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Chapter

Competency Modeling and Training Needs Assessment for Staff Development in Higher Education

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Abstract

In the Digital Transformation era, Higher Education Institutions (HEI), including universities are seeking various methods to cope with the digital environment. Human resources management and development can be implemented in the HEI because university staff is the main human capital of HEI. In order to promote the performance of HEI, it is essential to develop the competencies of university staff, including digital literacy. The following research presents a redefinition of competencies for job levels of university staff and the training needs assessment of each competency for the Digital Transformation era. The result of the research implies that HEI should consider the emerging competencies and develop its staff for work efficiency and competitiveness of them in the Digital Transformation era.

Keywords: staff development, competency model, needs assessment, determining priority, higher education

1. Introduction

The aging population structure, declining school-age population, and Digital transformation, recently accelerated by COVID-19 demands that universities prepare new survival measures [1]. Universities seek various means to respond to external environmental changes, such as management and development of human resources and transition to consumer-centered education, as well as digital transformation [2–4].

Digital transformation refers to the act of turning innovation, culture, and systems of organizational structures into a digital basis to respond to various changes caused by digital elements. In a broad sense, digital transformation means “changes related to applying digital technologies to all aspects of human society [5, 6].” Besides digitization of the assets, digital transformation includes the use of digital technologies that enhance the experience of interested parties, employees, and customers [7, 8]. Accordingly, a digital competency, that is, understanding and utilizing digital technologies, is crucial in coping with the digital transformation era and promoting related

strategies. On the organizational level, members are required to cultivate digital competency [9, 10]. Digital competency converges on various concepts demanded by the informational and technological environments, such as the Internet, media, information, and digital literacy. Among such concepts, digital literacy is most closely related to digital competency [11, 12]. Beyond the ability to use certain hardware or software, digital literacy embraces the ability to judge the value of the information as well as create new information. It can be understood as a strategic ability for attaining goals [13–16]. If the competency level in digital literacy increases, one can better understand and contribute to the changes in the management strategy of an organization during the digital transformation era. Since digital literacy is also critical for universities, it is necessary for their staff to strengthen their competency from the digital literacy perspective [5].

In the digital transformation era, universities and their administrative staff need to strengthen digital literacy [5], but there is a lack of interest and research on competency development among the administrative staff [17]. The reason is that the administrative staff is considered to play just supportive and assistive roles compared to the faculty and students. Moreover, universities do not share information about human resources due to competition [18, 19].

The purpose of this study is to develop a competency model for the administrative staff of National University Corporation A to increase the competitiveness and improve performance of the universities in the digital transformation era. When developing the competency model, the digital literacy competency that was emphasized earlier will be included, and the process of transforming and reconstructing the competency model for administrative staff at A National University Corporation will be carried out. This change can be seen as a remodeling process that repeats the competency modeling procedure according to the circumstances and purpose. In addition, this study aims to additionally analyze the training needs by job level to improve the utility of the developed competency model. The following three research problems are set. First, confirm the competency required for each job level of the administrative staff of National University Corporation A. and perform the competency remodeling. Second, secure the validity of the competency model derived through internal and external expert reviews. Third, verify the importance of the competency by job levels and differences in the levels of possession through the training needs analysis.

2. Theoretical background

2.1 Competency of university administrative staff

In the early stages, competency was meant in a broad sense that includes the psychological and behavioral characteristics of human beings [20]. Later, the competency was specified by the internal characteristics that explain the behavior to discern differences between persons with high and average performance, including knowledge, skills, abilities, and other characteristics [21, 22].

Competency on the organizational level can be regarded as a combination of the unique resources and abilities of an organization to attain its strategic goals [23]. Competency on the individual level is the combination of knowledge, skills, and attitudes that influence the work performance of individuals and can be improved through education and training [24, 25].

In the 1990th, South Korean companies were actively introducing a competency-based approach to the development of human resources to improve competitiveness [26]. As universities turn into organizations that create performance, there are increasing cases that perceive the importance of staff competency and implement a competency model [2]. The focus of the research on the improvement of the abilities of the university administrative staff is shifting from job to competency [27].

