Journal of Clinical and Nursing Research, 2026, Volume 10, Issue 5
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Integration of Competency Map and Online Courses in Clinical Practical Skills

Guyue Li

Hubei Three Gorges Polytechnic, Yichang 443199, Hubei, China

Abstract: Against the background of digital medical education development, the teaching of *Clinical Practical Skills* in higher vocational colleges is faced with problems such as insufficient teaching pertinence, unreasonable resource allocation, and disconnection between practical ability training and clinical needs. Based on this, this paper studies the integration of the competency map of *Clinical Practical Skills* and online courses, explores the existing problems in the teaching of *Clinical Practical Skills* in higher vocational colleges, analyzes the important value of their integration, and puts forward targeted integration strategies. The aim is to optimize the allocation of teaching resources, improve students' clinical practical ability, and provide practical references for the reform of medical education in higher vocational colleges.

Keywords: Clinical practical skills; Competency map; Online courses; Medical education; Integrated teaching

Online publication: May 31, 2026

1. Introduction

The core goal of medical education is to cultivate high-quality medical talents with solid theoretical foundation and excellent clinical practical ability. As a core course of medical majors in higher vocational colleges, *Clinical Practical Skills* is a key link connecting medical theory and clinical practice. As an important tool for sorting out the hierarchy of professional abilities and clarifying the standards of ability training, a competency map can clearly define the components, hierarchical relationships and evaluation criteria of clinical practical skills. Integrating the competency map of *Clinical Practical Skills* with online courses is not only an inevitable trend to adapt to the development of digital medical education, but also an important measure to solve the current pain points in the teaching of clinical practical skills and improve teaching quality [1]. Therefore, it is of great significance to explore the integration path of the competency map of *Clinical Practical Skills* and online courses.

2. Existing problems in the teaching of *clinical practical skills* in higher vocational colleges

2.1. Lack of systematicness and accuracy in skill training

In the current teaching of *Clinical Practical Skills* in higher vocational colleges, some colleges have not systematically sorted out the hierarchy of clinical practical skills, with vague teaching objectives and unclear paths and standards for skill training. Most teaching contents are theory-oriented, without hierarchical design according to students' learning stages, cognitive levels and skill needs of clinical posts, resulting in students' inability to identify their weak skill links and blind learning. Meanwhile, teachers find it difficult to accurately grasp the key and difficult points in teaching, and lack pertinence in teaching students of different levels. As a result, students with weak foundations cannot keep up with the teaching progress, while those with good foundations cannot get further improvement, leading to serious lack of systematicness and accuracy in skill training.

2.2. Poor connection between online and offline teaching

Although medical colleges in higher vocational education have gradually constructed online course resources, some resources are characterized by single content and fixed forms, mostly teaching videos and electronic courseware, lacking interactive and practical simulated operation resources, which is disconnected from the needs of clinical practical skill training. Meanwhile, online course resources have not been effectively connected with offline teaching, and the allocation of teaching resources lacks overall planning, resulting in repeated construction and waste of resources. In addition, online platforms have relatively simple functions, lacking precise push of learning content, real-time monitoring of learning process and scientific evaluation of learning effects, which cannot provide students with personalized learning experience or assist teachers in targeted teaching guidance, leading to low utilization efficiency of teaching resources.

2.3. Disconnection between practical ability training and clinical needs

The teaching of *Clinical Practical Skills* in higher vocational colleges mostly relies on classroom simulation practice and on-campus training, which is not closely integrated with real clinical scenarios. Students lack practical experience in real clinical environments, and the cultivation of clinical thinking and problem-solving ability is insufficient. The teaching evaluation system of some colleges still focuses on theoretical examinations and written assignments, with one-sided, single and vague evaluation of students' practical operation ability, which cannot comprehensively, objectively and accurately reflect students' clinical practical skill level. Meanwhile, the evaluation results fail to be fed back to the teaching process in a timely manner, making it difficult to effectively adjust teaching contents and methods, resulting in failure to continuously improve teaching quality and a large gap between the quality of student training and the actual needs of clinical posts.

