Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China

Xiaoli Liang

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Education in Educational Administration and Development
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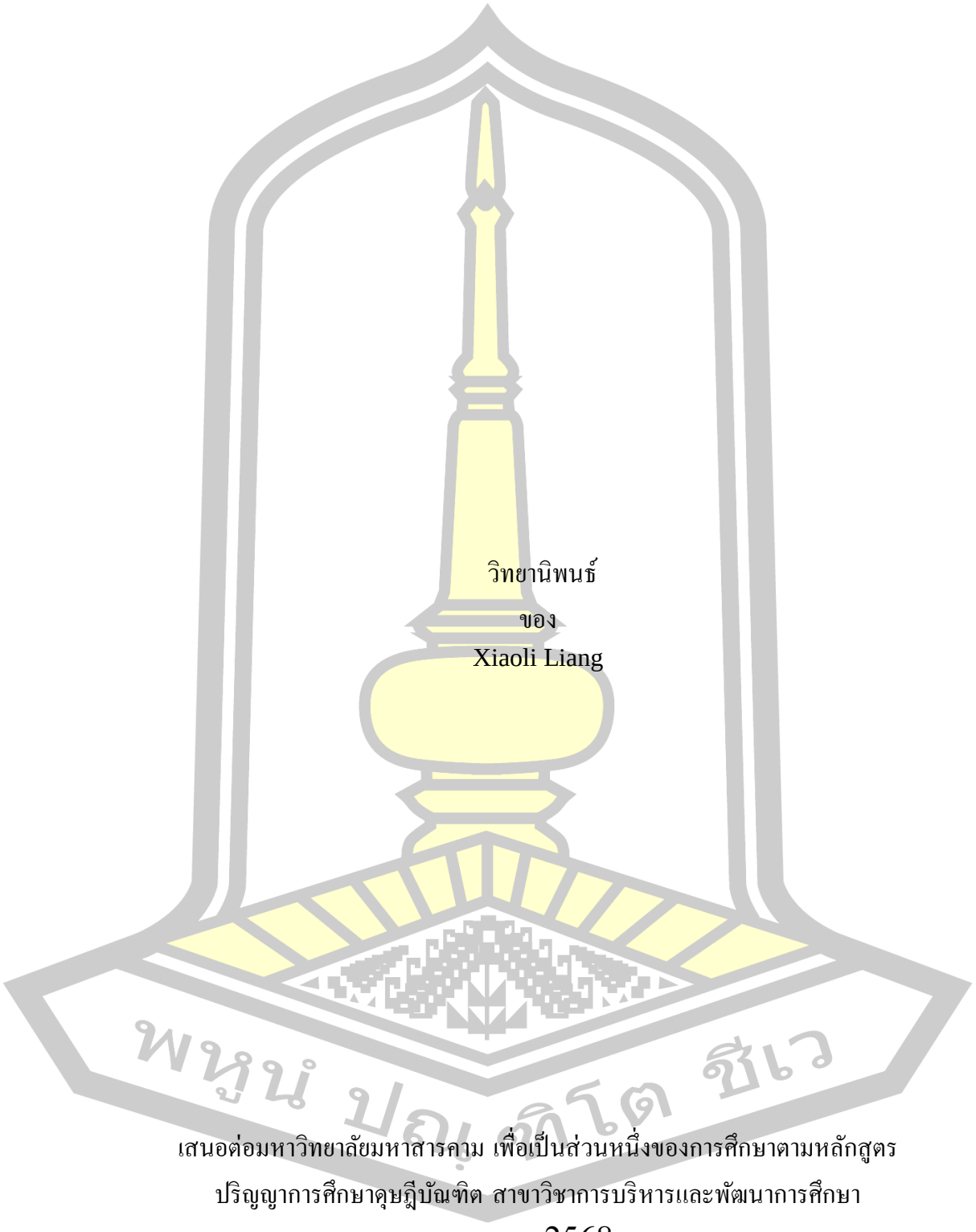

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ABSTRACT

How to ensure the quality of higher education and improve its global competitiveness had become a major concern and challenge for governments in the world. The quality of higher education has become a hot topic of general interest in the academic world. Higher vocational education in China had stepped into a critical period of transformation from pursuing scale expansion to improving quality. Therefore, it was very necessary to research and develop an internal quality assurance model of higher vocational colleges that met the characteristics of higher vocational education, playing a reference role in peer institutions'construction.

In this study, the following research was conducted and results were obtained: First, building on the results of previous research, this research studied the components of internal quality assurance system in higher vocational colleges by researching and synthesising various academic sources and policy documents, and drawn the initially selected components, which were evaluated by five experts invited, then producted the final components of internal quality assurance system in higher vocational colleges in Guangxi consisting of nine elements. Second, questionnaires and surveys were prepared in conjunction with the nine components, and poeple closely related to the development of the internal quality assurance system model in higher vocational institutions were selected as the sample, which were presidents, middle-level leaders, administrators, full-time front-line teachers in the three schools, totally 306 people, and experts in QM/QA in higher vocational education. Through questionnaires and interviews, the result of the current state, desired state and priority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi, China was explored: the current state level was ranked from highest to lowest as follows:Subject System,Organazation System, Mechanism Guarantee System, Quality Culture, School-based Information Management Platform, Objective System(Objective Chain), Operation System, Quality Assurance Philosophy (Quality Perspective), Criteria System (Criteria Chain). The desired state level was ranked from highest to lowest as follows: Criteria System (Criteria Chain),Operation System,

Objective System(Objective Chain),Quality Culture, Mechanism Guarantee System, School-based Information Management Platform, Organazational System, Subject System,Quality Assurance Philosophy (Quality Perspective). The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: Criteria System (Criteria Chain), Operation System, Objective System(Objective Chain), School-based Information Management Platform, Quality Assurance Philosophy (Quality Perspective), Quality Culture, Mechanism Guarantee System, Organazation System, Subject System. And Elements with high $PNI_{modified}$ values needed to be prioritised and addressed. Third, the initially selected components of model were obtained by reviewing relevant academic materials, which were evaluated by 5 experts invited, and finally concluding that components of an internal quality assurance system model consisted of 5 components: Principles, Objectives, Approaches, Procedures, Evaluation. Combining the components of internal quality assurance system;the current state, desired state and priority needs; and components of an internal quality assurance system model, the process to develop an internal quality assurance system model in higher vocational colleges in Guangxi were studied out, which of the suitability and feasibility evaluated by 5 experts invited were very high level. Finally, combining with these results above, this study pointed out suggestions for using the results of the study and suggestions for future research.

Keyword : Quality assurance in higher education, Internal quality assurance in higher vocational education, Internal quality assurance system, Model development

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INTRODUCTION

Background

How to ensure the quality of higher education and improve its global competitiveness had become a major concern and challenge for governments. Stepping into the popularization stage, the most prominent and obvious feature of higher education was the rapid expansion of scale, and the demand for specialized, diversified and internationalized education had becoming more and more prominent, but it was also accompanied by the anxious concern of the government, society and parents about the quality of education. The establishment of an effective quality assurance system for higher education was undoubtedly seen as an important way to effectively prevent the quality of higher education from slipping (Chen Yunkun &Dai Ruihua et al., 2004). The reasonable construction and effective operation of internal quality assurance system was the key to realize quality assurance in higher education. As one scholar put it that “the quality management of colleges can be realized through internal quality assurance system” (Mursidi and Andi, 2017).

Compared with European and American countries, the construction and research of China higher education quality assurance system started relatively late, and scholars began to pay attention and explore it in the middle of 1990s (Wei Hong &Zhong Binglin, 2009). Stepping into the new stage of popularization development, higher education in China was facing severe challenges, where the basic features of higher education were diversification, special features and high quality. In this period, the core competitiveness of the development of colleges and universities was mainly reflected in the quality of education (Liu Hongjing,2023). Therefore, It was impossible to emphasize the significance of quality assurance in higher education. However, higher education quality assurance in China still aimed at the quality benchmark of the massification stage, and the existing problems and drawbacks could hardly adapt to the needs of the high-quality development of higher education in the new stage of popularization at present. For instance, many colleges and universities confused internal and external quality assurance activities invariably, mechanically copied the

external quality assurance model, and fragmented and sliced the internal quality assurance system (Liu Zhentian, 2016; Liu Hui &Li Jiahui, 2019), lacking of correct understanding and in-depth understanding of the nature, concepts, structures, characteristics and functions of the internal quality assurance system, resulting in the internal quality assurance system to follow the instructions of the external quality assurance system, too much emphasis on expediency and utility, and the subject status of quality assurance was not highlighted (Liu Zhentian, 2013; Bie Dunrong &Yi Mengchun &Li Zhiyi et al, 2018), problems such as marginalized status of students and weak construction of quality culture were also prominent (Yang Caixia, 2019). Among them, the most prominent and most in need of rectification was the problem in the construction and operation of the internal quality assurance system. Some colleges and universities still had a vague understanding of what and how to build the internal quality assurance system, and the systematicity, holistic and scientific construction was insufficient, so a scientific, complete and operable idea had not yet been formed (Li Guoqiang, 2016;Li Qingfeng,2022). As a result , at the important time node of entering the popularization stage, China higher education needed to continuously strengthen the construction of internal quality assurance system to better face the challenges brought by the new situation.

Higher vocational education is the main source of cultivating high-quality technical and skilled talents, which is of great significance in enhancing the quality of a country's human capital and promoting industrial upgrading and high-quality development of the economy(Ding Yasong,2021). By the end of 2020, the number of Students enrolled in three grades in China higher vocational colleges (at the specialist level) had reached 1,468, 1,459,000 and 5,240,000, accounting for 54%, 44% and 54% of the total number of ordinary colleges respectively (Ministry of Education of China, 2017). Higher vocational education in China had achieved rapid development by leaps and bound. At the 2021 China Vocational Education Conference, China's General Secretary Xi Jinping made an important instruction on the work of vocational education, stressing that “we will accelerate the construction of a modern vocational education system, and cultivate more high-quality technical and skilled talents, skilled craftsmen, and great national craftsmen”. A comprehensive and integrated education quality assurance system could realize the continuous improvement of talent cultivation

quality and promote higher vocational colleges to achieve high quality and connotative development (Li Yunshan & Wang Mei et al., 2021). However, it was only in the last few years that the Chinese government officially started to address the issue of establishing an internal quality assurance system for higher vocational education. In 2015, the construction of an internal quality assurance system for higher vocational institutions was put on the agenda when the Ministry of Education of China issued a document "*Circular on the Establishment of a System for Diagnosis and Improvement of Teaching Work in Vocational Institutions"*(Ministry of Education of China, 2015) This was a policy document that mentions the construction of internal quality assurance system of higher vocational education for the first time in an official name. Immediately following this, in 2016 the Ministry of Education of China issued the document "*Notice on Printing and Issuing the Guidance Programme for Diagnosis and Improvement of Internal Quality Assurance System of Higher Vocational Colleges (for Trial Implementation)*"(Ministry of Education of China, 2015), which established the management idea of guiding vocational colleges to improve the quality of talent cultivation by means of "diagnosis and improvement", and requires higher vocational colleges to independently set up their internal quality assurance systems. However, due to the short time of construction, the construction of internal quality assurance system in higher vocational colleges still had many problems. For instance, most of the colleges lacked systematic and comprehensive thinking about the construction of internal quality assurance system, only implementing part of the work in accordance with the requirements of the policy documents; the institutions did not put themselves in the main position in the process of construction of internal quality assurance system, and there is a bias in the understanding of the significance and value of the system construction and the content and procedure of the system; some colleges lacked a clear understanding of their own schooling orientation and talent cultivation goals, often copying the model of the internal quality assurance system of general higher undergraduate education, failing to think from the perspective of higher vocational education and the school's own characteristics. Therefore, it was very necessary to research and develop an internal quality assurance model for higher vocational colleges that met the characteristics of higher vocational education, had reasonable structural elements and operates efficiently.

Located on China's southwestern border, Guangxi is economically underdeveloped, and the quality of education at all levels is at the lower-middle level of the country. The Annual Report on *the Quality of Higher Vocational Education in the Guangxi Zhuang Autonomous Region (2022)* stated that by the end of 2021, there were 44 independent higher vocational colleges (31 public higher vocational colleges and 13 private higher vocational colleges) recorded by the Ministry of Education in Guangxi, which accounted for 53.66% of the 82 colleges in Guangxi (Guangxi Zhuang Autonomous Region Department of Education,2022). In 2017, under the unified deployment of the Ministry of Education, higher vocational colleges in Guangxi began to practice and explore a diagnosis and improvement model of building an internal quality assurance system. Through active deployment and implementation, training and learning, Guangxi higher vocational colleges had basically established an internal quality assurance system and formed a Diagnosis and Improvement Model with "Five Vertical, Five Horizontal and One Platform" as the basic framework, and some institutions had initially shown their own characteristics and highlights(Wang Rurong & Yuan Hongzhi & Yang Yingsong, 2022). Although the construction of internal quality assurance system of Guangxi higher vocational colleges had achieved stage-by-stage results, the construction was still in the initial stage, and there were still many problems, such as the lack of deep understanding of the concepts embedded in the Diagnosis and Improvement Model of internal quality assurance; the lack of familiarity with the process and steps of constructing the internal quality assurance system; and the weak support capacity of information technology. In view of the above problems, it was necessary to further enhance the understanding, to improve the organizational system, strengthen the construction of information technology, to combine the school-based characteristics, and to continuously improve the construction of internal quality assurance system(Wang Xian,2012). Therefore, on the basis of investigating the current state, the desired state and priority needs of internal quality assurance system in Guangxi higher vocational colleges, this study could explore the development of an applicable and effective model for solving the above problems, in view of the existing problems.

Research Questions

This research has three questions, these are:

1. What are the components of internal quality assurance system in higher vocational colleges in Guangxi,China?

2. How are the current state, desired state , and priority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China?

3. How is a model of internal quality assurance system in higher vocational colleges in Guangxi,China?

Research Objectives

This research had three objectives, as follows:

1. To study the components of internal quality assurance system in higher vocational colleges in Guangxi, China.

2. To explore the current state, desired state and priority needs of internal quality assurance system in higher vocational colleges in Guangxi, China.

3. To develop a model of an internal quality assurance system in higher vocational colleges in Guangxi, China.

Research Significances

The discussion of internal quality assurance system in China higher vocational institutions had been a hot research topic in recent years. The results of this study could help the managers of higher vocational institutions, especially presidents and middle-level leaders, to be familiar with and master the relevant theories, influencing components, construction concepts, principles, and approaches, procedures of developing a model, and other basic conditions of the internal quality assurance system based on the understanding of the current situation and challenges. Meanwhile, the results of the study would not only help higher vocational institutions to establish an internal quality assurance system systematically and comprehensively that highlights the characteristics of vocational education and school-based features, but also promote higher vocational institutions to achieve high-quality development in order to respond to the social demand for high-level technical and skilled talents.

1. President

The results of this study would be particularly helpful for presidents of higher vocational colleges in China to further understand the challenges in building internal quality assurance systems. Presidents could draw on the model to think systematically about how to build an internal quality assurance system, how to strengthen the top-level design, how to set medium- and short-term goals, and how to design criteria for evaluating the achievement of the goals in order to realize the school's talent cultivation goals and long-term vision. Therefore, the results of this research would provide presidents of higher vocational colleges with meaningful lessons and references.

2. Middle-level Leader

Middle-level leaders of higher vocational institutions had strong power and leadership, and were the key responsible subjects in the internal quality assurance system of higher vocational colleges, and had the central role of connecting the presidents with teachers and students. This study results could relevantly help middle-level leaders to further systematically understand the concept of approaching an internal quality assurance system, and familiarize themselves with its influencing elements, building principles and improvement strategies. Meanwhile, middle-level leaders could construct an internal quality assurance system through the thinking of comprehensive system management, with the goal of improving the quality of talent training and the satisfaction of teachers and students, and providing service support and resource guarantee for education and teaching.

3.Teacher

The management of the education quality included the management of teachers, which was in essence the management of human resources. The internal quality assurance system also included a component that guarantees the professional development of teachers. Therefore, this study could also provide a self-assurance model for teachers' own professional development, and could provide quality assurance theories, principles and influencing factors for teachers' own growth and development. Teaching quality could only be improved if the quality of the teaching force was improved. The construction of an internal quality assurance system could make teachers realize the initiative and importance of being one of the responsible subjects of quality assurance, as well as the value of being a real educator, and stimulate the vitality of

their teaching. Therefore, this model had important guiding significance for both teachers' own development and the improvement of teaching quality.

4. Student

The ultimate goal of internal quality assurance was to improve the quality of personnel training, so the internal quality assurance system also included a part to ensure the growth and development of students. The main training goal of higher vocational colleges was to cultivate high-quality and high-skilled teachers for basic education. This study results would help to establish a "student-centred" internal quality assurance system, and to set up an indicator system, mechanism and system suitable for the development needs of students. At the same time, the study would also provide students with an important path and direction for active learning and improvement of their qualifications, based on an understanding of the current situation and challenges.

5. Institution

The objective of this research was to construct an internal quality assurance system model for higher vocational colleges. This study investigated the components of internal quality assurance system, and explored the current state , desired state and priority needs of internal quality assurance system in higher vocational colleges in Guangxi, which was of great significance for higher vocational colleges to improve the quality of talent training, enhance core competitiveness, and focus on connotation construction.The construction and application of the internal quality assurance system model could help higher vocational colleges to reverse their previous shortcomings of not putting themselves in the main position, not having clear objectives of talent cultivation, copying the talent cultivation model of undergraduate colleges, having weak endogenous motivation, and not reflecting student-centredness, and to gradually form a self-assurance circulatory system that highlighted the characteristics of vocational education as well as the characteristics of the school.

Scope of Research

1. Scope of Research Contents

This study belongs to the research field of higher vocational education and the research direction involved was vocational education management, which of research objects were mainly the higher vocational colleges in Guangxi,China. Focusing on developing an

internal quality assurance system model for higher vocational colleges in Guangxi,China, **First**, this study had analysed and sorted out the components of internal quality assurance system by searching and studying the documents of various academics, and then relevant experts were found to evaluate the suitability of the preliminary components; **Second,** questionnaire and interview outline were be prepared, and relevant data and information were be obtained through questionnaires and interviews from different groups of people in higher vocational institutions, such as presidents, middle-level leaders, administrators, full-time front-line teachers, etc, in order to obtain the current state, desired state, and the priority needs of internal quality assurance system in higher vocational colleges in Guangxi; **Third**, according to the results of the previous two parts, combined with the principles, approaches, and procedures of model, the researcher studied the components of a model for internal quality assurance system in higher vocational colleges in Guangxi by reviewing and analysing relevant academic sources, which were evaluated by 5 experts invited; **At last**, the process of developing internal quality assurance system model of higher vocational colleges in Guangxi were studied, of which suitability and feasibility were evaluated by 5 relevant experts invited. Therefore, the scope of the research content involved the following aspects:

1.1 Components of internal quality assurance system in higher vocational colleges in Guangxi

Starting from the research and synthesis of the literature by various scholars, the internal quality assurance system in higher vocational colleges in Guangxi includes nine components:

1) Quality Assurance Philosophy (Quality Perspective)

2) Organization System

3) Subject System

4) Objective System (Objective Chain)

5) Criteria System (Criteria Chain)

6) Operation System

7)Mechanism Guarantee System

8)Quality Culture

9) School-based Information Management Platform

1.2 Components of an internal quality assurance system model in higher vocational colleges in Guangxi

The researchers studied various documents and found that internal quality assurance in higher vocational colleges was a multilevel and complex system structure, which consisted of five components: Principles, Objectives, Approaches, Procedures, Evaluation.

