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Assessment Mechanisms as Drivers of University Teachers' Digital Teaching Competence in the Context of Digital Transformation

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Abstract: In the context of the digital era and ongoing reforms in higher education, how to cultivate and enhance university teachers' digital teaching competence has become a prominent topic among scholars. Accordingly, this study examined the relationships between university assessment mechanisms and teachers' digital teaching competence based on 422 valid questionnaires. The results indicate that instructional assessment, research assessment, administrative assessment, and qualification assessment all exert positive effects on teachers' digital teaching competence. Social support moderates the negative relationship between work stress and digital teaching competence, and further moderates the mediating role of work stress in the relationships between the four dimensions of assessment mechanism rationality and digital teaching competence. The findings provide insights and recommendations for optimizing assessment mechanisms and promoting the modern professional development of university teachers.

Keywords: Assessment mechanisms; Digital teaching competence; Work stress; Social support

1. Introduction

The rapid advancement of new-generation digital technologies—represented by cloud computing, big data, the Internet of Things, and artificial intelligence—has accelerated the arrival of the digital economy era. In response, higher education has been compelled to undertake corresponding adjustments and reforms to align with the demands of the new era (Cahyono et al., 2024). In October 2020, the central committee of the Communist Party of China (CPC) and the State Council issued the Overall Plan for Deepening the Reform of Education Evaluation in the New Era, which designated digital-era educational transformation as a strategic task essential for advancing educational modernization. By early 2025, many universities had already initiated exploratory practices in educational digitalization and achieved preliminary progress. However, for teachers, the challenge of effectively integrating digital technologies and resources, innovating instructional models, and improving instructional quality remains central to the success of educational digitalization.

The enhancement of university teachers' digital teaching competence is influenced by various internal and external factors, including instructional support and individual motivation, while assessment mechanisms play a particularly critical role. As a core component of organizational human resource management, assessment mechanisms directly affect remuneration and career advancement and exert substantial psychological and behavioral influence on teachers. Well-designed assessment mechanisms have the potential to strengthen motivation, encourage teachers to enhance their knowledge base, and cultivate higher levels of professional competence, ultimately fostering improvements in instructional performance. From the perspective of work stress theory, rational assessment mechanisms can maintain work-related stress at an adaptive level, thereby motivating teachers to manage challenges effectively and to achieve optimal performance outcomes.

However, current assessment mechanisms in Chinese universities are widely criticized for their disproportionate

emphasis on research publications, academic titles, degrees, and awards. Excessive research pressure, limited pathways for professional advancement, and substantial teaching workloads have been identified as major obstacles that teachers must confront. Such irrationalities significantly weaken teachers' motivation to enhance their digital teaching competence. The pressing challenge for higher education institutions, therefore, lies in designing scientifically robust and equitable assessment mechanisms that accommodate individual differences among teachers and in establishing effective incentive structures that promote the development of digital teaching competence and support improvements in instructional quality and talent cultivation.

Current research in China on digital teaching competence remains in an early developmental stage and has primarily focused on influencing factors (Zhang, 2023a), competence evaluation (Claro et al., 2018), and current developmental conditions (Chen et al., 2021). Studies on assessment mechanisms have largely been normative in nature, emphasizing the importance of establishing appropriate assessment systems while giving limited attention to whether, and through which pathways, such mechanisms shape teachers' digital teaching competence. In response to this gap, survey data were systematically collected and analyzed to examine, from the perspective of work stress, the mechanisms through which university assessment mechanisms affect digital teaching competence. The findings demonstrate that the rationality of assessment mechanisms is positively associated with digital teaching competence; that work stress constitutes a principal pathway through which assessment mechanisms exert their influence; and that social support attenuates the negative association between work stress and digital teaching competence.

This study offers several potential contributions. First, drawing on the Information and Communication Technology (ICT) in education assessment framework and the approaches of Zhang (2023b) and Wu et al. (2025), a scale for assessing the rationality of university assessment mechanisms was developed, representing a pioneering effort to quantify assessment rationality in a standardized manner. Second, by situating the research within the current landscape of instructional reform, the transmission mechanism connecting assessment mechanisms to digital teaching competence was empirically identified, with work stress serving as a mediating factor and social support serving as a moderating factor. This analytical framework extends the application boundaries of work stress theory and social support theory. Third, previous studies on assessment mechanisms have predominantly examined indicator systems or assessment models; in contrast, this study adopts the perspective of assessment recipients, offering deeper insight into how assessment mechanisms influence the development of digital teaching competence. Such an approach is expected to contribute to the refinement of assessment mechanisms and to support ongoing efforts to advance instructional reform in Chinese higher education.

