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CONTENTS

DEVELOPING A VALID MEASUREMENT SCALE FOR HUMAN RESOURCE QUALITY IN COLLEGES

Nguyen Ai Nhan, Truong Tan Quan, Hoang Trong Hung*
University of Economics, Hue University, Vietnam
*nanhan.dhkt21@hueuni.edu.vn;ttquan@hce.edu.vn;*hthung@hueuni.edu.vn*

ABSTRACT

Measuring human resource quality in organizations in general, and in colleges in particular is crucial as it may contribute to positive organizational performance. This study aims to develop and validate a scale that measure human resource quality in colleges. A mixed method consisting of interviewing with managers of colleges for dimension and item generations, and a survey of 364 college lecturers in Central Vietnam for main study are utilized. The scale development is tested via Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The findings show that the scale of human resource quality in colleges is represented by 13 items comprising four dimensions: innovation and adaptability in the workplace, professional knowledge, knowledge sharing, and organizational commitment.

Keywords: Human resource quality, colleges, measurement scale.
JEL codes: E24, J24, M54

1. INTRODUCTION

Human resource quality has been identified as a crucial resource for organizations to gain a competitive advantage as it may contribute to positive organizational performance (Hrab, 2014). At colleges, especially vocational education institutions (VET), the human resources include both teachers and managers. Teachers and managers are at the heart of colleges, in which the teaching staff is the main force and directly participates in research, teaching, and training for students. In recent years, this force has grown rapidly in terms of quantity, professional qualifications, expertise, and vocational skills, gradually standardized, meeting the requirements of each stage of development. However, to date, research on human resource quality has only been conducted for enterprises and industrial zones. There are very few studies on human resources in the education sector in general and no studies on human resource quality in the vocational education sector or colleges in particular.

A review of the literature on measuring the quality of human resources in businesses, organizations, and educational institutions reveals two prevailing perspectives. The first perspective defines human resource quality based on individual attributes (e.g. Bùi Văn Nhơn, 2008; Ngoc & Tien, 2023; Trần Kim Dung, 2010). These are typically evaluated through indicators such as health status, cultural literacy, educational attainment, professional qualifications, and personal

* *Corresponding author*

traits. This approach emphasizes inherent or static characteristics that individuals bring to their roles.

In contrast, the second perspective evaluates human resource quality through the lens of competence (e.g. Al Farisi, 2021; Baharun et al., 2021; Darmawan et al., 2020; Hrab, 2014). Competence involves skills, knowledge, and the ability to apply them effectively in real-world contexts (Darmawan et al., 2020; Hrab, 2014). This approach focuses on performance; for instance, how well individuals fulfill their job responsibilities, solve problems, adapt to challenges, and contribute to innovation (Baharun et al., 2021; Darmawan et al., 2020). Competence-based view demonstrates the ability to address issues with skills and attitudes (Darmawan et al., 2020).

Among the few studies on measuring the quality of human resources from a competence perspective, Darmawan et al. (2020) developed a scale for assessing human resource quality, consisting of 10 items: general skills, specific skills, knowledge of work, learning process, effortlessness, employee appearance, enthusiasm, perseverance, obedience, and feelings about working conditions. However, this scale was designed for human resource quality in corporate settings rather than in educational institutions. The education sector has distinct institutional factors, which suggests that the measurement of human resource quality should be approached differently.

While foundational attributes such as education, physical health, and intellectual capacity are important, they should not be the sole indicators of human resource quality. These characteristics are often static and may not fully reflect an individual's potential to perform or grow within an organization. In contrast, a competence-based approach offers a more nuanced and comprehensive measure of an employee's value. It accounts for adaptability, innovation, continuous learning, and the capacity to meet evolving job demands, all of which are increasingly critical in today's dynamic work environments.

Moreover, competence-based frameworks allow for the inclusion of work ethic, professional attitude, and alignment with organizational goals—factors that are often overlooked in attribute-based evaluations. While education and health are foundational, they do not necessarily translate into workplace effectiveness. Therefore, measuring human resource quality solely on the basis of intellectual, mental, or physical traits may overlook crucial dimensions of real-world performance.

