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Exploring the Assessment Mechanism of the "Modern Occupational Health" Course

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Abstract: *Course assessment is an essential component of the Modern Occupational Health course, yet current assessment methods have deficiencies and cannot effectively enhance students' post competence. To further summarize the existing defects and propose improvement measures, this study conducted interviews and questionnaires with postgraduate students specializing in Occupational and Environmental Health at a university in Jilin, China, who entered in 2022 and 2023. The findings showed that after the course assessment reform, student satisfaction with the course improved compared with that before the reform, and case analysis indicated that the scores of students after the reform were significantly higher than those prior to the reform ($P<0.05$). Overall, the competency-oriented course assessment reform has effectively stimulated students' learning interest and improved their ability to apply theoretical knowledge in practical situations.*

Keywords: *Modern Occupational Health, course reform, course assessment, post competency*

1. Introduction

Occupational Health is a course aimed at cultivating the ability of students to identify, evaluate, predict, and control occupational hazards in various occupational settings, and the course is an important specialized course for undergraduate students majoring in preventive medicine[1]. Modern Occupational Health is a course mainly focused on master's students in preventive medicine. This course is designed to develop the ability of students to apply theoretical knowledge to solve problems in occupational health practice[2]. In course instruction, the course aims to cultivate students' ability to solve real problems while critically introducing the discipline's current advances and global developments.

Course assessment is served as a way to test the students' comprehension of the content within the subject they are currently engaged in studying[3]. On the one hand, the students can promptly know about their learning progress and identify their weak points in study. On the other hand, the teachers can adjust their teaching plans and methods based on the results of assessment. In recent years, the assessment of the Modern Occupational Health course has focused on testing the understanding of theoretical knowledge and the innovation ability of students[4]. Although professional skills have been also assessed, the assessment methods and content have deficiencies such as inadequacy and a deviation from practical work. Therefore, it is necessary to analysis the deficiencies in the assessment and management of Modern Occupational Health courses and propose improvement measures.

Post competency was regarded as an effective evaluation criterion in recent years for assessing students' ability to apply theoretical knowledge to practical situations[5, 6]. Modern Occupational Health is a highly practical course, with the objective of enabling students to skillfully utilize the theories they have learned to address problems in occupational health work, such as handling occupational health emergencies, diagnosing and preventing occupational diseases, etc. In this study, we conducted interviews[7] with postgraduate students majoring in Occupational and Environmental Health. Subsequently, we summarized the existing problems in the course and proposed optimization and improvement measures. Furthermore, we conducted a comparative analysis of students' evaluations and grades of the course before and after the reform of assessment.

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2. Methods

2.1 Research object and data collection

In this study, we recruited a total of 57 postgraduate specializing in Occupational and Environmental Health from a university located in Jilin of China from 2022 and 2023. All participants provided their informed consent prior to participation, and the research was conducted on an anonymous basis. The basic demographic characteristics of the study objects were summarized in Table 1.

After completing the course we distributed questionnaires to each student. Trained surveyors guided the participants in completing the questionnaires. Once the questionnaires were collected, three surveyors verified them to ensure accuracy. After confirming the reliability of the data, it was entered into Excel software for further analysis.

2.2 Interview with research object

After completing the course, two participants of the 2022 grade were randomly selected and conducted semi-structured interviews with them. The interview content included:

(1) After completing the course, what have you learned about the basic theories of occupational health and its future prospects?

(2) Do you think the current course assessment methods can accurately evaluate practical skills in occupational health?

(3) What shortcomings do you think are present in the course assessment methods? And what suggestions do you have for improving the course assessment methods.

2.3 Statistical

Measurement data is represented in mean±SD, and enumeration data is presented in percentage terms. All data were analyzed by IBM SPSS 24.0. The differences among different groups were compared by chi-square test or Rank Sum Test between two group. A two-tailed $P<0.05$ was considered statistically significant.

3. Results

3.1 Characteristics of research subjects

The demographic characteristics of participants divided into 2022 and 2023 grade were shown in Table 1. Compared with the 2022 grade, there were more female participants in the 2023 grade. In terms of age and degrees, the participants in the two grades showed no significant differences.

Table 1 The characters of participants

Characteristic	Total	2022	2023	*P*[a]
N	57	25	32	
Sex(n,%)				
Female	35	14(40.0%)	21(60.0%)	0.45
Male	22	11(50.0%)	11(50.0%)	
Age(mean±SD)	22±0.95	22±1.00	22±0.87	
Type of Bachelor's degree (n,%)				
Bachelor of medicine	45	20(44.4%)	25(55.5%)	0.9525
Bachelor of Science	10	4(40.0)	6(60.0)	
Other	2	1(50.0)	1(50.0)	

Data are presented as the median or frequency). [a] tudent's t test was performed for continuous variables, and Chi-square test was performed for categorical variables.