2.2 Competency modeling

Competency modeling is the process of investigating the key abilities of the employees for attaining the purpose of the organization. The competency model, as the outcome of a competency modeling, refers to a system of competency that contains the core knowledge, skills, actions, values, and behaviors that effectively perform roles and contribute to performance creation [28, 29]. Different scholars propose different methods of the development of the competency models, but they share the common purpose of increasing the performance of individuals and attaining organizational goals effectively.

The representative methods of the development of the competency models include the following: (1) job competency assessment method, (2) modified job competency assessment method, (3) generic model overlay method, (4) customized generic model method, and (5) flexible job competency model method proposed by Dubious [30], as well as (1) classical method using reference group, (2) shortened study using expert panels, and (3) future job and personal job competency model development method proposed by Spencer and Spencer [31]. Besides, Rothwell and Lindholm [32] proposed three methods, namely (1) borrowed approach, (2) borrowed tailored approach, and (3) tailored approach. Lucia and Lepsinger [33] proposed two methods, namely (1) new model development method and (2) method of using verified models. The competency model methods above can be classified into the methods of developing new competency models, methods of modifying the existing competency models according to the organization, and methods of developing competency models based on the circumstances of a given job or special purpose [34]. The competency model development methods proposed by the researchers vary in the details, but they commonly include the following: (1) investigation of high performance, (2) lection of persons with high performance and average performance according to certain criteria, (3) summarization of the characteristics of persons with high performance (BEI, observation, etc.), (4) initial determination of the competency model, (5) competency verification (repetition of same or different methods, alternative research, expert verification, etc.), and (6) finalization of the competency model.

As the importance of digital competency grows in the digital transformation era [35], studies on the competency modeling to attain internal strategic goals of organizations include digital literacy competency [36, 37].

2.3 Needs assessment

The concept of a need is generally defined as the difference between the required and present levels [38]. Needs assessment is one of the factors of success in developing training programs for adults; selecting a method of needs assessment is a critical part of the program development [39].

Needs assessment in education is intended to develop training programs and refers to the state that resolves differences between the required and present levels of learners [40].

In Korea, almost up to 75% of the studies on adult education and training between 1990 and 2005 used a questionnaire technique, and many studies only considered one criterion instead of analyzing differences between the required and present levels [41]. Accordingly, Kim [40] proposed to register differences between the required and present levels when collecting data for the needs assessment. Since the 2000s, studies have suggested the t-value and correlation between the priorities by performing t-tests on the required and present levels [42, 43]. Other studies [44, 45] used Borich needs assessment to determine priorities.

Borich needs assessment is used by many researchers worldwide [27]. Borich [46] defined training needs as the discordance between the training purpose and student performance and stated that training needs could be identified by analyzing differences between the present student level and the target level of training programs. The Borich model proposed an equation that assigns weight to the required level and determines priorities by listing the results (refer Borich needs assessment Eq. (1)):

$$\frac{\sum(RCL - PCL) \times \bar{RCL}}{N} \quad (1)$$

RCL : Required Competence Level

PCL : Present Competence Level

\bar{RCL} : Mean of RCL

N : Population

3. Study methods

3.1 Selection of the development method for the competency model

Based on the literature review related to the development of the competency models, the universities without a competency model are developing a new competency model [47–49] National University Corporation A, a research organization, was confirmed to have a competency model developed in 2017. Under these circumstances, it would be more efficient to modify and use the verified competency model than to develop a new one. Therefore, the generic model overlay method proposed by Dubious [30] was selected as the key research method, and the process of modifying, supplementing, and reconstructing the existing competency model was named competency remodeling [50, 51]. However, the method of using an existing competency model has its limits in reflecting various characteristics, such as the organizational environment, jobs, and roles. Considering these limits, this study used the existing competency model but included a process verifying the newly-derived competency model by HRD experts and internal interested parties.

3.2 Procedure and method of competency remodeling

The procedure and method of competency remodeling performed in this study are based on the ‘generic model overlay method’ proposed by Dubious [30].

