

# Bridging the Willingness-Competence Gap: A Narrative Review of First Aid Education for Non-Medical University Students

Chenfei Qu, Jingru Liu\*, Jie Du, Yuanmeng Li, Chao Liu

Qingdao Binhai University, Qingdao, Shandong, 266555, China

**Abstract:** Willingness to help in emergencies does not always result in effective first-aid action. Among non-medical university students, a gap remains between strong willingness and limited first-aid competency. This problem reflects not only insufficient knowledge and skills, but also weaknesses in current educational management.

Based on studies published from 2015 to 2025, this review identifies three main factors contributing to the gap: low learning engagement, inaccurate self-assessment, and fragmented one-time training. In response, an integrated competency-based framework is proposed, including curriculum reform, refresher training, reflective assessment, simulation-based learning, and university-community cooperation.

This study suggests that first-aid competency should be treated as an important part of university health education rather than an optional activity. The framework provides practical guidance for future educational reform.

**Keywords:** first aid education; competency-based education; educational management; framework construction; non-medical university students

**DOI:**10.12417/3029-2328.26.05.024

## 1. Introduction

Willingness to help in emergencies does not always result in effective first-aid action. Out-of-hospital cardiac arrest (OHCA) remains a serious public health issue, and timely bystander CPR can significantly improve survival rates<sup>[1-2]</sup>. The “Healthy China 2030” initiative has also highlighted the importance of improving public emergency response capacity. University students generally have the physical and cognitive ability to provide basic first aid. However, non-medical students, who make up the majority of university populations in China, often receive limited formal first-aid training.

Previous studies have identified a clear “willingness-competence gap” among non-medical university students. Although many students express a strong willingness to help in emergencies, their actual first-aid knowledge and practical skills are often insufficient<sup>[3-6]</sup>. This suggests that positive attitudes alone are not enough to ensure effective emergency response.

Most existing studies mainly focus on knowledge acquisition and the short-term effects of training<sup>[7]</sup>, while long-term competency development receives less attention. One-time training, lack of reinforcement, inaccurate self-assessment, and weak behavioral transfer all affect skill retention and practical application<sup>[8-9]</sup>. Therefore, the willingness-competence gap should also be understood as an issue related to educational management, including curriculum design, assessment methods, and institutional support.

In addition, current research remains relatively fragmented, with factors such as learning engagement and self-assessment often discussed separately. Based on previous studies, this review examines the main factors contributing to the gap and proposes an integrated competency-based educational management framework to support long-term first-aid competency development.

## 2. Literature Identification

This review covers peer-reviewed studies published from January 2015 to June 2025. Databases searched included PubMed, Web of Science, ERIC, CNKI, and Wanfang. Search terms included “first aid education,” “CPR

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Corresponding Author: Jingru Liu.

Funding: This study was supported by the China Association of Higher Education 2024 Higher Education Scientific Research Planning Project (Grant No. 24BJ0310).

training,” “non-medical students,” “university students,” “self-efficacy,” “competency,” “skill retention,” “behavioral transfer,” and “willingness,” along with Chinese equivalents for CNKI and Wanfang.

Inclusion criteria: non-medical students, focusing on first-aid knowledge, willingness, competency, or skill retention; peer-reviewed studies; English or Chinese. Exclusion criteria: medical students only, no subgroup analysis, specialized clinical interventions, conference abstracts, or non-peer-reviewed reports.

A total of 186 records were initially identified. After removing duplicates (n=37), 74 full-text articles were assessed, and 42 studies met the inclusion criteria. A narrative synthesis method was adopted in this review<sup>[10]</sup>.

### 3.Current Landscape of the Willingness-Competence Gap

#### 3.1 High Willingness but Limited Competency

Studies in different countries show a clear gap between willingness to help and actual first-aid competency among non-medical university students. Although willingness often exceeds 80%–90%, knowledge and practical skills remain low<sup>[3,4,6]</sup>. Representative findings are shown in Table 1.