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3.2 Interview and communication

Interviewee 1:

(A1) After studying Modern Occupational Health, I have a further understanding of occupational hazards and their harmful effects on the human body. I'm very interested in this course because my father is a miner. I've learned about some occupational hazardous substances such as dust and noise in my father's workplace. And I've talked to my father about how to take measures to prevent these hazards. I think this course is meaningful.

(A2) Our course assessment focus mainly focused on the theory of occupational health. Although I have grasped the theory of this course, I still find a challenge to identify occupational hazards in a real workplace and the potential occupational injuries they may cause.

(A3) I hope that the assessment methods can be diversified, with more emphasis on practical applications, and incorporate elements of group discussions. This would allow us to deepen our understanding of fundamental theories.

Interviewee 2:

(A1) Through the study of the Modern Occupational Health course, I have developed a substantively deeper understanding of occupational health challenges across both conventional and emerging industries, particularly regarding the identification and control of occupational hazards.

(A2) The assessment method of this course is good. However, the assessment results were only presented though scores. I hard to found out my deficiencies in the course especially in case analysis.

(A3) I hope that in the course evaluation, there could be an additional section for teachers' comments, especially for case analysis. Moreover, I believe that the case assessment can be made more vivid. For instance, we could simulate workplace and have the students play the roles of those workers who are exposed to occupational hazards.

3.3 The deficiencies of assessment methods

Based on historical course assessment outcomes and the feedback of interviewees, we summarized the main issues existing in the Modern Occupational Health course.

3.3.1 Assessment objectives

In addition to testing the mastery of professional knowledge, the assessment of postgraduate courses places more emphasis on professional competence and professional ethics, which can reflect post-competency for future career. Some teachers cannot conduct a comprehensive evaluate of the teaching effectiveness due to lack of the understanding of the assessment objectives of postgraduate courses. For instance, the Modern Occupational Health course primarily focused on evaluating the mastery of professional knowledge and innovative abilities of students. Although the assessment included professional skills, the effectiveness is not fully demonstrated. Moreover, the assessment methods did not adequately test professional qualities.

3.3.2 Assessment content

The formulation of assessment content needs to refer the syllabus and teaching objectives of course. However, many postgraduate courses fail to satisfy the teaching objectives and cannot achieve an effective integration of teaching content and assessment content. It’s necessary to ensure a close connection between teaching objectives and course assessment when designing the syllabus.

In the past few years, the assessment content of Modern Occupational Health focused on analyzing and expanding a specific part of the teaching content or involved summarizing and reporting on the entire teaching content. Although the mastery of professional knowledge and levels of innovative capabilities could be examined, there was insufficient assessment of students' abilities to analyze and solve problems in real- occupational health workplace and their professional qualities. More importantly, it could not effectively reflect the achievement of teaching objectives.

3.3.3 Assessment methods and forms

Assessment objectives are the foundation of assessment content. Teachers can choose the assessment methods and forms by designing the assessment objectives and content. In the process of postgraduate teaching, some teachers may lack of deep analysis of assessment methods and forms and this will fail to

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achieve a coordinated development among assessment objectives, assessment content, assessment methods, and assessment forms. And the outdated assessment model, methods and forms will ultimately result in the inability to effectively gauge students' learning outcomes.

3.3.4 Feedback on assessment results

To assess the professional competence and qualities are crucial parts of postgraduate learning outcomes. Students should comprehend their learning status based on the assessment results, which could help students identify knowledge gaps, make up for deficiencies, refine their learning approaches, and rectify their learning attitudes and finally enhance their post-competency. Due to the imperfect assessment content and methods, students usually cannot understand their shortcomings. Consequently, the feedback on teaching outcomes is insufficient.

3.3.5 Change of focal point of curriculum management

With the increase of students' demands for courses and employers' requirements for qualities, learning professional knowledge can no longer meet students' learning needs. The students pay attention to the future development in actual work positions. For example, the course management of the Modern Occupational Health stressed "promoting disciplinary development through teachers' work". The teachers completed their teaching tasks according to the teaching syllabus, and the students also achieved their grades. Although these methods included ability tests, they were not comprehensive, thus resulting in a deviation between the actual needs of the students and the focus of the previous course management.

