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COMPETENCE OF HIGHER VOCATIONAL STUDENTS BASED
ON DELPHI METHOD AND GROUNDED THEORY IN THE PRCHasyamuddin Othman¹, Shen Junfeng^{2*},¹ Universiti Tun Hussein Onn Malaysia² Universiti Tun Hussein Onn Malaysia

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This work is licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/)**Abstract:**

Occupational competence (OC) is a matter of competitiveness in the future job market as well as the level of student development. However, in China there is a gap between the OC of higher vocational students (HVS) and the requirements of the industry, and graduates have a relatively low employment rate and lack the necessary skills and experience in the real world, requiring additional training and guidance in order to be qualified for their positions. The aim of this study is to explore the elements of OC of HVS and to provide a basis for educators to develop the OC of HVS. In order to achieve this goal, this paper uses 2 qualitative research methods, the Delphi method and Grounded Theory. Through purposeful sampling techniques, 12 experts from 3 regions, Jiangsu, Guangdong, and Zhejiang, including college administrators, corporate personnel, outstanding graduates, and government officials, were selected to help identify and extract the components of OC of HVS. The results of the study are based on 3 dimensions—learning and innovation, career and life, and character and literacy—composed of 15 sub-components and 35 items. It is recommended to apply the list of elements in practice and emphasize its important orientation in vocational education in order to improve the OC with the needs of enterprises and personal development.

Keywords:

Occupational Competence, Vocational Education And Training, Delphi Method, Grounded Theory

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Introduction

Mertens pioneered key qualifications in the 1970s, emphasizing knowledge, skills, and attitudes essential for adaptable work in specific occupational domains. It now forms the fundamental structure for vocational education training goals worldwide.³ In the late 1990s, competence replaced the previous concept. Competencies are viewed as acquirable and transferable attributes, signifying the capacity for diverse human activities like work, learning, and adapting to change.⁴ The most influential systematic study of global core competence can be traced back to the OECD's (The Organization for Economic Co-operation and Development) Definition and Selection of Literacy: Theoretical and Conceptual Foundations project launched at the end of the twentieth century, which categorized the core competence expected of future citizens as interactive use of tools, autonomous action, and interaction in socially heterogeneous groups, and generalized them as person-versus-tool, person-versus-self, and person-versus-society⁵. Currently, this framework has become the cornerstone of the composition of core literacy in many countries (regions).⁶ In September 2016, China released the Core competence for Chinese Students' Development, which is based on the basic principles of scientific, contemporary and national character, with the cultivation of a "well-rounded person" as the core, divided into three aspects: cultural foundation, independent development and social participation, and put forward humanistic background, scientific spirit, learning to learn, healthy life, responsibility, The six major qualities and eighteen basic points are proposed, namely, humanistic foundation, scientific spirit, learning to learn, healthy life, responsibility, practice and innovation.⁷ Sang Lei (2020) in the model of occupation competence of higher vocational students, constructed vocational character and cultivation, life and career literacy, learning and innovation literacy, information and technology literacy at four levels and twenty-eight elements.⁸

Due to swift advancements in science, technology and the evolution of the industrial economy, the labor market is progressively influenced by globalized work structures.⁹ Single occupational skills no longer suffice for today's economic and social demands; comprehensive vocational abilities are the essential "core competence" sought by employers.¹⁰ However, issues such as what constitutes a "competency" and how to characterize it in relation to the curriculum are far

³ Lilia, R., & Elena, T. (2019). Skills and competencies in higher education and beyond. *Journal of Language and Education*, 5(4 (20), 4-8.

⁴ Ropohl, M., Nielsen, J. A., Olley, C., Rönnebeck, S., & Stables, K. (2018). The concept of competence and its relevance for science, technology and mathematics education. *Transforming assessment: Through an interplay between practice, research and policy*, 3-25.

⁵ OECD. (2019). *An OECD Learning Framework 2030. The Future of Education and Labor*, 23-35.

⁶ Dudyrev, F., Maltseva, V., Romanova, O., & Petrov, E. (2021). Assessment of Vocational Skills and Learning Outcomes in VET: A Review of International Initiatives. *Journal of supranational policies of education*, (13), 145-167.

⁷ Shizhongyin.(2018).Philosophical Reflections on the Development of Core Competencies for Chinese Students. *Courses. Teaching materials. Teaching methodology*(09),36-41. doi:10.19877/j.cnki.kcjcf.2018.09.007.

⁸ Sanglei.(2020).Research on vocational core literacy of higher vocational students and its cultivation(PhD thesis,Nanjing Normal University).<https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFDLAST2021&filename=1021506549.nh>

⁹ Schröder, T. (2019). A regional approach for the development of TVET systems in the light of the 4th industrial revolution: the regional association of vocational and technical education in Asia. *International Journal of Training Research*, 17(sup1), 83-95.

¹⁰ Rieckmann, M. (2018). Learning to transform the world: Key competencies in Education for Sustainable Development. *Issues and trends in education for sustainable development*, 39, 39-59.

from being agreed upon.¹¹ Currently, a disparity exists between the occupational competence of higher vocational students and industry requirements. According to a questionnaire on youth employment in Guangdong in July 2023, 28.24% college students were employed in professions that were completely compatible, 46.34% professions that were partially intertwined with their positions, and 24.41 per cent in professions that were unrelated. In addition, 46.1% young people said that they had a relatively smooth job search and were employed upon graduation, while 53.39 % young people were troubled by the fact that they could not find a matching profession. The survey shows that more than half of the young people believe that it is more difficult to find jobs that are fully compatible with their majors.¹²

In summary, OC is a process that changes dynamically with social change and educational reform, and it is worthless to talk about the OC of HVS in a general way by leaving out the contextual research. Therefore, this paper uses qualitative research, draws on the experience of constructing core competence index systems at home and abroad, and redefines the current elements of OC from four aspects, namely, the government, colleges and universities, enterprises, and graduates themselves, by applying the Delphi method and the Grounded Theory in the context of China's unfavourable employment situation and the disconnection of talent cultivation, with a view to providing a clearer and more effective direction for the cultivation of OC in higher vocational colleges.

