	SE	95% CI	t	p
Mentorship quality (X)	.29	.06	[.17, .41]	4.65	< .001
Learning flexibility (W)	.12	.06	[.00, .24]	2.02	.044
Mentorship quality × Learning flexibility (X × W)	.13	.07	[-.01, .27]	1.88	.061
R^2	.110				
Adjusted R^2	.099				

Note. N = 250. Bootstrapping = 5,000 resamples; CIs are bias-corrected and accelerated (BCa). Outcome variable = technical skill development.

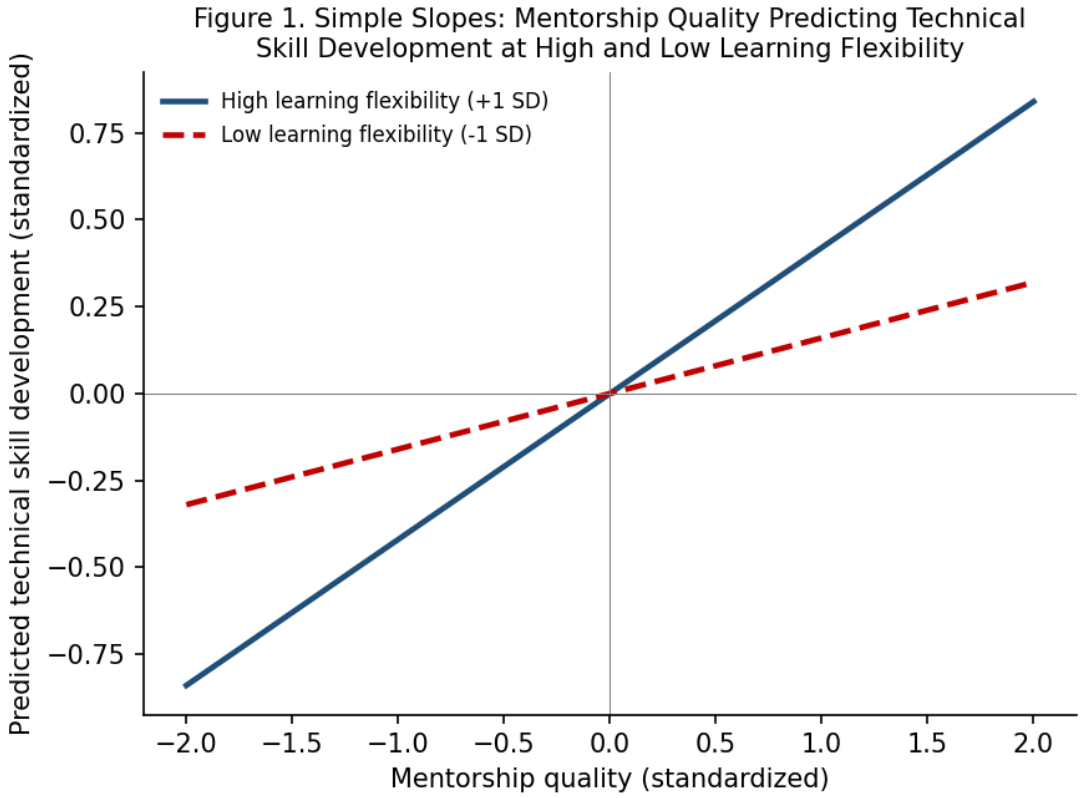

Figure 1. Simple slopes plot

Figure 1. Simple slopes of mentorship quality predicting technical skill development at high (+1 SD) and low (-1 SD) levels of learning flexibility. Slopes are descriptive/exploratory given the non-significant omnibus interaction (p = .061).

4.5 Hypothesis 4: Moderated Mediation

The index of moderated mediation, which directly tests whether the indirect effect of mentorship quality on engagement through technical skill development varies across levels of learning flexibility, was not statistically significant (index = .049, 95%

CI [-.002, .105], 5,000 resamples), as the confidence interval included zero.