2. Research Theories and Hypotheses

2.1 Assessment Mechanisms and University Teachers' Digital Teaching Competence

Digital teaching competence refers to the ways in which teachers employ digital technologies in digitalized environments to conduct instructional activities and complete teaching tasks, as well as the personal capabilities required to carry out such activities effectively (Chen et al., 2021). This competence can be further divided into several dimensions, including competence in the application of digital technologies, competence in designing, implementing, and evaluating digitalized instruction, and competence in integrating digital technologies with curricular content (Claro et al., 2018). Digital literacy functions as an intrinsic component of instructional competence, enabling teachers to meet the demands of a digital society and supporting their autonomous professional development. Nevertheless, challenges persist within university teaching staffs, including weak digital awareness, narrow and fragmented use of digital instructional approaches, and insufficient levels of digital knowledge and literacy (Ng et al., 2023).

The primary purpose of organizational performance assessment is to evaluate and facilitate employee development. For university teachers, assessment mechanisms are closely linked to remuneration, professional title evaluation, and career advancement, operating as a principal instrument that shapes motivation. The rationality of university assessment mechanisms refers to the extent to which such mechanisms are goal-appropriate and comply with developmental principles. In essence, the rationality of assessment mechanisms is determined by the extent to which they conform to the patterns of teacher development and fulfill the objective of promoting such development. From this perspective, rational assessment mechanisms are posited to exert a positive effect on the enhancement of digital teaching competence. This relationship can be explained through goal-setting theory, which posits that the highest performance is achieved when goals are both challenging and specific. Under scientifically designed assessment mechanisms, salary improvement, career advancement, and other extrinsic incentives are more likely to be internalized as personal objectives, thereby encouraging teachers to strengthen their digital teaching competence.

However, due to limited institutional experience, assessment indicators and assessment models in many universities remain suboptimal, often producing effects contrary to their intended purposes. First, many universities have established detailed and heavily weighted assessment criteria for research outputs in professional

title evaluation, while criteria for teaching performance remain minimal, often limited to instructional workload requirements and the absence of teaching incidents. This imbalance—characterized by prioritizing research over teaching—has hindered shifts in teacher roles and impeded the development of digital teaching competence (She et al., 2025). Second, most universities in China lack clear regulations for part-time employment, and such practices are widespread. Although part-time work may generate mutually beneficial outcomes, teachers commonly experience role conflict and diminished energy due to multiple responsibilities, severely constraining the vitality and creativity required for digital teaching. Lastly, many universities have insufficient assessment mechanisms concerning personal planning, professional ethics, and other qualification-related attributes, thereby neglecting teachers' individual developmental needs. From the perspective of goal orientation, such mechanisms fail to promote personal development and thus fall short of value rationality. Although some universities have begun to emphasize qualification-related assessment, these assessments are often abstract and qualitative, lacking quantifiable indicators. Consequently, assessment outcomes fail to reflect actual qualification levels, undermining teachers' professional development and competence enhancement.

As assessment mechanisms for university teachers have evolved—from early-stage evaluations focused on political performance, work accomplishments, and professional competence to contemporary systems that incorporate widely recognized dimensions such as academic achievement, instructional competence, personal development, and organizational engagement (Trixa & Kaspar, 2024)—the content of assessment has been progressively expanded and refined. This evolution has compensated for the limitations of earlier quality evaluations and performance assessments, while simultaneously imposing higher expectations on university teachers' digital teaching competence. Building on the preceding analysis and the findings of Zhang (2023b) and other scholars, the rationality of assessment mechanisms can be understood as comprising four principal dimensions: the rationality of instructional, research, administrative, and qualification assessment. Accordingly, the following hypotheses were proposed:

H1a: Rationality in instructional assessment is positively associated with university teachers' digital teaching competence.

H1b: Rationality in research assessment is positively associated with university teachers' digital teaching competence.

H1c: Rationality in administrative assessment is positively associated with university teachers' digital teaching competence.

H1d: Rationality in qualification assessment is positively associated with university teachers' digital teaching competence.

2.2 Mediating Role of Work Stress

Work stress is conceptualized as a complex psychological and behavioral response process arising from the interaction between workplace conditions and individual characteristics. Teachers' work stress refers to the unpleasant emotional states—such as anxiety, frustration, and irritability—perceived under environmental stimuli and generated by work-related demands. It has been defined as pressure imposed on teachers by their working environment and can also be described through the states and response patterns manifested by teachers (Yan & Liu, 2025).