3.2.1 Competency structure design

Job levels, roles, and responsibilities of the administrative organization of National University Corporation A were examined to design the competency structure. The administrative organization of National University Corporation A has 1084 corporate employees, classified into job levels 1–8. If classified according to the internal duties, the employees are divided into five job levels (levels 1–3, level 4, level 5, level 6, levels 7–8). The roles and responsibilities for each level are configured based on five job levels, and it is necessary to design the competency structure for full-time employees that applies to the development of the job level competency model. Hence, in-depth interviews with the Personnel and Human Resources Departments and persons with high performance were conducted to reconfigure the roles and responsibilities for every job level. During the in-depth interviews, the existing roles and responsibilities for every job level were modified and supplemented to confirm the duties and details and determine the required level of digital competency. These details were used to classify the competency for each job level within the competency model.

3.2.2 Competency extraction and arrangement

To determine the competency required for the administrative staff of National University Corporation A, a literature analysis was performed. The competency candidate group was formed by including the competencies proposed by public institutions and universities in South Korea and overseas as well as the competencies from existing competency models, accounting for the roles and organizational characteristics of the university administrative staff. The competency candidate group included competencies related to digital understanding and use to derive a competency model appropriate for the digital transformation era. After the competency candidate group was formed, the competencies suitable for each job level were arranged to take into account the roles and responsibilities for every job level.

3.2.3 Adjustment and integration of extracted competencies

An expert workshop was conducted to adjust and integrate the competencies by the job levels. The competencies that belong to the competency candidate group for every job level were reviewed at the expert workshop to integrate similar competencies and finalize them. The adjustment and integration of the extracted competencies were carried out simultaneously while deriving the competency model, and the competencies judged to be commonly required by different job levels at the workshop were categorized as common competencies. In addition, competencies related to digital competency were combined in the name of digital literacy through a literature review. Digital literacy was determined as appropriate to be used as a concept similar to digital competency and to signify the strategic ability to use digital information to attain goals [13, 52].

3.2.4 Competency model

To derive the competency model for the administrative staff of National University Corporation A, three workshops were held. Five HRD experts in the public sector participated in the first workshop to review the draft for the competency groups, competency names, and competency definitions and select five competencies for

every job level. The first workshop also reviewed whether the name digital literacy is appropriate as a name that represents digital competency. Four of the HRD experts in the public sector who participated in the first workshop participated in the second workshop to define modified competencies, specify behavioral indicators, classify competencies for every job level into five types, and review whether common competencies for every job level are to be included in the competency model. Five HRD experts in the private sector participated in the third workshop to review the adequacy of the definitions of the competencies for every job level derived during the previous workshops, behavioral indicators, and five competency types.

3.2.5 Finalization of the competency model

A Delphi survey was conducted to review the validity of the derived competency model and complete the final competency model. For the Delphi survey, it is important to build an expert panel with expertise in the respective field and to secure the reliability of the survey, 10–15 experts are required [53]. The Delphi survey is carried out in three stages, but two stages may be enough if a sufficient agreement is reached [54]. In this study, the expert panel was comprised of 20 experts recommended by the Personnel and Human Resources Departments and persons in charge of National University Corporation A, including 10 internal interested parties and 10 public and private HRD experts who participated in the competency model development stage and gained an understanding of National University Corporation A and university administrative staff. The first Delphi survey was carried out among 20 experts, and 16 experts responded to the survey. The second Delphi survey was sent out to the 16 experts who participated in the first survey, and all of them responded (refer to **Tables 1** and **2**).

The Delphi survey utilized Likert’s 5-point scale to define each competency of the competency model, grant scores on behavioral indicators, make modifications, and describe additional opinions. The content validity of the gathered responses was measured, and the equation proposed by Lawshe [55] was used to calculate the

No.	Affiliation	Final degree	No.	Affiliation	Final degree
1	Professor at K University	Ph.D. in HRD	5	HRD expert of P Company	Ph.D. in HRD
2	Professor at S University	Ph.D. in HRD	6		Ph.D. in HRD
3	National research institute related to HRD	Ph.D. in HRD	7	HRD expert of H Company	Ph.D. in HRD
4		Ph.D. in HRD	8		Ph.D. in HRD

Table 1.
List of participants in second Delphi survey—External experts.