Literature Review

In the early 20th century, the concept of occupation competence emerged, emphasizing the scientific analysis of human behavior to explore the abilities needed for high achievement.¹³ In the 1940s, Piaget regarded competence as individual intellectual differences, emphasizing the interaction between individuals and the environment in constructing knowledge.¹⁴ In the 1960s, Chomsky introduced the notion of innate language ability.¹⁵ In the 1970s, McClelland defined competence as motivation, traits, knowledge, etc., related to outstanding performance. In the 1990s, Prahalad & Hamel proposed the concept of "collective competence," and Gardner introduced the theory of multiple intelligence.¹⁶ In 1993, Spencer presented the "Iceberg model," emphasizing comprehensive qualities. In 1996, UNESCO outlined the pillars of learning. In the late 20th century, with the development of information technology, the concepts of competence and skills were upgraded and expanded, and consensus on literacy emerged.¹⁷ From 1997 to 2005, the OECD conducted literacy research, proposing a concept covering knowledge, abilities, and attitudes.¹⁸ Literature analysis shows that there is still a certain degree of interchangeability between occupational literacy, occupational ability and

¹¹ Lester, S., Koniotaki, A., & Religa, J. (2022). ComProCom: a revised model of occupational competence. *Education+ Training*, 60(4), 290-302.

¹² <https://new.qq.com/rain/a/20230915A06IXI00>

¹³ Salman, M., Ganie, S. A., & Saleem, I. (2020). The concept of competence: a thematic review and discussion. *European Journal of Training and Development*, 44(6/7), 717-742.

¹⁴ Parrish, M. (2020). Cognitive theories and cognitive development. *Human Growth and Development in Children and Young People: Theoretical and Practice Perspectives*, 51.

¹⁵ Tantray, M. A. (2023). Chomsky's Theory of Mind: Concepts and Contents. *Tattva Journal of Philosophy*, 15(1).

¹⁶ Wong, S. C. (2020). Competency definitions, development and assessment: A brief review. *International Journal of Academic Research in Progressive Education and Development*, 9(3), 95-114.

¹⁷ Xiang, H. (2021). Study on Selection Mechanism of College Student Cadre under Iceberg Model. *Frontiers in Humanities and Social Sciences*, 1(3), 89-97.

¹⁸ Salman, M., Ganie, S. A., & Saleem, I. (2020). The concept of competence: a thematic review and discussion. *European Journal of Training and Development*, 44(6/7), 717-742

occupational quality, and the conceptual boundaries of their research are not particularly clear.

Research on "occupation competence" among college students in China first appeared in 2003. Before 2008, there were few theoretical achievements related to occupation competence, and the understanding and clarification of the concept of occupational competence were in the exploratory stage, with no unified consensus in academia.¹⁹

Literature analysis reveals that Lü Ganglan was one of the early scholars to study the occupational competence of vocational college students. He initially distinguished between the concepts of "competence" and "ability," laying a good foundation for subsequent research.²⁰

Currently, with the gradual deepening of research, academia has reached a relatively unified understanding and interpretation of the concept of occupational competence. Although descriptions from different scholars vary, they all point to one thing: occupational competence refers to the inherent norms and requirements within a profession, manifested as comprehensive qualities demonstrated in the process of engaging in a profession. It is reflected through specific professional actions in particular professional contexts and encompasses aspects such as occupational ethics, occupational consciousness, occupational behavioral habits and occupational skills.²¹

Wei Lijun pointed out the influencing factors of OC are broad, categorized into three aspects based on general individual development: personal factors, environmental factors and social factors.²² Additionally, the current research elements are rich and expanding, but the research is not complete and in-depth enough, the perspective focuses on the school field and lacks the enterprise and industry perspective, and there are more theoretical studies in the research results, but fewer interventions and applications, and less improvement and promotion of the research.

Methodology

This study adopts qualitative research method. Because qualitative research methods are more suitable for describing and analyzing individual things in detail and dynamically at the micro level.²³ And this paper, which involves the influence of individuals, society, schools and policies on them, has to be keen to find out the phenomena behind the problems and analyse the complex viewpoint connections and contradictions, so it is more appropriate to use qualitative research.

¹⁹ Baibin, Hezhen & Wuqiuchen. (2021). Occupational Core Literacy of Highly Skilled Talents - A Qualitative Study from the Perspective of Corporate Employers and Excellent Employees. China Vocational and Technical Education(18), 15-24+34. doi:CNKI:SUN:ZONE.0.2021-18-002.

²⁰ Wangxi. (2020). A Mechanistic Study of the Role of Career Growth on Employee Advising Behavior (PhD thesis, University of Science and Technology of China (USTC)). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFD1214&filename=1014268942.nh>

²¹ Qianyu. (2021). An empirical study on the influencing factors of vocational ability of higher vocational students in the perspective of modern apprenticeship system. Writer's Corner(13), 97-98. doi:CNKI:SUN:ZJTD.0.2021-13-050.

²² Weilijun & Xushijian. (2023). Research on factors influencing occupational competence: hotspots, vectors and outlook - coding analysis based on Nvivo 12.0. Journal of Wuhan Institute of Vocational Technology(04), 17-23. doi:10.19899/j.cnki.42-1669/Z.2023.04.003.

²³ Hennink, M., Hutter, I., & Bailey, A. (2020). Qualitative research methods. Sage.