Assessment constitutes a major source of work stress, while institutional arrangements serve as crucial mechanisms for safeguarding employee rights and sustaining motivation. The rationality of assessment mechanisms directly shapes the level of work stress experienced by teachers. The development of assessment systems in Chinese universities began relatively late, and early-stage models typically relied on simplified competitive evaluations that neglected teachers' capacity to withstand pressure, thereby increasing occupational strain. With the implementation of the "Double First-Class" initiative, competition among universities has intensified, prompting stricter assessment practices and substantially elevating teachers' work stress. Among these pressures, competitive institutional arrangements have become a critical stressor (Vermote et al., 2023). Based on these considerations, the following hypotheses were proposed:

H2a: Rationality in instructional assessment is negatively associated with university teachers' work stress.

H2b: Rationality in research assessment is negatively associated with university teachers' work stress.

H2c: Rationality in administrative assessment is negatively associated with university teachers' work stress.

H2d: Rationality in qualification assessment is negatively associated with university teachers' work stress.

As competition among universities in China has intensified, most university teachers have been subjected to prolonged and excessive work stress, often experiencing heightened levels of negative and anxious emotions. Empirical evidence has shown that such teachers exhibit significantly higher levels of anxiety and depression than employees in other sectors, resulting in adverse physiological and psychological consequences (Yan & Liu, 2025). According to stress theory, excessive occupational stress leads to professional burnout, which subsequently suppresses the development of professional competence and ultimately impedes the improvement of instructional quality.

H3: Work stress exerts a negative effect on the enhancement of university teachers' digital teaching competence.

Taken together, these considerations suggest that irrational assessment mechanisms generate excessive work stress, diminish teachers' enthusiasm for their work, and ultimately hinder the development of digital teaching competence. In contrast, rational assessment mechanisms impose moderate levels of stress that are conducive to motivating teachers and enhancing their digital teaching competence. Based on this argument, the following hypotheses were proposed:

H4a: Work stress mediates the positive relationship between rationality in instructional assessment and university teachers' digital teaching competence.

H4b: Work stress mediates the positive relationship between rationality in research assessment and university teachers' digital teaching competence.

H4c: Work stress mediates the positive relationship between rationality in administrative assessment and university teachers' digital teaching competence.

H4d: Work stress mediates the positive relationship between rationality in qualification assessment and university teachers' digital teaching competence.

2.3 Moderating Role of Social Support

Social support refers to the emotional or material assistance provided to individuals within a given social system. Within the job demands–resources model, social support is conceptualized as an essential job resource that not only directly reduces distress and enhances well-being but also mitigates the impact of job demands and stressors on employees. The deep integration of digital technologies with classroom instruction represents a long-term systemic undertaking requiring substantial investments of time and effort. Teachers are therefore prone to experiencing professional burnout, particularly under conditions of heightened work stress. According to social support theory, assessment mechanisms that reflect teachers' legitimate needs and concerns increase their perceived social support (Yang & Xu, 2024), which in turn helps alleviate burnout and strengthens motivation to engage in digital teaching training and the transfer of training. Based on these theoretical foundations, the following hypothesis was proposed:

H5: Social support moderates the negative association between work stress and university teachers' digital teaching competence.

Building on the earlier analysis, rationality in assessment mechanisms (instructional, research, administrative, and qualification assessment) enhances digital teaching competence by reducing work stress, while social support weakens the negative association between work stress and digital teaching competence. It is therefore inferred that higher levels of social support are associated with lower levels of work stress and stronger digital teaching competence. This indicates that social support moderates the entire mediating mechanism linking assessment mechanism rationality, work stress, and digital teaching competence. Accordingly, the moderated mediation hypothesis was proposed as follows:

H6a: Social support positively moderates the mediating effect of work stress in the relationship between rationality in instructional assessment and digital teaching competence.

H6b: Social support positively moderates the mediating effect of work stress in the relationship between rationality in research assessment and digital teaching competence.

H6c: Social support positively moderates the mediating effect of work stress in the relationship between rationality in administrative assessment and digital teaching competence.

H6d: Social support positively moderates the mediating effect of work stress in the relationship between rationality in qualification assessment and digital teaching competence.

Based on the preceding analysis, a theoretical model was constructed to illustrate the mechanism through which the rationality of assessment mechanisms influences university teachers' digital teaching competence (Figure 1).