3.4 Innovative Strategies for Restructuring Assessment Systems

3.4.1 Improving the syllabus

In order to meet the requirements of current course teaching, it is necessary to optimize and integrate the content of course assessment. One important way to achieve the scientific development of course assessment is to improve the construction of the teaching syllabus, because the teaching content will be influenced by the normative guidance of the syllabus.

Based on the current training goals and capability development requirements for professional health personnel, we will clearly define the functional positioning of the courses, integrate and utilize various teaching reference materials, actively draw on the course outline compilation requirements of other institutions, and achieve the scientific formulation of the teaching outline, thereby improving the teaching quality of modern occupational health science courses.

3.4.2 Definition of assessment content

Establishing teaching objectives is the foundation for setting assessment content standards[8]. The teaching objectives of the "Modern Occupational Health" course are to enable students to acquire the knowledge and skills necessary for identifying, assessing, predicting, and controlling occupational hazard factors in specific scenarios, and to cultivate professional capabilities required for occupations related to occupational health. Based on the characteristics of this course and its teaching objectives, the assessment content should cover the current occupational environment of major industries, including occupational health issues present in the working environment and the practical process. The assessment content should be integrated and designed according to actual teaching conditions, aiming to enhance students' subsequent abilities, fully meet their learning needs, and ultimately adjust their learning status and focus.

3.4.3 Optimization of assessment methods

Optimizing the evaluation method can enhance the management efficiency of course evaluation and make the evaluation goals and contents more closely aligned. Due to the different contents of course evaluation, the evaluation methods also vary significantly. In the past, the evaluation model of modern vocational health courses usually adopted open project design or group presentation forms. Although these methods could assess students' innovative skills, they were insufficient in comprehensively evaluating students' comprehensive abilities and qualities. Based on the teaching objectives and evaluation contents, we have created a new evaluation method aimed at comprehensively assessing students' vocational abilities and qualities. Teachers provide work scene videos or simulated vocational scene videos, allowing students to discover and identify occupational hazards in the work scene, formulate evaluation plans and specific methods for assessing these occupational hazards, and propose improvement measures.

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3.4.4 Improvement of the assessment criteria system

The assessment model should adopt various forms based on the assessment content. To conduct a scientific assessment of this course, it is necessary to combine the assessment goals with the methods. This model can improve the accuracy and scientificity of the assessment results. In the past, the assessment methods for courses mainly involved teachers scoring the students' submitted projects or giving evaluations on the PPT presentations of the groups. However, this method could not comprehensively measure the students' level and professional qualities, nor could it help students fully understand their own shortcomings. Therefore, the feedback on teaching outcomes lacked effectiveness. Based on the assessment content and methods proposed in this article, teachers can immediately evaluate and analyze the assessment results of students, and finally provide the assessment situation back to the students.

3.4.5 Adjustment of course design

In order to effectively integrate knowledge with practical work, students hope to take courses that combine theory with practice. Therefore, the focus of course management has shifted from the previous "teacher-centered" model to "emphasizing the improvement of students' practical operation ability and professional quality". This model not only has professional knowledge reserves in terms of occupational health, but also can effectively connect course learning with actual work. With the shift in the focus of course management, the overall design of the courses also needs to be adjusted accordingly. This requires a thorough understanding of students' needs when designing the course details. Teachers should make full use of knowledge resources related to occupational health practice worldwide. They should incorporate the main occupational types in the current society and existing occupational health issues into the teaching and assessment contents. Moreover, they should also use real or simulated occupational scenario cases for course teaching and assessment. This method helps students form professional memory in actual situations, enhance professional ability and professional quality, and smoothly transition from the classroom to the workplace.

3.5 Empirically Validated Outcomes of Assessment System Reform

Table 2 showed the students' evaluations of the effect of the curriculum reform. After the implementation of the curriculum reform, students' satisfaction with the assessment content, assessment methods, and practical skills was higher than that before the reform. Moreover, compared with the students who participated in the courses before the reform, the students after the reform had significantly higher satisfaction with the assessment methods ($P<0.05$). Additionally, there was no significant difference in the theoretical examination scores before and after the reform, but the results of the case analysis showed that the performance of the 2023 grade class was significantly better than that of the 2022 grade class ($P<0.05$) (Figure 1).