1) Principles

2) Objectives

3) Approaches

4) Procedures

5) Evaluation

1.3 Principles of constructing an internal quality assurance system in higher vocational colleges in Guangxi.

Starting from the research and synthesis of documents from scholars and educators, construction of an internal quality assurance system in higher vocational colleges in Guangxi primary complied with the following principles:

1） Principle of systematicity

2） Principle of scientificity

3） Principle of participation of multiple subjects

4） Principle of continuous improvement

1.4 Approaches of developing an internal quality assurance system model in higher vocational colleges in Guangxi

The researchers studied various documents and found that the approaches of developing an internal quality assurance system model in higher vocational colleges could conducted two approaches of the PDCA Cycle and the “8” Type Quality Improvement Spiral.

1) PDCA Cycle

2) “8” Type Quality Improvement Spiral

1.5 Procedures of developing an internal quality assurance system model in higher vocational colleges in Guangxi

The researchers studied various documents and found that the procedures of developing an internal quality assurance system model in higher vocational colleges included four elements: Conceptual Level, Input Level, Process Level and Output Level.

1) Conceptual Level

2) Input Level

3) Process Level

4) Output Level

1.6 Evaluation of an internal quality assurance system model in higher vocational colleges in Guangxi

The researchers studied various documents and found that the approaches of developing an internal quality assurance system model in higher vocational colleges in China conducted the evaluation methodology of Five-stage Approach to Diagnosis and Improvement Model.

1.7 Process to develop an internal quality assurance system model in higher vocational colleges in Guangxi could be complied with the following steps

1.7.1 Investigate internal quality assurance system in higher vocational colleges in Guangxi.

1.7.2 Explore the current state, desired state and priority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi.

1.7.3 Create a model of internal quality assurance system in higher vocational colleges in Guangxi.

1.7.4 Evaluate the suitability and feasibility of the internal quality assurance system model in higher vocational colleges in Guangxi.

2. Population and Sample

The population of this study were 20 higher vocational institutions in Guangxi that had independently established their internal quality assurance systems and successfully passed the two rounds of Diagnosis and Improvement Review in 2019 and 2022, respectively, since the policy documents of diagnosis and improvement of internal quality assurance systems in higher vocational institutions in China was carried out in 2016. According to the results of the two rounds of Diagnosis and Improvement Review, which of the results were divided into 2 types of review results: “validity”and“To be improved” , the best practice schools in internal quality assurance or the schools that passed the two rounds of Diagnosis and Improvement Review in “validity” level were studied as the source of the population. The three higher vocational colleges seleted as the sample institutions were: Guangxi College for Preschool Education (the institution where the researcher is located),

Guangxi Vocational &Technical Institute of Industry, and Guangxi Vocational College of Water Resources and Electric Power.

Phase1: Study the components of internal quality assurance system in higher vocational colleges in China ,which was be verified by five experts.

Five experts consisting of presidents of higher vocational institutions, heads of quality management departments in higher vocational institutions, and academics in the field of quality management or quality evaluation in higher vocational education, evaluated the suitability of components.

Phase 2: Explore the current state, desired state , priority needs and PNI of constructing an internal quality assurance system in higher vocational colleges in Guangxi, China

1) Population included the three higher vocational colleges selected in Guangxi,China, including presidents, middle-level leaders, administrators, and full-time front-line teachers with total 1436 people, which consisted of 15 presidents (1.04%), 183 middle-level leaders(12.74%), 332 administrators(23.12%), and 906 full-time front-line teachers(63.09%).

2) The sample group included presidents, middle-level leaders, administrators, and full-time front-line teachers from the three higher vocational colleges selected. The sample was calculated by comparing the total population with the prepared table of Krejcie and Morgan (1978), and then Simple Random Sampling was used to get the sample in each layer. This resulted in a sample of 306 people in which included 4 presidents, 39 middle-level leaders, 70 administrators, and 193 full-time front-line teachers.

Phase 3: Develop a model of internal quality assurance system in higher vocational colleges in Guangxi, China

1) 5 experts consisted of presidents of higher vocational institutions, heads of quality management departments in higher vocational institutions, and academics in the field of quality management or quality evaluation in higher vocational education were in-depth interviewed about components of internal quality assurance system model in higher vocational colleges.

2) 5 experts consisted of presidents of higher vocational institutions, heads of quality management departments in higher vocational institutions, and academics in the field of quality management or quality evaluation in higher vocational education were in-depth

interviewed about the concepts, principles, approaches, and procedures of developing an internal quality assurance system model in higher vocational colleges.

3) 5 experts consisted of presidents of higher vocational institutions, heads of quality management departments in higher vocational institutions, and academics in the field of quality management or quality evaluation in higher vocational education, evaluated the suitability and feasibility of the internal quality assurance system model in higher vocational colleges.

Theoretical Framework

This research focused on developing a model of internal quality assurance system in higher vocational colleges in Guangxi,China. **First**, studying the components of internal quality assurance system in higher vocational colleges was carried out by researching and synthesizing various academic sources. Then, Five experts were invited to verify the initially selected components. **Second**, questionnaires and surveys were administered to explore the current state, desired state and priority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi, China. **Third**, after studying by synthesizing a variety of relevant academic literature, the concepts, principles, approaches and procedures for developing an internal quality assurance system model in higher vocational colleges in Guangxi were studied, then which were evaluated by 5 experts invited been identified. **Fourth**, components of an internal quality assurance system model were obtained by reviewing relevant academic materials, which were evaluated by 5 experts invited. **Fifth**, combining the components of internal quality assurance system, the current state, desired state and priority needs, the concepts, principles and methods for constructing an internal quality assurance system, and components of an internal quality assurance system model, the process to develop an internal quality assurance system model in higher vocational colleges in Guangxi were studied. **Sixth**, the suitability and feasibility of the internal quality assurance system model were evaluated by 5 experts invited. In conclusion, the researcher conducted the study with a conceptual framework as shown in figure 1：

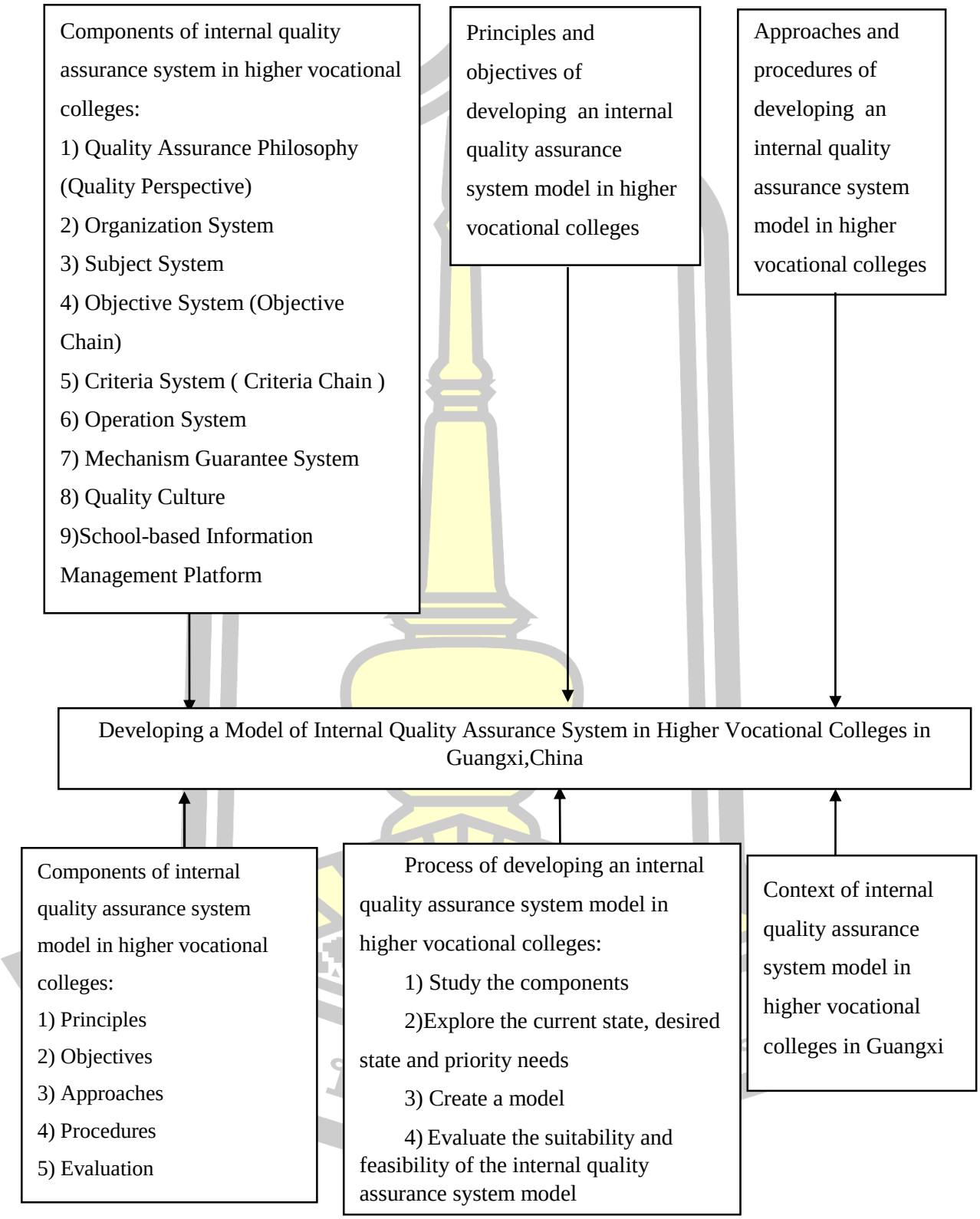


Figure 1 Research theoretical framework

Term Definition

1. Internal Quality Assurance System in Higher Vocational Colleges

1.1 Quality Assurance (QA)

Feng Run (2019) "Quality assurance"is an activity that provides evidence to all stakeholders, and this evidence is provided in order to win the trust of the stakeholders, which shows that the function of quality assurance is working.

Chen Yunkun &Dai Ruihua et al. (2004:10) Quality assurance was the process by which a manufacturer or producer of a related product provided a product or service to a user that continued to reach a predetermined goal in order to satisfy the user. It could be seen that quality assurance was a dynamic process of continuous development, in which quality improvement was pursued with the purpose of user satisfaction or quality enhancement.

This study defines "quality assurance" as a dynamic process of continuous development, in which quality improvement was pursued with the purpose of user satisfaction or quality enhancement.

1.2 Quality Assurance System in Higher Education

Zhou Wenqing (2022) Quality assurance system in higher education refers to the interconnection and mutual constraints between the basic elements related to quality assurance and thus constitutes a unified organism, covering the external quality assurance system and internal quality assurance system.

Liu Zhentian(2016) Higher education quality assurance system was divided into two parts: external quality assurance system and internal quality assurance system. Internal quality assurance system refers to the self-restraint and self-management system independently constructed by higher education institutions or organizations in order to ensure the quality of talent cultivation, combined with their own characteristics, and the main body of construction and implementation is the university itself .

In this study, the internal quality assurance system in higher education refers to a set of closed-loop systems including goals, standards, systems, evaluation, feedback and improvement, including at least five systems of mutual constraints, support and promotion before, during and after: the goal and standard system, the resource allocation system, the operation system, the evaluation system and the feedback and improvement system (Wei Hong and Zhong Binglin, 2009).

1.3 Higher Vocational Colleges in China

Higher vocational education in China is a type of higher education that aims to cultivate senior practical talents with certain theoretical foundation and strong practical ability for vocational positions in the fields of production, service and management, and is another type of higher education alongside ordinary undergraduate higher education (Liu Fengcun, 2016).

1.4 Internal Quality Assurance System in Higher Vocational Colleges

The internal quality assurance system in higher vocational colleges refers to a networked quality assurance system built around the whole process of talent cultivation, centered on serving the needs of students' career development and local industrial development, oriented on the results of talent cultivation, and based on facts and data, and constructed within the colleges and universities by certain institutional mechanisms.

1.4.1 Quality Assurance Philosophy (Quality Perspective)

Quality Assurance Philosophy, also known as the “Quality perspective”, refers to the fundamental views and attitudes of higher vocational institutions towards the quality of education in their internal quality assurance processes.

1.4.2 Organization System

Organization system refers to the organizational structure and division of responsibilities established by higher vocational colleges to ensure the quality of education in the process of implementing internal quality assurance.

1.4.3 Subject System

Subject System refers to the various types of subjects and their interrelationships involved in quality assurance activities during the implementation of internal quality assurance in higher vocational colleges.

1.4.4 Objective System (Objective Chain)

Objective system refers to a collection of multi-level and multi-dimensional objectives systematically formulated by higher vocational colleges according to their own schooling orientation, social demand and vocational education development requirements, combined with national education policies and quality standards. It is also known as the “Objective Chain”, which reflects the hierarchy,

relevance and consistency of the goals and ensures that all the work of the institution is centered on the core goals.

1.4.5 Criteria System (Criteria Chain)

Criteria system refers to a series of hierarchical quality standard documents formulated by higher vocational colleges based on national policies, industry needs and school realities in order to achieve educational goals, ensure that the whole process and all aspects of educational and teaching activities have clear quality criteria, so as to realize the systematization, standardization and refinement of quality management. It is also figuratively called the “Criteria Chain”.

1.4.6 Operation System

Operation system refers to a set of systematicity and standardized operation mechanism and process established by higher vocational colleges and universities according to the principle of PDCA Cycle to ensure the quality of education. It is a process of ensuring the realization of educational goals and quality improvement through goal-setting, standardization of process, process monitoring, information feedback, evaluation and diagnosis, continuous improvement and information support, etc., in accordance with the three phases of Before event, During event and After event and the procedure of “input - process - output”.

1.4.7 Mechanism Guarantee System

Mechanism guarantee system refers to a series of regulations, management processes and standards established by higher vocational institutions to ensure the quality of education and teaching and to realize the objectives of talent training. It includes quality policy and objectives, organizational structure and responsibilities, teaching management system, faculty building system, student management and support system, quality monitoring and evaluation mechanism, and internal audit and improvement system.

1.4.8 Quality Culture

The quality culture refers to an organizational culture centered on quality in the internal quality assurance system in higher vocational colleges, which is the quality values and concepts recognized by all members of the institution.

1.4.9 School-based Information Management Platform

The school-based information management platform refers to the information platform independently developed or customized by higher vocational colleges

to support the diagnosis and improvement of internal quality assurance system, which is also referred to as Diagnosis and Improvement Platform. It collects, analyzes and feeds back data by integrating data from all aspects of the school to help the school discover problems, analyze the reasons, formulate improvement measures, and follow up the effect of the improvement, and ultimately realize the continuous improvement of the quality of education and teaching.

2. Current state

The current state refers to the level of practice about the internal quality assurance system in higher vocational colleges in Guangxi,China.

3. Desired state

The desired state refers to the level of need. That shows the need to construct an internal quality assurance system in higher vocational colleges in Guangxi, China.

4. Priority needs

The priority needs refer to the wish that there should be, regarding the construction an internal quality assurance system in higher vocational colleges in Guangxi, China.

5. Diagnosis and improvement of internal quality assurance systems in higher vocational colleges in China

The diagnosis and improvement of internal quality assurance systems in higher vocational colleges in China, also known as **Diagnosis and Improvement Model,** which was proposed by the Ministry of Education of China, issuing the document "*Guidance Programme for Diagnosis and Improvement of Internal Quality Assurance Systems in Higher Vocational Institutions (Trial)"* in 2015. **It refers to** an innovative model of internal quality assurance system with Chinese characteristics developed by China on the basis of the advanced experience of higher education quality assurance systems around the world, which is the first step in China's efforts to improve the quality of higher vocational institutions. **"Internal Quality Assurance System"** refers to the working system and operation mechanism for comprehensively improving and assurancing the quality of talent cultivation. It takes cultivating high-quality talents as the goal, improving teaching quality as the core. "**Five Vertical, Five Horizontal and One Platform"** as the basic framework, the construction of institutional mechanism and quality culture as the **"Double Engine"**. Diagnosis and improvement as the means, strengthen the quality dependence between the five horizontal subject elements (**School level, Major level, Curriculum level, Teacher**

level, Student level), and rationally organize the activities and functions of each link and each department in the process of talent cultivation, so as to form a networked, full-coverage organic whole, the so-called "**system**", with clear tasks, responsibilities and authorities, and with the ability to co-ordinate and promote each other.

6. "Five Vertical, Five Horizontal and One Platform"

"Five Vertical, Five Horizontal and One Platform" refers to the abbreviation of the **Diagnosis and Improvement Model,** which was proposed by the Ministry of Education of China, issuing the "*Guidance Programme for Diagnosis and Improvement of Internal Quality Assurance Systems in Higher Vocational Institutions (Trial)*" in 2015. It is a model innovation made by China on the basis of absorbing and learning from the advanced experiences of various countries around the world. Among them, **"Five Vertical"** means five vertical systems - Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System. **"Five Horizontal"** is the horizontal five responsible subjects - School level, Major level, Curriculum level, Teacher level, Student level. "**One Platform"** refers to the School-based Information Management Platform, also known as Diagnosis and Improvement Platform, mainly being in charge of quality management data integration, analysis, monitoring, early warning, generating diagnostic and analytical reports to provide reference for decision-making.

7. "8" Type Quality Improvement Spiral

"8" Type Quality Improvement Spiral is a concept proposed by the higher vocational education sector in China regarding the operation logic of the internal quality assurance system. It is a continuous improvement mechanism based on the PDCA Cycle Theory, which refers to the closed-loop management mechanism of "Plan-Do-Check-Act" in the construction of the internal quality assurance system of higher vocational colleges through the double-chain linkage of the "Objective Chain" and the "Criteria Chain". The two loops are intertwined, forming a similar horizontally placed "8" - "∞", so it is called "8" type, not only reflects the dynamic characteristics of double-loop structure and spiral, but also reflects the core concept of continuous improvement and infinite cycle of quality assurance system. It emphasizes that each of the five responsible subjects of internal quality assurance - "school, major, curriculum, teacher and student" should follow the "8" Type Quality Improvement Spiral for each of their target task units.

8. Model of internal quality assurance system in higher vocational college

8.1 Model

The "model" refers to the connotation of the following three aspects, 1) model was a methodology for solving a certain type of problem; 2) was the method of solving a certain type of problem summarized to a theoretical level; 3) was a standard style that others can follow.

8.2 Model of an internal quality assurance system in higher vocational college

Model of an internal quality assurance system in higher vocational colleges refers to a set of theoretical models or theoretical schema with typical characteristics, based on the analysis, abstraction and generalization of the interests of the main bodies and the realization mechanism of the quality demand, and under the guidance of specific theories and methods, using specific management strategies and management approaches to implement internal quality assurance of the teaching and learning in higher vocational colleges.

8.3 Components of an internal quality assurance system model in higher vocational college

The components of an internal quality assurance system model in higher vocational college basically included seven key components: principles, objectives, approaches, procedures, and evaluation.

1) Principles: the basic guidance or norms used in developing the model.

2) Objectives: the specific goals that the development model hopes to achieve.

3) Approaches: the approaches or methods used in developing the model.

4) Procedures: the specific implementation steps and management processes used in developing the model.

5) Evaluation: the specific implementation steps and management processes used in developing the model.