3. Important value of integrating the competency map of *clinical practical skills* and online courses

3.1. Conducive to improving the accuracy and systematicness of clinical skill training

Based on the systematic and comprehensive sorting of the clinical practical skill map, the competency map is divided into three modules: basic skills, professional skills and comprehensive skills, clarifying the skill

elements, hierarchical corresponding relationships and evaluation standards, providing a clear framework and basis for the teaching of *Clinical Practical Skills*. If this idea is applied to online courses, the content and path of online courses can be designed according to the requirements of this method, enabling students to clarify the ability goals and development tasks to be achieved at each stage [2]. Meanwhile, according to students' ability coordinates and learning progress, suitable resources can be accurately pushed to them, and corresponding personalized education intervention measures can be given to realize "teaching students in accordance with their aptitude". Similarly, for teachers, this competency map can help them clarify the key and difficult points of teaching, reasonably arrange the teaching process, and form a gradient and organically integrated whole for clinical practical skill training, thus greatly improving the accuracy and comprehensiveness of skill training.

3.2. Conducive to optimizing the allocation of teaching resources

The integration of the two can promote the integration and optimal allocation of teaching resources, avoiding repeated construction and waste of resources. Guided by the competency map, the development and construction of online course resources will be more targeted. Around the training requirements of various clinical practical skills, diversified resources such as teaching videos, case analyses and simulated operation exercises can be produced, achieving a high degree of matching between teaching resources and skill training goals. Meanwhile, online courses break the limitations of time and space, allowing students to study and practice skills anytime and anywhere with fragmented time, effectively improving learning efficiency. Teachers can monitor students' learning process in real time through online platforms, collect students' learning data, timely find problems in the teaching process, and provide targeted teaching guidance, realizing the innovation of teaching methods. In addition, the integrated teaching model can give full play to the advantages of online teaching, integrate high-quality teaching resources inside and outside the school, realize resource sharing, provide all-round support for teaching and learning, and achieve two-way empowerment [3].

3.3. Conducive to connecting with actual clinical needs

The construction of the competency map fully integrates the skill needs of medical talents from clinical practice bases and grassroots health workers, integrating the actual requirements of clinical posts into all links of skill training. After the integration of the two, online courses can introduce real clinical cases and simulate actual clinical operation scenarios, allowing students to practice repeatedly in a virtual environment, accumulate clinical practice experience, cultivate clinical thinking and problem-solving ability, effectively make up for the disconnection between on-campus training and clinical practice, and make students' skill training more in line with the needs of clinical posts.

4. Integration strategies of the competency map of *clinical practical skills* and online courses

4.1. Systematically construct a clinical practical skill map to clarify the core framework of integration

Constructing a scientific and practical competency map is the basis for the integration of the two. Guided by the skill needs of clinical posts and combined with the talent training goals of medical majors in higher vocational colleges, clinical practical skills should be comprehensively and systematically sorted and

classified.

First, conduct extensive research. Taking medical students, clinical teachers, internship bases and general practitioners as research objects, adopt questionnaire surveys and interviews to collect their needs for clinical practical ability training, requirements for professional skills and problems encountered in teaching, providing a basis for the construction of the competency map [4].

Second, divide the hierarchy of clinical practical skills. Divide clinical practical skills into three levels: basic skills, professional skills and comprehensive skills, and clarify the skill composition of each level: basic skills cover clinical essential basic operation skills such as inquiry and physical examination, medical record writing and aseptic operation; professional skills target different medical majors, including diagnosis, treatment techniques and characteristic nursing of various diseases; comprehensive skills mainly include clinical thinking ability, condition analysis ability, communication and cooperation ability, and adaptability [5].

Third, formulate the learning objectives and abilities for each learning stage, establish an electronic version of the competency map with network tools to lay a foundation for future docking with online courses, and set up a mechanism that can revise and improve the competency map at any time according to the development of clinical medical technology and changes in clinical post needs to ensure its applicability and scientificity.

