



Research Report on the Pathways for Enhancing the Competencies of Vocational College Teachers in African Countries

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Abstract. Vocational education in Africa is currently at a critical stage where both demographic dividends and quality bottlenecks coexist. Insufficient teacher skills have become the core issue: only 38% of teachers have industry practical experience, 65% lack modern teaching skills, about 40% have not received systematic vocational education teaching method training, and some national curriculum content has been used for more than 20 years. The shortage of funds is most prominent, with less than 10% of teacher training funds, over 60% of colleges lacking multimedia equipment, and network coverage rate less than 30%.

This study focuses on the "low-cost, replicable" path and draws on the QVT model to construct a core competency framework that includes five dimensions: teaching implementation ability, practical guidance ability, local resource development ability, basic digital application ability, and social service and sustainable development ability. Based on the "capability gap resource constraint" correspondence model, design a three-stage path system of "diagnosis support evaluation" to fully respond to the real pain points of funding shortage and weak infrastructure in Africa.

Keywords: Vocational education in Africa, Teacher's ability enhancement, Low cost path

1 Introduction

The proportion of young people aged 15-24 in Africa reaches 20%, but only 762 out of every 100000 people receive vocational and technical education, indicating a serious shortage of vocational education supply. ^[1-2] The lack of teaching ability is prominent: only 38% have industry practical experience, 65% lack modern teaching skills, 40% have not received systematic teaching method training, and the course content has been used for more than 20 years, which is seriously disconnected from the needs of industry development. ^[3] The financial constraints are severe, with education funding accounting for an average of only 4.5% of GDP, teacher training funding less than 10%, over 60% of colleges lacking multimedia equipment, and

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network coverage less than 30%.^[4] The average annual turnover rate of teachers has reached 8%, further exacerbating the difficulty of team building.

The current improvement of African teacher capacity mainly relies on three models: short-term training by international organizations, internal training by enterprises, and studying abroad in China. However, there are generally problems such as short cycles, insufficient targeted content, high costs, and difficulty in scaling up, which have failed to respond to the core demands of "low cost, replicability, and localized adaptation". At the academic research level, there are prominent issues such as uneven regional research, insufficient verification of path effectiveness, and a lack of research on the adaptability of China Africa cooperation.^[5] Based on this, this study focuses on three core issues: the dimensions and current gaps of core competencies that African vocational school teachers should possess; How to build a "low-cost, replicable" improvement path under severe resource constraints; How to localize and adapt Chinese experience.

In terms of foreign research, the QVT model proposed by South African scholars Wedekind et al. provides an important theoretical reference for this study. This model includes five dimensions: teaching methods, industry understanding, external stakeholders, future orientation, personal/professional values, and abilities. It places teachers in a broader socio-economic ecosystem and emphasizes the need for collaborative efforts in capacity building from four levels: individuals, colleges, policy institutions, and TVET systems.^[6] Regional research reveals that there is a significant demand for Ethiopian teachers in curriculum development and the adoption of new technologies; South African teachers face a crisis of professional identity; Kenyan teachers have a cognitive bias where subject content naturally translates into teaching skills. The reports from the African Union and ACET further point out that the TVET system in Africa is facing structural challenges such as long-term funding shortages, teacher shortages, and a lack of professional development opportunities.

Domestic research shows the characteristics of "sufficient local cultivation and insufficient international extension", with only 3.7% of research involving African countries.^[7] There are abundant achievements in the fields of digital teaching, dual teacher training, and digital intelligence enhancement, but there are three major gaps: insufficient empirical research in Africa, insufficient consideration of resource constraints in the path, and a lack of research on regional adaptation in Chongqing.

2 Research Methodology

This study adopts literature review, comparative research, case analysis, and inductive summary methods to systematically sort out international policy texts and academic achievements, compare the differences in teacher training models between China and Africa, and extract practical experience that can be promoted. The research period is 12 months, divided into three stages: preparation stage (literature review, framework design), implementation stage (current situation analysis, case analysis, path construction), and conclusion stage (result refinement, report improvement).

Based on a systematic analysis of the development of vocational education in Africa and relevant international research, and drawing on the theoretical framework of the QVT model, this study defines the core competencies of African vocational school teachers from the perspective of "holistic development" as the following five interrelated dimensions. Figure 1 shows the performance of the core competitiveness of teachers in African vocational colleges.

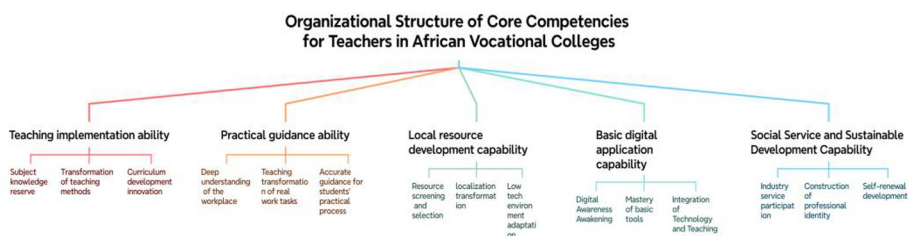


Fig. 1. Definition of Core Competencies for African Vocational College Teachers.

Teaching implementation ability is the fundamental ability for vocational education teachers to fulfill their educational function. This study defines it as a progressive ability structure covering three levels: subject knowledge reserve, teaching method transformation, and curriculum development innovation, aiming to respond to the teaching dilemma of "emphasizing content over methods" commonly found in vocational education in Africa. The key to enhancing the capacity of African teachers is not to isolate and expand subject knowledge, but to build a systematic ability to transform from "subject experts" to "teaching experts".