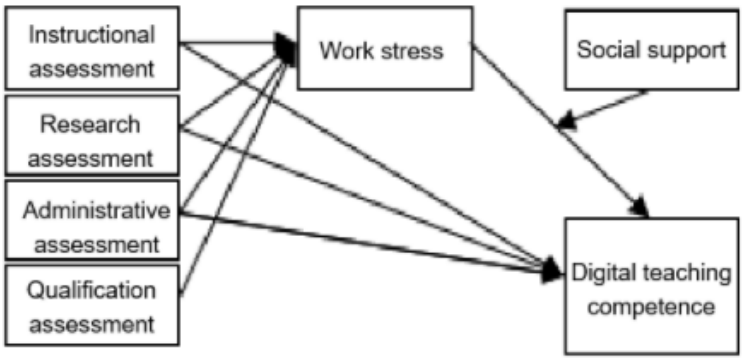

Figure 1. Theoretical model

3. Research Design

3.1 Data Collection

This study examined the influence of the rationality of assessment mechanisms on university teachers' digital teaching competence; therefore, the sample was restricted to teachers employed in regular higher education institutions. Data were collected from May to October 2024. Questionnaires were distributed via email addresses identified through published academic articles listing university faculty contact information. In consideration of the developmental landscape of Chinese higher education institutions, universities from all regions were included in the sampling frame. To ensure representativeness, no more than 5–10 questionnaires were collected from each institution. A total of 800 teachers from more than 100 universities—including Central South University, Hunan University, Tongji University, Chongqing University, and Zhengzhou University—were invited to participate. In total, 453 questionnaires were returned, yielding a response rate of 56.6%. After validity screening, 422 questionnaires were retained for analysis, resulting in an effective rate of 52.7%.

3.2 Research Instruments

Based on factors influencing university teachers' digital teaching competence and the conditions of higher education institutions, eight demographic variables—gender, age, educational background, professional title, years of teaching experience, institution, marital status, and parental status—were included as basic information. To ensure reliability and validity, all scales used in this study—other than demographic items—were adapted from established instruments developed in prior domestic and international research. Semi-structured interviews with scholars and experts in the relevant field were conducted to refine scale items and revise content as necessary, thereby ensuring sound content validity. Four variables were measured in this study: rationality of assessment mechanisms, work stress, social support, and digital teaching competence. The social support scale employed a subscale scoring method with a total score of 40 points, whereas the other scales adopted a five-point Likert format, with scores ranging from 1 to 5.

(a) Assessment mechanism rationality scale: Assessment mechanism rationality was conceptualized for the first time in this study, reflecting the extent to which assessment practices align with teachers' academic development, instructional competence, and personal growth. To ensure accurate measurement, the scale was developed with reference to the approaches of Trixa & Kaspar (2024), Zhang (2023b), and other relevant scholars. The final instrument included 14 items across four dimensions: instructional assessment, research assessment, administrative assessment, and qualification assessment. Exploratory Factor Analysis (EFA) was conducted on the secondary dimensions of the questionnaire. Factor loadings ranged from 0.636 to 0.821 (all exceeding the 0.50 threshold). Results demonstrated that the rationality of assessment mechanisms could be extracted into four subdimensions corresponding to instructional, research, administrative, and qualification assessment. Reliability analysis yielded a Cronbach's α of 0.902. Confirmatory Factor Analysis (CFA) showed good model fit, with chi-square/degrees of freedom (χ^2/df) = 1.807, Comparative Fit Index (CFI) = 0.942, Tucker–Lewis Index (TLI) = 0.943, Incremental Fit Index (IFI) = 0.933, and Root Mean Square Error of Approximation (RMSEA) = 0.068.

(b) Work stress scale: The work stress scale was adapted from the teacher stress inventory developed by Kyriacou (1987), with modifications reflecting stressors characteristic of the digital era. The instrument consisted of 18 items covering four dimensions: job security, workload, workplace relationships, and work state. Reliability analysis produced a Cronbach's α of 0.906. The CFA results again indicated acceptable model fit (χ^2/df = 2.14, CFI = 0.921, TLI = 0.923, IFI = 0.911, RMSEA = 0.077).

(c) Social support scale: The social support scale was adapted from the social support rating scale originally developed by Xiao in 1986. The instrument included 10 items across three dimensions: objective support, subjective support, and utilization of social support. Reliability analysis produced a Cronbach's α of 0.894. CFA demonstrated good model fit (χ^2/df = 2.05, CFI = 0.913, TLI = 0.906, IFI = 0.915, RMSEA = 0.076).

(d) Digital teaching competence: Digital teaching competence was measured based on the definition proposed by Bolaños et al. (2023) and the operationalization used by Claro et al. (2018). Three dimensions were included: competence in digital instructional design, competence in digital instructional implementation, and competence in digital academic assessment. A total of 15 items were developed.