To date, there is a lack of competency-based measurement scales pertaining to human resource quality in general, and more specifically within the context of higher education institutions such as colleges. This absence has resulted in significant challenges for organizations in assessing, evaluating, and enhancing the quality of their human resources. Accordingly, this study seeks to develop a comprehensive measurement scale for human resource quality in colleges, thereby providing a foundational framework for subsequent research endeavors aimed at constructing theoretical models and conducting empirical studies in this domain.

The structure of this paper is as follows. First, a definition of human resource quality is conducted. Second, a reliable and valid human resource quality scale for colleges is empirically developed via different phases. Next, the results are presented and finally the implications are discussed.

2. DEFINITION OF HUMAN RESOURCE QUALITY

Previous studies have proposed various definitions of human resource quality, reflecting the multifaceted nature of the concept. Some scholars define it as a combination of intellectual, emotional, and physical capacities. In these definitions, emotional capacity is expressed through various elements such as ethics, attitude, and behavior. For example, Tran Xuan Cau and Nguyen Thị Minh (2010) described human resource quality as "a combination of factors that reflect the level of development in terms of physical strength, intelligence, professional skills, ethics, lifestyle, and creative working capacity of individuals, ensuring they meet the demands of social development." (p. 51).

Some researchers focus more specifically on worker competence and outcomes. For instance, Darmawan et al. (2020) argues that human resource quality lies in the capabilities of workers, which in turn lead to improved performance. International Labor Organization (ILO) emphasizes the connection between competence and human resource quality, particularly highlighting the need for workers to have skills that enable them to be effective contributors to both the economy and society (International Labour Office, 2008). Similarly, World Bank (1995) also highlights the importance of skills and competencies as essential factors for improving the workforce's ability to contribute to economic and social development.

3. SCALE DEVELOPMENT

3.1. First phase

As suggested by Morgado et al. (2017) and Tracy (2024), the procedure for generating factors consists of three core phases. In the first phase, interviews were conducted with 9 college managers to confirm the key factors used to measure the quality of human resources. Based on the collected opinions, it is evident that the quality of human resources in educational institutions, particularly at the college level, is commonly assessed using several key criteria. The most widely agreed-upon factors include: 1) innovation and adaptability; 2) Professional knowledge; 3) Knowledge-sharing; 4) Organizational commitment. Other aspects, such as proficiency in information technology and foreign languages, as well as research capability, were mentioned by a few interviewees but did not achieve a broad consensus.

3.2. Second phase

The second phase involved a literature review to identify items measuring these factors. The review also included relevant literature from other industries (e.g. Nham et al., 2020; Shamim et al., 2019; Sahibzada et al., 2022). In the third phase, follow-up interviews were conducted with the same managers to examine the form and content validity of the identified items. Table 1 presents the profile of the interview participants, while Table 2 displays the original items, and the modifications made after the second round of interviews.

Table 1. List of interview participants

		Count	N %
Gender	Male	7	77.8
	Female	2	22.2

Qualification	Undergraduate	0	0
	Master	3	33.3
	Doctorate	6	66.7
Tenure	5 or under 5 years	0	0
	From 6 to 10 years	1	11.1
	From 11 to 20 years	6	66.7
	Over 20 years	2	22.2
Position	Rector	4	44.4
	Vice Rector	5	55.6
Public	Private	4	44.4
	Public	5	55.6

(Source: Surveyed by author)

