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Construction of Digital Competency Model for Applied Undergraduate University Business Administration Teachers under the Context of Educational Digital Transformation—Take University A as an Example

Yimeng Liu

Chengdu Neusoft University, Chengdu, Sichuan Province, 610000, China

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Abstract: As the rapid iteration of educational mechanisms brought about by digital transformation continues, university faculty competency models need to adapt to the demands for talent in the era of a knowledge-based society. Relying on data samples from business administration teachers at an innovative applied undergraduate institution in Sichuan Province and using the Competency Iceberg Model and the Onion Model as frameworks, a digital competency model for business administration teachers was constructed. This model incorporates ten key competencies: professionalism, influence, responsibility, continuous learning, digital literacy, mentorship, organizational coordination, analytical thinking, teamwork, and communication skills. These competencies were identified through strategic and cultural analysis of the university, interviews regarding key job responsibilities, and assessments of the importance of various competencies. The model can facilitate strategic goal achievement in universities concerning recruitment and allocation, training and development, performance management, and career planning for business administration teachers.

1. Introduction

“A hundred-year plan” takes education as its foundation and “an educational plan” takes teachers as its foundation. The Ministry of Education of China has successively issued significant documents such as the 'Central and Western Regions Higher Education Revitalization Plan (2012-2020)' and 'Opinions on Strengthening the Construction of Young University Teachers', highlighting the crucial value of teacher training in enhancing the professional development of university educators, advancing the intrinsic development of higher education, and supporting the construction of a powerful nation in higher education [1-2]. The State Council issued the 'Opinions on Comprehensively Deepening the Reform of Teacher Team Construction in the New Era' in January 2018, cultivating the university teacher to socialist builders and successors who are well-rounded in morality, intelligence, physique, and aesthetics [3]. Subsequently, in April 2022, the Ministry of Education and seven other departments jointly issued the 'Program to Strengthen Teacher Force for Basic Education in the New Era' [4], embarking on a new journey to build a high-quality, professional, and innovative teaching workforce for the new era.

Among them, business administration teachers bear the responsibility of supplying society and corporate organizations with key talents, playing an essential role in promoting economic prosperity, and maintaining social stability. With the digital transformation and the development of artificial intelligence, constructing a competency model suitable for university teachers in the new era and guiding universities in recruitment and allocation, training and development, performance management, and career planning will help the business management and related disciplines' teaching teams to adapt to the current trend of education digitalization.

2. Research Design

2.1 Competency and Competency Modelling

The concept of competency was first proposed by Professor McClelland from Harvard University in 1973. It refers to the motivations, traits, self-image, attitudes or values, knowledge in a certain field, cognitive or behavioral skills that distinguish outstanding performers from average ones in a particular job [5]. Based on this research, foreign scholars have further improved the competency model. For instance, Spencer and others proposed the "Competency Iceberg Model," which divides competencies into threshold competencies and differentiating competencies; Boyatzis conducted an in-depth study of the Iceberg Model and proposed the Onion Model, emphasizing the core qualities that determine a person's long-term work performance. As the theoretical research on competencies has matured, both domestic and international scholars have gradually applied it to the education profession, focusing on constructing and exploring competency models for teachers.

2.2 Current Research Status on Competency Models for Higher Education Institution Teachers

In recent years, Chinese research on teacher competencies has been conducted from multiple perspectives. Some studies have explored the improvement of China's higher education teacher training system through comparative research and individual group questionnaires; others have built a three-level indicator model for young university teachers in the new era based on the Iceberg Model theory using statistical analysis; some have used Analytic Hierarchy Process to construct a "four-dimensional" competency model for new engineering teachers and propose new ideas and insights for development and enhancement; still others have used three-level coding through category analysis to construct a competency model that clarifies its capability elements [6-8]. The emphasis on data literacy, competencies, and artificial intelligence literacy in the information society era is not sufficient to meet the demand of university teachers in the knowledge society era. Research related to teacher digital competency models found that, by analyzing dimensions such as organizational types, framework goals, construction concepts, competency elements, and social ethics responsibilities, contemporary higher education teacher competency models typically cover four major competency areas: technology, teaching, ethics, and attitude [9].