Because digital teaching competence was conceptualized as a new construct in this study, EFA was conducted on its secondary dimensions. The Kaiser–Meyer–Olkin (KMO) value was 0.891 (> 0.70), and Bartlett's test of sphericity was significant ($p < 0.001$). Principal component analysis was employed, and factor loadings ranged from 0.596 to 0.818 (all > 0.50). The results confirmed that items loaded onto three subdimensions: digital instructional design competence, digital instructional implementation competence, and digital academic assessment competence. Reliability analysis yielded a Cronbach's α of 0.885. The CFA results indicated an acceptable model fit (χ^2/df = 2.442, NFI = 0.892, TLI = 0.901, CFI = 0.904, RMSEA = 0.079).

3.4 Common Method Bias Testing

Because the rationality of assessment mechanisms, work stress, social support, and digital teaching competence were all evaluated through self-reported responses provided by university teachers, the possibility of common method bias required examination. During data collection, procedural controls were implemented, including anonymous participation and multi-regional sampling, to mitigate potential bias.

Following data collection, Harman's single-factor test was first conducted to assess common method bias. An EFA was performed to examine the explanatory power of the first unrotated factor across the four variables (rationality of assessment mechanisms, work stress, social support, and digital teaching competence). The results indicated that the first factor accounted for 19.14% of the variance, well below the commonly accepted threshold of 40%. A CFA was then conducted by constraining all items to load onto a single latent factor. The model demonstrated an acceptable fit ($\chi^2/df = 2.613$, RMSEA = 0.047, NFI = 0.906, TLI = 0.901, CFI = 0.921). These results indicate that no substantial common method bias was present in the data.

4. Data Analysis

4.1 Correlation Analysis and Descriptive Statistics

As shown in Table 1, all dimensions of assessment mechanism rationality exhibit significant positive correlations with digital teaching competence, providing preliminary support for hypotheses H1a–H1d. Significant negative correlations are observed between each dimension of assessment mechanism rationality and work stress, offering preliminary support for hypotheses H2a–H2d. In addition, the correlation coefficient between work stress and digital teaching competence is -0.411, indicating that higher levels of work stress are associated with lower levels of digital teaching competence. This result provides initial support for hypothesis H3.

Table 1. Descriptive statistics and correlation matrix of main variables ($N = 422$)

	Instructional Assessment	Research Assessment	Administrative Assessment	Qualification Assessment	Work Stress	Social Support	Digital Teaching Competence
Instructional assessment	1						
Research assessment	0.521***	1					
Administrative assessment	0.606***	0.652***	1				
Qualification assessment	0.593***	0.697***	0.705***	1			
Work stress	-0.416***	-0.527***	-0.306***	-0.435***	1		
Social support	-0.226**	-0.174**	-0.246**	-0.301**	-0.185**	1	
Digital teaching competence	0.503***	0.486***	0.502***	0.421***	-0.411***	0.508***	1
Mean	3.352	3.266	3.612	3.205	3.318	3.248	3.059
Variance	0.602	0.631	0.647	0.646	0.647	0.705	0.525

Note: * indicates $p < 0.1$; ** indicates $p < 0.05$; and *** indicates $p < 0.01$; the same applies below.

4.2 Hypothesis Testing

4.2.1 Main effect testing

To examine the effects of the rationality of each dimension of assessment mechanisms on digital teaching competence and work stress, multiple regression analyses were conducted with digital teaching competence and work stress as dependent variables, respectively. The results are presented in Table 2.

In the first set of analyses, digital teaching competence was treated as the dependent variable. Models (5) – (8) examined the effects of the four subdimensions of assessment mechanism rationality. Significant positive associations were observed across all dimensions ($p < 0.01$). Among them, the rationality of instructional assessment exhibited the strongest positive effect ($\beta = 0.422$), whereas the rationality of qualification assessment showed the weakest—though still significant—positive effect ($\beta = 0.318$). These results provide further support for hypotheses H1a–H1d.

In the second set of analyses, work stress was treated as the dependent variable. Models (1) – (4) assessed the impact of the four subdimensions of assessment mechanism rationality on work stress. Significant negative relationships were found for all dimensions ($p < 0.01$). The rationality of research assessment demonstrated the

strongest negative effect (β = -0.485), while the rationality of administrative assessment showed the weakest negative effect (β = -0.244). These findings provide further confirmation of hypotheses H2a–H2d.

4.2.2 Mediation effect testing

Model (1) first examined the effect of work stress on digital teaching competence. The results indicated a significant negative association (β = -0.309, $p < 0.01$), providing support for hypothesis H3. Combined with the results of models (1)–(4) in Table 2, the findings suggest that the rationality of assessment mechanisms may enhance digital teaching competence by reducing work stress.