CHAPTER II
LITERATURE REVIEW

In this research, The researcher studied documents, textbooks, and research related to the model to develop the internal quality assurance system in higher vocational colleges in Guangxi,China, with the following topics specified:

1. Quality assurance in higher education

1.1 Definition of quality assurance in higher education

1.2 Definition of internal quality assurance in higher education

1.3 Theories related to quality assurance in higher education

1.4 Approaches related to quality assurance in higher education

1.5 Models for constructing quality assurance in higher educational institutions (HEIs)

2. Internal quality assurance in higher vocational education

2.1 Meaning of higher vocational education

2.2 Definition of quality assurance in higher vocational education

2.3 Definition of internal quality assurance system in higher vocational education

2.4 Components of internal quality assurance system in higher vocational education in China

2.5 Models of internal quality assurance system in higher vocational education in China

3. Elements of An Internal Quality Assurance System Model in Higher Vocational Education

3.1 Value orientation of developing an internal quality assurance system model in higher vocational education

3.2 Principles of developing an internal quality assurance system model in higher vocational education

3.3 Approaches of developing an internal quality assurance system model in higher vocational education

3.4 Procedures of developing an internal quality assurance system model in higher vocational education

3.5 Evaluation of developing an internal quality assurance system model in higher vocational education

4. Developing a Model of Internal Quality Assurance System of Higher Vocational Education

4.1 Definition of model

4.2 Components of an internal quality assurance model in higher vocational education

4.3 Developing a model of internal quality assurance system in higher vocational education

5. Relevant Research

5.1 Relevant research of internal quality assurance in higher vocational education in China

5.2 Relevant research of internal quality assurance in higher vocational education in other countries

Quality assurance in higher education

1. Definition of quality assurance in higher education

Ellis R. (1993) Quality assurance (QA) is the systematicity process through which a manufacturer or service provider ensures that the products or services they offer consistently meet predefined objectives and satisfy users. In the realm of higher education, QA involves the intensification and institutionalization of quality assessment and control practices. This entails adhering to a set of quality standards and operational procedures that have been proactively established. It requires all personnel within educational institutions to leverage their utmost potential and diligence, earnestly implementing and perpetually refining educational and instructional programs. The aim is to attain or surpass the established educational quality benchmarks and progressively realize the university's comprehensive objectives. This is the process towards achieving the institution's overarching goals.

Malcolm Frazer (1992) The quality assurance system of higher education is a systematicity activity under the influence of the theory of total quality management and on the basis of higher education assessment activities, which starts from the commitment, guarantee and construct of the quality of higher education in order to win the trust of the society and strive for greater support from the society (Alma Craft (ed.), 1992)

Diana Green (1994) The quality assurance of higher education refers to the quality assurance organization's control, audit and evaluation of the quality of higher education in accordance with a certain quality standard system and a certain procedure, as well as guaranteeing the quality of higher education to students and the society, and providing relevant information on the quality of higher education. The basic idea is to be responsible to students and society, to maintain and improve the quality of higher education, and to promote the overall development of higher education. Quality control refers to the creation of the necessary conditions for the educational activities of higher education, including the understanding of the quality of higher education, the development of human resources training programme, the design and planning of curricula and specialties, and the preparation of educational and teaching qualities in order to ensure the smooth progress of the activities of higher education. Quality audit refers to the review of the process of higher education teaching and learning activities

in order to ensure the successful implementation of programme created by quality control activities; quality assessment refers to the evaluation and assessment of the results of the quality of higher education activities.

Bi Jiaju(2007) The definition of quality assurance in education by the UK Quality Assurance Agency for Higher Education (QAA) is representative: quality assurance is the sum of all the systems, resources and information that are used to maintain and improve the quality and standards of teaching, scholarship and research, as well as student learning. This definition covers a wide range of factors related to quality and explains the various aspects that influence the formation of quality from a multidimensional perspective.

Xiong Zhixiang (2009) Quality assurance in higher education refers to the quality of higher education to students and social security institutions in accordance with certain procedures, on the basis of internal management and supervision and evaluation, and accept the assessment and accreditation of external formal higher education assessment agencies. It emphasizes more on the importance of external quality assurance.

An Xin（1999）"Quality assurance system in higher education" is defined as a management system established by the State, society and higher education institutions for continuous and effective quality control of the quality of education.

Yu Xiaobo (2005) Quality assurance in higher education refers to the continuous improvement activities of the quality of higher education carried out by the government, society and universities and other quality assurance related subjects, using quality monitoring, quality management, quality control, quality auditing, quality accreditation and quality assessment, including internal quality assurance and external quality assurance two parts.

Qiu Guofeng(2008) Quality assurance in higher education refers to a specific entity that controls, audits and evaluates the quality of higher education, mainly universities, based on a set of quality assessment index system and in accordance with certain processes and procedures, and provides information about the quality of higher education to students and social stakeholders to ensure the quality of higher education.

Tian Enshun (2006) Quality assurance in higher education means that a specific organization controls, audits and evaluates the quality of education in higher

education according to a set of quality standard system and in accordance with certain procedures, and guarantees the quality of higher education to students and social stakeholders and provides information about the quality of higher education, and its basic concepts are to be responsible to the students and the society, to maintain and improve the level of quality of education in higher education, and to promote the development of higher education as a whole. (Tian Enshun,2007) In addition, this concept can be understood and grasped from the following aspects: Firstly, the main purpose of quality assurance in higher education lies in two aspects: firstly, to promote the maintenance and improvement of quality; secondly, to provide quality evidence to a large number of higher education stakeholders, such as governments, employers, students and their parents, to prove that the quality of products and services provided by the higher education institutions can be relied on, and to enhance their confidence in the Secondly, in order to achieve these objectives, it is necessary to adopt a series of specific policies and processes, such as the establishment of quality assurance agencies, the development of quality standards, the establishment of assessment methods and procedures, etc.

Jiang Jizhang & Xu Chaofu et al. (2008) The quality assurance system of higher education is a systematicity and planned assurance work based on the maintenance and improvement of quality, in order to provide evidence of quality so that the higher education institutions to get the recognition of the quality of the products and services provided by the institution by the stakeholders, and in order to achieve the ultimate goal of improving their confidence in the quality of higher education, it consists of It consists of an external quality assurance system and an internal quality assurance system.

In summary, What is quality in higher education? At present, the academic circles around the world have not yet reached a completely unified consensus on its definition. from studying the above definitions of the quality assurance of higher education, it can be concluded that "quality in higher education" is a dynamic concept rather than a static one, and its connotation varies according to the identity and purpose of the discussants, as well as according to the changes in time, place, and the learners and their environments in fact. In a nutshell, quality assurance in higher education refers to the continuous improvement of the quality of higher education carried out by the

government, society, universities and other quality assurance-related entities, using quality monitoring, quality management, quality control, quality audit, quality certification and quality assessment, including internal quality assurance and external quality assurance.

In this research, the quality assurance of higher education refers to the comprehensive quality management process in which multiple stakeholders inside and outside the university participate in the assessment of the quality of higher education, decision-making, structural optimization and mechanism improvement through diversified and applicable evaluation standards and methods. The quality assurance system of higher education consists of external quality assurance system and internal quality assurance system, which requires the participation of multiple subjects, the interconnection of internal and external assurance systems, and the development and evaluation of classification. The external quality assurance system covers the government system, laws, policies, evaluation and social participation and supervision, while the internal quality assurance system includes the cultivation of talents, subject and professional settings, curriculum arrangement, education and teaching methods, management system, quality culture and quality construction of teachers, as well as the practice of quality assurance institutions and alliances in higher education (Song Haisheng, 2023).

2. Definition of internal quality assurance in higher education

Yuan Xibin (2003) The internal quality assurance system of higher education refers to the school in order to achieve the quality policy and goals, the use of the concepts and methods of system theory, the integrated play of goal orientation, conditions, incentives, constraints, supervision and control functions, in order to improve the quality of teaching as the core, in order to cultivate high-quality talents as the goal, the school within the teaching process of the various aspects of the various departments of the activities and functions of a reasonable organization To form a quality management system with clear tasks, responsibilities and authority, which can coordinate and promote each other.

Liu Dongxing (2014) The quality assurance system of higher education has internal and external points, in which the external education quality assurance system of colleges and universities is mainly a series of safeguard measures taken by the

government and social intermediary organizations and students' parents, etc. to ensure the quality of teaching and learning in colleges and universities, and it is a kind of external pressure and motivation; the internal education quality assurance system that can really ensure the quality of education in colleges and universities. It is defined as the systematicity optimization of the university's objectives and positioning, teaching staff, teaching resources, training process, student development and other elements related to the teaching system through certain ways and procedures in order to achieve the goal of education quality, and give full play to the guarantee of objectives, inputs, process and effect, so that the education and teaching effect of the university can be maximized to be in conformity with the corresponding teaching quality standards.

Li Qingfeng (2022) The internal quality assurance system of higher education institutions is a complex concept combined by several simple concepts, including the four simple concepts of ‘higher education’, ‘internal quality’, ‘assurance system’, and ‘quality’, four simple concepts. Therefore, ‘internal quality assurance system of higher education’ can be defined as the internal working system and its operation mechanism, which is composed of the relationship between the main factors of education and teaching quality and the basic elements of its management, with the fundamental purpose of guaranteeing and improving the quality of education and teaching.

Li Zhiyi & Zhang Xiaogang et al. (2023) The internal quality assurance system of higher education institutions refers to the internal quality assurance system, which aims at guaranteeing and improving the quality of teaching, applies system concepts and methods, relies on the necessary organizational structure, organizes the quality management activities of each department and each link tightly, monitors all the processes and factors affecting the quality of teaching and learning, and forms a quality assurance organic whole with a clear mission, responsibility and authority, which is coordinated and promoted by each other. Quality assurance organic whole. The internal quality assurance system of colleges and universities has three core elements: quality assurance standard, quality assurance structure and quality assurance process; and contains four elements: goal assurance, resource assurance, process assurance and management assurance.

In summary, the quality assurance system of higher education refers to the implementation of the higher education assurance process, the main bodies, links,

elements in order to achieve the goal of playing a common role in quality assurance, through the systematicity design of a set of interlinked, mutual constraints on the operation of the system, the structure of which is divided into two parts of the internal and external quality assurance system. The internal quality assurance system of higher educational institutions refers to the goal of guaranteeing and improving the quality of teaching, applying system concepts and methods, relying on the necessary organizational structure, closely organizing the quality management activities of various departments and links, effectively monitoring all the processes and factors affecting the quality of teaching, and forming an organic whole of quality assurance with a clear mission, responsibilities and authority, coordinating with each other and promoting each other.

3. Theories related to quality assurance in higher education

3.1 Total Quality Management Theory (TQM)

Wang Mingxian& Dong Yutao&Ma Junlong(2011) Quality assurance originated from the quality assurance of products in the business community, that is, the theory of total quality management. 1961, the American scholar A.V. Feigenbaum first put forward the concept of "Total Quality Management" (TQM), and in his book "Total Quality Management", the total quality management is outlined as follows: "Total quality management refers to all departments, all organizations, all enterprises under the impetus of a comprehensive society, all sectors, all organizations, all enterprises and all enterprises. And in his book "Total Quality Management" in the total quality management is outlined as follows: "Total quality management refers to the promotion of a comprehensive society, all departments in the enterprise, all organizations, all personnel to product quality as the core, the professional technology, management technology, mathematical and scientific technology together, to establish a set of scientific and rigorous and efficient quality assurance system, control the factors affecting quality in the production process, in order to achieve high quality products, and to ensure that the quality of products is maintained. Factors affecting quality in the production process, to provide quality work the most economical way to meet the user's needs of the product of all activities."

The main points are:

(1) Total Quality Control is a system that integrates the development, maintenance and improvement of quality standards within a company.

(2) The "control" of quality control includes setting quality standards, evaluating behaviour in relation to those standards, taking corrective action when predetermined standards are not met, and developing plans for improving quality standards.

(3) Factors affecting quality can be divided into two categories: "technical" and "human", with human factors being more important.

(4) The costs of quality are divided into four categories: prevention costs, identification costs, external loss costs and internal loss costs.

(5) It is important to control the quality at the source. The theory of total quality management has changed from being mainly based on after-action control to being mainly based on prevention and improvement; from "managing results" to "managing factors", i.e., putting forward various factors affecting quality and grasping the main contradictions; and from being mainly based on division of labour to being mainly based on coordination.

TQM has been gradually introduced to universities since the mid-1980s. Although the name is different, the content and essence are the same, so that customers feel that the quality of education services provided by educators is indeed reliable, so as to establish a relationship of trust. W. Edward Demingin the "Deming on Quality Management" book put forward "Deming cycle" (also known as the PDCA Cycle) and 14 points,5 Deadly Diseases and System of Profound Knowledge. Deming's PDCA cycle is in accordance with the plan (P), do (D), check (C) and act (A) four-stage sequence to carry out management work. PDCA is a work cycle, and is a forward cycle. Like a wheel moving forward, week after week, a continuous cycle. PDCA cycle at all levels. PDCA at all levels to form a large set of small rings, a ring with a ring, a ring with a ring, layer by layer to solve the problem and , so that the whole optimization cycle turning up; through each PDCA cycle, to sum up, put forward a new goal, and then the second cycle, so that the wheel of quality management is constantly moving forward. Every cycle of quality level and management level will improve one step.

Deming's 14 principles of quality management: (1) Determine an enduring goal that tends to improve products and services, develop a plan to make the company

competitive and permanently viable, and decide who top management is responsible for. (2) Adopt new principles, we are in a new economic era, if, as is usually the case, delays, errors, substandard materials and poor workmanship can not be improved, we can not continue to survive. (3) Instead of relying on a large number of inspections, provide statistics that confirm quality. (4) Stop rewarding companies on the basis of price differences, and instead rely on meaningful quality measurements and reward them on the basis of price levels. Eliminate companies that provide statistics on quality. (5) Identify problems. Management is about continuously influencing the company. (6) Adopt modern methods of training employees. (7) The responsibility of the team leader must be strengthened so that quality issues are not avoided and good quality increases productivity. (8) Avoid intimidation so that everyone can work effectively for the company. (9) Remove interdepartmental barriers; people in research, design, marketing and operations must work together in order to anticipate production problems that may be related to material and technical requirements. (10) Remove numerical targets, slogans, and catchphrases directed at workers, and continually pursue new productivity goals even when new methods are not provided. (11) Remove work standards that prescribe quantity quotas. (12) Remove the inferiority complex of temporary workers and increase their pride in their work. (13) Implement strong education and training programme. (14) Take steps at the top management level to promote daily work in line with the 13 principles above. The core ideas of the 14 principles of quality management are: a. The cause of inefficiency and poor principles lies in the company's management system and not in the employees. b. The responsibility of the line manager lies in the continual adjustment of the management system to achieve the desired results. c. The need to reduce fluctuations in quality is emphasized. d. Reducing fluctuations in quality requires identifying the special and common causes of fluctuations. e. The need to reduce fluctuations in quality requires identifying the special and common causes of fluctuations. The need to reduce fluctuations in quality requires identifying the common causes of fluctuations.

The quality management system approach consists of eight main parts: 1. determining customer needs and expectations; 2. establishing the organization's quality policy and quality objectives; 3. identifying the processes and responsibilities necessary to achieve the quality objectives; 4. identifying and improving the resources necessary

to achieve the quality objectives; 5. specifying the methods for measuring the effectiveness and efficiency of each process; 6. applying these measurements to determine the Methods for applying these measurements to determine the effectiveness and efficiency of each process; 7. Determining measures to prevent nonconformity and eliminate its causes; 8. Establishing and applying a process for continuous improvement of the quality management system.

In summary, Total Quality Management refers to the internal adherence to quality as the core of the organization, the participation of all members, to maximize the interests of all members of the optimization and customer satisfaction as the goal, continuous improvement of the tools and techniques used, improved training to guide decision-making and planning actions, so that the process of operation in all areas of the optimization is constantly close to optimization, thus forming a set of overall conceptual system. It mainly includes four contents: quality system, quality standard, quality control and quality evaluation, and has three basic features: systematicity, comprehensive and developmental, as well as three principles of action: demand-oriented, continuous improvement and people-oriented. The modern concept of quality management emphasizes holistic and systematicity design; focuses on process management and full participation; and attaches importance to quality management techniques of extensive data analysis as well as improvement and constructment under quality evaluation.

3.2 Systems Theory

Von Bertalanffy first defined "system" as a scientific concept in 1937: a system is a complex of interacting components, and subsequent research has further refined this concept by suggesting that "a system is a whole with new qualities not found in its own constituent elements" (Lu Hongde,1991:50). According to Chinese scholars, a system is an organic whole with a specific function composed of a number of interconnected, interacting elements. "Interaction" mainly refers to the non-linear action, which is the intrinsic basis for the existence of the system and constitutes the basis for all the characteristics of the system. The core of the system is the system analysis method, its essence is in accordance with the systematicity nature of the thing itself, always focusing on the whole and part from the whole; the whole and the external interconnection, interaction, mutual constraints in the relationship between the

comprehensive and precise examination of the object, in order to achieve the management of the optimal method. The direct content of the system structure is the contact between the system elements, and any system element is also a system itself, which is the structural characteristics of the system, also known as the hierarchical level principle. The system theory and system analysis method has the characteristics of wholeness, comprehensiveness, structural hierarchy, relevance, dynamic equilibrium, unity of synthesis and analysis, etc. It reflects the development trend of modern science and modern management of wholeness and synthesis, and is the theoretical basis of cybernetics and information theory **(Li Ming, 2010)**.

In summary, the internal quality assurance in higher education is both a multifactor coupled activity process and a multilevel coordinated activity process. It involves not only the government, society, institutions, teachers and students, but also education policy, school orientation, education objectives, teaching process and other elements, and these factors have their own role and function, but any of them can not play an independent role, they can only play a role in the interconnection. Therefore, the internal quality assurance of colleges and universities must be unified management of all relevant factors, otherwise it will not be able to receive good management results. The quality management of each level and each link must start from the integration of its connection with other levels and other links. The internal quality assurance system of higher vocational teacher training colleges is from the perspective of internal quality management and monitoring, using the corrective function of information feedback to ensure the quality of education and teaching from the perspective of internal self-assurance. In the construction of the internal quality assurance system, it emphasizes the construction and operation of the internal and external information feedback mechanism as a whole, as well as its corrective function, so as to make the management constantly approaching and reaching the goal of education and teaching; the system of information feedback and the close connection and communication between links are the embodiment of system theory.

3.3 Management by Objectives Theory(MBO)

Thomson, T. M. (1998) The "Management by Objectives" (MBO) approach, as a term, "Management by Objectives" was first used by Peter Drucker in 1954. It requires all managers to set specific objectives to be achieved in the future and

encourages them to continually ask what more can be done, is offered as a partial answer to this question of organizational vitality and creativity. Essentially, MBO is a process or system designed for supervisory managers in which a manager and his or her subordinate sit down and jointly set specific objectives to be accomplished within a set time frame and for which the subordinate is then held directly responsible. As a management approach, it has been further developed by many management theoreticians, among them Douglas McGregor, George Odiorne, and John Humble.

The most important tool the manager has in setting and achieving forward-looking goals is people, and to achieve results with this tool the manager must: first, be able to instill in the workers a sense of vital commitment and desire to contribute to organizational goals; second, control and coordinate the efforts of the workers toward goal accomplishment; and, last, help his or her subordinates to grow in ability so that they can make greater contributions.