2.3 Construction Pathways for the Competency Model of Business Administration Teachers in Higher Education Institutions

To align with the development trend of digital transformation in higher education, application-oriented universities have a certain typicality within the higher education industry. Compared to traditional research-oriented universities, these institutions exhibit higher market sensitivity [10]. This study selected more than 120 full-time teachers from the School of Business Administration at application-oriented University A, covering 8 undergraduate majors in business administration

including e-commerce, information management and information systems, logistics management, big data management and application, financial management, human resource management, supply chain management, and marketing. Based on Competency Model Theory, Iceberg Model Theory, and Onion Model Theory, the study delves into the intrinsic and deep-seated competencies to construct a digital competency model suitable for contemporary university faculty in business administration and related fields. By analyzing textual data to infer core competencies from the university's strategy and culture, and then verifying and supplementing the final elements through interviews and questionnaires, the competency model is formed and applied to the construction of educational quality in higher education institutions.

3. Results and discussion

3.1 Analysis of University Strategies and Culture

Through the analysis of the college's official website, promotional brochures, and informational pamphlets, five core competencies have been identified (see Table 1):

Table 1 Analysis of University Strategy/Cultures

No.	Strategy/Culture	Competency Qualities
1	Focus on modern enterprise management and operation solutions in education, emphasizing the cultivation of students' comprehensive application ability and practical skills in professional knowledge	Professionalism
2	Promote teaching and learning through competitions, guiding students to learn independently	Mentorship
3	Proficiently apply IT technology in the construction and business operations of various industries' informatization, breaking through traditional teaching models	Digital Literacy
4	Adhere to open education, undertake social responsibility, and carry out international educational exchanges and cooperation	Influence
5	Implement the TOPCARES integrated management and business application talent training model, focusing on the integration and development of new engineering and new liberal arts majors in the "IT + Management" and "IT + Business" modes	Continuous Learning Ability

3.2 Interviews on Key Responsibilities of Management Faculty in University

The evaluation of university faculty primarily considers teaching volume, research and competition results, and student ratings, factoring in the teacher's subject area and length of service. Interviews were conducted with 10 individuals, making up 8.3% of the sample size. The interview structure was devised following the STAR methodology to explore additional key responsibilities beyond the five core competencies of university instructors. The process was executed double-blind. By encoding and processing the interview data and recordings, understanding the meaning of sentences in context, identifying the main themes, and filtering and optimizing nouns and verbs, ten competencies were identified through manual intervention, taking into account the complexity and diversity of language (see Table 2):

Table 2 Interview Content Coding and Organization

Interview Content	Corresponding Competencies
1. Fulfill responsibilities with integrity 2. Prepare lessons diligently 3. Pay attention to student's emotional changes	Responsibility
1. Display confidence in professional abilities and talents 2. Maintain a firm stance and perspective 3. Truly enjoy teaching	Self-confidence
1. Keep teaching renovation 2. Keep academic accumulation 3. Long career development path	Perseverance
1. Establish a knowledge network 2. Utilize critical thinking 3. Conduct comprehensive analysis 4. Adjust teaching strategy based on student analysis	Analytical Thinking
1. Collaborate on lesson preparation 2. Cooperate to conduct scientific research projects 3. Participate in cultural festivals and sports meets	Teamwork
1. Manage class efficiently 2. Instruct social practice activity 3. Integrate and utilize resources	Organizational Coordination
1. Teach communication and management courses 2. Enhance student's understanding by language expression 3. Organize class by language expression	Communicative Ability
1. Categorize, organize, and summarize information systematically. 2. Summarize and refine effective teaching methods suitable for different teaching scenarios 3.Summarize and conclude of research findings	Inductive Ability
1. Pay attention to teaching content, methods, and environment 2. Be meticulous on assignment and grading 3. Excavate differences	Attention to Detail
1. Respond quickly to unforeseen circumstances 2. Balance teaching, research and social service 3. Cope with updates on teaching content	Flexibility

3.3 Assessing the Importance of Competency Qualities

Questionnaires were distributed to full-time faculty and students in the School of Business Administration of University A. The questionnaires used a Likert scale to analyze the importance of 10 competency qualities and included open-ended questions to examine and supplement additional competencies. A total of 507 valid questionnaires were collected, with 51 from teachers and 456 from students. Considering the limitations of student evaluations of teacher performance, the questionnaire reference weights were set at 70% for the teacher responses and 30% for the student responses. The scores for each competency quality are shown in Table 3.