Subsequently, models (2)–(5) tested the mediating effect of work stress in the positive relationships between the four subdimensions of assessment mechanism rationality and digital teaching competence. Compared with models (5)–(8) in Table 2, the adjusted R²values in models (2)–(5) in Table 3 increased by 0.072, 0.122, 0.023, and 0.082, respectively, after the inclusion of work stress. Meanwhile, the coefficients associated with the four subdimensions of assessment mechanism rationality decreased by 0.110, 0.071, 0.199, and 0.039, respectively. These results indicate that work stress plays a partial mediating role in the relationships between each dimension of assessment mechanism rationality and digital teaching competence, thereby providing support for hypotheses H4a–H4d.

Table 2. Results of main effect testing

Variable	Work Stress				Digital Teaching Competence			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Instructional assessment	-0.382***				0.422***			
Research assessment		-0.485***				0.395***		
Administrative assessment			-0.244**				0.401***	
Qualification assessment				-0.412***				0.318***
Control variables	Controlled							
Adjusted R^2	0.489	0.475	0.472	0.420	0.285	0.239	0.308	0.264
F	72.629***	86.633***	61.875***	77.422***	18.432***	17.339***	18.127***	15.672***
N	422	422	422	422	422	422	422	422

Table 3. Results of mediation effect testing

Variable	Digital Teaching Competence				
	(1)	(2)	(3)	(4)	(5)
Instructional assessment		0.312***			
Research assessment			0.324***		
Administrative assessment				0.202**	
Qualification assessment					0.279***
Work stress	-0.309***	-0.152**	-0.162**	-0.138**	-0.114**
Control variables			Controlled		
Adjusted R^2	0.212	0.357	0.361	0.331	0.346
F	35.629***	16.865***	19.853***	16.274***	16.618***
N	422	422	422	422	422

Table 4. Results of moderation effect testing

Variable	Digital Teaching Competence		
	(1)	(2)	(3)
Work stress	-0.309***		-0.274***
Social support		0.433***	0.313***
Work stress × social support			0.164**
Control variables	Controlled	Controlled	Controlled
Adjusted R^2	0.212	0.182	0.202
F	35.629***	26.453***	18.722***
N	422	422	422

4.2.3 Moderation effect testing

To examine the moderating role of social support in the relationship between work stress and digital teaching competence, work stress, social support, and their interaction term were sequentially included in regression models in which digital teaching competence served as the dependent variable. The results are presented in Table 4. Model (3) shows that the interaction term between work stress and social support is significantly positive ($\beta = 0.164$, $p < 0.05$), in contrast to the negative main effect of work stress ($\beta = -0.274$, $p < 0.01$). This finding indicates that higher levels of social support effectively buffer the negative impact of work stress on digital teaching competence. Accordingly, hypothesis H5 is supported.

4.2.4 Moderated mediation effect testing

To examine the presence of moderated mediation effects, the indirect effects of each dimension of assessment mechanism rationality on digital teaching competence through work stress were calculated under different levels of social support (one standard deviation above and below the mean). The 95% confidence intervals for these conditional indirect effects are presented in Table 5. Across all dimensions and at both levels of social support, the confidence intervals did not include zero, indicating that the indirect effects were significant. These results demonstrate the existence of moderated mediation effects, thereby supporting hypotheses H6a–H6d.

Table 5. Results of moderated mediation effect testing

Path: Instructional assessment → Work stress → Digital teaching competence				
Moderator	Level	Effect	Standard error	95% confidence interval
Social support	M-SD	0.0278	0.0406	(0.0512, 0.1056)
	M+SD	0.1306	0.037	(0.0987, 0.2439)
Path: Research assessment →Work stress → Digital teaching competence				
Social support	M-SD	0.0181	0.0415	(0.0191, 0.1809)
	M+SD	0.1149	0.0402	(0.0408, 0.2008)
Path: Administrative assessment →Work stress → Digital teaching competence				
Social support	M-SD	0.0143	0.0372	(0.0362, 0.0742)
	M+SD	0.1075	0.0485	(0.0687, 0.1975)
Path: Qualification assessment →Work stress → Digital teaching competence				
Social support	M-SD	0.0678	0.0456	(0.0464, 0.1018)
	M+SD	0.1674	0.0297	(0.0884, 0.2395)

Table 6. Gender differences in the effects of assessment mechanism rationality on digital teaching competence