4.2. Enrich online course resources based on the competency map to create diversified learning carriers

Based on the competency map and around the training requirements of various clinical practical skills, develop and improve diversified and high-quality online course resources to create a diversified learning carrier integrating learning, practice and assessment.

First, produce a relevant teaching video resource library, including intuitive and vivid teaching videos for the operation specifications of basic skills, judgment processes of specialized skills, and clinical thinking training of comprehensive skills, such as animation demonstrations, on-site demonstrations and case explanations, allowing students to intuitively master the key points of skills [6].

Second, establish a rich clinical case library, including real medical cases of different types and degrees, with the main information, treatment plans and key technical points of each case provided, facilitating students to master and improve their clinical thinking ability in the process of case analysis.

Third, design virtual simulation operation resources. Schools can develop a virtual simulation training system, which combines virtual reality technology and simulation technology to build a simulated clinical scenario training platform, allowing students to practice repeatedly on the platform, familiarize themselves with the process and improve their practical operation ability [7].

Fourth, compile a hierarchical and graded practice question bank. Schools can form a ladder and graded assessment question bank, designing questions at primary, advanced and senior levels according to the competency map, technical hierarchy and evaluation standards to meet the needs of students at different levels. Meanwhile, sort out the existing online teaching resources, delete repetitive and obsolete content, realize classified management and precise retrieval of resources, facilitating students to find corresponding teaching materials according to the goals of the competency map and improving resource utilization [8].

4.3. Build a diversified integrated application model to empower the whole process of teaching and learning

Explore the organic integration path of the competency map and online courses, and build a diversified integrated application model of "precise push–real-time monitoring–scientific evaluation–continuous improvement" to empower the whole process of teaching and learning.

First, precisely push learning resources to students. Based on the digital competency map docking with the online teaching management platform, record and analyze relevant data such as students' ability assessment scores, learning progress and answer situations, determine their position in the competency map and missing ability points, and then provide corresponding teaching videos, simulation training, case analysis and other contents for them to study and improve purposefully.

Second, conduct dynamic learning monitoring. Collect data on students' learning time, learning content, practice completion and posting interaction frequency through the online teaching system. Teachers can grasp students' progress in real time in the background of the platform, timely find possible problems in their learning process, and provide appropriate guidance and intervention in the forms of online Q&A, live broadcast and group discussion, making teaching more personalized and precise [9].

Third, establish a scientific learning effect evaluation mechanism. In accordance with the requirements of the competency map, combine various online and offline evaluation methods to comprehensively evaluate students' learning effects. Online assessments include theoretical knowledge assessment, virtual simulation assessment and case discussion assessment; offline assessments verify students' operation ability through practical hands-on training and clinical practice. Comprehensively evaluate students' knowledge mastery, hands-on operation ability and clinical thinking judgment ability, and feed back to the online platform in real time to let them know their learning progress [10].

Fourth, establish a continuous teaching improvement mechanism. Based on the analysis of students' learning materials and evaluation results, summarize the advantages and disadvantages in the integrated teaching process, timely adjust the online teaching content and structure, improve the ability assessment standards, optimize teachers' teaching methods and strategies, and realize the spiral improvement of education. Meanwhile, strengthen technical support to solve problems such as online teaching network congestion and online training failures, ensuring the smooth development of blended teaching.

5. Conclusion

In summary, against the background of digital medical education reform, integrating the competency map of *Clinical Practical Skills* with online courses is an important measure to solve the current pain points in the teaching of clinical practical skills in higher vocational colleges and improve teaching quality, and also an inevitable choice to cultivate high-quality medical talents and meet the development needs of medical and health services. In the process of practical integration, attention should be paid to constructing a scientific and practical competency map, developing diversified and high-quality online course resources, and building an application model of "precise push–real-time monitoring–scientific evaluation–continuous improvement" to improve students' clinical practical ability. With the continuous development of science and technology, schools should constantly enrich the forms of integration, improve the effect of integration, and promote the digital and precise development of medical education in higher vocational colleges.

Disclosure statement

The author declares no conflict of interest.

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