Table 2 Students' evaluation of curriculum reform effects

Questions	Options	2022(n,%)	2023(n%)	P^a
How do you think about the relevance between current assessment content and real occupational health workplace?	Very close; it can very well reflect actual work requirements.	20(80.0)	30(93.7)	0.24
	Pretty close, with some practicality	2(8.0)	2(6.3%)	
	Generally, the connection is not very direct.	2(8.0)	0(0)	
	Not closely connected, feels unrealistic	1(4.0)	0(0)	
Does the assessment content help you enhance your mastery of the core knowledge and skills in occupational health?	It is very helpful in systematically mastering.	24(96%)	32	0.25
	It is of great help and promotes certain aspects	0(0)	0(0)	
	The help was general and the effect was not obvious.	1(4%)	0(0)	
	The assistance was limited, with basically no effect	0(0)	0(0)	
	I accept it very much and think it's innovative and effective	22(88%)	31(96.8)	<0.01

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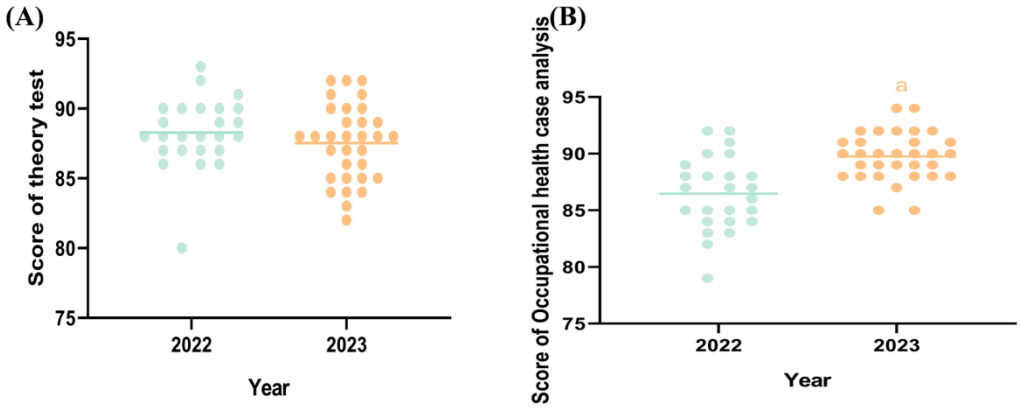
How receptive are you to the assessment method?	I relatively accept it and can adapt to this assessment format	3(12%)	1(3.2)	
	I don't fully accept it; I feel the difficulty is quite high	0(0)	0(0)	
	I don't accept it at all and do not recognize this method	0(0)	0(0)	
How the assessment method improves your ability to integrate knowledge and solve real occupational health problems?	There is significant improvement, with noticeable progress in abilities.	19(76.0%)	30(93.8%)	0.16
	There is some improvement, and opportunities for practice exist.	3(12%)	1(3.1%)	
	The improvement is not obvious, and many shortcomings remain	3(12%)	1(3.1%)	
	There is no improvement; it feels about the same as before	0	0	
Do you feel the shift in the focus of course management towards enhancing students' practical skills and professional ethics?	I strongly feel it and my participation has increased	20(80.0%)	30(93.8%)	0.12
	I have some sense of it, with relevant learning activities	5(20.0%)	2(6.3%)	
	I am not sure, without an obvious sense	0(0)	0(0)	
	I don't feel it at all	0(0)	0(0)	
Overall evaluation of the course:	Satisfied	25(100%)	32(100%)	/
	Generally satisfied, with many positive aspects	0(0)	0(0)	
	Average, needs improvement	0(0)	0(0)	
	Not very satisfied, with some issues	0(0)	0(0)	
	Extremely dissatisfied	0(0)	0(0)	

Data are presented as frequency. [a] Chi-square test was performed for categorical variables.



(A) Score of theory test; (B) Score of case analysis; [a] Comparison with the students of 2022 grade.

Figure 1 Assessment results of students

4. Discussion

With the continuous increase in educational investment worldwide, the academic qualifications of occupational health professionals have gradually improved, and postgraduate students have become the main practitioners. In global higher education, emphasizing the cultivation of postgraduate professional abilities has become a common consensus[9]. "Modern Occupational Health" is a compulsory course for graduate students in the field of labor hygiene and environmental hygiene. Besides requiring students to master theoretical knowledge, this course also requires students to have the ability to solve practical problems in occupational health workplaces[10]. Course assessment is an important way to evaluate students' mastery of knowledge[3, 11]. Currently, the "Modern Occupational Health" course focuses on

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assessing theoretical knowledge, but it is not sufficient to assess students' practical skills. In this study, we used the interview method to interview three graduate students. Based on these interviews, we summarized the shortcomings of the current course assessment system and proposed corresponding improvement measures. In addition, we distributed questionnaires to students before and after the course assessment reform. The results showed that students' satisfaction with the course and their actual operational skills level improved after the reform.