Table 1. Willingness and Competency in Selected Studies

Study	Country	Sample Size	Willingness	Knowledge/Competency
Tao et al. (2019) <sup>[3]</sup>	China	~500	~91%	~39% proficiency
Qin et al. (2024) <sup>[4]</sup>	China	1,320	99.1% (training willing) / 76.8% (bystander)	2.44/10 (CPR knowledge)
Riggs et al. (2019) <sup>[6]</sup>	International review	29 studies	>80%	<50% (typical)
Sugimoto et al. (2024) <sup>[5]</sup>	Brazil	4,803	98%	2.4/10 (practical skills)

*Table Note:* Knowledge/competency refers to passing scores on standardized assessments or average scores on practical tests reported in the original studies.

As shown in Table 1, Tao et al.<sup>[3]</sup> found over 90% of Chinese students willing to help, but knowledge scores below 40%. Qin et al.<sup>[4]</sup> reported 99.1% willing to train, yet average CPR knowledge was only 2.44/10. A large Brazilian study (n=4,803) found 98% willingness, but practical skills scored only 2.4/10<sup>[5]</sup>. Riggs et al.<sup>[6]</sup> observed similar results across multiple countries. These findings suggest that willingness alone does not ensure effective emergency response.

#### 3.2 Skill Decay and Weak Long-Term Retention

First-aid skills decline quickly without repeated practice. Research shows that training intensity, task difficulty, and retention interval affect skill retention, and many skills weaken within six months<sup>[12]</sup>. Liang et al.<sup>[8]</sup> also found CPR skills dropped significantly without refresher training, consistent with international studies<sup>[9]</sup>. Therefore, long-term reinforcement is necessary.

#### 3.3 Structural Limitations of Current Training

Most university first-aid programs rely on short-term workshops rather than integrated competency-based curricula. This often results in weak retention and limited practical application. Although students may be willing to help, many lack confidence and practical skills in real emergencies. Therefore, the willingness-competence gap also reflects structural problems in current educational systems.

### 4.Key Factors Underlying the Willingness-Competence Gap

#### 4.1 Insufficient Learning Engagement

Many students attend first-aid training only to complete requirements, which limits long-term retention<sup>[8]</sup>. Most programs rely on one-time lectures with limited practice or feedback, making sustained engagement difficult.

### 4.2 Inaccurate Self-Assessment

Some students overestimate their first-aid ability and therefore practice less or avoid feedback. Limited competency may also reduce the ability to evaluate personal performance accurately<sup>[11]</sup>. Objective assessment and feedback are therefore important.

### 4.3 Structural Fragmentation of Existing Training Models

Most first-aid training is short-term and lacks continuous reinforcement, leading to rapid skill decline<sup>[8,9,12]</sup>. Since skill transfer requires repeated practice in different situations<sup>[13]</sup>, one-time training often fails to produce lasting competency.

### 4.4 Interaction of Educational and Institutional Factors

These factors are closely related. One-time training reduces engagement, while inaccurate self-assessment may lead to overconfidence and less practice. Studies show that combining reflective learning with refresher training can improve retention<sup>[14]</sup>. Therefore, universities need integrated systems that support continuous practice and effective self-assessment.

## 5. Construction of an Integrated Competency-Based Educational Management Framework

Three key factors explain the gap. Sustained competency development requires an integrated system supporting engagement, self-assessment, reinforcement, and application. Based on existing research, Figure 1 presents the framework.