No.	Affiliation	Job level	No.	Affiliation	Job level
1	National University Corporation A	Level 4	5	National University Corporation A	Level 4
2		Level 4	6		Level 5
3		Level 4	7		Level 5
4		Level 4	8		Level 5

Table 2.
List of participants in second Delphi survey—Internal experts.

Content Validity Ratio (CRV) for each competency. The validity of the competency model was secured through the Delphi survey results, and the opinions were reflected to derive the final competency model.

3.2.6 Analysis of training needs

To study the requirements for competencies by job level, a survey was conducted on 1084 corporate employees of National University Corporation A. The subjects of the survey were selected considering the fact that only full-time employees receive education by job level. The survey was conducted online, the subjects received links to the questionnaire by email valid for 2 weeks, and 393 subjects participated. After excluding 33 unreliable responses, 360 responses were analyzed. The Borich needs equation was used to analyze the competency needs by job levels.

4. Results

4.1 Competency remodeling by job levels of administrative staff at national university Corporation A

4.1.1 Roles and responsibilities of the administrative staff at National University Corporation A

The definitions, roles, and responsibilities for every job level reconfigured based on the literature analysis and in-depth interviews with the Personnel and Human Resources Development Departments and persons with high performance are presented in **Table 3**. Jobs at National University Corporation A were classified into five levels: levels 1–3 for upper-level managers, level 4 for mid-level managers, level 5 for low-level managers, level 6 for mid-level staff, and levels 7–8 for low-level staff.

4.1.2 Extraction and arrangement of competencies for administrative staff at National University Corporation A

Competency candidate groups with 66 competencies related to university administrative staff were formed by analyzing literature in Korea and overseas.

Job level	Roles	Definitions
Levels 1–3	Upper-level managers	Leaders of the organization who can present the vision and goals of the organization
Level 4	Mid-level managers	Managers who understand the organizational circumstance based on analytical thinking and can lead the organization effectively
Level 5	Low-level managers	Coordinators between managers and staff who promote cooperation among members
Level 6	Mid-level staff	Key staff creating a work culture for communication and cooperation
Levels 7–8	Low-level staff	Staff sincerely performing given duties within the organization

Table 3.
 Roles and definitions by job levels at National University Corporation A.

Competencies were arranged according to the roles and responsibilities by job levels based on the literature analysis and interviews. Levels 1–3 or upper-level managers were assigned 12 competencies, level 4 or mid-level managers—13, level 5 or low-level managers—12 competencies, level 6 or mid-level staff—10 competencies, and levels 7–8 or low-level staff were assigned 11 competencies. Eight competencies determined necessary for all job levels are stated as common competencies (refer to **Table 4**).

4.1.3 Derivation of competency model for administrative staff at National University Corporation A

Competencies that belong to the competency candidate groups were integrated and defined as competency groups by five job levels and the common competency group by going through adjustment and integration. The draft of the competency model was reviewed by HRD experts in the public and private sectors (refer to **Table 5**), and the final competency model for each job level was derived by reflecting feedback (refer to **Table 6**).

The finally derived competency model for each position was composed of 25 competencies for the same positions as the existing competency model, but 12 competencies were modified and supplemented and 2 competencies were added (**Table 7**).