Variable	**Digital Teaching Competence**							
	Male Group				**Female Group**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Instructional assessment	0.251**				0.583***			
Research assessment		0.206**				0.559***		
Administrative assessment			0.176				0.613***	
Qualification assessment				0.301***				0.472***
Control variables				Controlled				
Adjusted R^2	0.196	0.189	0.193	0.199	0.231	0.284	0.273	0.272
F	11.423***	10.863***	11.368***	13.649***	20.642***	22.643***	22.194***	21.864***
N	258	258	258	258	164	164	164	164

4.3 Robustness Testing and Further Analysis

As proposed in the research hypotheses, the rationality of assessment mechanisms exerts a positive direct effect on digital teaching competence, while work stress functions as a mediating variable. This raises an additional question: Do male and female teachers experience different levels of work stress when facing assessment mechanisms, and does this difference subsequently influence their digital teaching competence? Chen (2023) noted that although gender disparities in China have gradually narrowed, genuine gender equality has not been achieved in many domains. Female professionals are often more likely to encounter unfair treatment in career advancement and social status. Moreover, the dual pressures of work and family, combined with persistent gender bias in the workplace, contribute to higher levels of perceived work stress among women (Lun & Chen, 2024). Based on these observations, it was posited that the positive effect of assessment mechanism rationality on digital teaching

competence would be stronger for female teachers, as rational assessment mechanisms are more likely to alleviate work stress among women and thereby enhance their digital teaching competence.

As shown in Table 6, the positive effects of all four subdimensions of assessment mechanism rationality on digital teaching competence remained robust after the sample was divided by gender and regression analyses were conducted separately. With the exception of the non-significant coefficient for administrative assessment in the male subgroup, both male and female teachers demonstrated higher levels of digital teaching competence as the rationality of assessment mechanisms increased. These findings are consistent with the earlier confirmation of hypotheses H1a–H1d. Furthermore, the magnitude of the positive effects was generally larger for female teachers than for male teachers across all dimensions of assessment mechanism rationality. This indicates that substantial gender heterogeneity exists in the extent to which assessment mechanism rationality enhances digital teaching competence. The results confirm the conjecture that rational assessment mechanisms are particularly effective in improving the digital teaching competence of female teachers, likely due to their stronger effect in mitigating work stress.

5. Discussion

The findings indicate that all four dimensions of assessment mechanism rationality—instructional assessment, research assessment, administrative assessment, and qualification assessment—significantly enhance university teachers' digital teaching competence. Work stress was shown to play a partial mediating role in these relationships. The underlying mechanism can be conceptualized as an "environment–motivation–behavior" chain reaction: the rational design of assessment mechanisms reduces the occupational stress experienced by teachers across instructional, research, administrative, and qualification-related domains, thereby mitigating unnecessary depletion of psychological resources and creating a more supportive institutional environment for investing effort in the development of digital teaching competence. Moreover, social support was demonstrated to buffer the negative effect of work stress on digital teaching competence, thereby moderating the mediating role of work stress in the relationships between each dimension of assessment mechanism rationality and digital teaching competence. This mechanism reflects the interaction between teachers' psychological processes and behavioral responses. Specifically, dynamic changes in assessment mechanisms influence psychological pressure, which in turn affects the degree to which digital teaching competence is developed. Social support alleviates this psychological pressure and strengthens teachers' motivation to engage in digital instructional practices, ultimately moderating the entire mediating process.

In relation to the mediating mechanism of work stress, the increasing massification of higher education has led universities to reform assessment mechanisms under pressures associated with institutional rankings, the "Double First-Class" initiative, and demands for enhanced institutional influence. Stricter requirements have been imposed on minimum teaching hours, classroom supervision, research project participation, publication outputs, administrative responsibilities, professional title evaluations, and academic background. Competitive pressures arising from research evaluations, "up-or-out" employment policies, and the growing expectation of doctoral qualifications have become increasingly widespread (Yan & Liu, 2025). Although university teachers constitute a highly skilled intellectual workforce with strong aspirations for personal achievement and life fulfillment, assessment mechanisms aimed primarily at selecting elite performers—yet often lacking scientific rigor and fairness—can create contradictions between teachers' real-life constraints and their professional goals. Such "standardized" evaluation systems frequently lead to heightened anxiety, disappointment, and depressive symptoms as teachers struggle with performance-based teaching evaluations, exhausting research competition, and unsustainable professional development burdens. Under such psychological strain, teachers are more likely to experience professional burnout, fear of future development, and a sense of psychological drift. These conditions reduce the time, energy, and motivation required to engage with emerging digital teaching practices and high-quality digital resources. Consequently, teachers may find it difficult to use digital technologies effectively in instruction or to develop interest in leveraging digital tools for communication with students. In contrast, rational assessment mechanisms can generate an opposite effect by fostering a fair educational environment, alleviating work stress, and guiding teachers to align with digital transformation trends and professional development goals. Such mechanisms encourage engagement with digital pedagogies and facilitate teachers' readiness to meet the challenges of future-oriented instruction.