Table 2. Scale items

Sources	Codes of items	Original items	Modified items based on the interviews
Nham et al. (2020)	*Innovation and adaptability*		
	DM1	I enjoy trying out new ideas	I enjoy seeking out new ideas.
	DM2	I seek out new ways to do things	I often look for new approaches to perform my work
	DM3	I frequently improvise methods for solving a problem when an answer is not apparent	I frequently adapt or modify methods to solve problems.
	DM4	I consider myself to be creative and original in my thinking and behavior	I believe that I am always creative in both thinking and behavior.
Shamim et al. (2019)	*Professional knowledge*		
	TT1	My knowledge helps me in day to day problem solving activities	I have sufficient professional knowledge for my job.
	TT2	My knowledge helps me to serve the customer in a better way.	I possess the necessary skills relevant to my work.
Sahibzada et al. (2022) & Nham et al. (2020)	*Knowledge sharing*		
	TT3		I am always willing to share my work experience with colleagues and students.
	TT4	When I have learned new skills or acquired new information, I tell my colleagues about it.	I am always willing to share my professional knowledge and skills with colleagues and students.
	TT5	I often share information, knowledge, skill and experience to my colleagues	I often share ideas, opinions, and information with colleagues to improve work efficiency and outcomes.
Meyer and Allen (1991)	*Organizational commitment*		
	CK1	I do not feel like 'part of the family' at my organization	I feel like a member of a family at the institution where I work.
	CK2		I always strive to perform my duties within the scope of my responsibilities.
	CK3	This organization has a great deal of personal meaning for me	The institution where I work holds great significance to me.
	CK4	Right now, staying with my organization is a matter of necessity as much as desire	Staying committed to the institution where I work is important to me.

(Source: Surveyed by author)

3.3. Main study

3.3.1. Sampling method and sample profile

In the main study, we conducted surveys with teaching staff at colleges in Central cities/provinces of Vietnam, including Danang, Quang Nam, Khanh Hoa and Binh Thuan. We approached rectors/vice rectors of the colleges in Central Vietnam and asked for their permission to conduct surveys with the teaching staff in their colleges. 15 rectors/vice rectors agreed for their colleges to participate in this project. A total of 450 questionnaires were distributed to the teaching staff at these colleges. Of which, 389 were returned and after checking the questionnaires, only 364 questionnaires were valid for further analysis. This sampling number is sufficient as the minimum sample size for EFA and CFA is five times the number of survey items (Hair et al., 1998).

Table 3 shows sample profiles, including age, gender, qualification level, tenure, management position, and sector. Out of 364 respondents, 35.7% aged from 41 to 50 years old, followed by followed by those aged from 30 to 40 years old (34.3%), those aged 30 or under (15.1%), those aged over 50 (14.8%). In terms of gender, 50.5% were males and 49.5% were females. Regarding educational qualifications, a significant portion of the sample holds a master's degree (64.3%), followed by those with an undergraduate degree (28.8%). Only a small percentage of lecturers (6.9%) have a doctorate degree. The tenure data reveals that the largest group of individuals has from 11 to 20 years of experience in their current roles, representing 37.9% of the sample. The second-largest group has from 6 to 10 years of tenure (28.8%), while 17.0% have been in their positions for over 20 years and 16.2% have 5 years or less of tenure. In terms of management positions, the majority of lecturers (73.1%) are not in managerial roles, while 26.9% hold a management position. Finally, the distribution sector illustrates that 51.9% of lecturers working in the public sector and 48.1% in the private sector.

Table 3. Survey respondents' profile

		Count	N %
Age	30 or under 30	55	15.1
	From 30 to 40	125	34.3
	From 41 to 50	130	35.7
	Over 50	54	14.8
Gender	Male	184	50.5
	Female	180	49.5
Qualification	Undergraduate	105	28.8
	Master	234	64.3
	Doctorate	25	6.9
Tenure	5 or under 5	59	16.2
	From 6 to 10	105	28.8
	From 11 to 20	138	37.9
	Over 20	62	17.0
Management position	No	266	73.1
	Yes	98	26.9
Public	Private	175	48.1
	Public	189	51.9

(Source: Surveyed by author)

3.3.2. Exploratory factor analysis (EFA)

In order to evaluate the construct validity of the scale, we applied exploratory factor analysis (EFA) by using the Varimax rotation technique and a minimum eigenvalue threshold of 1.0 (Coakes & Steed, 2001). Table 4 indicates that the KMO (Kaiser-Meyer-Olkin) value is 0.822, which exceeds the 0.5 threshold, confirming that the data are suitable for factor analysis. The Bartlett's test of sphericity yielded a statistically significant result (Bartlett's Test Sig < 0.05), proving that the observed variables are interrelated within the factors.