Ntanos, A. S., & Boulouta, K. (2012) Management by Objectives (MBO) is a systematicity and organized approach that allows management to focus on achievable goals and to attain the best possible results from available resources. It aims to increase optimizational performance by aligning goals and subordinate objectives throughout the optimization. MBO includes ongoing tracking and feedback in the process to reach objectives. In the 1990s, Peter Drucker himself decreased the significance of this optimization management method, when he said: “It’s just another tool. It is not the great cure for management inefficiency... Management by Objectives works if you know the objectives, 90% of the time you don’t. ” Finally the complete MBO system is to get managers and empowered employees acting to implement and achieve their plans, which automatically achieve those of the optimization.

3.4 PDCA Cycle Theory

Du, Q. L & Cao, S. M & Ba, L. L. & Cheng, J. M(2008) PDCA Cycle Theory, proposed by American quality management expert William Edwards Deming (W. Edwards Deming), also known as Deming ring or quality ring, is a continuous improvement management method. Its basic meaning is: first make a plan, then implement the plan, check the implementation, and finally deal with the results. This process is cyclical. The principle behind the PDCA Cycle is that all operations are P (Plan), D (Do), C (Check), A (Act),. The phases and steps are detailed in Table 1 shown:

Table 1 Four phase and eight steps of PDCA Cycle

Phase	Step	Content	Cycle
Plan	1	Analyses the current conditions and finds out the existent problems.	
	2	Finds out various causes resulting in those problems.	
	3	Identifies the major factors from various causes.	
	4	Works out the solution and improvement plan according to the major factors.	
Do	5	Carries out the plan and measures.	
Check	6	Checks the implements according to requirements of the plan.	
Act	7	Summarizes experiences and consolidates achievements.	
	8	Turns problems that haven't been solved or appear newly into the next cycle.	

Ariyani,W.D.&Kosasih,F.(2022) One approach that can be used as a reference to improve the implementation of the quality assurance system is to implement the W. Edwards Deming Education Quality Assurance System model, namely the PDCA (Plan, Do, Check, Act) cycle. implementing a quality assurance system as a systematicity and continuous cycle. Schools are expected to be able to plan quality fulfillment based on quality mapping through school self-evaluation and quality report cards, carry out quality compliance, monitor and evaluate quality fulfillment results, and develop quality improvement actions/strategies based on monitoring and evaluation results, so that schools can plan for quality fulfillment again. This is as quoted by Nanang Fattah in the Education Quality Assurance System, namely; There are four aspects in the education quality assurance cycle including **Plan, Do, Check, Act**:

1) Plan (Planning) is a plan related to quality planning, including the determination of quality policy, determination of quality objectives and indicators of

their achievement, as well as determination of procedures and achievement of quality objectives.

2) Do (Implementation) is the implementation of what has been planned, so to ensure the quality of education, the entire educational process, including educational administration services is carried out in accordance with the SOP (Standard Operational Procedure) that has been determined.

3) Check (Monitoring and Evaluation) is the existence of monitoring, checking, measuring and evaluating the implementation and results of implementation, including internal quality audits.

4) Act (Action) is the follow-up and improvement of the evaluation results, namely the preparation of quality improvement strategies.

The PDCA Cycle has the following characteristics:

1) **cycle after cycle:** PDCA Cycle is a continuous cycle process, each cycle represents an improvement.

2) **large set of small cycles:** a large PDCA Cycle can be broken down into multiple small PDCA cycle, the formation of a large set of small ring pattern.

3) **Ladder spiral:** Each PDCA Cycle represents an improvement, and finally realizes the goal of continuous improvement.

3.5 Continuous Improvement Theory

Carnerud, D., Jaca, C., & Bäckström, I. (2018) Continuous improvement theory is a management philosophy and methodology, and "**Continuous Improvement**" is often called "**Kaizen**" (from the Japanese word "Kaizen"), and its theoretical basis is derived from Lean Production(LP) and Total Quality Management (TQM). Total Quality Management (TQM). This theory emphasizes the continuous improvement of organizational performance through the continuous optimization of processes, products and services. Its core concept is "no best, only better", that is, the organization should always pursue higher quality and efficiency. The core idea includes the following four aspects: 1) Continuous improvement: through continuous small improvements, gradually realize the overall quality improvement. 2) Full participation: improvement is not only the responsibility of the management, but also requires the active participation of all employees. 3) Customer-centered: the ultimate goal of improvement is to meet the needs of customers and improve customer satisfaction. 4)

Data-driven: decision-making based on data and facts to ensure the scientific and effectiveness of the improvement measures. 5) Data-driven: the improvement measures should be scientific and effective. measures are scientific and effective.

3.6 Fourth Generation Evaluation Theory

Egon G. Guba & Yvonna S. Lincoln (1989) In the late 1980s, American scholars Egon G. Guba and Yvonna S. Lincoln collaborated in the sublimation and improvement of Effective Evaluation (1981) and Naturalistic Investigations (1985) and published the book Fourth Generation Evaluation, which reviewed the emergence and development of evaluation science, and called the first three generations of evaluation methods, divided into three eras from measurement, description and judgment in terms of methodology, time and characteristics. The Fourth Generation Evaluation reviews the emergence and development of evaluation and divides the first three generations of evaluation methods into three eras: measurement, description, and judgment, in terms of methodology, time, and characteristics of evaluation. The publication of Fourth Generation Evaluation also marked the formalization of the fourth generation of evaluation theory, characterized as a process of constructing and reconstructing evaluation activities on the basis of equal consultation among stakeholders. According to Goubert and Lincoln, evaluation emerges from a process of construction and reconstruction in which a variety of factors interact, dividing modern educational evaluation theory into four eras: First Generation: “The Age of Measurement” (late 18th century to the 1930s). The Second Generation: “The Age of Description”(1930s to 1950s). Third Generation: “Era of Judgment” (1950s to 1970s). The Fourth Generation: “Era of Assessment” (1980s to present). They believe that although evaluation is essentially a political act, from the perspective of educational ethics, educational evaluation has a humanistic mission and humanistic spirit, reflecting the recognition of human nature, and the humanistic spirit of education embodies ethnicity. Therefore, it is not in line with educational ethics for the first three generations of evaluation to completely ignore the value of pluralism.

The main contents of the Fourth Generation Evaluation are as follows:

1) The subjects of the Fourth Generation Evaluation include three types, firstly, the evaluation advocates are also called the agents of evaluation. The second is the beneficiaries of the evaluation who benefit from the use of the evaluation results

tools or programs, such as the target group of the evaluation, which is the direct beneficiaries; the second is the indirect beneficiaries who have intermediary relations with the direct beneficiaries such as mitigation, promotion, and other relationships affected by the direct beneficiaries of the positive impacts of the direct beneficiaries, as well as those who should be evaluated for the work of the beneficiaries. Thirdly, the victims of the evaluation, who are negatively affected by the evaluation, including the groups who are systematically excluded from the evaluation activities, the groups who are affected by the side effects of the evaluation activities, the political impacts caused by certain evaluations, and the people who have paid the opportunity costs for certain evaluation activities.

2) The methodology is the Responsive Focusing and Constructivist Methodology, which aims at making the stakeholders who have different or even conflicting natures reach a consensus on a common goal. constructed stakeholders to reach a consensus judgmental opinion.

3) The value orientation is pluralist values.

4) The evaluation approach balances quantitative and qualitative choices. The constructivist methodology of Fourth Generation Evaluation discards the expression of findings and emphasizes evidence and factual support.

Liu Kangning (2010) The “Fourth Generation Evaluation” is an evaluation theory system centered on “value co-construction”, which systematically elaborates the theory of respecting the value of multiple subjects, with the main ideas of “co-construction”, “multiple values”, and “comprehensive participation”, advocating that the intention of evaluation is not to prove but to improve. The main ideas are “co-construction”, “multiple values” and “full participation”, advocating that the intention of evaluation is not to prove but to improve; that the direction of evaluation is future-oriented, and that the subject of evaluation is pluralistic, equal, participatory and cooperative; that the direction of evaluation is future-oriented, and that the result of assessment is not to prove but to improve. The direction of evaluation is future-oriented, and the result of evaluation is to form a common value identity, i.e. value co-construction.

In summary, the core concept of the Fourth Generation Evaluation Theory is “value co-construction”, so that quality assurance has new features, changing the

relationship between the “subject” and “object” of assessment, gradually eliminating the difference between the dominant position and subordinate position in the assessment process, the residents and objects work together for quality improvement, through consultation, co-development mechanisms, play their respective roles and advantages, and form a “quality community”for quality building in higher education. It changes the relationship between the “subject” and the “object” of assessment, gradually eliminates the difference between the dominant position and the subordinate position in the assessment process, and makes joint efforts for quality improvement between the subject and the object, and gives full play to their respective roles and strengths through the mechanism of negotiation and joint development, so as to form a “quality community” of the construction of the quality of higher education, and make the value of higher education realize value-added.

4. Approaches related to quality assurance in higher education

Vlasceanu, L& Grunberg, L & Parlea, D (2004) defines Quality Assurance as “the process of assessing, monitoring, assuring, maintaining and improving an institution of higher education or an educational program on an ongoing basis”. Due to the different initiators, organization and standards of quality assurance activities, the quality assurance system has different system characteristics, both external and internal. External quality assurance is a quality regulation mechanism from outside higher education that focuses both on accountability, enhancement, and transparency of information in higher education and on promoting consistency and continuity in the management of higher education through the establishment of quality standards. The increased use of the terms assessment or audit suggests a genuine process of evaluation of a higher education school or educational program from an external source, with the aim of improving the quality of higher education. In many definitions, quality assurance is synonymous with “Assessment” or “Audit”, which puts more emphasis on improving the quality of education by means of recommendations in assessment. It is an all-encompassing form of quality assurance that involves an ongoing process of continuous evaluation (assessing, monitoring, assuring, maintaining and improving), as well as the quality institutions of the education system.

ViktoriaKis (2005) argued that quality assurance methods were divided into three main types: Accreditation, Audit, and Assessment, with accreditation and

assessment focusing on monitoring teaching and learning, and audit emphasizing internal processes to accomplish goals.

Tian Enshun (2005) The procedures and methods of quality assurance in higher education were related to the question of "how to assure", which actually includes two levels, i.e. **the institutional level and the technical method level**. In most cases, the mentioned quality assurance methods actually referred to the level of technical methods. In the practice of quality assurance in higher education in the Western developed countries, the so-called **Four-stage Model** is usually followed, i.e. The establishment of **"Establishment of expert panels - Self-assessment - Peer review by on-site visit - Publication of evaluation reports"**. Among these, the most basic methods are mainly self-assessment within the institution and Peer Review by On-site Visit outside the institution.

(1) Self-study / Self-evaluation

In the English literature, terms similar to self-evaluation include self-study, school-based evaluation, and school self-evaluation. In China, academics often translate both "Self-study" and "Self-evaluation" into the Chinese term "自我评估 ". In fact, there is a difference between the two terms.

Self-evaluation generally refers to the process by which internal staff of a school describe or analyze the school's goals, current situation, processes, and results according to external standards for the purpose of quality assurance and performance accountability, and write a report on the results to serve as a basis for further external evaluation. In other words, this self-evaluation plays a passive role for the evaluated school, and the responsibility, purpose, content, criteria, and methodology of the evaluation are all determined by the external organization. Self-evaluation is only a step or part of external evaluation.

Self-study emphasizes that the purpose of quality assurance is quality improvement and organizational renewal, and that Self-study is an improvement-oriented assessment process. The process emphasizes the participation of all school members, under the leadership of the senior administrator, in evaluating inputs, processes, and outcomes of the school through a variety of effective evaluation mechanisms to achieve quality improvement and accountability for performance, and to develop a quality culture of self-regulation in the school.As can be seen from the

above, Self-assessment was an assessment process carried out by all school personnel in their own environment, motivated internally, autonomous and voluntary in nature; aimed at promoting further development and improvement of the school; and conducted in a scientific and systematicity procedure.There are two main approaches, one is the extent to which goals are achieved for external evaluation (**Self-evaluation)**, and the other is the function of the system, i.e. problem solving, which emphasizes the participation of all members of the school community, under the leadership of the senior management of the school, and through the evaluation of endogenous motivation mechanisms, in order to achieve the purpose of quality improvement **(Self-study)**.

Kells，H.R divides the Self-assessment activity into three phases:

Phase 1: Preparation and Design Phase

1) Preparation of conditions,including.

① Leader support;

② Appropriate level of expertise;

③ Appropriate resource input;

④ Development of appropriate internal motivation;

⑤ Diagnosis of basic problems and needs.

2) Designing a self-assessment (self-evaluation/ self-study) process that includes:

① Determining the purpose of the evaluation and the focus of the evaluation;

② Deciding the scope and depth of the evaluation;

③ Selecting the activities to be assessed;

④ Deciding the sequence and schedule of evaluation activities;

⑤ Deciding on the conditions of the participants in the evaluation.

Phase 2: Organizational evaluation Phase

1) Define tasks and roles;

2) Forming a steering group and establishing evaluation guidelines;

3) Selecting and training evaluation personnel;

4) Establishing various working groups based on the tasks;

5) Provide channels for information collection;

6) Establishing coordination and communication mechanisms

Phase 3: Implementation Stage

1) Gathering factual information and opinions and engaging in research;

2) Evaluating the goals, inputs, processes, and outcomes of the school, discipline, or program based on external criteria;

3) Discussing the results of the evaluation;

4) Writing a self-assessment (Self-evaluation/ Self-study) report.

(2) Peer Review

At the end of the school's **Self-evaluation/ Self-study**, in order to understand the objectivity of the self-assessment process and the credibility and validity of the assessment results, the best way is to form a visiting team of professional peers from outside the school to carry out external assessment work. The team is usually composed of academics and practitioners with high achievements in the field, and in some cases, government administrators may be involved to meet the requirements of the government's performance accountability. External peer assessment usually takes the form of a On-site Visit, during which members of the assessment team must complete the following tasks:

1) Reviewing **self-assessment (**self-evaluation/ self-study) reports against established assessment criteria;

2) Holding various symposia with administrators, members of the Self-assessment team, academic staff, and student representatives;

3) Visiting various facilities, including the library and various places where student services can be provided;

4) On-site Visit to the current state of teaching and learning;

5) To understand the quality of faculty members' research capabilities and achievements;

6) To ask relevant questions about major current issues and future programs;

7) To write an evaluation report with specific recommendations.

If the main purpose of **Self-assessment**（Self-evaluation/ Self-study）is the diagnosis and improvement of the quality of education in the institution, the purpose of **Peer Review** focuses on quality assurance. In addition to validating the validity and reliability of internal self-assessment, external peer assessment allows internal members of the institution to feel professional pressure from external peers to make necessary adjustments. With the

development of quality assurance practices in higher education, specific assessment-based quality assurance approaches have become diverse and systematicity. At present, there are four main types of higher education quality assurance methods in Europe, such as Evaluation, Accreditation, Audit and Benchmarking, and the objects of evaluation involve institutions, disciplines, specialties and themes, and the assessment methods are combined with different assessment objects to form 16 types of quality assessment, including program evaluation, program accreditation, institution audit, institution accreditation, institution evaluation, subject evaluation, program benchmarking and subject benchmarking, with the above-mentioned 8 types mentioned above are used more frequently, as Table 2 shown.

Table 2 European approaches to quality assurance in higher education

Assessment Objects / Evaluation Approaches	**institution**	**subject**	**program**	**theme**
Evaluation	institution evaluation	subject evaluation	program evaluation	theme evaluation
Accreditation	institution accreditation	subject accreditation	program accreditation	theme accreditation
Audit	institution evaluation	subject evaluation	program evaluation	theme evaluation
Benchmarking	institution Benchmark-ing	subject benchmarking	program benchmarking	theme benchmarking

Evaluation: Evaluation is a value judgment activity, is the object to meet the needs of the subject of the degree of judgment. Educational evaluation is the activity of judging the extent to which educational activities satisfy the needs of society and individuals, and it is the process of judging the real or potential value of educational activities with a view to achieving value-addedness.

Accreditation: The International Encyclopedia of Higher Education defines **accreditation** as: “Accreditation is the public determination by a legally accountable

body or association that a school, college, university, or professional program of study (course of study) meets certain established qualifications and educational standards. Accreditation is conducted through initial and staged evaluations. The purpose of the accreditation process is to provide a recognized, professional assessment of the quality of educational institutions or educational programs and to promote continuous improvement and quality enhancement of those institutions and programs." In short, accreditation is an external quality assessment process that determines whether an educational institution or professional program meets some generally accepted standard.

Audit: Audit, which examines not the quality of the institution, nor the quality of a particular program at the institution, but examines and evaluates the institution of higher education's own organizational structures and methodological techniques for assuring the quality of the program of study, in order to determine whether the institution or program being evaluated has adequate and effective academic standards and quality management procedures.

Benchmarking: Benchmarking, originally a business management approach, refers to the industry inside and outside the organization of a certain aspect or several aspects of the best behavioral practices as a benchmark, in-depth analysis, comparison, combined with the judgment of their own practice based on the creative learning and improvement of the implementation, so as to improve, optimize and even beyond the benchmark object of the continuous cycle of improvement process. Benchmarking is a tool for self-evaluation and self-improvement in organizations.

Liu Kangning (2019) Although there are large differences in the way quality is pursued across countries, certification, auditing, and assessment have become the three basic approaches to external quality assurance and have had a large impact on other countries, especially developing countries.

(1) **Accreditation** is a review of the quality of an institution or program of higher education, which must meet minimum standards of quality for the purpose of quality improvement. As such, accrediting agencies typically develop accreditation standards and procedures to guide institutions toward continuous improvement. Accreditation can be viewed as giving a higher education institution or program a formal certificate of quality, which demonstrates that the higher education institution

or program is able to meet the minimum requirements expected of it.

(2) **Evaluation** is still the most important way of quality assurance in higher education. It emphasizes the "value co-construction" of each subject through assessment. Evaluation is primarily about making judgments about the level of quality, which are quantitative and ask "how good are the results". Quality assessment shows the process of external quality judgment of a higher education institution or program. It consists of mechanisms and activities implemented through external agencies that essentially assess the quality of higher education processes, practices, programs, and services. When defining and operationalizing the concept of "quality assessment", there are a number of important elements, including: first, context (national, institutional); second, methodology (self-evaluation, peer review, on-site visit); third, level of sophistication (system, institutional, departmental, individual); fourth, mechanisms (incentives, policies, structures, culture); and fourth, focus on disciplines. and culture); and fifth, focus on subject areas and quality standards related to academic value, but also on faculty teaching skills and the managerial value of classroom activities, as well as emphasizing graduate quality and the employment value of learning outcomes.

(3) Another important tool for quality assurance is **Audit**, a term commonly used mainly in countries such as the United Kingdom and Australia, Whether it is certification, assessment or audit, it is a different approach used in different countries and regions. The International Standards Organization (ISO) defines audit as having three components: first, consistency with stated objectives; second, adherence to authentically planned quality activities; and third, effectiveness of activities in meeting stated objectives. Audit differs from other quality assurance tools in that, first, it is primarily a quality assessment process implemented through an external agency, and more often than not, it is a review of the institution's internal quality assurance processes to ensure that quality assurance (both external and internal) procedures are appropriate; second, it is an activity geared toward a complete quality assurance system; third, it meets the institution's internal objectives (internal audit) or external objectives (external audit); and fourth, the results of the audit are ultimately made public in the form of an audit report. For quality assurance quality auditing is a very specific approach, it is not a direct assessment of quality per se, but a procedure for quality assessment through this assurance mechanism.