In relation to the moderating mechanism of social support, when university teachers experience substantial pressure arising from assessment mechanisms, the material and emotional resources gained from their social networks—including objective support, subjective support, and the degree to which such support is utilized—provide a multifaceted buffering mechanism. Economic assistance, collegial concern, and family care can help teachers confront the work-related pressures inherent in higher education, maintain a positive psychological state, and continue to engage with students through digital technologies. Such support enables teachers to adopt digital tools to deliver innovative instructional approaches, thereby enhancing comprehensive professional competence and fostering personal development (Zhao & Hu, 2024). Furthermore, as teachers strive to improve their digital

teaching competence as part of their broader professional growth, social support networks play an essential role in generating feedback that reinforces positive emotional states and supports mental well-being. This reinforcement promotes continued exploration of emerging digital technologies for instructional improvement (Zhu & Wu, 2023). Social support can be understood as a form of "social reward" (in relation to their work performance and outcomes) and material exchange within the organization, consistent with the "economic man" assumption: teachers remain in their positions due to economic incentives such as welfare benefits and salary. Under high-pressure assessment conditions, work burnout or even resignation may occur; however, access to adequate material and emotional resources through social support systems serves to alleviate such pressures. Within existing assessment structures, a well-developed social support network and a high degree of support utilization enable teachers to develop stronger identification with their work activities. This, in turn, facilitates the internalization of extrinsic incentives—such as higher salaries and promotion opportunities—as personal goals. Consequently, teachers become more inclined to employ new digital technologies, innovate instructional practices, and continuously improve work performance and engagement.

6. Conclusion and Implications

Against the backdrop of the national "Double First-Class" initiative, a mechanism model was constructed to examine how the rationality of assessment mechanisms influences university teachers' digital teaching competence, drawing on work stress theory and social support theory. Based on survey data collected from teachers at more than 100 universities nationwide, the empirical analysis revealed that the rationality of assessment mechanisms exerts not only a direct effect on digital teaching competence but also an indirect effect through work stress and social support. Further analysis indicated that rational assessment mechanisms are particularly beneficial for enhancing the digital teaching competence of female teachers. On the basis of these findings, the following recommendations were proposed:

First, rational assessment mechanisms should be designed to cultivate teachers' intentions to engage in digital instruction. Sustained digital teaching intention represents a key driver in the development of digital teaching competence. Universities should therefore leverage institutional mechanisms by incorporating appropriate indicators and requirements within assessment systems to strengthen teachers' recognition of the importance of digital teaching competence. Simultaneously, overemphasis on "publications, titles, degrees, and awards" should be reduced in favor of evaluating qualitative dimensions such as instructional quality. Creating a more flexible and academically inclusive environment would enable teachers to focus on talent cultivation and thereby maintain long-term motivation to advance digital teaching competence.

Second, work stress should be alleviated to stimulate teachers' vitality in digital instruction. Numerous studies have shown that university teachers have become a high-pressure occupational group, and the physical and psychological consequences associated with sustained stress have begun to affect their daily lives and professional development. Digital instruction, as a complex form of pedagogical work, imposes substantial demands on teachers' knowledge and skills and can easily generate additional work stress. Therefore, stress management should be prioritized in educational reform. Teaching workloads should be scientifically defined, and measures such as granting adequate leave and assisting with personal or family-related difficulties should be implemented to reduce stress and enable teachers to maintain the energy necessary for digital teaching.

Third, social support should be enhanced to ensure the sustained development of teachers' digital teaching competence. The findings of this study indicate that social support effectively mitigates the pressure generated by assessment mechanisms and contributes to the improvement of digital teaching competence. Consequently, universities should expand information channels and establish effective communication mechanisms. For example, teacher unions, Communist Party of China (CPC) branches, and other organizational platforms may be leveraged, and multiple communication methods—such as surveys and interviews—should be adopted to identify teachers' work-related and personal concerns in a timely manner. In addition, material support may be strengthened through initiatives such as establishing instructional start-up funds or increasing allowances for the transformation of teaching achievements. These forms of support can help cultivate the intrinsic motivation required for teachers to continuously advance their digital teaching competence.

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Data Availability

The data used to support the research findings are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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