Table 3 Scores for Competency Qualities

No.	Competency Qualities	Importance Level										Score
		Very Important (5 points)		Important (4 points)		Neutral (3 points)		Less Important (2 points)		Very Less Important (1 point)		
		Stu.	Tea.	Stu.	Tea.	Stu.	Tea.	Stu.	Tea.	Stu.	Tea.	
1	Professionalism	192	36	184	13	72	2	4	0	4	0	4.53
2	Influence Ability	236	33	160	16	49	2	5	0	6	0	4.53
3	Responsibility	242	29	174	21	33	1	7	0	0	0	4.51
4	Continuous Learning Ability	177	34	192	16	72	1	15	0	0	0	4.50
5	Digital Literacy	176	35	160	13	100	3	16	0	4	0	4.46
6	Cultivation and Guidance	203	26	200	25	41	0	12	0	0	0	4.45
7	Organizational Coordination	204	21	204	25	43	5	5	0	0	0	4.32
8	Analytical Thinking	195	22	201	21	45	8	15	0	0	0	4.27
9	Teamwork	176	19	216	28	56	4	8	0	0	0	4.27
10	Communicative Ability	208	10	176	21	60	19	8	1	4	0	3.93
11	Flexibility	151	15	212	20	80	10	10	5	3	1	3.92
12	Attention to Details	136	5	196	23	104	20	13	3	7	0	3.70
13	Inductive Ability	142	7	216	12	78	22	20	8	0	2	3.51
14	Self-Confidence	144	6	152	12	116	21	44	10	0	2	3.40
15	Perseverance	104	8	164	10	164	16	20	16	4	1	3.34

3.4 Competency Modeling Construction

By integrating the five competency competencies extracted from the strategic and cultural analysis of University A and the ten competency competencies extracted from interviews with business administration faculty members at University A, and based on the results of a comprehensive scoring of the 15 competency competencies by a total of 507 faculty members and students, ranked from highest to lowest, 10 key competency qualities have been identified: professionalism, influence ability, responsibility, continuous learning ability, digital literacy, cultivation and guidance, organizational coordination, analytical thinking, teamwork, and communication skills. The competency model is constructed (see Table 4).

Table 4 Digital Competency Model for Business Administration Teachers in Higher Education Institutions

Competency Quality	Definition	Hierarchy	Hierarchical Behavior Descriptions
Competencies Above the Iceberg			
Professionalism	Teaching relevant courses involves content related to theories, technologies, tools, and processes.	1	Have a basic understanding of the content outlined in the textbook and be able to explain it based on the textbook and other supplementary materials.
		2	Building on the existing content of the textbook, proactively offer personal professional knowledge to help students and others solve technical problems or improve their level of expertise.
		3	Utilize the resources at hand to expand on the professional knowledge contained in other channels, disseminate new information and technologies, and gain recognition within the industry.
Continuous Learning Ability	The ability to proactively acquire new knowledge, skills, and experience in a constantly changing and	Level 1	Recognize the importance of continuous learning, proactively participate in on-campus and off-campus training and learning exchanges, and constantly update and expand one's professional knowledge and teaching skills.
		Level 2	Not only participate in training, but also proactively seek