The research problem of this paper is the factors of OC of HVS, which involves the influence of individuals, society, schools and policies on them, which involves the influence of the individual, society, school and policy on them, following the Motivation and social cognitive theory, where people's thoughts and behaviors are constructed in social situations. Each person is in a different social situation, which results in different cognitive experiences.²⁴ Therefore, the inquiry into the vocational competence of higher vocational students should go deeper into the four dimensions of students, universities, enterprises and government, and try to construct a vocational competence scale for higher vocational students from three aspects: cognition and practice, feedback and reflection, and autonomy and internalization. It is necessary to keenly discover the phenomenon behind the problem and analyze the complex viewpoint connections and contradictions, so it is more suitable to use qualitative research.²⁵

Research Methods

Delphi Method

This is a structured decision support technique designed to obtain relatively objective information, opinions and insights in the information gathering process through independent and repeated subjective judgments of multiple experts²⁶. In this paper, multiple rounds of written opinions were solicited anonymously from a selected group of experts. Each round of expert opinions was summarized and collated, and the collated materials were fed back to each expert for analysis and judgment. The experts put forward new arguments on the basis of the collated materials. Through many iterations, the opinions gradually converged and a more consistent and reliable conclusion or program was reached.²⁷

During the consultation process, the names of the experts are not exposed, and each expert does not know how many experts there are in total and which ones are involved in the consultation, so there is no psychological pressure to speak freely when giving opinions, and the process of data collection breaks down the presuppositions made in advance, which is more applicable to the elemental constructs of this study.²⁸

Grounded Theory

A research method jointly developed by two scholars, Anselm Strauss and Barney Glaser of Columbia University. That is, on the basis of systematic data collection and analysis procedures, core concepts are continuously extracted and outlined, and then gradually rise to theories through comparison and integration among concepts.

In this paper, the choice of experts will cause subjective differences, and subjective differences are part of the data, according to the Grounded Theory and code the data, coding methods in order of open coding, Axial coding, selective coding will make the corresponding conclusions

²⁴ Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary educational psychology*, 60, 101832.

²⁵ Merriam, S. B., & Grenier, R. S. (Eds.). (2019). *Qualitative research in practice: Examples for discussion and analysis*. John Wiley & Sons.

²⁶ Lund, B. D. (2020). Review of the Delphi method in library and information science research. *Journal of Documentation*, 76(4), 929-960.

²⁷ Zartha Sossa, J. W., Halal, W., & Hernandez Zarta, R. (2019). Delphi method: analysis of rounds, stakeholder and statistical indicators. *foresight*, 21(5), 525-544.

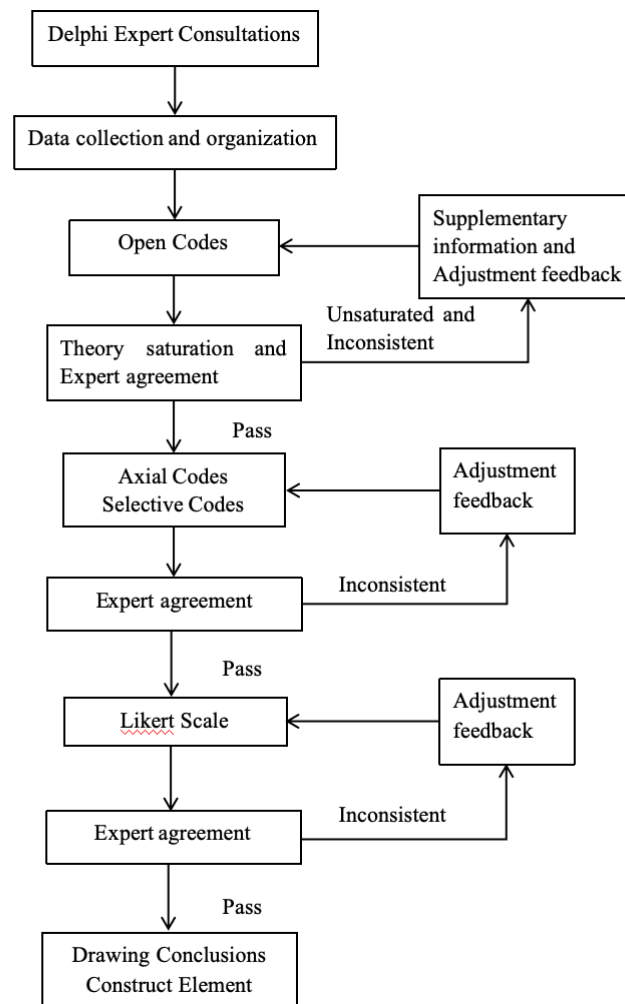
²⁸ Fink-Hafner, D., Dagen, T., Doušak, M., Novak, M., & Hafner-Fink, M. (2019). Delphi method: strengths and weaknesses. *Metodoloski Zv*, 16(2), 1-19.

are different. It is because of the individual subjective differences in the characteristics (no one else can replace) of the achievement of the charm of Grounded Theory.

Research Design

Based on the perspective of higher vocational education, this study applies the theory of vocational growth law, the theory of multiple intelligence, the theory of human-vocational matching, draws on the results of theoretical research and practical exploration of different international organizations, countries and regions, combines the type of characteristics and target positioning of China's higher vocational education, and constructs a table of OC of HVS based on the needs of enterprises and employers and the needs of HVSs' vocational sustainable development with the help of literature analysis, Grounded Theory, and the Delphi method, and designing and optimizing its structure. (see Figure1)

Figure 1 Research Design Of OC Elements For HVS



Participants

The primary criterion for the selection of experts is "typicality". The Evaluation Report on the Development of Vocational Education in China (2022) compiled by the China Vocational Education Society (CVES) has been released, which calculates the development index of vocational education in each province based on the data of 16 indexes such as student

cultivation, teachers' conditions, resources and integration of industry and education. Among them, Jiangsu (index 67.82 points), Guangdong (index 67.75 points), Zhejiang (index 65.15 points) ranked the top three.²⁹ Therefore, it is typical to choose experts from Jiangsu, Guangdong and Zhejiang to analyze the elements of OC of HVS. (see Table 1 for details)

Table 1 Profile of Participants (N=12)