Chen Yukun& Dai Ruihua et al. (2004:107-134) On the basis of learning from the rich experience of quality assurance in higher education institutions around the world, put forward two methods of educational quality assurance that are more suitable for the actual situation of Chinese colleges and universities: accreditation quality assurance approach and developmental quality assurance approach.

(1) Accreditation higher education quality assurance approach

The accreditative quality assurance approach is the process of evaluating higher education institutions and their specializations, curricula, faculty, and student training through external agencies to confirm compliance with established standards. It centers on ensuring that the quality of education and academic standards meet or exceed industry standards through systematicity assessment and accreditation. It has the functions of ensuring quality, enhancing reputation, promoting improvement, safeguarding students' rights and interests and promoting international recognition.

(2) Developmental higher education quality assurance approach

The developmental quality assurance approach to quality assurance in higher education takes the development of institutions of higher education as the diagnostic object, but also aims at promoting the development of institutions of higher education, emphasizes the characteristics of the development of institutions of higher education, adjusts the development goals of the institutions according to the changing social needs, regularly diagnoses the key factors in the development process, continuously cares about the process of the development of the institutions, and continuously improves the development mechanism of the institutions in order to ensure the steady development of the institutions. Characterized by several points: developmental; autonomous; and diagnostic. The developmental approach to quality assurance emphasizes: first, self-quality assurance within the higher education institution is the main focus, supplemented by external quality audits; second, evaluation is an important means of quality assurance in education, and there are various types of evaluation, such as locational, diagnostic and summative evaluations; and, third, focusing on the characteristics of higher education institutions' operation is the main focus, supplemented by the general requirements for the operation of higher education institutions.

Zhou Wenqing (2022:71-73) Quality assurance methodology involves the issue of "how to ensure quality", which is a general term for the technical means of quality assurance used by higher education institutions around the world. In order to further ensure and improve the quality of higher education, countries around the world have adopted certain quality assurance methods. Generally speaking, there are four types of quality assurance methods for higher education in force in the world: **assessment, accreditation, audit and benchmarking**.

(1) **Evaluation**

Evaluation is an activity of value judgment, i.e., judging the degree to which an object satisfies the needs of the subject. Educational assessment is the process of judging the extent to which educational activities satisfy the needs of individuals and society, i.e., it is the process of judging the value of educational activities and promoting the value-added process. Usually, educational assessment systematically evaluates and analyzes the level of specialties, curricula, and institutions, and makes recommendations for quality and improvement at the end, which is one of the most common assurance methods used in various countries at this stage.

(2) **Accreditation**

In the book International Encyclopedia of Higher Education, "accreditation" is defined as "Accreditation is the public determination by a legally accountable body or association that a school, college, university, or professional program of study (course of study) meets certain established qualifications and educational standards. Accreditation is conducted through initial and staged evaluations. The purpose of the accreditation process is to provide a recognized, professional assessment of the quality of educational institutions or educational programs and to promote continuous improvement and quality enhancement of those institutions and programs." Overall, accreditation is an important basis for judging whether or not an institution of higher education itself and its programs and majors are solidly committed to a certain standard.

(3) **Audit**

Audit examines not the quality of the institution, nor the quality of a particular program of the institution, but examines and evaluates the organization and methods used by the higher education institution to ensure the quality of its own study

programs, in order to determine whether the institution or program being evaluated has adequate and effective academic standards and the degree of quality management. It consists of four main phases: preparation for the audit, a short visit, direction of the audit and issuance of the audit report. The audit is concerned with the quality of teaching, academic standards, learning systems and faculty of the institution under review. The audit report focuses on whether the internal quality assurance mechanism of the audited institution is sound and complete, and the impact of various quality assurance measures on the quality of student training.

(4) **Benchmarking**

Benchmarking is an emerging approach to quality assurance in higher education in recent years. It is originally a kind of business management program, which refers to taking the best behavior in one or several aspects of industrial organizations as the basic standard, carrying out deep comparison and analysis, and making creative learning based on one's own practice, so as to adjust, upgrade, surpass the benchmarking object, and continuously improve. As a tool for self-improvement and assessment, benchmarking can be applied to the quality management of higher education macro-systems as well as to the quality management of various levels and organizations within the institutions of higher education, and its purpose is mainly to obtain external reference coordinates and good practice measures, and to diagnose shortcomings and deficiencies in the practice of running a school in order to improve. Its functions are: first, as a diagnostic tool to make judgment on quality. Second, as a self-improvement tool, it helps higher education institutions to identify shortcomings and facilitate their improvement. Third, as a developmental and collaborative assessment of services and processes aimed at learning from good practice. Fourth, as a systematicity process of ongoing comparison and improvement with other providers.

In summary, the new quality assurance methodology follows some of the previous assessment tools, but with a further breakthrough in methodology and philosophy. Methodologically, it has gradually changed from the traditional assessment mode that favors factual measurements and value judgments to the developmental assessment means that pays more attention to the bottom-line standards, the development of the object, and the environmental factors. The future of higher education will be dominated by developmental quality assurance. **Assessment,**

accreditation, audit and benchmarking are the four basic methods of quality assurance in higher education. The three basic methods of accreditation, assessment and audit are not used singly in a country. From the experience of higher education quality assurance in developed countries, the cross-fertilization and comprehensive use of multiple methods is an important trend in the development of higher education quality assurance in the future. For example, the combination of school self-evaluation and external evaluation, institutional evaluation and professional evaluation, and teaching evaluation and scientific research evaluation will be able to better serve the assurance and improvement of the quality of higher education.

5. Models to construct quality assurance in higher educational institutions(HEIs)

5.1 Connotation of higher education quality assurance model

Wu Daguang (2022) believes that the internal quality assurance system of higher education is a series of necessary organizational structures set up within the university in order to achieve the purpose of improving and safeguarding the quality of teaching in our school, to organize the school's departmental links related to the quality of teaching closely, and to strictly control all the factors related to the quality of teaching and promote the quality management of higher education education with each other. The internal quality assurance system of colleges and universities is the concepts and methods of modern information systems, cybernetics, quality management and other methods synthesized into the quality management of higher education in order to achieve the cultivation goals of the school, improve and monitor the quality of education (Liu Zhentian,2016).

Chinese scholar **Chen Yukun& Dai Ruihua et al**.**(2004)** mentioned that the quality assurance model of higher education is defined as , a set of theories and practices to ensure the quality of higher education under the guidance of a specific methodology and using specific management strategies and management tools.

In summary, a quality assurance model is not the same as a certain approach of conducting quality assurance. The so-called quality assurance model does not have a fixed form and is characterized by uncertainty and ambiguity, but is related to the subject of the assessment implementation, which ultimately results in different

subject experiences and characteristics, which are more often characterized as national models.

5.2 Types of quality assurance models in higher education

(Liu Kangning, 2019) There are mainly different perspectives on the categorization of higher education quality assurance models as follows: **First**, it is divided by region. The three most basic international higher education quality assurance models are—**the American model**: the U.S. higher education accreditation system; **the British model**: peer assessment of higher education quality; and **the Continental model**: government management of higher education quality assurance system. **Secondly,** it is divided according to principles. There are mainly quality assurance model (application model), total quality management model application model, performance indicator model, institutional research model, student development assessment model (value-added assessment model, and program evaluation model. **Thirdly,** it is divided according to the main body. There are four main models such as the British pluralistic assessment model, the French centralized model, the Belgian binary structure model and the Dutch external assessment model.

Tian Enshun (2005) categorizes quality assurance in higher education into: micro level - operational techniques or methods of quality assurance; macro level - institutional level of quality assurance from both macro and micro levels.

(1) Models of operational techniques or methods of quality assurance. The first, BS5750 quality assurance model or ISO9000 model. Such as British scholars Roger Ellis after research, the 20 elements of BS5750 quality assurance transplanted to the teaching field of the university, and combined with the university background of the new interpretation, put forward a more complete teaching quality assurance model. American scholars Ralph G. Lewis and Douglas H. Smith(1994) start from ISO9000, and believe that among the 20 basic elements of ISO9000 standard, only 12 standards are directly related to university teaching, and then analyze the relationship between these 12 elements and the teaching process, and construct a flowchart of quality standards in the field of higher education. **The second one, Performance Indicators Model (PIM).** The European Organization for Economic Cooperation and Development (OECD) published “The Preparation of Performance Indicators for Higher Education - EU-11 Outline” and “The Preparation of Performance Indicators

for Higher Education - EU-12 Outline", edited by Kells (H.R.), twice before and after 1990 and 1993. -EU XII Outline. Unlike the BS5750 model of quality assurance, indicators of academic requirements have been placed at the forefront of quality assurance. **Third, Professional Model for Quality**. The expert management model (professional model for quality) is proposed by the British scholar Elton, L.based on the theory of Total Quality Management. Its important feature lies in its developmental nature: starting from the establishment of goals in schools until the promotion of teacher specialization, and then laying the foundation for re-establishing goals and starting a new quality assurance cycle, so that the spiral cycle to achieve the purpose of continuous quality improvement.

(2) Institutional level models. The first one: institutional model. For example, Burton Clark categorized higher education management systems into European, British, American and Japanese models based on the power structure of the higher education system. Wang Bing (1998) divided the higher education quality assurance models into three: the British model characterized by peer assessment of higher education quality; the continental model mainly characterized by governmental management of higher education quality; and the American model featuring the accreditation system of higher education. **The second: empirical models.** The European higher education quality assurance models are summarized in four types: first, the UK's multi-assessment type: consisting of quality control, quality audit, quality assessment and social evaluation. The second is the centralized type in France: it is the responsibility of the National Council for Higher Education Research (CNRHE), the National Evaluation Council (CNE), and other institutions (e.g., the National Commission for the Titles of Engineers, the Degree Awarding Council, the University Council, the National Council for Scientific Research (CNRSR), etc.). Thirdly, the Belgian binary structure: national degrees are awarded by French-speaking societies and Dutch-speaking societies on a regional basis. Fourthly, the Dutch external evaluation type. The Association of Universities mainly carries out external evaluations of the quality of teaching and research at universities; the Association of Colleges of Higher Vocational Education mainly evaluates the state of education at non-university institutions of higher education.

Chen Yukun & Dai Ruihua et al. 2004) categorized the western models of quality assurance in higher education into three main types, namely **the Continental model, the American model and the British model. The first one: the continental model** is also known as the French model. France, the Netherlands, Germany and other Western European countries mostly adopt this model for quality assurance, which focuses on government-led external quality assessment, and the assessment process reflects more of the government's will, with less autonomy within the university. In addition, the continental model emphasizes the quality of student sources but not the quality of output. **The second one: the American model.** The U.S. model mainly consists of external assessment agencies to guarantee the quality of teaching, the government does not directly intervene in the teaching assessment of colleges and universities, but only retains the right of approval, and under the government's permission, the specialized teaching quality assessment or accreditation agencies to assess, accredit and rank the teaching activities of the colleges and universities. **The third one: the British model**. The UK model consists of an internal quality assessment organization and an external quality assessment organization jointly assessing the quality of teaching and learning in colleges and universities. The internal quality assessment organization is led by the college or university, and the college or university inspects and supervises the teaching and learning process and the process of quality management through the formulation of quality standards. The government does not intervene much in the external quality assessment, but only assesses the quality of teaching and learning in colleges and universities through assessment intermediaries.

In summary, quality assurance activities in higher education are involved in the process of quality assessment of an educational system, institution or program, a process that includes the assessment, control, assurance, maintenance and improvement of quality. In terms of its process, quality assurance in higher education is a practical activity in which the government, society, universities and other value subjects express and seek to realize their higher education interests and quality claims by controlling educational resources. This study argues that the higher education quality assurance model refers to a set of theories and practices to implement the guarantee of higher education quality under the guidance of a specific methodology and the use of specific management strategies and management tools. It is a theoretical model or theoretical

schema with typical characteristics formed on the basis of analyzing, abstracting and generalizing the interests of each subject and the mechanism of realizing the quality demand, which is in essence a high degree of generalization of the concepts, mechanisms and methods of higher education quality assurance. From the experience of higher education quality assurance in developed countries, the cross-fertilization and comprehensive application of multiple approaches is an important trend in the development of higher education quality assurance in the future. Many countries have been changing their quality assurance methods. At present, most of the quality assurance models of Chinese higher education institutions have been developed from the Professional Model for Quality.

Internal quality assurance in higher vocational education

1. Meaning of higher vocational education

The “vocational education” in China's concept of “higher vocational education” is a special form of vocational education, a completely new type of higher education in comparison with “general education”. It has the dual attributes of “higher education” and “vocational education”, spanning the fields of vocational education and higher education. It encompasses both vocational and technical education, emphasizes the cultivation of students' practical abilities, and is positioned as a means of training highly technical and skilled personnel. **In this study, the “higher vocational education” referred to** is essentially “higher vocational and technical education”, which **refers to** the full-time academic education under the supervision of the education department, relying on higher vocational colleges and universities of higher education, with the main task of cultivating high-quality technical and skilled specialists, and implementing the “higher vocational education” program of full-time academic education.

Huang Bin (2020) Vocational education, as a type of education, has social, regional and human characteristics in terms of functional positioning and social status; vocational, dual demand and integration characteristics in terms of schooling positioning and cultivation goals; practical, flexible and personalized characteristics in terms of cultivation paths and behavioral modes, and the difference in cultivation goals is the most essential difference between vocational education and general education**.**

Sun Yiying (2020) Academics basically agree that "higher" and "vocational" are the two basic attributes of higher vocational education, and exploring the quality evaluation standards of higher vocational education from these two basic attributes can more accurately grasp the essence of the quality of higher vocational education and explore the law of quality of higher vocational education.

2. Definition of quality assurance in higher vocational education

Regarding the connotation of quality assurance of education in higher vocational colleges, most scholars around the world draw on the concept or reference to quality assurance in higher education; after all, higher vocational education is also a component of higher education. Listed below are several definitions of quality assurance systems for higher vocational education：

Fang Hongqin (2011) “Quality of higher vocational education” can be defined as the degree to which higher vocational education meets the requirements of customers (employers) with its inherent characteristics, including the degree of satisfaction of social employers with graduates, i.e. “social quality”; the satisfaction of students with the educational services of higher education institutions, i.e., “internal quality”; and the satisfaction of educational administrators and implementers (including educational administrative departments, university leaders and teachers, etc. with the work of education, i.e., “quality of work”.

Wang Sheng (2023) The quality of higher vocational education refers to the comprehensive evaluation of the effectiveness of education of high-quality technical and skilled talents in higher vocational colleges and universities on the basis of whether the quality of talent cultivation can satisfy the needs of education stakeholders as the evaluation standard, and on the basis of the degree of satisfaction with the students' knowledge transfer and ability construction based on the social activities and work process. The quality assurance system of higher vocational education is a systematicity, scientific and orderly management system based on the feelings of stakeholders about the school in talent cultivation, scientific research, social service, international exchange and cultural heritage.

In summary, higher vocational education is a kind of education different from undergraduate education for more students of the right age, and its purpose is to meet the employment needs of social industries and enterprises and to cultivate high-quality

technical and skilled talents. The quality of higher vocational education should be based on the needs of multiple subjects of higher vocational education, clarify the intrinsic attributes of school teaching, scientific research and social services, and satisfy the "customer needs" through continuous quality management and its improvement. The core of the quality of higher vocational education is the cultivation of technical-skilled talents, that is, to serve the talent needs of regional economic and industrial development, as well as to serve the employment, entrepreneurship and sustainable development ability of learners.

3. Definition of internal quality assurance system in higher vocational education

Quality assurance system is divided into external quality assurance system and internal quality assurance system, and the quality assurance system of higher vocational education is also divided into **two types**: external quality assurance system and internal quality assurance system. Generally speaking, the external quality assurance system refers to the official organization, such as the expert body organized by the education administration department, whose members cover experts in the industry and experts outside the industry. Such official organizations mainly do guidance, supervision, consultation and other roles on school quality management. The internal quality assurance system is the behavioral motivation and institutional guarantee developed by the institutions themselves in order to ensure the quality of education and teaching, which belongs to the behavior supported by endogenous motivation. Different scholars hold different views on the definition of internal quality assurance system of higher vocational education:

Zhou Shen & Zhang Ling (2010) The internal quality assurance system of higher vocational education institutions refers to the self-regulation mechanism formed by higher education institutions to take the quality objectives as the standard, and continuously reduce the gap with the objectives by adjusting the various elements and the operational relationship between them.

Liu Hu & Shi Weiping (2012) The internal quality assurance system of higher vocational education institutions refers to the planned and organized systematicity management process that higher education institutions take the initiative to adopt in order to maintain and improve their own educational quality.

Han Qisheng (2012) The quality assurance system of higher vocational education generally includes two subsystems: external quality assurance system and internal quality assurance system. The external quality assurance system refers to the system of quality supervision, evaluation and regulation of higher vocational education, also known as the macro quality assurance system, which consists of the Ministry of Education and the provincial education authorities as well as the relevant parties in society. The internal quality assurance system refers to the system of internal quality assurance activities of higher vocational colleges and universities, also known as the micro quality assurance system, which consists of quality generation, quality supervision and evaluation, information management, feedback regulation and other sub-systems.

Li Lei (2020) Higher vocational education is also an important part of higher education, and the quality assurance system of higher vocational education is also divided into two parts: external quality assurance system and internal quality assurance system. Its external quality assurance refers to the assessment and evaluation activities carried out by educational administrative departments or intermediary institutions on the quality of teaching resources and equipment, professional settings, faculty, teaching activities and other quality of higher vocational colleges and universities; internal quality assurance refers to the fact that higher vocational colleges and universities, in order to ensure that the purpose of education is realized, and that the talents they cultivate are able to achieve the objectives of running schools and meet the needs of society, monitor the quality of teaching through the establishment of relevant systems or institutions, the quality of teachers, the academic performance of students, the quality of teaching and the quality of teaching. The activities of special assessment of teachers "teaching quality and students" academic performance.

Liu Fengcun (2016) "Internal quality assurance in higher vocational institutions" can be regarded as a static and dynamic process, and it is believed that the internal quality assurance system of higher vocational institutions refers to taking the cultivation of high-quality skilled talents as the goal, relying on the theory of total quality management, taking quality assessment as the core, and adopting human resources and optimizational Institutions for protection, information feedback on the problems found, and then the factors affecting the quality of personnel training to

detect, regulate and form a dynamic cycle of continuous self-improvement and improvement of the system.

Chen Xiangping (2017) The internal quality assurance mechanism of higher vocational colleges is a multi-factor, multi-structural integration of management systems, requiring schools to give full play to the status of the main body of running schools, to improve the quality of education and teaching as the core, to establish a chain of goals and standards as an entry point, to build around the goals and tasks of the school's construction and development, to clarify the strategic thinking of the school's development, and to improve and perfect the school's autonomy and self-discipline of the school's development and self-discipline of the operating mechanism, and carry out regular self-diagnosis and improvement work to promote the quality governance of higher vocational colleges from ‘he governs’ to ‘autonomy’. It should improve and perfect the operation mechanism of autonomous development and self-discipline, carry out regularized self-diagnosis and improvement work, and promote the quality governance of higher vocational colleges from “other governance” to “self-governance”.