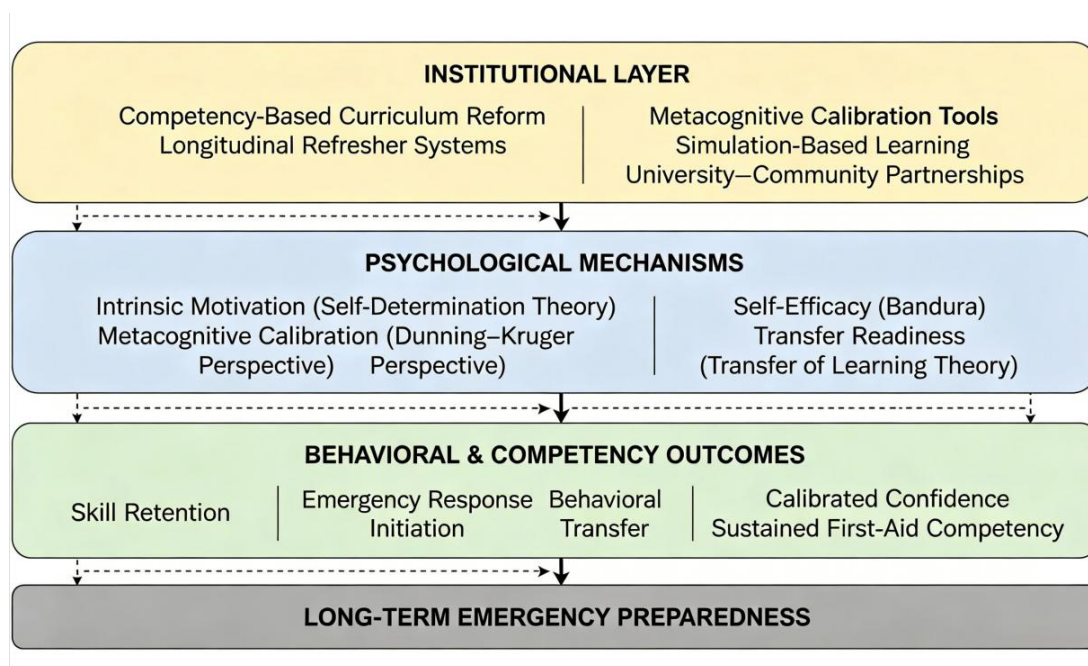


Figure 1. An Integrated Competency-Based Educational Management Framework for First-Aid Development

*Figure Note:* The framework conceptualizes competency development as a dynamic interaction between institutional interventions, educational mechanisms, and competency outcomes. Dashed feedback loops indicate reciprocal interactions.

### 5.1 Core Components of the Framework

The framework includes three connected layers.

**Institutional Layer:** Competency-based education provides the foundation for curriculum reform<sup>[15]</sup>. Main strategies include competency-based curriculum reform, refresher training systems<sup>[12]</sup>, reflective assessment<sup>[16]</sup>, simulation-based learning<sup>[17]</sup>, and university-community partnerships<sup>[9]</sup>.

**Educational Mechanisms Layer:** These strategies influence learning engagement, self-assessment, confidence,

and practical transfer ability.

Competency Outcomes Layer: Expected outcomes include improved skill retention, greater willingness to respond, and sustained competency.

**5.2 Feedback Loops and Dynamic Interactions**

Sustained competency improves reflective self-assessment<sup>[16]</sup>, while successful emergency response strengthens confidence<sup>[18]</sup>. Patterns of skill retention can also guide refresher training design<sup>[12]</sup>. Therefore, competency development should be viewed as a continuous process rather than a linear one.

**5.3 How the Framework Addresses the Gap**

Studies suggest that multi-component interventions are more effective than single approaches<sup>[19]</sup>. In this framework, curriculum reform and refresher systems reduce training fragmentation, reflective assessment helps correct overconfidence, and simulation with community partnerships improves practical application.

**6. Implications for Educational Management**

**6.1 Competency-Based Curriculum Reform**

Universities should move from knowledge-focused teaching to competency-based first-aid education, emphasizing practical outcomes and long-term skill development rather than isolated activities.

**6.2 From One-Time Training to Longitudinal Reinforcement**

One-time training is insufficient for long-term competency. Universities should establish refresher systems with regular reinforcement based on forgetting-curve principles to improve preparedness.