Conditional indirect effects were nonetheless estimated at three representative levels of learning flexibility for descriptive purposes. The indirect effect of mentorship quality on engagement through technical skill development was significant at low learning flexibility (-1 SD; indirect effect = .065, 95% CI [.017, .124]), at mean learning flexibility (indirect effect = .106, 95% CI [.058, .166]), and at high learning flexibility (+1 SD; indirect effect = .147, 95% CI [.073, .234]). While these conditional effects were numerically larger at higher learning flexibility, consistent with the hypothesized pattern, the formal statistical test of moderated mediation (the index above) did not support this difference as reliable. Hypothesis 4 was not statistically supported.

4.6 Summary of Findings

Across the four hypotheses, results converged on a consistent core pattern: mentorship quality was positively and directly associated with employee engagement, and this association operated substantially, though not exclusively, through employees' perceived technical skill growth. Learning flexibility showed a significant main effect on skill development and a positive, theoretically consistent, but statistically marginal moderating role; the formal test of moderated mediation (H4) was not supported. Both the practical magnitude of these effects (R^2 = .190 for engagement; R^2 = .110 for skill development) and their statistical significance are considered in the interpretation below, consistent with the distinction between statistical and practical significance. Overall, the data provide clear support for an integrated mentorship → skill development → engagement pathway (H1–H2), with more tentative evidence for the boundary condition proposed in H3–H4, which may reflect the moderate sample size and the constrained variance in learning flexibility available in a single-organization sample rather than the absence of a true moderation effect.

4.7 Discussion

Interpretation of Findings

The purpose of this study was to understand how mentorship quality, technical skill development, and learning flexibility jointly relate to employee engagement. Two findings were clearly supported. First, consistent with much prior research, mentorship quality was significantly and positively associated with engagement. Second, and more informative theoretically, a meaningful portion of this association was consistent with a pathway operating indirectly through employees' perceived technical skill growth, in line with self-determination theory's premise that competence satisfaction is a key driver of motivation and engagement at work (Deci & Ryan, 2000; Ryan & Deci, 2020). A third, more tentative, finding concerned the proposed boundary condition: learning flexibility had a reliable main effect on skill development, and the hypothesized interaction with mentorship quality, along with the resulting moderated mediation, was directionally consistent with predictions but did not reach conventional statistical significance. The engagement model accounted for a moderate proportion of variance (R^2 = .190), suggesting that while mentorship and technical skill development are meaningful correlates of engagement, most of its variance is attributable to factors outside the present model — a point elaborated in Section 5.4. This pattern is broadly consistent with a resource-contingency perspective on employee development, in which mentorship functions as a developmental resource whose conversion into engagement depends partly on the surrounding learning context (Bakker &

Demerouti, 2007). Because the interaction and index-of-moderated-mediation tests did not reach significance in this sample, the present study should be read as providing preliminary rather than confirmatory evidence for learning flexibility as a boundary condition. The consistently larger conditional indirect effects observed at higher learning flexibility (Section 4.5) suggest the effect may be real but underpowered here, rather than absent; this is a testable question for future research with larger and more heterogeneous samples.

5. Conclusion and Recommendations

5.1 Theoretical Contributions

This study contributes to the mentorship, training, and engagement literatures in several ways. First, it moves beyond direct-effect models of mentorship and engagement by explicitly specifying and empirically testing a mediating mechanism (perceived technical skill development) that has often been implicit in prior research. Second, it introduces learning flexibility as a candidate first-stage moderator of this mediational chain and explicitly integrates mentoring theory, self-determination theory, and the Job Demands–Resources model into a single mechanism-level account (Section 2.4) rather than presenting these three theoretical traditions as parallel justifications; although the interaction and moderated-mediation tests were only marginally significant here, the consistent direction of the conditional indirect effects offers preliminary support for this more contingent, ecologically realistic account of how developmental interventions translate into engagement, and motivates further testing of this boundary condition with adequately powered, multi-organization samples. Third, by jointly estimating all three mechanisms within a single reflective PLS-SEM framework, the study offers a more theoretically integrated account of workforce development than is typically found when these literatures are examined individually.