Chen Shougen & Wang Liya (2017) The internal quality assurance system of higher vocational education refers to the quality management complex formed by higher vocational colleges for the purpose of enhancing the trust of stakeholders, guided by advanced quality management theories and concepts, and conditioned by quality standards and norms of each work, quality diagnosis, feedback and improvement, and quality resource supply to comprehensively chemical the quality of talent cultivation, scientific and technological research, service to the society, and cultural inheritance and innovation work.

Lu Desheng (2019) The internal quality assurance system of higher vocational education refers to taking the quality of education and teaching in higher vocational colleges and universities as the object of guarantee, taking the improvement of the quality of education and teaching in higher vocational colleges as the core task, and taking high-quality, technical and skilled talents as the goal of cultivation, and reasonably organizing the various links of the teaching process and the activities and functions of each department to form an organic operating system with clear tasks, clear responsibilities and powers, and the ability to coordinate and promote each other.

The organic operation system of the teaching process is clearly defined. The organic operation system that can coordinate and promote each other is formed with clear tasks and responsibilities.

In summary, higher vocational education is a type of education different from ordinary higher education, crossing the border between vocational education and higher education, and having the dual attributes of higher education and vocational education. Therefore, the type characteristics and essential attributes of vocational education determine the unique connotation and characteristics of quality assurance in higher vocational education. **In this study, internal quality assurance system in higher vocational education refers to** a comprehensive quality management complex formed by higher vocational colleges for the purpose of enhancing the trust of stakeholders, guided by advanced quality management theories and concepts, and based on the quality standards and norms of work, quality diagnosis, feedback and improvement, and the supply of quality resources quality management complex of talent cultivation, scientific and technological research, social service and cultural heritage and innovation（Chen Shougen&Wan Liya,2017）.

4. Components of internal quality assurance system in higher vocational education in China

Chinese scholars had put forward different views on the components of a teaching quality assurance system from different research perspectives and with different criteria.

Wang Sheng (2023) The internal quality assurance system of higher vocational colleges is to take the development of teachers and students as the root, to take the quality culture as the internal drive, to construct the connotation of the school as the purpose, to take the advanced quality management theory and concept as the guidance, to promote the spiral improvement through the search for self-problems, and to establish the up-and-down linkage and organic complementary operation system with the function of early warning and incentive in the level of the school, the profession, the course, the teachers and the students. The construction of internal quality assurance system aims to further strengthen the main position of school running, stimulate the vitality of school running, improve the quality of talent cultivation and school running

level, and construct the attractiveness of higher vocational education. It takes the establishment of the school's target system and standard system as an entry point, and builds up a self-diagnosis and improvement operation mechanism at the level of schools, professions, courses, teachers and students, so as to achieve the purpose of upgrading the modernization level of the school's governance system and governance capacity. The basic structure of the internal quality assurance system of higher vocational colleges and universities is the internal quality assurance system "**five vertical, five horizontal and one platform**" **(5×5+1)**, and its operation mode is mainly to build a quality objective system, implement a quality control system, create a quality evaluation and improvement system, and improve the quality support system in four aspects. Specifically, the first "5" in the structure consists of decision-making and command (leadership system, organizational structure, system construction, coordination and management), quality generation (teaching management, student work, international cooperation and exchange, etc.), resource construction (optimization, personnel, asset management, digital campus construction, development, storage, cleaning, use and management of internal and external resources), support services (optimization, personnel, asset management, digital campus construction, development of internal and external resources, storage, cleaning, use and management). The five vertical systems of quality generation (optimization, personnel, asset management, digital campus construction, on-campus and off-campus resources development, storage, cleaning, use and management), support service (life service, social service, cooperation platform, safety and security), and supervision and control (quality data, early warning release, information collection, aggregation, analysis, and quality report) cover all the links and processes of quality generation of tertiary institutions, and manage all the resources and activities related to the teaching and talent cultivation of the higher educational institutions as a quality process, which is the "quality process" of quality generation of the university. It covers all links and processes of quality generation in higher vocational colleges, manages all resources and activities related to teaching and talent cultivation in higher vocational colleges as a quality process, and is the "comprehensive control" and "comprehensive management" of quality generation in schools. The latter "5" consists of five levels: school, profession, course, teacher and student, which is the main body of quality generation

of higher vocational colleges and universities, and they are both relatively independent and complete and related to support, through carrying out self-diagnosis and improvement of the five levels, constructing the development mechanism of self-planning, self-development, self-warning and self-improvement, and practically fulfilling the main responsibility of talent cultivation work. By carrying out self-diagnosis and improvement work on the five levels, we will build a development mechanism for self-planning, self-development, self-alerting and self-improvement, and effectively fulfil the main responsibility of talent cultivation. The "1" in the basic structure refers to the construction of a multi-terminal and multi-channel information collection, all-element-coverage "school comprehensive analysis and decision-making platform" with early warning and diagnosis functions based on the state data of talent cultivation and dynamic data of quality generation. The decision-making platform makes use of data centres, cloud computing and other information technologies to establish school data standards and statistical analysis methods, regularly analyse and release school development status data, and through real-time collection of work status data, dynamic testing, connection and sharing, and timely early warning, it provides basic data protection for the school to correct deviations in a timely manner, optimize and revise goals and tasks, and achieve continuous quality improvement.

Yang Yingsong & Yuan Hongzhi & He Xitao (2019) pointed out that in 2015, under the unified deployment of the Ministry of Education, the construction of the Diagnosis and Improvement System of Teaching Work in Chinese Vocational Colleges and Universities (referred to as "Diagnosis and Improvement") started nationwide, aiming at the establishment of the Diagnosis and Improvement System and the creation of a novel internal quality assurance system. The construction of the diagnosis and improvement system is an innovative work. The innovativeness is mainly reflected in its eight core concepts. Firstly, the socialist core values are the only coordinate system for the quality of education. Second, the quality of education refers to the degree of satisfaction of two development needs. Third, the quality of education is formed in the process of planning, implementation and diagnosis. Fourth, there is no best quality but better quality. Fifth, quality is ultimately dependent on self-assurance. Sixth, quality improvement must rely on co-creation, co-management and sharing. Seventh, the diagnosis and improvement must adhere to the principle of combining the promotion

of development and the protection of the bottom line. Eight, diagnosis and improvement must be supported by modern information technology. Based on the above concepts, we have creatively put forward an implementation carrier that is adapted to the requirements of the times and the characteristics of vocational education - the internal quality assurance system of vocational colleges and universities with five vertical and five horizontal network structures, a figure-of-eight operation unit, a double-engine power mechanism and a platform for technological support (referred to as **the "55821" Model**). Internal quality assurance system of vocational colleges. The most distinctive features of the diagnosis and improvement are in four aspects, one is to emphasize that institutions are the first responsible body for quality assurance, and must take the responsibility of independent assurance. Secondly, it emphasizes that quality is a product of the "process", and that the "three wholes" must be put into practice. Thirdly, it is emphasized that quality assurance and improvement must rely on the joint efforts of the whole society. Fourthly, it stresses the important role of modern information technology.

Chi Yunxia & Wang Zhenjie & Zhang Shuyan (2019) believed that the construction of internal quality assurance system of higher vocational colleges should be centered on improving the quality of “cultivation of high-quality technical and skilled talents” , dividing the factors affecting the quality of talent cultivation into the direct and indirect factors in the growth process of students from enrollment to graduation, analyzing and clarifying the relationship of quality assurance responsibilities between management departments at all levels of colleges by applying management theories. , clarifying the components of internal quality assurance system, at the school level, the “1515” internal quality assurance system model of “One core, Five subjects, One platform, Five systems” has been constructed, forming a network with full coverage of all elements. “One core” refers to the quality of high-quality technical and skilled personnel training as the core. “Five subjects” refers to the five horizontal subjects of schools, specialties, courses, teachers and students. “One platform” refers to the school-based information management system. “Five systems” refers to five vertical systems: decision-making and command system, quality generation system, resource construction system, support service system, and supervision and control system.

Liu Fengcun (2016) The environment system, objective system, subject system, subject system and methods system were indispensable and necessary **components** that make up the internal quality assurance system of higher vocational colleges. The absence of any one element and the lack of whatever link would bring direct impact on the quality assurance system. To build the internal quality assurance system of higher vocational colleges was to combine these systems to form a "five-in-one" quality assurance model, so that they could both play their unique advantages and cooperate with each other in order to form a synergy to enhance the quality of talent cultivation, so as to realize the internal quality assurance system of higher vocational colleges from externally molded to endogenous type transformation.

Liao Xiaozhen (2020) believed that the quality assurance system in higher vocational colleges refers to the goal of guaranteeing and improving the quality of education and teaching, taking the cultivation of technical and skillful talents required by the society and the market as the starting point and finishing point, using scientific and systematicity methods and relying on the relevant organizational institutions of the school to organize the related elements of the teaching activities reasonably and closely to form an organic whole with a clear division of labor, mutual coordination and mutual promotion. Mutual promotion of the organic whole. It includes several components such as: organizational system, subject system, goal (objective criteria) system, methods system, operation (activity) system, service support system, information feedback (supervision and control) system, quality culture and school-based information platform.

Chen Wengui (2005) Quality assurance in higher education was a complex systematicity project. An effective quality assurance system should include: quality objective system, quality assurance subject system, quality assurance organization system, quality assurance activity system, quality information feedback system, teaching research and service support system. They were interdependent, mutual influence, synergistic operation in order to create the efficacy of ensuring the quality of education and teaching.

Lu Desheng (2019) proposed the internal quality assurance model in higher vocational colleges "2556" model. Among them, "2" refers to the internal and external quality assurance systems; "5" refers to the generation system, support system,

evaluation system, regulation system, and information system; “5” refers to the quality assurance subjects at the school The “5” refers to the quality assurance subjects at the levels of school, profession, course, teacher and student; “6” refers to the quality plan, key elements, key indicators, quality standards, quality evaluation and information collection, totaling six elements.

Chen Xinrong (2020) The purpose of establishing an internal quality assurance system in higher vocational colleges was to improve the satisfaction of multi-party evaluation subjects, and to establish a sound institutional system for continuous improvement of the quality of talent cultivation based on the support of the information platform. It included several components such as organizational system, goal (target standard) system, information feedback (supervision and control) system, institutional mechanism, quality culture, quality assurance concept (quality value) and school-based information platform.

The Ministry of Education of China (2015) issued the document Guidance Program for Diagnosis and Improvement of Internal Quality Assurance Systems in Higher Vocational Colleges (for Trial Implementation) in 2015, which put forward the basic framework for the construction of an internal quality assurance system in higher vocational education from an official perspective, with the basic components including “**Five Vertical, Five Horizontal and One Platform**”. **“Five Vertical”** refers to the five systems of Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System; **“Five Horizontal”** refers to the five levels of subjects- School level, Major level, Curriculum level, Teacher level, Student level; **“One Platform”**refers to the School-based Information Management Platform.

In summary, the results of the above scholars' research on the components of internal quality assurance system in higher education institutions were shown in Table 3. In this study, the internal quality assurance system in higher vocational education **included nine components:** 1) Quality Assurance Philosophy (Quality Perspective), 2) Organization System, 3) Subject System, 4) Objective System (Objective Chain), 5) Criteria System (Criteria Chain), 6) Operation System, 7)Mechanism Guarantee System, 8)Quality Culture, 9) School-based Information Management Platform.

Table 3 Components of internal quality assurance systems in Chinese higher vocational colleges

No.	Source / Components	Wang Sheng (2023(		Chi Yunxia &Wang Zhenjie & Zhang Shuyan（2019）		Liao Xiaozhen（2020）	Chen Wengui（2005）	Lu Desheng (2019(	Chen Xinrong（2020）	The Ministry of Education of China（2015）	**Frequency**
1	organization system	✓	✓	✓		✓			✓	✓	6
2	subject system	✓	✓	✓	✓	✓	✓			✓	7
3	objectives system&criteria system	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
4	instrument system	✓	✓		✓	✓	✓			✓	6
5	operation system	✓	✓	✓		✓	✓	✓		✓	7
6	Service support system			✓		✓	✓			✓	4
7	Quality Generation System									✓	1
8	Resource building system									✓	1
9	Information feedback	✓	✓	✓	✓	✓	✓	✓	✓	✓	9

No.	Components \ Source	Wang Sheng (2023(	Chi Yunxia &Wang Zhenjie & Zhang Shuyan（2019）	Liao Xiaozhen（2020）	Chen Wengui（2005）	Lu Desheng (2019(	Chen Xinrong（2020）	The Ministry of Education of China（2015）	Frequency
	(monitoring and control) system								
10	Environmental system			✓					1
11	Evaluation system							✓	1
12	mechanism guarantee system		✓				✓	✓	3
13	quality culture		✓	✓		✓	✓	✓	5
14	quality assurance philosophy (quality (values	✓	✓		✓	✓	✓	✓	6
15	school-based information management platform	✓	✓	✓	✓		✓	✓	6

5. Models of internal quality assurance system in higher vocational education in China

Ministry of Education of China (2015) The environment system, target system, subject system, object system and means system are indispensable factors that constitute the internal quality assurance system of higher vocational colleges. The combination of these systems forms a **"five-in-one" internal quality assurance system model** for higher vocational colleges and universities. Each component can not only play their own unique advantages but also cooperate with each other, so as to form a synergy and jointly improve the quality of talent cultivation, thus realizing the transformation of the internal quality assurance system of higher vocational colleges and universities from externally shaped to endogenous.

Chen Shougen & Wan Liya (2017) based on the application of theoretical and practical results, proposed a "5×4" model of internal quality assurance in higher vocational colleges with a comprehensive nature. The "5×4" model of internal quality assurance in higher vocational colleges and universities is a rectangular structure, with "5" referring to the fact that the quality assurance system consists of five sub-systems, namely, professional construction, students' education and management services, administrative services, logistic services, and ideological and political education of the party, and "4" meaning that the quality assurance system consists of five sub-systems. "4" means that each sub-system consists of a quality standard system, a process diagnosis and improvement system, a performance diagnosis and improvement system, and a quality spirit shaping system, as shown in Table 4.

Table 4 The "5 x 4" model of internal quality assurance in higher vocational institutions

	Professional development	Student education and management services	Administrative services	Logistic services	Party building Ideological and political education
Quality Standard System	Clearly related work to do what, how to do? It makes the content and methods of quality activities clear and organized; it also provides clear direction for process diagnosis and improvement, performance diagnosis and improvement, and spirit shaping system design.				
Process Diagnosis and Improvement System	Institutionalization and regular monitoring of the implementation of quality standards, timely detection and improvement of deviations in the implementation of standards, timely detection and promotion of experience in the implementation of standards to ensure the implementation of quality standards and beyond.				
Performance Diagnosis and Improvement System	Regularly measure and analyze the performance of related work, explore the causes with the results, and calibrate the process with the causes, so as to realize the benign interaction between process management and performance management, and to ensure the continuous improvement of the process and the continued quality.				
Quality Spirit Shaping System	Shape the quality spirit (consciousness, morality and habit) of teachers and staff, stimulate the endogenous motivation of pursuing, researching and innovating quality, and make the implementation and exceeding of standards and quality improvement a conscious action.				

The Ministry of Education of China issued the "*Guidance Program for Diagnosis and Improvement of Internal Quality Assurance System of Higher Vocational Colleges (for Trial Implementation)*" in 2015, proposing **the "55821" Diagnosis and Improvement Model** of internal quality assurance system in higher vocational colleges, which takes **"Five Vertical, Five Horizontal and One Platform"**as the basic framework of the internal quality assurance system, which is based on the " '8' Type Quality Improvement Spiral" (hereinafter referred to as the 8-

type spiral) as the basic operation unit, “Mechanism Guarantee System” and “Quality Culture” as the double-engine drive, and a School-based Information Management Platform as the support of the internal quality assurance system, i.e., **the “55821” Model**. The first “5” refers to the “Five Vertical”, vertical five systems are Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System.The second “5” refers to the “Five Horizontal”, horizontal five quality generating bodies are School level, Major level, Curriculum level, Teacher level, Student level. The “8” refers to the basic unit of quality assurance operation in accordance with the "8" Type Quality Improvement Spiral; “2” refers to the “Mechanism Guarantee System” and “Quality Culture” double engine, and “1” refers to “One Platform”, that is, the School-based Information Management Platform. The model aims to use diagnosis and improvement as a quality assurance method to establish a complete and relatively independent self-quality assurance mechanism at different levels of schools, professions, curricula, teachers and students.

Chi Yunxia & Wang Zhenjie & Zhang Shuyan(2019) proposed **the “1515”model** (“Five Vertical, Five Horizontal, One Platform, One Core”) for internal quality assurance in higher vocational colleges and universities. Among them, “1” refers to the quality of cultivating high-quality technical and skilled talents as the core, referred to as “One Core” ; “5” refers to the five vertical systems, referred to as “Five Vertical”. “Five Vertical”- the role of the school's internal administrative departments and teaching units in the internal quality assurance system was divided and attributed to form a total of five systems of decision-making and command, quality generation, support services, resource construction, supervision and control; “1” refers to a School-based Information Platform, referred to as “One Platform”, i.e. the school-based information platform supporting the construction and operation of the internal quality assurance system; “5” refers to the horizontal five quality assurance subjects, or “Five Horizontal” for short - school, major, curriculum, teacher, student, and five quality generating subjects.

Lu Desheng (2019) proposed the “2556” internal quality assurance model of higher vocational colleges. Among them, “2” refers to two quality assurance systems, internal and external; “5” refers to the generation system, support system, evaluation

system, regulation system, and information system; “5” refers to the school The “5” refers to the quality assurance subjects at the levels of school, profession, course, teacher and student; “6” refers to the quality plan, key elements, key indicators, quality standards, quality evaluation and information collection, totaling six elements.