Table 5 indicates the EFA of human resource quality for colleges. The analysis showed that the extraction of four factors have eigenvalues greater than 1; thus, they efficiently capture the information from the 13 observed variables. Out of the 13 observed variables, DM1 exhibited a loading factor lower than 0.5 and was therefore excluded from the factor groupings. Indeed, DM1 specifically emphasizes the interest in exploring new ideas, whereas the other variables (DM2, DM3, DM4) focus on actual actions and the capacity to apply creativity or flexibility in professional settings and problem-solving. These variables primarily measure practical behaviors or skills, while DM1 relates more to an individual's personal interest or motivation, which doesn't necessarily translate into creative actions within the workplace. Consequently, we changed the name of factor 1 "Innovation and adaptability" to "Innovation and adaptability in the workplace" to reveal the content of the three observed variables (DM2, DM3, DM4).

The four factors extracted in the analysis accounted for a total variance of 70.973%, which is above the 50% threshold. This means the four factors explain 64.27% of the variance in the data derived from the 12 observed variables included in the exploratory factor analysis. The Cronbach's alphas range from 0.71 to 0.80, meeting the requirement of scale reliability.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.822
Bartlett's Test of Sphericity	Approx. Chi-Square	1546.757
	df	78
	Sig.	0.000

(Source: Surveyed by author)

Table 5. EFA of human resource quality for colleges

	Components			
	1	**2**	**3**	**4**
DM1				
DM2	0.775			
DM3	0.847			
DM4	0.798			
TT1				0.857
TT2				0.788
TT3			0.610	
TT4			0.785	
TT5			0.807	
CK1		0.740		

CK2		0.534		
CK3		0.740		
CK4		0.739		
Eigenvalues	4.507	1.561	1.194	1.093
Variance explained (%)	34.672	12.010	9.181	8.406
Cumulative variance explained (%)	34.672	46.683	55.864	64.270
Cronbach's alpha	0.80	0.74	0.76	0.71

(Source: Surveyed by author)

3.3.2. Confirmatory factor analysis (CFA)

The table presents the CFA models. Model 1 is a first-order model, which performs poorly across all indices. The chi-square value is high relative to its degrees of freedom, resulting in a χ^2/df ratio of 10.32, which indicates a poor model fit. The CFI (0.65) and TLI (0.57) are both well below acceptable thresholds, suggesting that the model fails to adequately explain the covariance structure of the data. Additionally, the RMSEA of 0.160 is well above the acceptable limit of 0.08, further reinforcing the poor fit.

Based on the results from the EFA, we developed Model 2 with 12 observed variables, categorized into four factors: innovation and adaptability in the workplace, professional knowledge, knowledge sharing, and organizational commitment. Table 6 shows that Model 2 demonstrates a better goodness-of-fit index than Model 1. The χ^2/df drops to 3.00, which is within the acceptable range. The CFI (0.93) and TLI (0.91) exceed the threshold of 0.90, indicating a good model fit. The RMSEA of 0.074 is also within the acceptable range, suggesting a reasonably close approximation of the model to the population covariance matrix. However, Model 2 includes one observed variable (CK2) with a factor loading of 0.37, which falls below the commonly accepted threshold of 0.50.

CK2 refers to individual behavior and performance ("I always strive to perform my duties within the scope of my responsibilities"). It is related to professional responsibility or doing tasks required rather than the emotional or long-term attachment to the institution. In contrast, CK1, CK3, and CK4 present emotional attachment and long-term loyalty, which are all key aspects of organizational commitment. Therefore, the removal of CK2 is reasonable because it centers on the individual's active performance and duty, rather than on emotional or long-term attachment to the institution.

As a result, we removed CK2 from the CFA model to build Model 3. This model reveals a slightly improved goodness-of-fit index. The χ^2/df slightly improves to 2.99, and both the CFI (0.94) and TLI (0.92) increase marginally. The RMSEA remains stable at 0.074. Among the three, Model 3 demonstrates the best overall fit and can be considered the most suitable for further analysis.