4.2 Verification of validity of the derived competency model

Two surveys were conducted among the internal interested parties and HRD experts to review the validity of the final competency model. The necessity to modify the terms of the competency model according to the roles and responsibilities for

Job level	Roles	Competency pools
Levels 1–3	Upper-level managers	Value orientation, global, goal setting, future prediction, change management, vision provision, business sense, flexibility, decision making, human resource management, strategic agility, strategic thinking
Level 4	Middle-level managers	Plan establishment, motivation, change management, judgment, performance orientated, work innovation, risk management, interest relationship adjustment, human resource management, coordinating ability, organizational management, organizational culture management, judgment
Level 5	Low-level managers	Conflict management, emotional communication leadership, task management, network management, logical thinking, goal management, work coordination, process management, convergent thinking, integrated adjustment, coaching, team member management
Level 6	Middle-level staff	Critical mind, problem-solving, trust formation, business promotion, work management, business negotiation, resource organization, creativity, communication, cooperation
Levels 7–8	Low-level staff	Courteous listening, customer-centeredness, positive thinking, interpersonal relationship, time management, passion, information management, adaptability, job understanding, work ethics, sense of responsibility
Common competency		Data analysis, digital literacy, document preparation, problem solving, detailed work handling, idea derivation, work planning, communication

Table 4.
Competency pool by job levels.

Affiliation	expert	Details of feedback
Public	Kim, OO	Work process management needs to focus on managing the procedure for process systematization and manual development and providing feedback.
	Lee, OO	Digital literacy is a highly important competency, and it would be appropriate to define and reflect on this competency.
Private	Song, OO	It is advisable to specify relationship formation as 'relationship formation within the organization' to clarify the concept of relationship formation and integration.
	Yang, OO	Since negotiations also occur on the staff level, problem-solving and communication should be commonly included in all job levels.
	Park, OO	Considering the weight placed by National University Corporation A on future orientation, digital literacy should be commonly included in all job levels.

Table 5.
Examples of expert feedback.

every job level was partially posed during the first questionnaire, and the second survey was conducted by reflecting this opinion. After the second survey, the validity of the competency definitions by job levels and behavioral indicators by levels was analyzed based on CVR, as presented in **Table 8**.

4.3 Analysis of competency training needs by job levels of administrative staff at National University Corporation A

A survey was conducted to analyze the competency training needs by job level, and 360 subjects participated. Based on the characteristics of the respondents, there were more female and level 6 respondents affiliated with the Head Quarter and college (graduate school). Responses were collected at all job levels at National University Corporation A (refer to **Table 9**), and job levels that considered the roles and responsibilities of National University Corporation A configured previously were set as reference points to build a competency model that can be applicable at all job levels. A paired t-test was performed to analyze the level of training needs perceived by employees of National University Corporation A about the competencies at each job level included in the finalized competency model. The Borich needs equation was used to confirm the priorities for the training needs by competencies. The results of analyzing the training needs are shown in **Table 10**, and they were analyzed by classifying competencies into five job levels and common competencies.

Upper-level managers at levels 1–3 showed statistically significant differences between the current and required levels for all five competencies. The training needs were found in the order of strategic thinking (4.78), vision provision (4.78), decision-making (4.65), change management (4.54), and goal setting (4.01). In order to cope with changing circumstances inside and outside the organization, upper-level managers at levels 1–3 are required to show the ability to diagnose the organization based on strategic thinking and make clear decisions as leaders.

Mid-level managers at level 4 showed statistically significant differences between the current and required levels for all five competencies. The training needs were found in the order of organizational management (4.36), work innovation (3.95), judgment (3.76), risk management (3.43), and performance-orientated (3.14). Mid-level managers at level 4 are required to show the ability to manage the organization and achieve work performance based on their understanding of the organization.

Job level	Competency by job level					
	Leadership competency					Common competency
	Strategic	Teamwork	Coordination and integration	Change	Performance	
Levels 1–3	Strategic thinking	Visionary	Decision making	Change management	Goal setting	<ul style="list-style-type: none"> • Communication • Problem-solving • Digital literacy • Planning • Business writing
Level 4	Work innovation	Organizational management	Judgment	Risk management	Performance oriented	
Level 5	Process management	Building internal relationships	Interest relationship integration	Conflict management	Task management	
Level 6	Work negotiation	Building trust	Work negotiation	Creative thinking	Systematic thinking	
Levels 7–8	Time management	Adaptability	Interpersonal relationship	Work ethics	Responsibility	

Table 6.
Final competency model by job level (draft).