Table 5 Models of internal quality assurance systems in higher vocational colleges in China

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
1	The "five-in-one" model	"Five-in-one" means that the framework of the internal quality assurance system of higher vocational colleges consists of five subsystems: Environment system, Target system, Master system, Object system and Tooling system.	Environmental system		Liu Fengcun (2016)
			Target system		
			Master System		
			Object system		
			Tooling system		
2	"5 x 4" model	"5" refers to five levels of quality assurance - student, major, administration, civic education, and logistical assurance; "4" means that the five dimensions should be designed in accordance with the four aspects of	Five levels	student	Chen Shougen& Wan Liya (2017)
				major	
				administration	
				civic education	
				logistical assurance	
			Four links	performance appraisal	
				standard setting	
				process monitoring	

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
		performance appraisal, standard setting, process monitoring and overall improvement		overall improvement	
	"55821" Diagnosis and ImprovementModel	The "55821" Diagnosis and Improvement model is a web-like system formed by the interweaving of five vertical elements and five horizontal elements. The "five vertical" are five vertical systems - the division and attribution of the role of the school's internal administrative departments and teaching units in the internal quality assurance system, forming five systems of Decision-making Command System, Quality Generation	Five vertical systems	Decision-making Command System	Ministry of Education of China (2015)
				Quality Generation System	
				Support Service System	
				Resource Assurance System	
				Supervision and Control System	
			Five horizontal subjects	School level	
				Major level	
				Curriculum level	
				Teacher level	
				Student level	
			One	School-based	

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
		System, Support Service System, Resource Assurance System , Supervision and Control System; "Five Horizontal" refers to the horizontal five quality assurance subjects - School level, Major level, Curriculum level, Teacher level, Student level; "One" refers to an information technology platform, or "One Platform" for short, i.e. a School-based Information Management Platform that supports the construction and operation of the internal quality assurance system.	Platform	Information Management Platform	
	"1515" ("Five	"1" refers to the quality of training	A core	Focusing on the quality of	Yunxia Chi&

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
3	vertical, five horizontal, one platform, one core")	high-quality technical and skilled personnel as the core, referred to as "a core"; "5" are five vertical systems, or "five verticals" - the roles of administrative departments and teaching units in the internal quality assurance system are divided and attributed to form five systems of Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System; "1" refers to an information technology platform, or "One Platform" for short, i.e. a school-based information		cultivating high-quality technical and skilled personnel	Zhenjie Wang&Shuyan Zhang (2019)
			Five vertical systems	Decision-making Command System	
				Quality Generation System	
				Support Service System	
				Resource Assurance System	
				Supervision and Control System	
			One Platform	Informatization platform	
			Five horizontal subjects	School level	
				Major level	
				Curriculum level	
				Teacher level	
				Student level	

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
		technology platform that supports the construction and operation of the internal quality assurance system; "5" refers to the horizontal five quality assurance subjects, or "five horizontal" for short - School level, Major level, Curriculum level, Teacher level, Student level, a total of five subjects.			
4	The "2556" model	"2" refers to two quality assurance systems, internal and external; The "5" refers to generating system, support system, evaluation system, regulatory system, and information system; "5" refers to the five levels of quality	2 5	Internal quality assurance system External quality assurance system generating system support system Evaluation system regulatory	Lu Desheng (2020)

NO.	Organizing plan paradigm	Essential properties implied or reflected by a notion	Components		Author/ Years
		assurance bodies: school, major, curriculum, teacher and student; "6" refers to the quality program, key elements, key indicators, quality standards, quality evaluation and information collection, totaling six elements.		system	
				information system	
			5	School	
				Major	
				Curriculum	
				Teacher	
				Student	
			6	Quality program	
				Key elements	
				Key indicators	
				Quality standards	
				Quality evaluation	
				Information collection	

In summary, the findings of the above scholars on the internal quality assurance system models of higher vocational colleges were shown in Table 5. **The "55821" Diagnosis and Improvement Model**, which officially announced by the Ministry of Education of China represents the official value orientation, conceptual principles and basic framework for the construction of the quality assurance system of higher vocational education, which is of great reference significance for the internal quality assurance construction of Chinese higher vocational colleges. **This study adopted the "55821" Diagnosis and Improvement Model** as the basic framework,

and developed a model suitable for the construction of the internal quality assurance system in higher vocational education institutions in Guangxi on this basis.

Elements of an internal quality assurance system model in higher vocational education

1. Value orientation of developing an internal quality assurance system model in higher vocational education

Value orientation refers to the basic value stance held by the subject based on his or her own values, the basic value attitudes held, and the basic value choices expressed when facing or dealing with various relationships, conflicts and contradictions (Zhang Fengming, 2021). The value orientation of quality assurance determines what the quality activities of higher vocational education ensure, i.e., the question of the content of the assurance, which is the key issue concerning the direction of the assurance activities. UNESCO pointed out in the book World Declaration on Higher Education in the 21st Century: Prospects and Actions that the quality of education is a multifaceted concept, and the quality standards of education should be avoided to be measured by a uniform scale (Wang Junhong, 2013). The concept of quality of education is the value choice of people under specific historical conditions, and is closely related to economic relations, political life and social culture. Generally speaking, people's understanding of the concept of quality of education is constantly developing and changing, and has gone through a process from school education to lifelong learning, from teacher-oriented to student-oriented, from transferring information to knowledge construction, from rote memorisation and duck-type learning to the enhancement of comprehensive ability including analysis, synthesis, application, creativity, innovation, and problem solving, and from focusing on the inculcation of knowledge to the cultivation and enhancement of competence and quality process (Bista&He Pei& Li Ping, 2013).

Higher vocational education spans the two fields of higher education (type of education) and vocational education (level of education); from the viewpoint of type of education, higher vocational education needs to be oriented to industries and occupations, and to transfer knowledge, skills and abilities; from the viewpoint of level of education, higher vocational education needs to be built on the foundation of

secondary education, with an emphasis on specialization (Guo Wenfu, 2018). A comprehensive understanding of the quality of higher vocational education needs to be viewed from multiple perspectives and dimensions in an all-round, three-dimensional and comprehensive way.

Liu Xianjun (2012) In 1998, UNESCO proposed in the Declaration of the First World Conference on Higher Education that higher education needs to be dedicated to a new perspective and model of "student-centredness". Higher education policy makers in various countries are required to regard students as the main participants in education improvement and pay significant attention to students and their needs.

Pan Maoyuan (2004) Higher vocational education with Chinese characteristics started in the 1980s, and its development history is not long. In the initial evaluation of the quality of higher vocational education, it is more of a "fetishism", i.e., borrowing the quality concepts of general higher education. From this point of view, in terms of the evolution of the quality concept of higher education, before the 1980s, it was more of a traditional knowledge quality concept, after the 1980s, it was gradually transformed into a competence quality concept, and in the new century, with the massification of higher education, it was further transformed into a comprehensive quality concept.

Chen Yukun & Dai Ruihua et al. (2004: 52-59) argued that there was a clear divergence of views on the value of quality assurance in higher education around the world. Synthesizing the views of various schools of thought, the debate on the value orientation of quality assurance in higher education was broadly divided into the following three schools of thought: the instrumental value orientation, the communicative value orientation and the student development value orientation.

(1) **The instrumental value orientation** is the dominant school of thought today. It sees higher education as a "product" production process with inputs and outputs, with the aim of delivering graduates as products to the social labour market. The quality of education is evaluated to a large extent in terms of the extent to which it meets the needs of society, its productivity, etc. It is divided into three categories: the theory of teaching output, the theory of added value, and the theory of "input-process-output".

(2) **The communicative value orientation** is a viewpoint that is more commonly shared by the higher education academic community, and it reflects the

values of the student community itself. It sees higher education as a self-sufficient academic structure, and advocates a peer evaluation approach where academic experts are the chief judges of the quality of higher education, and where academic quality is an important basis for judging the quality of education and teaching. As far as student quality is concerned, it also mainly measures the academic standard of students.

(3) **The student development value orientation** holds that higher education teaching standards must meet the needs of students. Student development should be at the centre when measuring whether the objectives of teaching quality in higher education are achieved. Centred on humanism and the development trend of international higher education, especially that of developed countries in the West, this school of thought proposes that higher education should firstly respect "human nature", and believes that human development is the ultimate goal of education development, so the most important "clients" of education and teaching activities are students, and their clients are the students in all aspects. Therefore, the most important "clients" of education and teaching activities are students, whose development in all aspects should be the main basis for measuring the quality of higher education teaching.

Chen Zhonggen (2008) In recent years a large number of scholars have begun to pay attention to the personal value orientation of education, emphasising that education should follow the concept of people-oriented education, and that the student-oriented view of the quality of higher vocational education will be a new direction in the pursuit of high quality in higher vocational education.

Sun Cuixiang & Zhang Yuanyuan (2014) pointed out that in a society with diversified values, the value orientation that should be adhered to in the quality assessment of higher vocational education should be varied, but the most basic value orientation should include: people-oriented value orientation, educational equity value orientation, and sustainable development value orientation.

Ma Shuchao & Guo Wenfu (2016) based on the mission, characteristics and goals of higher vocational education, the current quality concept of higher vocational education should consist of five dimensions: student development, teaching implementation, service to the community, policy protection, and development environment.

Guo Wenfu (2018) mentioned in his doctoral thesis that there are 3 quality concepts of higher vocational education: the first was the quality concept of adapting to the demand, which believed that vocational education should be the basic criterion for measuring quality in terms of whether it can satisfy the demand of regional socio-economic development, and the strength of the ability to adapt to market changes. The second was the quality concept of student development, which hold that vocational education should be concerned with the degree of satisfaction of students' education and be student-oriented. The third comprehensive view of quality, which believed that the quality of vocational education included not only output indicators, but also the professional status of teachers, the attributes of vocational education institutions and the teaching process, methods of improvement and innovation, and the quality of the student population.

Lu Desheng (2019) argued that there had been a dispute between two value orientations, social and personal, in education. Higher vocational colleges must have a clear and specific goal system in the construction of the internal quality internal assurance system of education quality, and reflected the most basic value orientation in these goals. China's current “order-type” talent training model reflects the value orientation of social orientation, which had a certain degree of reasonableness, but there were also problems such as the prominence of instrumental rationality, the alienation of educational functions, and the lack of educational concepts.

In summary, an important current trend in quality assurance in higher education around the world was that there had been a paradigm shift from a resource- and teacher-centred to a student-centred model. This study took student-centredness as a value orientation, while taking into account the interests of multiple subjects such as the state, society and enterprises, and built a model of internal quality assurance system for higher vocational education that meeted the local needs of Guangxi by using new concepts such as customer orientation, honesty, prevention-oriented, and quality culture.

2. Principles of developing an internal quality assurance system model in higher vocational education

The construction of an internal quality assurance system for higher vocational colleges was the key to improving the quality of education and realizing the sustainable

development of the institutions. The purpose of studying and exploring the construction principles of the internal quality assurance system of higher vocational education was to make the relevant subjects consciously comply with the corresponding rules or standards in their work. In order to ensure the effectiveness and scientificity of the system, the construction should follow the relevant principles. Different scholars had different views on the principles of the construction of the internal quality assurance system of higher vocational colleges:

Lu Desheng (2019) The construction of the internal quality assurance system of higher education institutions should follow the following four principles: the principle of systematicity, the principle of scientificity, the principle of participation of multiple subjects, and the principle of continuous improvement.

(1) **The principle of systematicity** is the basis for the construction of the internal quality assurance system of higher education institutions, because it is originally a whole system composed of many subsystems, and when constructing the internal quality assurance system, it should take the improvement of teaching quality as a criterion, coordinate the interrelationships between the subsystems, integrate all factors affecting the quality as well as all links, grasp them in all directions, and form an interacting, mutually reinforcing Organic whole, promote the overall improvement of education quality.

(2) **The principle of scientificity** means that the internal quality assurance system of higher vocational colleges must be guided by scientific theories, and on the basis of highlighting the “higher education nature” and “vocational education nature” of higher vocational education, scientific thinking and methods should be applied to promote its maximum development.

(3) **The principle of participation of multiple subjects** refers to the participation of all relevant interested subjects in the construction and operation of the internal quality assurance system of higher vocational colleges. It is necessary to improve the quality consciousness of all staff, so that leaders, teachers, students and part-time personnel of industrial enterprises in higher vocational colleges are concerned about the quality of education in higher vocational colleges, and all of them consciously and actively participate in the work.

(4) **The principle of continuous improvement** refers to the fact that the internal quality assurance system of higher vocational colleges is a process of continuous improvement, which is not static but a dynamic development process. The quality of education in higher vocational colleges needs to be continuously improved with the demands of the social market economy.

Liao Xiaozhen (2020) believed that the internal quality assurance system framework was the skeleton of the quality assurance system of education and teaching in vocational colleges. The following five principles could be followed in constructing the system: the principle of people-oriented, the principle of process approach, the principle of full participation, the principle of continuous improvement, the principle of science and objectivity.

(1) **The principle of people-oriented** refers to the value orientation of the internal quality assurance system of higher vocational colleges and universities, i.e., the operation should reflect the concept of people-oriented, take the development of teachers and students as the core of the guarantee, and at the same time, take into account the needs of the country and the society, and grasp the various quality links to ensure that the work of quality assurance is smoothly pushed forward.

(2) **The principle of process approach** means that quality assurance is a dynamic and ever-changing process. The internal quality assurance system should be able to monitor the whole process of education and teaching, organically combine the operation, monitoring, evaluation and feedback of teaching, and use the process approach for continuous improvement to continuously improve the quality of education and teaching.

(3) **The principle of full participation** means that the internal quality assurance of higher vocational colleges is not only the responsibility of the management, but also requires the common participation of all teachers, students and staff. We should actively mobilize all stakeholders of higher vocational colleges to participate in the construction of internal quality assurance system, to ensure the realization of their own interests while forming a relevant monitoring atmosphere, and to steadily improve the quality of education and teaching in higher vocational colleges.

(4) **The principle of continuous improvement** refers to the fact that the internal quality assurance of higher vocational colleges is a dynamic process, which

needs to be constantly optimized and improved. It is necessary to use the PDCA Cycle Theory and the Continuous Improvement Theory as a guide to regularly assess the effect of the quality assurance system, find problems and make timely adjustments to continuously improve the whole system.

(5) **The principle of science and objectivity** means that the construction and operation of the internal quality assurance system of higher vocational colleges should be realistic, objective, fair and unbiased in specific operations, and scientific and objective improvement measures should be proposed through the process data collection, analysis and early warning of the modern information technology platform.

Chen Wengui (2005) believed that the construction of internal quality assurance system in institutions of higher education should follow the following principles: the principle of objectives, the principle of systematicity, The principle of normality, the principle of efficiency and effectiveness, and the principle of diversity.

(1) **The principle of objectives** means that when establishing an internal quality assurance system, institutions of higher education should closely control the process around the quality assurance targets, reasonably select the elements of the system, and organise and co-ordinate all kinds of effective forces to improve the quality objectives of teaching and learning in order to form an effective quality assurance system. Implementing the principle of goal-oriented, that is, according to the theory of goal management to establish a quality assurance system.

(2) **The principle of systematicity** refers to the fact that the internal quality assurance system of higher education institutions is a complex system, and the factors affecting the quality are also multifaceted. Therefore, institutions of higher education in the construction of internal quality assurance system should follow the systematicity viewpoints and methods, comprehensively analyse and examine the links between the various elements of quality assurance activities, and the implementation of effective control, so as to ensure that the quality of the various elements are closely linked to form an organic whole. Its core is to grasp the following three aspects: comprehensiveness, dynamism and continuity.

(3) **The principle of normality** means that the establishment of internal quality assurance system and quality assurance activities of the university should be based on the relevant national policies, decrees and regulations, and the management

should be carried out in accordance with the law, overcoming the subjective arbitrariness and making the quality assurance activities institutionalised, standardised and normative, and the management, monitoring, evaluation and feedback should be carried out in an orderly manner.

(4) **The principle of efficiency** means that when institutions of higher education formulate internal quality assurance plans or objectives, they should meet the needs of the stakeholders of the institutions of higher education on the one hand, and consider the efficiency of the school's resources on the other hand, and take into account the two aspects of efficiency and effectiveness to ensure that institutions of higher education achieve sustainable development.

(5) **The principle of diversity** refers to the need to be multi-dimensional, diversified, and to avoid measuring the quality of higher education by a uniform dimension. The standard for measuring the internal quality assurance system of higher education institutions cannot be single either. Therefore, each institution of higher education should develop and implement an internal quality assurance system that meets the school's talent cultivation objectives on the basis of the general laws and requirements of internal quality assurance, according to the local conditions, the time and the school, and avoid blindly pushing a certain model or method.

In summary, this study followed the following five principles in constructing the internal quality assurance system of higher vocational colleges: the principle of systematicity, the principle of objectives, the principle of scientificity, the principle of participation of multiple subjects, and the principle of continuous improvement.

3. Approaches of **developing** an internal quality assurance system model in higher vocational education

(1) **PDCA Cycl**

Li Ming (2010) Deming Cycle (Deming Cycle), also known as the PDCA cycle. the PDCA cycle is a process methodology to implement quality management work in accordance with the sequence of the four phases of Plan (P), Do (D), Check (C) and Act (A). the PDCA is a work cycle, and it is a cycle of moving forward. Like a wheel moving forward, week after week, continuous cycle, upgrade iteration. PDCA cycle can be used for all levels of quality objectives, the objectives of each level in accordance with the PDCA logical approach to quality management, the formation of

a large ring set of small rings, a ring of a ring, a ring of a spiral upward cycle, layer by layer to solve the problem and so that the entire optimizational cycle rotates; after each of the After each PDCA cycle should be summed up, and then put forward the next cycle of new goals, measures, and then the second cycle, so that the wheel of quality management continues to move forward. Each cycle of quality level and management level will improve one step.

This method is characterized by:

1) **Four stages with clear requirements.** The requirements of the planning stage to develop guidelines, objectives, activities, management projects, etc.; the implementation stage requires strictly according to the rated objectives and requirements of the plan, and solidly put into action; the inspection stage requires checking the effectiveness of the implementation, and identify the causes. The processing stage requires a comprehensive summary of the lessons learned from successes and failures to form a standardization, so that the next cycle is carried out according to the standardization.

2) **Each quality body and quality unit are managed according to these four stages of the cycle, mutual promotion and common improvement**.

3) **Continuous cycle, week after week, spiral, cycle once, to a higher level of a step forward, rather than stand still**.

Du, Q. L & Cao, S. M & Ba, L. L. & Cheng, J. M(2008) The PDCA cycle is divided into four phases, and the four phases are specifically divided into **eight steps**: first, analyses the current conditions and finds out the existent problems. Second, finds out various causes resulting in those problems. Third, identifies the major factors from various causes. Fourth, works out the solution and improvement plan according to the major factors. Fifth, Carries out the plan and measures. Sixth, checks the implements according to requirements of the plan. Seventh, summarizes experiences and consolidates achievements. Eighth, turns problems that haven't been solved or appear newly into the next cycle,as the Table1 shown.

(2) "8" Type Quality Improvement Spiral

(Huang Jingmei &Wan Zhaoli,2019;Zhang Anfu & Zhang Hua,2020) The so-called "8" type quality improvement spiral refers to the "8" in the "55821" Diagnosis and Improvement Model of the internal quality assurance system of

Chinese higher vocational institutions, i.e., it was made up of the superposition of two spirals, namely, the dynamic and static cycles. The so-called Static Cycle refers to a complete workflow: “objectives - criteria - plan - optimization - implementation - monitoring - early warning - improvement”. Dynamic Cycle refers to the process of quality generation, based on real-time monitoring of the data, timely warning and immediate follow-up regulation, improvement process, generally did not involve the adjustment of objectives and criteria,including: “objectives - criteria - plan (Re-plan) - optimization (Re-optimization) - implementation (Re-implementation) - diagnosis - motivation - learning - innovation - improvement” link, forming an organic whole, complementary, interconnected and interactive, indispensable. It was that the data sources of the school-based information management platform all carried out independent diagnosis and improvement in accordance with the “8” type quality improvement spiral. That was to say, for the vertical five different systems - decision-making command system, quality generation system, support service system, resource construction system, supervision and control system, all in accordance with the “objectives - criteria - plan - optimization - implementation - monitoring - early warning - improvement - Re-plan - Re-optimization - Re-implementation - diagnosis - motivation - learning - innovation - improvement” was the whole big cycle, as Figure 2 is shown.