Table 6. CFA model comparison

	χ^2	**df**	***p***	**χ^2//df**	**CFI**	**TLI**	**RMSEA**
Model 1: First-order model	557.222	54	0.000	10.32	0.65	0.57	0.160
Model 2: Second-order model (12 observed variables)	147.204	49	0.000	3.00	0.93	0.91	0.074
Model 3: Second-order model (11 observed variables)	116.506	39	0.000	2.99	0.94	0.92	0.074

(Source: Surveyed by author)

Table 7 presents the results of the measurement model's validity and reliability assessments through CFA. All CR values exceed the commonly accepted threshold of 0.70, indicating that all constructs have strong internal consistency. Convergent validity is confirmed for all constructs, as their AVE values are above 0.50, indicating that each construct explains more than half of the variance in its observed variables. Additionally, the AVE values for each construct are greater than their respective MSV values, further supporting the adequacy of convergent validity.

Discriminant validity is also well established across the constructs. The square roots of the AVE values (represented on the diagonal of the correlation matrix) are greater than the inter-construct correlations in each case. The correlations between constructs ranged from 0.327 to 0.580, significant at the $p < 0.001$ level. These results indicate that each construct shares more variance with its own indicators than with other constructs, satisfying the criteria for discriminant validity.

Table 7. Construct validity

	CR	AVE	MSV	MaxR(H)	V1	V2	V3	V4
Organizational commitment (V1)	0.748	0.504	0.337	0.783	**0.71**			
Innovation and adaptability in the workplace (V2)	0.804	0.581	0.314	0.851	0.392***	**0.762**		
Professional knowledge (V3)	0.742	0.59	0.305	0.744	0.552***	0.327***	**0.768**	
Knowledge sharing (V4)	0.757	0.512	0.337	0.768	0.580***	0.560***	0.537***	**0.715**

*Notes: *** $p < 0.001$; The square roots of the AVE values are represented on the bold diagonal of the correlation matrix.*

(Source: Surveyed by author)

4. DISCUSSION, LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

To date, there remains a noticeable gap in the availability of competency-based measurement scales to assess human resource quality, particularly within the context of colleges. This deficiency may leads to significant obstacles for these institutions in effectively evaluating, and improving the capabilities and performance of their academic staff. As a response to this issue, the current study has developed a comprehensive and practical measurement scale tailored to the unique needs of colleges. By doing this, the study not only addresses a critical gap in the literature but also sets the stage for future theoretical model development and empirical investigations focused on advancing the understanding and enhancement of human resource quality in colleges.

The findings indicate that the concept of human resource quality in colleges can be evaluated through four key dimensions: innovation and adaptability in the workplace, professional knowledge, knowledge sharing, and organizational commitment. Applying the validated measurement scale, the definition of human resource quality in colleges was refined as follows. Human resource quality in colleges refers to academic staff who exhibit strong professional competence, a continuous drive for improvement, and a deep alignment with the institution's core values. These lecturers not only possess the essential skills and expertise required

for their roles but also actively engage in sharing knowledge, demonstrate flexibility in responding to new challenges, and show a strong emotional bond and loyalty to their organization. The results confirm the argument of Darmawan et al. (2020) who indicated that human resource quality should be emphasized on employees' competence. The scale also aligns study of Hrab (2014) with the notion that human resource quality is professional and skilled individuals. Beside the professional knowledge and skills, the study adds that human resource quality in colleges also consists of the strong commitment of the lecturers to their colleges.

This study is subject to several limitations. First, it developed a scale to measure the quality of human resources specifically applied to the context of colleges. The scale, when applied to other contexts such as universities or corporations, may need to be refined to better fit their institutional factors, especially in the context of digital transformation in higher education and business. Second, this study focused on a global scale of human resource quality, which benefits from a concise scale; however, it may not reflect all aspects of human resource quality. Future research may develop a scale with a greater number of items if a more detailed understanding of this concept is needed. Third, this study is limited to scale development and did not examine the drivers and outcomes of human resource quality. By applying this scale, future research should test the relationship between colleges' culture, human resource policies, training policies… and human resource quality in colleges. Others may examine the consequence of human resource quality on lecturers' performance, colleges' training quality or performance.

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