Competency	
Modification and supplementation competency (12)	Change Management, Work Innovation, Judgment, Process Management, Building Internal Relationships, Interest Relationship Integration, Work Negotiation, Creative Thinking, Systematic Thinking, Adaptability, Problem Solving, Planning
New competency (2)	Digital Literacy, Ethics

Table 7.
 Modification, supplementation, and new competencies within the final competency model.

Job level	Competency	Avg	CVR	Validity	Job level	Competency	Avg	CVR	Validity
Levels 1-3	Strategic thinking	4.69	1.00	O	Level 4	Work innovation	4.69	0.88	O
	vision provision	4.63	0.75	O		Organizational management	4.63	0.75	O
	decision making	4.88	1.00	O		Judgment	4.88	1.00	O
	Change management	4.44	0.75	O		Risk management	4.50	0.75	O
	Goal setting	4.75	1.00	O		Performance orientated	4.88	1.00	O
Level 5	Process management	4.75	0.88	O	Level 6	Work negotiation	4.75	0.88	O
	Building internal relationships	4.44	0.75	O		Building trust	4.88	1.00	O
	Interest relationship integration	4.50	0.88	O		Collaboration	4.88	1.00	O
	Conflict management	4.38	0.75	O		Creative thinking	4.69	0.88	O
	Task management	4.75	1.00	O		Systems thinking	4.69	1.00	O
Levels 7-8	Time management	4.75	0.88	O	Common	Communication	4.88	1.00	O
	Adaptability	4.81	1.00	O		Problem-solving	4.88	1.00	O
	Interpersonal relations	4.38	0.75	O		Digital literacy	4.63	0.75	O
	Ethics	4.56	0.88	O		Planning	4.88	1.00	O
	Responsibility	4.94	1.00	O		Business writing	4.75	1.00	O

Table 8.
 Results of comprehensive analysis of competency and behavior indicators by job level.

Low-level managers at level 5 showed statistically significant differences between the current and required levels for all five competencies. The training needs were found in the order of conflict management (3.51), interest relationship integration (3.38), building internal relationship (3.37), task management (3.30), and work process management (3.25). Low-level managers at level 5 are in the middle position within the organization, in charge of linking managers and staff. Conflict

		Frequency	%
Gender	Female	194	53.9
	Male	166	46.1
Affiliates	Head quarter	130	36.1
	College/graduate school	127	35.3
	Attached facilities	95	28.6
Level	Levels 1-3	14	3.89
	Level 4	28	7.78
	Level 5	69	19.17
	Level 6	121	33.61
	Levels 7-8	79	21.94
	Common	49	13.61
Total		360	100

Table 9.
Demographic information of respondents.

Job level	Competency	As-is		To-be		Difference			Borich	Priority
		M	SD	M	SD	M	SD	t		
Levels 1-3	Strategic thinking	4.18	0.86	3.04	0.98	1.14	1.18	18.43***	4.78	1
	Vision provision	4.15	0.87	2.99	0.96	1.16	1.21	17.99***	4.78	1
	Decision making	4.18	0.87	3.06	1.00	1.12	1.20	17.73***	4.65	3
	Change management	3.94	0.96	2.78	1.10	1.16	1.40	15.68***	4.54	4
	Goal setting	4.04	0.90	3.04	1.01	1.00	1.20	15.71***	4.01	5
Level 4	Organizational management	4.11	0.86	3.05	1.02	1.06	1.20	16.69***	4.36	1
	Work innovation	3.81	0.88	3.02	0.99	0.79	1.17	16.54***	3.95	2
	Judgment	3.88	0.86	2.86	1.03	1.02	1.19	14.74***	3.76	3
	Risk management	3.81	0.92	2.91	1.02	0.90	1.18	14.44***	3.43	4
	Performance orientated	3.84	0.86	3.02	0.99	0.82	1.14	13.69***	3.14	5
Level 5	Conflict management	3.91	0.91	3.01	0.98	0.90	1.19	14.29***	3.51	1
	Interest relationship integration	3.94	0.88	3.08	0.97	0.86	1.11	14.71***	3.38	2
	Building internal relationships	4.04	0.85	3.20	0.97	0.84	1.12	14.12***	3.37	3
	Task management	4.00	0.86	3.17	0.99	0.83	1.11	14.08***	3.30	4
	Work process management	3.95	0.86	3.13	0.97	0.82	1.06	14.70***	3.25	5