No	Name	Position in the organist	District	Categorical	Years of work in the field
1	LW	Director, Vocational and Higher Education Division, <u>Nantong Municipal Education Bureau</u>	<u>Nantong, Jiangsu</u>	Government branch	7
2	DJ	Party Secretary, <u>Nantong Talent Service Centre</u>	<u>Nantong, Jiangsu</u>	Government branch	6
3	HW	Deputy Director of Jiangsu University Admission and Career Guidance Service Centre	Nanjing, Jiangsu	Government branch	8
4	ZWW	Manager, Airline Ticket Sales Department, <u>Tongtong Travel</u>	Shanghai	Graduates	5
5	HFL	Shanghai Boeing Structures Department Foreman	Shanghai	Graduates	5
6	ZTY	Secretary of the General Party Branch of Intelligent Manufacturing College of Jiangsu Engineering Vocational and Technical College (JEVTC)	<u>Nantong, Jiangsu</u>	Graduates	15
7	ZYB	<u>Nantong</u> CPPCC Member, General Manager of New Oriental Power Supply Co.	<u>Nantong, Jiangsu</u>	Graduates	25
8	LLX	<u>Nantong Hangzhi Equipment Technology Co.</u>	<u>Nantong, Jiangsu</u>	Corporations	9
9	ZSY	Director of Human Resources Department, Shanghai <u>Yongsheng Chemical</u>	Shanghai	Corporations	13
10	DHL	Vice President, Jiangsu Engineering Vocational and Technical College	<u>Nantong, Jiangsu</u>	School	21
11	CSR	Director, Admission and Employment Office, Guangdong Institute of Science and Technology (GIST)	Guangdong <u>Zhuhai</u>	School	17
12	LD	Director of Admission and Employment Department, <u>Jinhua Institute of Vocational Technology</u>	<u>Jinhua, Zhejiang</u>	School	20

²⁹ <https://www.163.com/dy/article/HG4EG8NL05218435.html>

Research Procedure

First Round

The first round of expert consultation method distributed consultation forms to the expert members of the review group through WeChat and email, 12 copies were distributed, and 12 copies were recovered with a recovery rate of 100%, which showed that the positive coefficient of the experts was high, and the experts were more interested in the study and more motivated to participate in it. The design of the consultation form followed open-ended questions such as What do you think is the definition of occupational competence? The textual material collected in the first round became an important basis for open coding in this study.

Open coding : as the name suggests, requires the researcher to initially code the raw information collected as close as possible to its original form with an open mind and without subjective bias or theoretical stereotypes. Open coding is the crumbling and reintegration of information with the aim of defining concepts and discovering categories.³⁰

Adopting the coding analysis software Nvivo12, the phenomenon summary was carried out firstly, and the raw interview text data were initially organized sentence by sentence, line by line and paragraph by paragraph according to the requirements of open coding, and the raw representative statements related to vocational ability were extracted to establish free nodes, which were decomposed into different independent information units, and more than 457 raw statements were obtained, such as "Communication is not only the exchange of words, but also includes the ability to listen, understand, express and give feedback". Communication is not only the exchange of words, but also includes the ability to listen, understand, express and give feedback" and so on. Next is the development of concepts, due to the large number of concepts formed by the initial coding and the semantic intersection, the key statements are gradually grouped into theoretical categories through constant comparison, and the key information that can embody or influence the volunteer behavior of tourism is abstracted and formed into 45 initial concepts after analyzing and summarizing. (see Table 2)

³⁰ Vollstedt, M., & Rezat, S. (2019). An introduction to grounded theory with a special focus on axial coding and the coding paradigm. *Compendium for early career researchers in mathematics education*, 13(1), 81-100.

Table 2 Examples of Original text and Categories

Original text	Categories
This includes a willingness to learn, initiative to learn, and can take the initiative to learn all competencies required for the position.	Active Learning
The need to maintain lifelong learning habits and competencies.	lifelong learning
Communication is not only the exchange of words, but also the ability to listen, understand, express and give feedback.	Verbal communication
Students should have good language skills, be proficient in at least one foreign language, and be able to communicate and interact fluently.	Foreign language level
Written expression, on the other hand, is an important written communication skill.	Written communication
Many jobs need to be done in collaboration with others. Establishing good co-operative relationship with different people, effectively resolving conflicts and working together to achieve team goals; the ability of teamwork allows graduates to find their roles in the team and make progress together, as well as maintaining a harmonious and pleasant working environment.	Coordination and cooperation
The ability to work in a team allows graduates to find a role in a team and progress together, as well as maintain a harmonious and enjoyable work environment.	Find a niche
The ability to adapt to the development of society, to move freely between different positions, and to adapt well to a variety of work environments.	Adaptation to the work environment
Resilient people are never discouraged by failure and are open to good or bad outcomes. For them, failure is just part of learning.	Not afraid of setbacks

Second Round

The next step in the open coding process is axial coding, it was to analyze one category at a time in depth through clustering, looking for correlations around this category, hence the term "axial", with the main task of discovering and establishing the underlying logical connections between categories.³¹ Through stigmatization and categorization, the previous 45 categories were grouped into 21 Major Categories and sent to experts for a second expert consultation.(see Table 3)

³¹ Zhou, Q., Zhang, J., Wang, Q., & Zhong, J. (2023). Grounded theory-based analysis of occupational health and safety management modes in supply chain by core enterprises—evidence from China. *Heliyon*, 9(12).

Table 3 Relationships Between Initial Categories And Major Categories

Categories (39)					Major Categories (12)
Technical knowledge	Business knowledge	Body of knowledge			Specialize knowledge
Active Learning	lifelong learning				Learning ability
Manual dexterity	Translation of knowledge				Practical skills
Spirit of discovery	Innovative thinking				Innovation capacity
Independent thinking	Rational judgement				Critical thinking
Body Management	Emotion management	Pressure-resis tant			Physical and mental
Adaptation to the working	Not afraid of setbacks				Adaptive
Verbal communicatio	Written communicatio	Foreign language			communication skills
Thinking from multiple	Analytical power	Ability to think and act			Problem-solving skills
Setting career goals	Adapting and optimism				Career development and
Leadership	Enforce ability				Leadership executive capacity
Coordination	Find a niche				Teamwork skills
Ability to general and summaries	Decision-maki ng and judgement				Integrated decision-making
Judge the hour and size up the situation	Fast and effective				Adaptability
Mandate organization	Resource organization				Organizational capacity
Sense of social responsibility	Service Awareness	Hardworking and enduring hardships	Devotion	Sense of respon	Professionalism