**6.3 Reflective Assessment and Simulation-Based Learning**

Self-confidence does not always reflect actual preparedness. Objective assessment and structured feedback are important for reducing the gap between perceived and actual ability. Simulation-based learning also helps students improve practical skills and self-evaluation through realistic practice and feedback.

**6.4 University-Community Partnership and Behavioral Transfer**

Effective first-aid practice requires cooperation with emergency services, Red Cross organizations, and local EMS. These partnerships can provide professional training, practical resources, and real-world learning opportunities. Table 2 summarizes the main strategies and expected outcomes.

Table 2. Educational Management Strategies and Expected Outcomes.

Problem Identified	Educational Management Strategy	Expected Outcome
Fragmented one-time training	Longitudinal refresher system (spaced reinforcement)	Improved skill retention and reduced decay
Inaccurate self-assessment	Reflective assessment + structured feedback	Calibrated confidence and better self-awareness
Weak practical application	University-community partnerships (Red Cross, EMS)	Real-world readiness and applied competency
Low learning engagement	Competency-based curriculum with mastery progression	Sustained motivation and deeper engagement
No institutional governance	Integration into university health education system	Long-term competency governance

Partnerships with organizations such as Red Cross societies, heart associations, and local EMS support certified training, resource sharing, and repeated real-world practice beyond isolated workshops.

Overall, the evidence suggests that first-aid education should be treated not as short-term knowledge transfer,

but as a continuous competency development process embedded within higher education. The proposed framework demonstrates how institutional interventions, educational mechanisms, and competency outcomes interact to support sustained skill development.

## **7. Discussion**

### **7.1 Theoretical Contributions**

This review views first-aid education as a competency governance issue rather than only a short-term training problem. Previous studies mainly focused on knowledge acquisition and immediate training effects<sup>[6-7]</sup>. In contrast, this study identifies three connected factors—low learning engagement, inaccurate self-assessment, and fragmented training models—within broader educational management systems. The proposed framework also integrates research on motivation<sup>[20]</sup>, self-assessment accuracy<sup>[11]</sup>, and transfer of learning<sup>[13]</sup> into a more unified model.

### **7.2 Comparison with Existing Research**

Unlike traditional Knowledge-Attitude-Practice models that assume linear progression<sup>[7]</sup>, this framework treats competency development as continuous and context-dependent. It is influenced by institutional design, learning processes, and practice opportunities. While earlier competency-based studies focused mainly on medical education<sup>[15]</sup>, this framework applies these ideas to non-medical university students, who have received less research attention.

### **7.3 Educational Management Implications**

The framework provides practical guidance for competency-based curriculum reform and long-term emergency preparedness education in universities. The five proposed pathways support institutional improvement. In particular, longitudinal reinforcement addresses a key weakness of many current programs, which still rely on one-time training despite evidence of rapid skill decline without repeated practice<sup>[9,12]</sup>.

### **7.4 Limitations and Future Directions**

This review has several limitations, including the narrative review design, reliance on self-reported data, limited focus on actual helping behavior, and lack of empirical testing of the framework. Future studies should examine long-term interventions, reflective assessment methods, real-world behavioral outcomes, and technology-supported training models.

## **8. Conclusion**

This review identified three main factors behind the “willingness-competence gap” among non-medical university students: low learning engagement, inaccurate self-assessment, and fragmented training. These issues are related not only to individual knowledge deficits, but also to broader educational management systems. Based on existing studies, this paper proposed an integrated competency-based framework that includes curriculum reform, refresher training, reflective assessment, simulation-based learning, and university-community partnerships. First-aid education should therefore be viewed as a long-term competency development process within university health governance rather than a short-term extracurricular activity. The framework may provide practical support for educational reform in higher education, while future research should further examine its effectiveness in real-world settings.

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