Job level	Competency	As-is		To-be		Difference			Borich	Priority
		M	SD	M	SD	M	SD	t		
Level 6	Creative thinking	3.69	0.92	2.92	0.99	0.77	1.12	13.07***	2.85	1
	Work negotiation	3.78	0.83	3.13	0.92	0.65	1.02	12.15***	2.45	2
	Systematic thinking	3.81	0.83	3.18	0.89	0.63	0.95	12.54***	2.39	3
	Cooperation	3.77	0.84	3.21	0.92	0.56	1.02	10.26***	2.08	4
	Building trust	3.72	0.89	3.24	0.90	0.48	0.97	9.40***	1.79	5
Levels 7-8	Responsibility	3.96	0.95	3.32	0.94	0.64	1.02	11.95***	2.54	1
	Adaptability	3.73	0.96	3.13	0.98	0.60	1.05	10.97***	2.26	2
	Interpersonal relationship	3.69	0.93	3.08	0.95	0.61	1.02	11.45***	2.26	2
	Time management	3.86	0.95	3.29	0.94	0.57	1.01	10.83***	2.23	4
	Work ethics	3.68	0.98	3.17	1.00	0.51	1.01	9.66***	1.89	5
Common	Problem-solving	4.10	0.86	3.18	0.88	0.92	1.01	17.17***	3.74	1
	Communication	4.06	0.86	3.16	0.87	0.90	1.05	16.32***	3.67	2
	Digital literacy	3.91	0.93	2.99	1.00	0.92	1.25	13.88***	3.58	3
	Planning	3.94	0.86	3.04	0.91	0.90	1.10	15.49***	3.55	4
	Business writing	3.90	0.86	3.24	0.92	0.66	1.01	12.38***	2.58	5

* p < 0.05. ** p < 0.01. *** p < 0.001.

Table 10.
 Results of competency needs assessment by job level.

management, interest relationship integration, and relationship formation within organization are perceived as highly important competencies.

Mid-level staff at level 6 showed statistically significant differences between the current and required levels for all five competencies. The training needs were found in the order of creative thinking (2.85), work negotiation (2.45), systematic thinking (2.39), cooperation (2.08), and trust formation (1.79). As the position in charge of key work-level duties, level 6 staff are required to show the ability to perform administrative duties in a comprehensive and creative way based on systematic thinking.

Low-level staff at levels 7–8 showed statistically significant differences between the current and required levels for all five competencies. The training needs were found in the order of responsibility (2.54), interpersonal relationship (2.26), adaptability (2.26), time management (2.23), and work ethics (1.89). Staff at levels 7–8 are required to adapt to the organization by forming interpersonal relationships and show the ability to responsibly perform given duties.

All five common competencies also showed statistically significant differences between the current and required levels. The training needs were found in the order of problem-solving (3.74), communication (3.67), digital literacy (3.58), work planning (3.55), and document preparation (2.58). These results mean that the administrative staff of National University Corporation A is required to have additional competencies other than basic administrative competencies like document preparation.

5. Conclusions and suggestions

5.1 Conclusions

Based on the results of this study, the conclusions are as follows.

First, the competency model by job levels for the university administrative staff at National University Corporation A was derived by competencies classified by job levels and common competencies. This result is similar to previous studies revealing that there are competencies for university administrative staff required at each job level as well as common competencies. Digital literacy and Problem-solving competencies were verified as commonly required regardless of job levels. The fact that digital literacy competency is included in the common competencies implies that administrative staff are required to strengthen their digital literacy because of the increased implementation and use of digital technologies with the computerization of educational and administrative duties at the universities. In the present era where digital transformation occurs rapidly, the success of the digital transformation depends on the ability to secure human resources with digital competency [5], and including digital literacy competency in the competency model and fostering it can mark a big turning point for raising the competitiveness of university organizations. Accordingly, it is necessary to continuously provide learning opportunities for the university administrative staff to improve their digital literacy competency, and there is a need to develop training programs and present road maps by levels of digital literacy required for each job level and duty.