Third Round

The feedback from the second round of expert consultation on recycling was firstly satisfied with the saturation validation, and no new concepts appeared. Moreover, several experts suggested modifications to some of the content. Concurrently conducted was selective coding, which is rooted in the third step of the Grounded Theory process, also known as tertiary coding. This step is based on the analysis carried out by the open coding and the axial coding, comparing and reflecting on the major categories and categories and the relationships between them, identifying one or more core categories, and organizing a "story line" with the core categories leading the categories.³²

After revision, the concepts of "practical experience" and "time management" are deleted, and the concepts of "reasonable rest", "healthy diet" and "moderate exercise" are merged to form "body management"; the concepts of "keeping calm" and "positive response" are merged to form "body management". The concepts of "reasonable rest", "healthy diet" and "appropriate amount of exercise" were combined to form "body management"; the concepts of "keeping calm" and "positive response" were combined to form "resilience"; and the concepts of "stress management" were combined to form "stress management". and "positive coping" were combined to form "stress resistance". The resulting 39 major category were coded and categorized into 16 core category. (see Table 4)

Table 4 Relationships Between Major Categories And Core Categories

Major Category (16)			Core Category (3)
Specialize knowledge	Learning ability	Time-use capability	Learning and Innovation
Innovation capacity	Critical thinking		
Physical and mental management	Adaptive	Communication skills	Life and career
Problem-solving skills	Career development and planning		
Leadership executive capacity	Teamwork skills	Integrated decision-making	Quality and sophistication
Adaptability	Organization capacity	Professionalism	

³² Ye, Y., Omar, R., Ning, B., & Ting, H. (2020). Exploring the interactions of factory workers in China: A model development using the grounded theory approach. *Sustainability*, 12(17), 6750.

Three rounds of the study have been conducted and a preliminary OC scale for HVS has been constructed. The following is the third round of expert consultation on the consistency and importance of the indicators, and the preparation of the expert comment form consultation form.(see Table 5) The first is to explain the actual situation of the meaning to be expressed on the indicators; the second is to use a 5-point Likert scale for the importance of the indicator items for experts to give an evaluation based on the connotation of the indicators and combined with their own understanding; the third is to set up an open-ended column of opinions so that the experts can give their own opinions and suggestions after reflecting on the indicators.³³

³³ Remus, A., Smith, V., & Wuytack, F. (2021). Methodology in core outcome set (COS) development: the impact of patient interviews and using a 5-point versus a 9-point Delphi rating scale on core outcome selection in a COS development study. *BMC Medical Research Methodology*, 21(1), 1-15.
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Table 5 Example of Elemental Review of OC for HVS

Core Category	Major Category	Category	Connotation	Importance assessment
Learning and innovation	Specialize knowledge	Technical knowledge	Expertise, the ability to meet the basic standards of the position and one of the criteria for qualification.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
		Business knowledge	Poor business knowledge is often replaced at the time of interview for a position or during the internship assessment.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
		body of knowledge	Framework of Expertise. That is, an understanding of the most basic things, especially knowing the ins and outs of a particular piece of knowledge.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
	learning ability	Active Learning	This includes a willingness to learn, initiative to learn, and can take the initiative to learn all competencies required for the position.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
		lifelong learning	Maintain the habit and capacity for lifelong learning.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
	Practical skills	manual dexterity	Ability to apply knowledge and technology, also known as hands-on skills.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5
		Translation of knowledge and skills	Accumulate certain knowledge and experience and promote the formation and development of operational skills.	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5

Fourth Round

After the distribution and collection of the consultation questionnaire, SPSS and Excel were mainly used to organize and analyze the data, and the evaluation of the experts on each indicator showed the results more intuitively through the statistics and analysis of the data. The results of the third round of Delphi consulting questionnaire review consistency are shown in the Table 6, The value of Kendall's coefficient of concordance ranges from 0 to 1. The closer the w value is to 1, the higher the degree of consistency of the experts' opinions is represented.

³⁴It can be seen that $KendallW = 0.172$, in the this round of the expert evaluation of the consistency of opinion is poor, reflecting the review group of experts on the evaluation of the evaluation of the importance of the recognition of the indicator of the existence of differences in opinion, so it is necessary to carry out the next round of the review group of experts to comment on.

Table 6 Test Statistics

N	12
<u>Kendallw</u>	0.172
Chi-square	78.336
<u>df</u>	38
<u>Asymp. Sig.</u>	<0.01

On the basis of analyzing the results of the third round of expert evaluations, and in order to improve the efficiency of expert deliberations and fully consider the views of the experts, those elements of the indicators on which consensus had been reached by the experts in the previous round were no longer subject to deliberation. As the five-point likert scale was chosen, the average value of the indicator's expert rating was 4 or more, which is generally considered to be a high degree of recognition by the expert group, and the indicator can no longer be evaluated.³⁵

The second is Coefficient of Variation, which is a measure of the degree of variability of the data; the higher the coefficient of variation, the greater the degree of variability of the data and the lower the degree of consistency.³⁶Therefore, 17 indicators with a Coefficient of Variation of more than 0.2, as well as a mean value of less than 4, were selected to develop the fourth round of the expert consultation table .(see Table 7)

³⁴ Franceschini, F., & Maisano, D. (2021). Aggregating multiple ordinal rankings in engineering design: the best model according to the Kendall's coefficient of concordance. *Research in Engineering Design*, 32, 91-103.

³⁵ Chakrabartty, S. N., & Chakrabartty, S. N. (2019). Scoring and analysis of Likert scale: few approaches. *Journal of Knowledge Management and Information Technology*, 1(2), 31-44.

³⁶ Jalilibal, Z., Amiri, A., Castagliola, P., & Khoo, M. B. (2021). Monitoring the coefficient of variation: A literature review. *Computers & Industrial Engineering*, 161, 107600.