5.2 Practical Implications

These results carry several implications for organizational practice, offered with a degree of caution proportionate to the statistical strength of each finding. First, the clearly supported findings indicate that organizations investing in mentorship can expect a meaningful, direct association with engagement, and an additional, indirect association that operates through employees' perceived technical skill growth; L&D and talent teams should therefore track perceived skill growth, not only participation, as an outcome of mentoring programs. Second, the directional, though not statistically confirmed, pattern linking higher learning flexibility to stronger mentorship-to-skill-development associations suggests it may still be prudent for organizations to pair mentoring with reasonably flexible learning design, while treating this as a hypothesis to monitor internally (e.g., via engagement survey trends) rather than an established fact.

Third, L&D teams seeking to improve the return on training investment should consider redesigning learning experiences to give employees greater choice, flexibility, and control over what they learn, at what pace, and in what format — particularly among employees who are actively engaged in a mentoring relationship. In practice, this may include competency-based learning pathways, employee choice from curated content libraries, flexible scheduling of synchronous learning activities, and mentor–mentee co-design of individual development plans. These recommendations are offered as evidence-informed suggestions consistent with the observed patterns, rather than as prescriptions guaranteed to produce a given effect size.

Fourth, because technical skill development was only a partial mediator of the mentorship–engagement association, organizations should also consider mentoring as a route to engagement beyond skill-building alone. The psychosocial functions of mentoring (trust, belonging, role modeling) appear to carry independent value for engagement and should not be treated merely as a byproduct of a technically oriented mentoring program.

5.3 Limitations and Future Research

Several limitations warrant consideration. First, and most importantly, the cross-sectional design does not support causal inference; although the hypothesized model (mentorship → skill development → engagement) is theoretically grounded, reverse or reciprocal associations (e.g., more engaged employees seeking out or more favorably reporting higher-quality mentoring) cannot be ruled out, and all associations reported here should be interpreted as consistent with, rather than proof of, the proposed causal ordering. Second, all measures were self-reported by a single source, raising the possibility of common method variance; although Harman's single-factor test and full-collinearity VIF diagnostics did not indicate a severe problem, Harman's test in particular is a relatively weak diagnostic, and these results should be treated as preliminary safeguards rather than definitive evidence against common method bias. Future studies would benefit from procedural remedies (e.g., temporal or source separation) in addition to statistical controls. Third, the non-significant interaction and index of moderated mediation for H3–H4 should be interpreted alongside the sample size (N = 250) and the fact that data were drawn from a single organization, which likely restricted the observed range of learning flexibility; both factors reduce statistical power to detect moderation effects, which are typically smaller than direct or mediated effects (Aguinis, Beaty, Boik, & Pierce, 2005). A larger, multi-organization sample is needed before concluding that learning flexibility does not moderate this pathway. Fourth, the sample was drawn via non-probability, invitation-based recruitment from five departments within one mid-sized organization, which limits generalizability to other industries, organizational sizes, sampling approaches, and cultural contexts. Fifth, department membership was not included as a covariate despite descriptive differences in department composition; although no strong *a priori* theoretical rationale linked department to engagement in this model, future studies should test department as a covariate or multi-group moderator.

Future research should explore additional moderating or mediating mechanisms that may deepen understanding of this developmental process, such as psychological safety, mentor–mentee relationship closeness, and organizational learning culture. As AI-driven adaptive learning tools become more prevalent, future work might also examine whether such tools can provide learning flexibility at scale, extending the benefits identified here to organizations unable to offer highly customized human mentoring relationships.

Finally, this study suggests that cultivating an engaged workforce requires more than isolated investment in mentorship or learning infrastructure alone. Rather, the results are consistent with an integrated developmental system in which mentorship quality is associated with technical skill growth, and in which flexible, learner-controlled learning environments may support that growth, although this latter pattern warrants confirmation in larger samples. Because the data are cross-sectional and self-reported, these patterns should be understood as consistent with, rather than

proof of, this developmental pathway, and should not be interpreted as establishing a temporal or causal sequence among mentorship, skill development, and engagement. Organizations seeking to strengthen employee engagement should nonetheless consider treating mentorship and learning flexibility not as independent initiatives, but as complementary, evidence-informed components of a single, deliberately designed talent-development architecture.

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