Second, five specific competencies were derived for each job level of the university administrative staffs. In this study, the competency model was developed efficiently by utilizing the generic model overlay method proposed by Dubious [30], and organizational characteristics and requirements were reflected based on in-depth interviews. The completed competency model classified competencies by job levels based on five items, and elementary, intermediate, and advanced behavioral indicators were presented with the definitions of the competencies to increase the utility as the basic data for diagnosing and fostering each competency. Competency models are used restrictively in the areas other than education and training, such as career development and assessment [2]. They can be used to determine suitable applicants during the selection and recruitment stages, verify the effectiveness of the programs in the education and training stage, and judge the attainment of goals in the assessment stage. Therefore, it would be necessary to consider the methods of expanding the scope of behavioral indicators for each level of difficulty to the criteria for measuring the transition effects of the competency diagnosis tools and competency-based programs.

Third, the completed competency model verified high-priority competencies to be developed for each job level by analyzing the training needs for each job level through questionnaires. This result has significance in verifying the competencies to be developed preferentially for each job level and presenting the directions for human resource development for university organizations. The competency model must be modified and supplemented periodically to identify the training needs by job levels and set the directions for HRD operation in the future. In particular, since digital literacy is a concept that responds sensitively to technological advancement and social needs, it needs to be modified and supplemented continuously [37]. Accordingly, the competency model should be reconfigured based on the level of changes in competencies and used in practice [5].

5.2 Suggestions

Based on the results of this study, suggestions for future research are as follows.

First, additional research is required on the development of competency models for administrative staff at national and private universities. Since this study is limited to a large national university corporation with about 1100 corporate employees, there are limits in generalizing the study results onto national universities of all sizes. In the public sector, performance and research efficiencies differ according to the size and characteristics of the organizations [56, 57]. There are differences in the scope and level of work performed by the administrative staff according to organizational size. In particular, private universities are founded by educational foundations and therefore are influenced by the affiliated foundation. Administrative staff put greater emphasis on the private relationships than on the public ones, and they show various desires for job stability, remuneration, and job promotion depending on the location and size of the university [3]. Therefore, it is necessary to conduct additional research on the development of competency models based on the characteristics of each organization.

Second, in welcoming the digital transformation era, university administrative staff must promote talent transformation to increase their work efficiency and strengthen the competitiveness of the universities. Digital transformation and smart infrastructure formation accelerated by COVID-19 demand that people work in a new environment. Accordingly, learning agility, the ability to learn new aspects quickly, has become one of the core future competencies, along with digital literacy [58]. Such competencies must be developed by taking approaches on both individual and organizational levels. Organizational competencies are the preconditions for strengthening individual competencies [59], and adequate organizational support and intervention are needed in the circumstances that demand a new way of working. Particularly, the universities have difficulties applying the educational mechanisms of regular organizations because they guarantee tenure, subdivide duties, and implement regular job rotations [60]. With such characteristics of the universities under consideration, studies must be conducted on providing a self-directed learning environment, improving the competencies of the administrative staff through the reconstruction of the organizational culture, and changing perspectives instead of simply providing a one-time educational opportunity.

Third, the organization of the job system for the university administrative staff must be reviewed in alignment with the digital transformation era. Major universities are seeking changes based on digital technologies as a strategy to align with the digital transformation era. When universities implement digital technologies, they lead to the collaboration between the human beings and AI instead of human-to-human collaborations. Some jobs and resources are replaced by AI, and the job system needs to be reorganized through job analysis, mapping, and redesigning [58]. From the viewpoint of promoting the coexistence of AI and human beings [58], additional research must be conducted on the process of recreating duties so that employees in charge of establishing organizational strategies can make their duties meaningful by changing the perception of them [61].

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