Table 7 Elemental Review of OC for HVS (2ST)

No	Category	Average value	Coefficient of Variation	Importance assessment
1	Foreign language level	3.50	0.34	□1 □2 □3 □4 □5
2	Leadership	3.83	0.28	□1 □2 □3 □4 □5
4	Written communication	3.75	0.25	□1 □2 □3 □4 □5
5	Find a niche	4.25	0.24	□1 □2 □3 □4 □5
6	Judge the hour and size up the situation	3.83	0.23	□1 □2 □3 □4 □5
7	Devotion	3.75	0.22	□1 □2 □3 □4 □5
8	Body Management	4.33	0.22	□1 □2 □3 □4 □5
9	Emotion management	4.25	0.22	□1 □2 □3 □4 □5
10	Not afraid of setbacks	4.17	0.22	□1 □2 □3 □4 □5
12	Thinking from multiple perspectives	4.08	0.21	□1 □2 □3 □4 □5
13	Fast and Effective	4.08	0.21	□1 □2 □3 □4 □5
14	Adapting and optimism career paths	4.08	0.21	□1 □2 □3 □4 □5
15	independent thinking	4.00	0.20	□1 □2 □3 □4 □5
16	Resource organization	4.33	0.20	□1 □2 □3 □4 □5
17	Rational judgement	3.92	0.19	□1 □2 □3 □4 □5

As can be seen from Table 8, the Kendall's coefficient of concordance in the second round has a large improvement, $w=0.419>0.4$, indicating that the expert opinion concordance is obvious. Meanwhile, the P-value of the test of the coefficient of concordance in the two rounds is less than 0.05, indicating that the expert assessment opinions are well coordinated and the results are desirable at the 95% confidence level.

Table 8 Test Statistics (2ST)

N	12
<u>Kendallw</u>	0.411
Chi-square	69.131
<u>df</u>	14
<u>Asymp. Sig.</u>	<0.01

Table 9 Statistical Results Elemental Review of OC for HVS (2ST)

Category	Ratings by members of the Group of Experts												Average value
	1	2	3	4	5	6	7	8	9	10	11	12	
Foreign language level	3	4	3	3	3	3	3	4	3	4	4	3	3.33
Leadership	4	4	3	3	4	4	3	4	4	4	3	4	3.67
Written communication	3	4	4	3	4	3	4	4	3	3	5	3	3.58
Find a niche	5	5	4	4	4	4	4	4	4	4	4	4	4.17
Judge the hour and size up the situation	5	5	4	4	4	4	5	4	4	5	4	4	4.33
Devotion	3	3	3	4	3	3	3	4	3	3	3	3	3.17
Body Management	4	4	4	4	5	4	5	4	5	4	5	4	4.33
Emotion management	5	4	4	4	5	4	5	4	4	5	4	4	4.33
Not afraid of setbacks	5	4	4	4	4	4	5	4	4	5	4	4	4.25
Thinking from multiple perspectives	5	5	4	4	4	4	5	4	4	5	5	4	4.42
Fast and Effective	5	4	4	5	4	5	4	4	3	3	5	3	4.08
Adapting and optimism career paths	4	4	4	5	4	5	5	4	4	4	4	5	4.33
Independent thinking	4	4	4	4	5	3	4	4	4	4	4	5	4.08
Resource organization	5	5	4	4	4	4	5	4	4	5	4	4	4.33
Rational judgement	4	4	4	5	4	4	4	4	4	4	4	4	4.08

In summary, the results of the two rounds of expert deliberations were adopted comprehensively, and based on the experts' suggestions, "foreign language level", "leadership", "written communication" and "dedication" with a mean value of less than 4 points were excluded (see Table 9), and "execution" was included in the Major Category "teamwork ability", and finally, the list of elements of OC of HVS was modified accordingly. (See Table 10)

Table 10 Elements of OC for HVS

Core Category (3)	Major Category (15)	Category (35)
Learning and Innovation	Specialist knowledge	technical knowledge
		Business knowledge
		Body of knowledge
	Learning ability	Active Learning
		Lifelong learning
	Practical skills	Manual dexterity
		Translation of knowledge and skills
	innovation capacity	Spirit of discovery
		Innovative thinking
	critical thinking	Independent thinking
		Rational judgement
Life and career	Physical and mental management	Body Management
		Emotion management
		Pressure-resistant
	Adaptive	Adaptation to the working environment
		Not afraid of setbacks
	Communication skills	Verbal communication
	Problem-solving skills	Thinking from multiple perspectives
		Analytical power
		Ability to think and act
	Career development and planning	Setting career goals
		Adapting and optimist career paths
Character and Grooming	Teamwork skills	Enforce ability
		Coordination and cooperation
		Find a niche
	Independent thinking	Ability to general and summaries
		Decision-making and judgement
	Adaptability	Judge the hour and size up the situation
		Fast and effective
	Organization capacity	Mandate organization
		Resource organization
	Professionalism	sense of responsibility
		hardworking and enduring hardships
		Service Awareness
		Sense of social responsibility

According to the above list, our common leadership, dedication, foreign language level and written communication are not included, which is a big reversal of our established concepts, but also very much related to China's basic national conditions.

Limitation

Data processing is limited by qualitative research methods, the results are highly subjective, and data collection and analysis are time-consuming and labour-intensive. For example, when conducting the Delphi method, the opinions of experts are easily influenced by various factors such as education and status, or are based on inertia and lack of a holistic view. When coding data, there is also the subjective influence of the organist, which makes the expert's opinion lack of rigorous verification and feasibility, or shortens the number of consultations in order to reduce the number of coding times to improve the efficiency of decision-making, while ignoring the opinions of a few people, and so on.

Therefore, in this paper, the influence of subjective factors is minimized in order to ensure information and validity as much as possible during the research process. Firstly 2 experts in qualitative research from Malaysia and China were invited to evaluate the consultation form. Approval was obtained before data collection was carried out. Secondly, during the coding process, coding was carried out by myself and a fellow student simultaneously on the same sample, and then reliability testing was carried out using the formula for the Holsti Index is: $PA(Holsti) = 2A / (N1 + N2)$ PA (Holsti)a. The triangular mutual evidence method was used for testing, so as to achieve mutual complementation and validation of the data of the collected information, mainly using the spatial triangular method to take experts in different fields from different administrative regions in China as the research object, including Guizhou, Guangdong, Jiangsu, Shandong, Henan, Hebei, Liaoning and many other places. Finally, statistical tools were used to verify the subjective data, quantifying the subjective data with a 5-point Likert attitude scale, and verifying the consistency of the experts' attitudes with the KendallW coordinated test coefficient to improve the efficiency of data analysis.