Practical guidance ability is the core manifestation of the "professional attribute" that distinguishes vocational education teachers from ordinary education teachers. This study expands it from a simple "skill operation level" to a composite ability structure of "profound understanding of the workplace - teaching transformation of real work tasks - precise guidance of students' practical processes". In response to the reality that 62% of teachers in Africa lack industry experience, the improvement of practical guidance ability must take a "flexible" path that meets resource constraints. This can be achieved through short-term project-based enterprise practices and the entry of enterprise backbone into schools to teach, in order to achieve two-way flow of personnel between schools and enterprises at a lower cost.

The ability to develop local resources is a core competency dimension proposed in this study based on the special context of Africa, which directly responds to the reality that over 60% of vocational colleges lack multimedia equipment and network coverage is less than 30%. This ability is defined as a composite ability structure of "resource screening, localization transformation, and adaptation to low tech environments", emphasizing that the focus of teacher capacity building should shift from "using high-quality resources" to "creating teaching conditions without high-quality resources".

Basic digital application ability is an important component of the professional competence of vocational education teachers in the information age. This study

constructs it as a progressive ability structure consisting of three levels: "digital awareness awakening - mastery of basic tools - integration of technology and teaching", emphasizing that the focus of digital ability construction should shift from "pursuing advanced technology" to "achieving teaching optimization under limited technological conditions", and follow the development path of "lightweight, practical, and gradual".

Social services and sustainable development capabilities integrate the two core dimensions of "external stakeholders" and "future orientation" in the QVT model, constructing a composite capability structure of "industry service participation - professional identity construction - self-renewal development". This definition responds to the deep-seated problems of vague professional development paths, weak self-renewal motivation, and low professional identity among vocational college teachers in Africa.

Based on a systematic analysis of the shortcomings in the abilities of vocational college teachers in Africa, this study constructs a corresponding model of "ability gap resource constraints" to clarify the key bottlenecks that need to be overcome in the low-cost path. Table 1 indicates the corresponding 'capability gap resource constraint' model.

Table 1. Corresponding model of "capability gap resource constraint".

Capability dimension	Core gap	Main resource constraints	Path breakthrough direction
Teaching implementation ability	Lack of characteristic teaching methods in vocational education; Weak ability to transform disciplinary knowledge into teaching skills	Insufficient training funding (<10%); High quality training resources are scarce	School based training, peer assistance, and training on lightweight teaching methods
Practical guidance ability	Lack of industry practical experience (only 38% have it)	The mechanism of school enterprise cooperation is not smooth; Weak willingness of enterprises to participate	Flexible school enterprise cooperation mechanism; Virtual simulation resources; Case Method
Local resource development capability	Lack of high-quality teaching resources; Poor adaptability between resources and local industries	Insufficient digital equipment (>60%); Low network coverage (<30%)	Low tech dependence on resource development; Local case collection; Resource sharing mechanism
Digital application capability	Lack of basic operational skills; Weak ability to adopt new technologies	Shortage of hardware facilities; Technological updates are lagging behind; Training content tends to converge	Lightweight learning on mobile devices; Offline resource package; Layered differentiated training
Sustainable development capability	Unclear professional development path; Weak self-renewal motivation; Low sense of professional identity	Lack of incentive policies; The career development channel is not smooth; Negative public perception	Teacher community building; Growth profile records; Professional identity cultivation

3 Research Conclusion

The improvement of teachers' abilities needs to rely on a comprehensive system of institutional guarantees. The guarantee mechanism for teacher professional development includes establishing an annual research mechanism for teacher training needs, constructing a three-level training system of "new teacher adaptation - backbone teacher improvement - expert teacher guidance", establishing a mechanism for accumulating and converting teacher training credits, linking training results with qualification certification and job title promotion, and establishing a systematic mechanism for cultivating professional identity.

A long-term mechanism for school enterprise cooperation is designed to address the weak willingness of African enterprises to participate. A flexible cooperation mechanism with "low threshold and high frequency" is designed, including short-term lectures by enterprise backbone, project-based enterprise practice by teachers, and joint research and development of enterprise technical problems. Play the bridging role of industry associations, participate in the development of training standards, evaluate training quality, and organize industry mentors. Building a cooperation platform based on the Industrial College, integrating resources from the school, university, and enterprise.

The mechanism for co building and sharing digital teaching resources relies on regional vocational education centers to establish regional digital teaching resource centers, responsible for collecting, organizing, developing, and distributing resources. In response to the reality that the network coverage is less than 30%, we will build an offline resource library and create high-quality resources into resource packages that can be used offline. Establish incentive mechanisms to encourage teachers to develop localized teaching cases and practical projects based on local industry realities.

The mechanism for promoting collaboration among multiple stakeholders clarifies the government's leading responsibility, formulates national strategies and standard frameworks, and coordinates resource allocation; Give full play to the main role of schools in implementation, establish teacher development centers, and improve school-based training and teacher evaluation mechanisms; Inspire teachers' intrinsic motivation, establish incentive and fault tolerance mechanisms, and create a campus culture of respecting teachers and valuing education; Strengthen collaborative support from international organizations and expand cooperation coverage through joint projects, standard building, knowledge sharing, and other means.

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