	updating environment.		learning resources (professional books, courses, and academic papers).
		Level 3	Possess a high degree of autonomy, actively engage with cutting-edge fields, and apply what is learned to teaching, continuously improving the quality of instruction and research standards.
Cultivation Guidance	In the educational and teaching process, by focusing on students' potential and malleability, provide the correct guidance and necessary support for their growth, enhancing their learning outcomes.	Level 1	Believe in students' initiative and ability to learn, openly praise their achievements or progress, have a deep understanding of their learning situations, and make positive predictions and evaluations about the potential and future prospects inherent in students.
		Level 2	When giving instructions or demonstrations, explain why certain methods are adopted to help students understand and strengthen learning outcomes. Utilize questioning, testing, or other methods to assess whether students have mastered the material, guiding them to successfully complete the course.
		Level 3	Identify areas where students need improvement, arrange targeted tests, training programs, or other practical opportunities for them, and design study plans to promote their growth. Encourage students to undertake challenging learning tasks, allowing them to learn in their own ways.
Organizational Coordination	In educational and teaching activities, effectively plan and coordinate resources, clearly express, and effectively convey information.	Level 1	Basic ability to manage the classroom, communicate with students, understand their needs, and integrate simple teaching resources.
		Level 2	Not only resolve classroom issues but also address and handle problems within the teaching team, offer valuable opinions and suggestions to promote team progress.
		Level 3	Capable of independently conducting educational and teaching activities, identify problems during the process, establish good communication channels with colleagues, students, and parents, and effectively solve issues in teaching and management.
Teamwork	As a member of the teaching and academic team, actively seek others' opinions within the team, share information with each other, encourage one another, and collaborate with team members to achieve the team's goals.	Level 1	Willing to work cooperatively with other teachers, voluntarily participate in and support the team's decisions, and share useful information and resources.
		Level 2	View and discuss team teachers with positive language, express respect for others' talents, publicly praise and encourage others' abilities and contributions, and be willing to step forward to help other teachers solve problems during crises or critical moments.
		Level 3	Build high morale within the team, not hide from or avoid conflicts within the team, openly address internal contradictions, and actively seek favorable solutions to conflicts.
Communication Ability	In the process of education and teaching, the ability to listen, clearly express one's own views, provide open feedback, and communicate information with students and other teachers.	Level 1	Have the willingness to communicate and can respond to communication signals from students and other teachers.
		Level 2	Can accurately understand the perspectives of others when communicating with students and other teachers, actively provide feedback, express concisely and logically, with clear and distinct viewpoints.
		Level 3	Anticipate the needs and concerns of students and other teachers, adopt appropriate communication strategies based on different individuals, and can skillfully use language techniques and make flexible adjustments.

Sub-iceberg Competencies			
Influence Ability	In teaching, the starting point is to influence and change students' thinking and behavior, thereby generating a positive, profound, and lasting impact.	Level 1	Focus only on the teaching tasks, considering the teaching plan fulfilled sufficient, while neglecting the students' reception and effectiveness.
		Level 2	Consciously aim to influence students and acknowledges and affirms the changes made by students.
		Level 3	Achieve satisfaction and pleasure internally after educating students to a certain level of knowledge and skill.
Responsibility	In teaching, recognize the work responsibilities of university teachers, take serious actions to fulfill these responsibilities, and voluntarily and conscientiously bear the consequences of their work.	Level 1	Clearly understand job responsibilities and roles, recognizing the importance of one's own work.
		Level 2	Proactively take measures to manage both in-scope and out-of-scope tasks during teaching life, ensuring that tasks outside of one's responsibilities do not affect the completion of in-scope work.
		Level 3	Openly assume responsibility for issues within one's duties, supports the realization of corporate strategic goals, and complete work and assumes responsibility without compromise, even under significant pressure or personal loss.
Digital literacy	In the teaching process, teachers focus on new digital technologies, methods, and concepts to improve teaching quality and effectiveness. They challenge traditional teaching methods, innovate, strive for excellence, and engage in breakthrough innovations.	Level 1	Typically use past experiences or references internal viewpoints for inference when facing new teaching challenges.
		Level 2	Continuously question existing practices, challenge traditional teaching methods and thinking, have unique insights into improving their work, and constantly introduce concepts and methods from other fields to guide their work.
		Level 3	Develop and apply new concepts, creates innovative teaching methods or thinking, establish a theoretical system recognized by the industry, can guide and enhance teaching quality, and dare to take risks in formulating new policies, adopting new measures, or trying new methods.
Analytical Thinking	In the teaching and continuous learning process, the ability to understand things by breaking down the whole into parts, namely the ability to analyze problems step by step and conduct linear analysis of cause and effect.	Level 1	Break down a problem into separate, unrelated tasks and listing them.
		Level 2	Break down a problem or thing into several interconnected parts, recognizing simple multiple causal relationships, that is, simple causal chains of one cause leading to multiple effects and multiple causes leading to one effect.
		Level 3	Predict possible obstacles and pre-plan steps to solve the problem, be able to think of several solutions in advance, and judge and choose different solutions based on weighing pros and cons and feasibility.

4. Conclusion

This paper responds to the challenges and opportunities that artificial intelligence development and digital transformation present to the education sector. Relying on the competency iceberg model and onion model, it constructs a digital competency model for business administration teachers, which includes ten key competencies: professionalism, influence ability, responsibility, continuous learning ability, digital literacy, cultivation guidance, organizational coordination, analytical thinking, teamwork, and communication skills. This provides a valuable supplement to existing research. In the era of knowledge-based society, universities emphasize teacher competence to ensure that teachers possess relevant knowledge, skills, and qualities, which is of great significance for the quality and reputation of higher education.

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