Discussion

Leadership

Internationally renowned universities place great emphasis on the development of leadership skills in their students, initially developing the core qualities of a good leader before they enter society. From a university student's perspective, the meaning of leadership in society can be broken down into more basic meanings, such as being in charge of something big or small, and assisting other students in exploring new ideas³⁷. For example, the Institution for Sustainability Leadership at the University of Cambridge, in its study "The Future We Want, The Leaders We Need," has developed a model of leadership impact factors ("Cambridge Impact Leadership Model").

Is Chinese higher education not misunderstanding theoretical frameworks of leadership? Trace something to its source, the Chinese tradition, influenced by Confucianism, is typical of the vertical hierarchy concept, which naturally emphasizes status, hierarchy and control rather than fairness and equality, and harmony implies a kind of "order". As "harmony" in status and identity emerges, so does "harmony" in interpersonal relationships, and therefore approaches

³⁷ Stone, A. G., & Patterson, K. (2023). The history of leadership focus. Springer Books, 689-715.

that emphasize teamwork, autonomy and shared decision-making may be more in line with current work dynamics and values.

Devotion

Dedication can be said to be what every enterprise wants its employees to do. Employees in China in the 70s and 80s had a strong sense of responsibility and dedication. Examples of employees' dedication to the company can be seen in many companies, both state-owned and private. For example, we may not be like employees in some European countries who stop and leave work as soon as the end of the workday arrives, regardless of whether the concrete will solidify in the trough, but voluntarily work overtime to get the job done.

In recent years, with the awakening of Chinese employees' rights and interests. Ordinary employees are averse to leaders and employees talking about selflessness. Moreover, it is very challenging for employees to do their jobs well, and it is impossible to do them well if they do not devote themselves to them. Enterprises should not and do not have the power to force employees to dedicate themselves to the enterprise, it can only be made voluntarily by the employees. To make employees voluntarily dedication to the enterprise, it is necessary for enterprises to do a good job of employee relationship management, so that employees have a strong sense of belonging to the enterprise and a high degree of satisfaction. Dedication should be a kind of temperature, resonance of the enterprise culture call for benign feedback, rather than the enterprise call for employees to malicious competition product.

Written Communication

As an important component of professional communication, written communication is the use of words as a medium to convey information, which mainly includes a variety of official documents, reports, letters and contracts that will be encountered in a professional career. Written communication is flexible and procedural. The so-called flexibility refers to the length of written communication content is not limited, the content can be repeatedly carved until the writer wishes to meet; the so-called procedural refers to some special content needs to be written in accordance with the established format, such as notices, applications, government documents, contracts, etc., and these texts can be used as evidence of communication with legal effect.

Currently, people in China prefer to receive fragmented knowledge in a visual way. In contrast, long and complicated texts make people drowsy. If you think about it, it's not unreasonable to send an emoticon or play a terrier to solve the problem, so you don't need to talk about it at length. Now the network is in transition, showing a "heavy video light text" characteristics. And with the advent of the AI era, the rigor and systematical required for written communication to be handled by artificial intelligence, perhaps this mode of communication will be more marginalized.

Foreign Language Level

We live in an era of rapid technological development. Since Warren Weaver, the pioneer of information theory, published a translation memo in 1949, proposing the possibility of machine translation, machine translation has gone through decades of development and iteration, and has now entered an era of AI translation, which can use "neural networks" and incorporate "deep learning technology". Now it has entered an era of AI translation that can use "neural networks" and incorporate "deep learning technology". One of the foundations of the

government official's proposal to remove English as a major subject was the maturity of translator technology. People can't help but think, in a world where you can communicate without barriers by relying on AI translators, will learning a foreign language still be so useful? As a tool, the main value of a foreign language is in helping communication.³⁸ In China, the use of foreign languages is relatively limited. If a job does not necessarily require a foreign language, the value of a foreign language is infinitely close to zero. Secondly, Chinese people pay more attention to learning their mother tongue than learning a foreign language, and learning Chinese is much more difficult than learning English. Nowadays, a large number of software applications can help to read and understand the text to communicate with foreigners, and their convenience and accuracy are basically guaranteed. But it is important to emphasize that the lack of emphasis on foreign language standards does not mean that the international perspective of students is not valued.

Conclusion

This paper follows the research logic of "preparation-implementation-interpretation". Firstly, in the preparation stage, appropriate research methods, research samples and appropriate data sources are selected, and the principles and bases of selection are also explained; secondly, in the implementation stage, through Open coding, Axial coding and selective coding with four rounds of Delphi expert consulting, the raw data are organized and refined, and 15 category and 35 major category in the 3 core category of Learning and Innovation, Career and Life, and Character and Literacy are formed, providing a research basis for the subsequent construction of the model of vocational ability cultivation of higher vocational students. The formation of possible training methods and strategies based on the research results of this paper is not only the expansion and deepening of OC theoretical research, but also the enrichment and development of the theory of vocational education personnel training, education and teaching theory, and points out the direction of the solution to what kind of people are cultivated by the academic quality standards and what and how to teach by the curriculum and teaching standards.

There are still deficiencies in this paper, first, in the analysis of the information on the expert consultation form, although the process of coding and analyzing the information strictly adheres to the requirements of the rooted theory, it is difficult to avoid subjectivity, and limited to personal knowledge and vision, the constructed career elements may be biased and lack of universality. Secondly, in the Delphi expert survey, all the experts used online methods to carry out consultations, with limited feedback.

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³⁸ Tursunovich, R. I. (2023). Development of Communicative Competence in Teaching Foreign Language for Professional Purposes. In Proceedings of International Conference on Scientific Research in Natural and Social Sciences (Vol. 2, No. 1, pp. 26-33).