Enhancing post competency is an important teaching objective of graduate courses[12]. The assessment method for the "Modern Occupational Health" course should aim to evaluate job skills. We further integrated practical skills into the course by improving the teaching outline. We also optimized the assessment content by including the professional practice work environments of major industries in contemporary society in the assessment process. After the reform, students stated that this assessment method significantly improved their mastery of occupational health knowledge and skills, and effectively reflected the requirements of actual workplaces.

The assessment method is the core of the assessment process[13]. An effective assessment method not only tests students' mastery of theoretical knowledge but also enhances their practical skills[14, 15]. The assessment method is a key point in curriculum reform, aiming to improve practical skills. According to interviews, we learned that students believed the assessment method of the course was too simple, especially lacking a simulation section of a professional health workplace. Based on this defect, we added real workplace videos or simulated professional environment videos in the assessment process. Students were required to identify occupational hazards, design assessment plans and specific methods for assessing these hazards, and propose improvement measures. After this test, students showed significant improvement in the ability to integrate knowledge and solve practical problems.

We also made adjustments to the design of the course assessment, aiming to cultivate health professionals with high professional capabilities. We required teachers to provide one-on-one feedback to students. Additionally, we required teachers to incorporate real or simulated professional scenario cases into the teaching and assessment methods. Students believe that these reforms have been highly effective in enhancing their practical abilities. Their overall satisfaction with this course has also increased.

5. Conclusion

In this study, we identified the problems existing in the current assessment methods of modern occupational health courses through interviews and past course assessment results. The feedback from students and the assessment results all indicated that the current assessment system was disconnected from actual occupational health work. Therefore, we reformed the assessment of modern occupational hygiene courses, including improving the teaching outline, optimizing the assessment content and methods, improving the assessment system, and adjusting the overall course design. After these reforms, students' job competency has significantly improved, and their satisfaction with the courses has also increased.

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Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Ding, R. and H. Cheng, Improving undergraduate education of occupational health and occupational medicine appling massive open online courses & problem-based learning. BMC Med Educ, 2024. 24(1):

ISSN 2522-6398 Vol. 8, Issue 12: 103-110, DOI: 10.25236/FER.2025.081215

p. 188.
[2] La Torre, G., et al., Occupational Medicine and Prevention of Chronic and Infectious Diseases. J Clin Med, 2023. 12(16).
[3] Mennin, S.P. and S. Kalishman, Student assessment. Acad Med, 1998. 73(9 Suppl): p. S46-54.
[4] Beach, J. and N. Cherry, Course participation and the recognition and reporting of occupational ill-health. Occup Med (Lond), 2019. 69(7): p. 487-493.
[5] Zeng, Y., J. Yang, and J.W. Zhang, Post competency training in standardized training of resident physicians and integrated postgraduates. World J Clin Cases, 2024. 12(29): p. 6250-6254.
[6] Yingxia, L., et al., Research on the application of post competency training for new nurses: current status and considerations. Front Med (Lausanne), 2025. 12: p. 1537613.
[7] Williamson, N., et al., Qualitative In-trial Interviews: Methods, Challenges, and Best Practice. Patient, 2025. 18(3): p. 199-209.
[8] van der Baaren, L.M., et al., An exploration of governance in teaching hospitals in the Netherlands focused on educational objectives. BMC Med Educ, 2025. 25(1): p. 88.
[9] Wang, H., et al., [Exploration and practice of the collaborative education mode integrating full-time master of public health postgraduates with standardized public health physician training]. Zhonghua Yu Fang Yi Xue Za Zhi, 2025. 59(3): p. 402-405.
[10] Baker, B., D. Kesler, and T. Guidotti, Occupational and Environmental Medicine: Public Health and Medicine in the Workplace. Am J Public Health, 2020. 110(5): p. 636-637.
[11] Challen, L.M., et al., Assessing the utility of pre-course assessment and voluntary pre-work in two required integrated pharmacotherapy courses. Curr Pharm Teach Learn, 2023. 15(11): p. 974-978.
[12] Shrestha, S., et al., Competency Based Post Graduate Residency Program at Patan Academy of Health Sciences, Nepal. J Nepal Health Res Counc, 2021. 19(1): p. 189-195.
[13] Yang, W., et al., Motivational simulated teaching of clinical skills using formative assessment methods for medical undergraduate students: between-group evaluation of a simulated course in a Chinese medical college. BMJ Open, 2023. 13(9): p. e069782.
[14] Yan, L., X. Wu, and Y. Wang, Student engagement assessment using multimodal deep learning. PLoS One, 2025. 20(6): p. e0325377.
[15] Nesbitt, A., et al., Student perception of workplace-based assessment. Clin Teach, 2013. 10(6): p. 399-404.