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Reference

- Baibin, Hezhen & Wuqiuchen. (2021). Occupational Core Literacy of Highly Skilled Talents - A Qualitative Study from the Perspective of Corporate Employers and Excellent Employees. *China Vocational and Technical Education* (18),15-24+34. doi: CNKI:SUN:ZONE.0.2021-18-002.
- Chakrabartty, S. N., & Chakrabartty, S. N. (2019). Scoring and analysis of Likert scale: few approaches. *Journal of Knowledge Management and Information Technology*, 1(2), 31-44.
- Dudyrev, F., Maltseva, V., Romanova, O., & Petrov, E. (2021). Assessment of Vocational Skills and Learning Outcomes in VET: A Review of International Initiatives. *Journal of supranational policies of education*, (13), 145-167.
- Fink-Hafner, D., Dagen, T., Doušak, M., Novak, M., & Hafner-Fink, M. (2019). Delphi method: strengths and weaknesses. *Metodoloski Zv*, 16(2), 1-19.
- Franceschini, F., & Maisano, D. (2021). Aggregating multiple ordinal rankings in engineering design: the best model according to the Kendall's coefficient of concordance. *Research in Engineering Design*, 32, 91-103.
- Habibi, A., Sarafrazi, A., & Izadyar, S. (2014). Delphi technique theoretical framework in qualitative research. *The International Journal of Engineering and Science*, 3(4), 8-13.
- Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods*. Sage.
https://news.cnr.cn/native/gd/20230418/t20230418_526222582.shtml
<https://www.163.com/dy/article/HG4EG8NL05218435.html>
- Jalilibal, Z., Amiri, A., Castagliola, P., & Khoo, M. B. (2021). Monitoring the coefficient of variation: A literature review. *Computers & Industrial Engineering*, 161, 107600.
- Lester, S., Koniotaki, A., & Religa, J. (2018). ComProCom: a revised model of occupational
- Lilia, R., & Elena, T. (2019). Skills and competencies in higher education and beyond. *Journal of Language and Education*, 5(4 (20), 4-8.
- Merriam, S. B., & Grenier, R. S. (Eds.). (2019). *Qualitative research in practice: Examples for discussion and analysis*. John Wiley & Sons.
- Parrish, M. (2020). Cognitive theories and cognitive development. *Human Growth and Development in Children and Young People: Theoretical and Practice Perspectives*, 51.
- Qian, Y. (2021). An empirical study on the influencing factors of vocational ability of higher vocational students in the perspective of modern apprenticeship system. *Writer's Corner* (13),97-98. doi: CNKI:SUN:ZJTD.0.2021-13-050.
- Remus, A., Smith, V., & Wuytack, F. (2021). Methodology in core outcome set (COS) development: the impact of patient interviews and using a 5-point versus a 9-point Delphi rating scale on core outcome selection in a COS development study. *BMC Medical Research Methodology*, 21(1), 1-15.
- Rieckmann, M. (2018). Learning to transform the world: Key competencies in Education for Sustainable Development. *Issues and trends in education for sustainable development*, 39, 39-59.
- Ropohl, M., Nielsen, J. A., Olley, C., Rönnebeck, S., & Stables, K. (2018). The concept of competence and its relevance for science, technology and mathematics education. *Transforming assessment: Through an interplay between practice, research and policy*, 3-25.

- Salman, M., Ganie, S. A., & Saleem, I. (2020). The concept of competence: a thematic review and discussion. *European Journal of Training and Development*, 44(6/7), 717-742
- Sang, L. (2020). Research on vocational core literacy of higher vocational students and its cultivation (PhD thesis, Nanjing Normal University). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFDLAST2021&filename=1021506549.nh>
- Shizhongyin. (2018). Philosophical Reflections on the Development of Core Competencies for Chinese Students. *Courses. Teaching materials. Teaching methodology* (09), 36-41. doi: 10.19877/j.cnki.kcjcf.2018.09.007.
- Schröder, T. (2019). A regional approach for the development of TVET systems in the light of the 4th industrial revolution: the regional association of vocational and technical education in Asia. *International Journal of Training Research*, 17(sup1), 83-95.
- Tantray, M. A. (2023). Chomsky's Theory of Mind: Concepts and Contents. *Tattva Journal of Philosophy*, 15(1).
- Tursunovich, R. I. (2023). Development of Communicative Competence in Teaching Foreign Language for Professional Purposes. In *Proceedings of International Conference on Scientific Research in Natural and Social Sciences* (Vol. 2, No. 1, pp. 26-33).
- Vollstedt, M., & Rezat, S. (2019). An introduction to grounded theory with a special focus on axial coding and the coding paradigm. *Compendium for early career researchers in mathematics education*, 13(1), 81-100.
- Wang, X. (2014). A Mechanistic Study of the Role of Career Growth on Employee Advising Behavior (PhD thesis, University of Science and Technology of China (USTC)). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFD1214&filename=1014268942.nh>
- Wei, L. J., & Xu, S. J. (2023). Research on factors influencing occupational competence: hotspots, vectors and outlook - coding analysis based on Nvivo 12.0. *Journal of Wuhan Institute of Vocational Technology* (04), 17-23. doi: 10.19899/j.cnki.42-1669/Z.2023.04.003.
- Wong, S. C. (2020). Competency definitions, development and assessment: A brief review. *International Journal of Academic Research in Progressive Education and Development*, 9(3), 95-114.
- Xiang, H. (2021). Study on Selection Mechanism of College Student Cadre under Iceberg Model. *Frontiers in Humanities and Social Sciences*, 1(3), 89-97.
- Yao, C., Duan, Z., & Baruch, Y. (2020). Time, space, confucianism and careers: a contextualized review of careers research in China-Current knowledge and future research agenda. *International Journal of Management Reviews*, 22(3), 222-248.
- Ye, Y., Omar, R., Ning, B., & Ting, H. (2020). Exploring the interactions of factory workers in China: A model development using the grounded theory approach. *Sustainability*, 12(17), 6750.
- Zartha Sossa, J. W., Halal, W., & Hernandez Zarta, R. (2019). Delphi method: analysis of rounds, stakeholder and statistical indicators. *foresight*, 21(5), 525-544.
- Zhou, Q., Zhang, J., Wang, Q., & Zhong, J. (2023). Grounded theory-based analysis of occupational health and safety management modes in supply chain by core enterprises—evidence from China. *Heliyon*, 9(12).