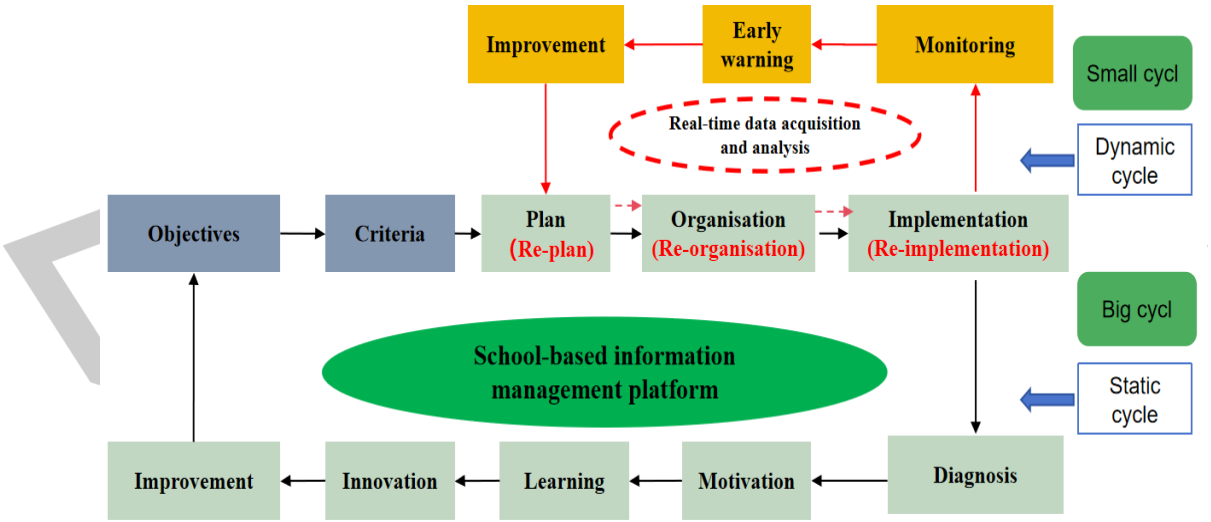


Figure 2 The “8” type quality improvement spiral

The specific connotations were as follows:

1) Objectives: Through extensive research, comparative analyses and existing foundations, the objectives in the spiral are determined so as to construct a chain of objectives.

2) Criteria: It is the measurement scale determined for the goal. Refer to the relevant policies and regulations at national and provincial levels, and combine them with the relevant systems developed by the school to determine the standards; if there are no regulations, you can also develop your own relevant standards. It should be noted that the national standard is the basic standard, and the school's own standard should be higher than the national standard, so as to build the corresponding standard chain.

3) Plan (Re-Plan): is to achieve the goal of the path and programme, and at the same time should determine the quality control points of the key nodes.

4) optimization (Re-optimization): Integration of human, financial and material resources in order to complete the target tasks.

5) Implementation (Re-implementation): initiatives to complete the objectives.

6) Monitoring: real-time data collection through the data platform, to open up information silos, to achieve data sharing, and to instantly track the relevant influencing factors in the implementation process.

7) Early warning: real-time feedback on the monitoring results that do not meet the preset conditions, and make prompt instructions.

8) Improvement: The relevant content of the early warning is improved and returned to the design process to further improve the design process.

9) Diagnosis: Check the quality control points against the standards, determine the degree of goal achievement, and identify problems.

10) Motivation: for the objectives that have been completed, in accordance with the relevant system mechanisms for timely incentives.

11)Learning: For the diagnosis of new problems, carry out learning and research.

12) Innovation: find new ways to solve problems, ways.

13) Improvement: solve the problem, determine new goals, and enter the next round of diagnosis and reform.

Chen Xinrong (2020) The “8” Type Quality Improvement Spiral and the PDCA Cycle in the Diagnosis and Improvement Model of the internal quality assurance system of Chinese higher vocational colleges are essentially the same, which means

that the operation of the internal quality assurance system of higher vocational colleges was carried out in accordance with the “8” type quality improvement spiral. It meant that the operation of the internal quality assurance system in higher vocational colleges was carried out in accordance with the “8” type quality improvement spiral. The so-called “8” type quality improvement spiral refers to “objectives - criteria - plan - optimization - implementation - monitoring - early warning - improvement - Re-plan - Re-optimization - Re-implementation - diagnosis - motivation - learning - innovation - improvement” continuous cycle, including both small and big cycles (also called Dynamic and Static Cycles). The small cycle is the objectives in the implementation process (during the process) for the process of testing and dynamic adjustment, including “objectives - criteria - plan - optimization - implementation - monitoring - early warning - improvement ” , which was a stage of detection and early warning and improvement, regular dynamic self-diagnosis and correction. The big cycle is “objectives - criteria - plan (Re-plan) - optimization (Re-optimization) - implementation (Re-implementation) - diagnosis - motivation - learning innovation - improvement” consists of ten links, as shown in Figure 3.

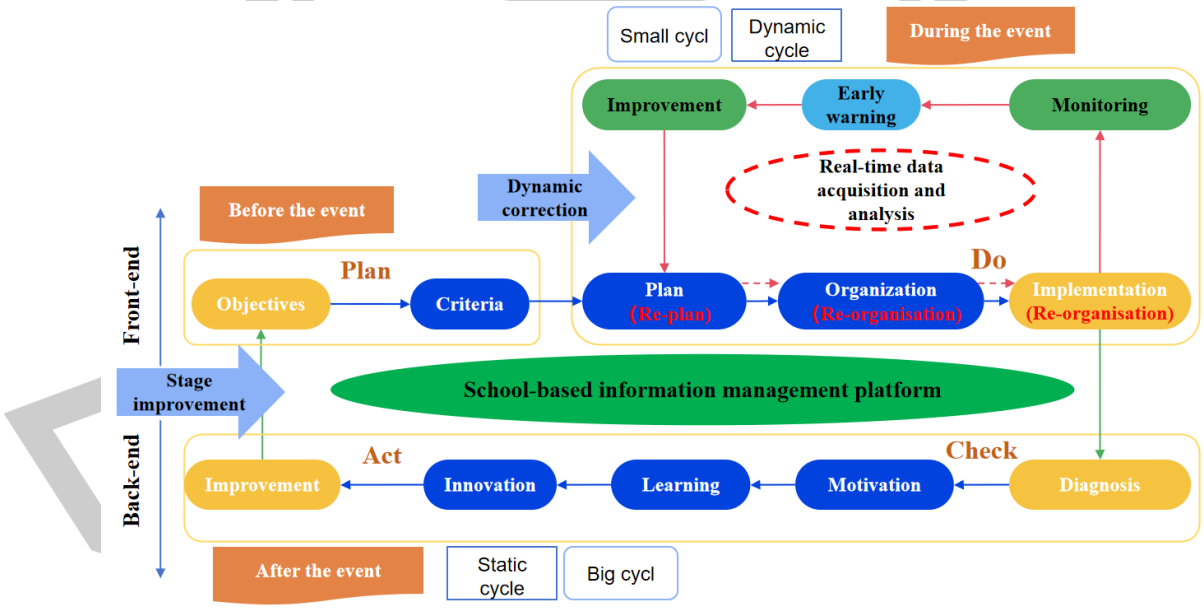


Figure 3 The “8” type quality improvement spiral based on the school-based information management platform

The whole diagnosis and improvement was divided into three phases, namely, “Before the event, During the event and After the event”, and each of the three phases focuses on different aspects: “Before the event” focusing on the design of objectives and standards; “During the event” stressing on regular corrections and timely corrections, which were mainly done through online (Front-end)and offline(Back-end); and “After the event” focusing on summaries and analyses, and continuous upgrading.

4. Procedures of developing an internal quality assurance system model in higher vocational education

Chen Wengui (2005) believed that the procedures of the internal quality assurance system model in higher education institutions include four parts: objectives, inputs, processes and outputs.

Chen Yukun &Dai Ruihua et al. (2004: 124) believed that the content of China's higher education quality assurance model was divided into five operational procedures: input quality assurance, process quality assurance, output quality assurance and system efficiency.

Tian Enshun (2005) believed that the higher education quality assurance system model could be divided into three operational procedures: input, process and output.

Xiong Zhixiang (2008: 47-48) believed that the higher education quality assurance system could be divided into three processes of input assurance, process assurance and output assurance based on the system process type theory.

Lu Desheng (2019) believed that quality assurance in higher education institutions was a multi-level structure, and based on existing research, the internal quality assurance system was divided into four operational processes: conceptual level, input level, process level, and output level.

In summary, this study considered that the operational procedures of the internal quality assurance system model in higher vocational institutions include four aspects: conceptual level, input level, process level, and output level.

5. Evaluation of developing an internal quality assurance system model in higher vocational education

Ministry of Education of China (2015) In order to stimulate the endogenous momentum of quality improvement and enhancement in higher vocational colleges, the

diagnosis and improvement work of the internal quality assurance system of higher vocational colleges (referred to as Diagnosis and Improvement) was launched in 2015, and comprehensively promoted in 2017. Diagnosis and improvement referred to the working policy of “demand-oriented, self-assurance, multi-dimensional diagnosis and improvement”, and using diagnosis and improvement as a approach to prompt higher vocational colleges to build an information-based diagnosis and improvement platform based on the data of talent cultivation status, and to establish complete and relatively independent self-quality assurance mechanisms at different levels of the school, major, curriculum, teacher and student, and to form an all-element networked quality assurance system. It formed a networked internal quality assurance system, and according to the school's own philosophy, school orientation and talent cultivation goals, it gathered the key elements of talent cultivation, such as professional settings and conditions, teacher team and construction, curriculum system and improvement, classroom teaching and practice, school management and system, school-enterprise cooperation and innovation, and quality monitoring and effectiveness, to find out the deficiencies and improve the process of improving the quality of the work. The networked internal quality assurance system was the “55821” internal quality assurance system model for higher vocational colleges, i.e. the internal quality assurance system with the basic framework of “Five Vertical, Five Horizontal and One Platform”. The first “5” is the abbreviation of “Five Vertical”, referring to the vertical five systems - Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System. The second “5” was the abbreviation of “Five Horizontal”, referring to the five horizontal quality generating bodies - School level, Major level, Curriculum level, Teacher level, Student level. “8” referred to the "8" Type Quality Improvement Spiral. “2” referred to the Mechanisms Guarantee System and Quality Culture as the two engines of internal quality assurance system. “1” was the abbreviation of “One Platform”, referring to a School-based Information Management Platform. Therefore, “Diagnosis and Improvement” was the abbreviation of the diagnosis and improvement of internal quality assurance system of Chinese higher vocational colleges, i.e. “55821”Diagnosis and Improvement Model.

At the same time, diagnosis and improvement was also used to refer to the implementation approach of internal quality assurance in Chinese higher vocational colleges - a combination of Autonomous Diagnosis and Sample Review. It embodied the value orientation of integrating and interacting with the internal self-study and the external review of the education administration. It consisted of two parts: Self-diagnosis by the institutions and Peer Review by a sample of experts organized by the education administration, of which the Peer Sample Review included two parts: **Online Peer Review and On-site Visit** by experts. The whole process was based on the independent review of higher vocational institutions. The results of the diagnostic review were classified as “validity”, “to be improved”. The review result of “validity” indicated that the institution had carried out diagnosis and implementation activities with remarkable effect; “to be improved” was the second most effective, but there are obvious areas that need to be improved.

Gao Wenjie(2019) Compared with traditional assessment, the diagnosis and improvement approach was a new internal quality assurance new model developed under the Fourth Generation Evaluation Thoery. First, the co-constructive and non-unique nature of evaluation indicators and standards undermined the tendency of managerialism and allowed the concept of co-construction to be promoted and implemented. Second, the centre of gravity was built on work improvement, advocating positive “constructivism”, highlighting the value judgement, improvement and optimization after evaluation, and the conclusion of the review was evaluated as “validity”, “to be improved”, highlighting the essence of diagnosis and improvement. Third, the evaluation process of multi-diagnosis. The diagnosis and improvement took “multi-diagnosis and improvement” as the important principle for the construction, operation and review of the internal quality assurance system. Fourth, the mechanism arrangement of continuous improvement. The document of the Ministry of Education clearly pointed out that the diagnosis and improvement is a continuous and regular work that was always on the road, different from the previous stage assessment, and stipulated that independent higher vocational colleges could complete at least one Diagnosis and Review of the quality assurance system every three years.

Yang Yingsong & Yuan Hongzhi & He Xitao (2019) The diagnosis and improvement mechanism was an innovative approach. It was a modern quality

assurance method for vocational education, which was established by the Ministry of Education of China to promote the “separation of management, operation and evaluation” and to deepen the improvement of the management system, and to coordinate and support the internal assurance and external evaluation of education. Its innovativeness was reflected in eight core concepts: **First**, socialist core values are the value orientation of education quality. **Second**, the quality of education referred to the degree of satisfaction of two development needs. **Third**, the quality of education was formed in the process of planning, implementation and diagnosis. **Fourth**, quality was not the best but better. **Fifth**, quality was ultimately dependent on self-assurance. **Sixth**, quality must rely on co-creation, co-management and sharing. **Seventh**, the diagnosis and improvement must adhere to the principle of combining development and bottom line. **Eighth**, diagnosis and improvement must be supported by modern information technology.

Wang Shilei & Liu Zhifeng (2017) Diagnosis and improvement of internal quality assurance system in higher vocational colleges, referred to as Diagnosis and Improvement. “Diagnosis” is the process of judging the construction and operation of the internal quality assurance system of higher vocational colleges by the educational administrative department according to certain principles and methods. “Improvement” was the process of self-analysis of the problems diagnosed by higher vocational colleges on the basis of diagnosis, and the process of proposing improvement measures and continuous improvement.

Chen Xinrong (2020:13) The implementation of the diagnosis and improvement approach of the internal quality assurance system in Chinese higher vocational colleges was carried out in accordance with certain procedures:

The first step was for the administration to set up relevant expert organizing committees and form expert pools to implement optimizational safeguards from the outside;

The second step was that each provincial administrative department formulates and implements a diagnosis and improvement guidance programme according to the actual situation;

The third step was forming programme and plans according to the requirements of the higher level of the province they belonged to, implemented all

quality assurance work according to the programme, and implemented Self-diagnosis and Improvement according to the cycle set by the programme, and form the Self-diagnosis and Improvement report of the cycle;

The fourth step was for provincial departments to sample higher vocational colleges on an annual basis according to their needs, and to form an expert group to carry out the review work according to the two main links of “Online Peer Review+ On-site Visits”;

The fifth step, the review expert group gave the review opinion on the reviewed institutions based on the results of the three parts of the school's independent diagnosis and improvement , online peer review and On-site Visit.

The sixth step was that the higher vocational colleges could integrate the goals and measures of diagnosis and improvement into their regular work by continuously improving their internal quality assurance system according to the review opinions of diagnosis and improvement, so as to achieve the continuous improvement of quality.

Generally speaking, the cycle of independent diagnosis and improvement was determined by the schools themselves according to the actual situation, but every three years there could be a Sample Review organized by the education administration. The purpose of the review was to grasp the situation of diagnosis and improvement and understand the problems encountered. The number of institutions participating in each review could be more than one quarter of the total number of local tertiary institutions. The result of the review was “effective”, which means that the institution had carried out the diagnosis and improvement activities with remarkable effect; “to be improved” was the second most effective, but there were obvious areas that need to be improved for the diagnosis and improvement of higher vocational education, the focus could be on the construction of internal quality assurance system, and the school could not pay too much attention to the diagnosis and improvement review, nor could it only focused on the Diagnosis and Improvement Review. In the process of diagnosis and improvement, the main push of endogenous power was much greater than the external dependence. The main body of diagnosis and improvement was the generator of quality, from the framework of the internal quality assurance system of higher vocational, five horizontal levels, namely, school, major, curriculum, teacher, and student are the main body of diagnosis and improvement; diagnosis and improvement could always put the

quality in the central position, and the results of diagnosis and improvement could meet the needs of the society and economy, and the diagnosis and improvement could be people-oriented and student-centred; the diagnosis and improvement would be completed with the established goal, but this was not the end, after completing the established goal, we could continue to exceed the goal, and stimulated the continuous improvement.

In summary, the diagnosis and improvement of the internal quality assurance system of higher vocational colleges, often referred to simply as “Diagnosis and Improvement”, was now officially recommended in China. This concept is used to refer to both the “55821” Model of the internal quality assurance system, which is characteristic of the nature and features of higher vocational education in China. The “Self-assessment + Peer Review” approach refers to a systematic guarantee method that is based on the Self-assessment conducted by internal institutions (known as Self-diagnosis and Improvement), supplemented by regular Sample Review of higher vocational institutions by external education administrations, and the integration of the two. Therefore, “Diagnosis and Improvement” is a kind of “internal diagnosis and improvement” and “external accountability” integration, Internal Self-diagnosis and Improvement as the main, external accountability and assessment as a supplement to the internal quality assurance system model of innovation. Paradigm, referred to as the “55821” Diagnosis and Improvement Model.

At the same time, the evaluation approach of the ‘55821’ Diagnosis and improvement Model was similar to that of the Four-stage Model mentioned in Dr Tian Enshun's dissertation in 2005, which is followed in the practice of quality assurance in higher education in western developed countries, with the four stages being‘Establishment of expert panels - Self-assessment - Peer review by on-site visit - Publication of evaluation reports’. The difference is that with the development of information technology, the testing and evaluation methods of the “55821”Diagnostic Improvement Model had inserted an “Online Peer Review” link between “Self-assessment” and “ Peer review by on-site visit ”, so that the professional peers outside the institutions could be enable to have a more in-depth understanding of the internal quality assurance system of the institutions under review before the On-site Visit, so as to achieve the effect of increasing the credibility and accountability of autonomous

diagnostics within the schools of the internal quality assurance system within the schools. Therefore, this study tentatively defined this approach as a Five-stage Approach to Diagnosis and Improvement Model, which consisted of the following: “Establishment of expert panel - Self-assessment - Online peer review - Peer review by on-site visit - Publication of evaluation reports”.

Developing a model of internal quality assurance system in higher vocational education

1. Definition of model

Hutson & Postlethwaite (1990) A model referred to the systematicity form and methodology of a process of inquiry into a field. After identifying, variables that influence a particular outcome, or formulating definitions, explanations, and predicted hypotheses related to a particular problem, when the intrinsic connected between variables or hypotheses were systematically articulated, it was necessary to merge the intrinsic connections between variables or hypotheses into a hypothesized model.

Feng Kecheng&Silkie (1994:38) Model was a framework that was generalized from observations and presented a complete structure around the factors and interrelationships involved in a given topic.

Cha Youliang (2001) Model was an important method of scientific operation and scientific thinking. It was to reproduce a certain essential characteristic of the prototypical object under certain conditions of abstraction, simplification and assumption for the purpose of solving a specific problem. It was a scientific method that serves as a mediator so as to better understand and transform the prototype and construct a new type of object. From practice, by generalization, induction, synthesis, can put forward a variety of models, models once confirmed, that was, it was possible to form a theory can also be from theory, by analogy, deduction, analysis, put forward a variety of models, so as to promote the development of practice. Models were similar simulations of objective objects, physical models, abstract depictions of the real world mathematical models, was the image of ideas (showing graphic models and semantic models).

Zhang Zhenyu (2006) Model was in fact an intuitive and concise description of the internal mechanism and external connection of a matter or entity, a symbolic and

logical conception of a relatively simple situation, which was a theoretical conception that possesses the same structural properties as the original objective system. While the natural sciences generally referred to the laws of interrelationship of elements as models, the social sciences generally referred to them as models.

Han Bing (2022) A “model” was an exemplar that can be emulated as an exemplar of a variety of factors, and it is a process.

Tian Enshun (2005) Quality assurance model of higher education refers to some typical theoretical models or theoretical schemas formed on the basis of analyzing, abstracting and generalizing the interests of each subject and the realization mechanism of quality demand, which is in essence a high degree of generalization of the concepts, mechanisms and methods of quality assurance in higher education.

In summary, the connotation of model could be summarized in the following three aspects, 1) model was a methodology for solving a certain type of problem; 2) was the method of solving a certain type of problem summarized to a theoretical level; 3) was a standard style that others can follow**(Zhang Liang2010)**. This study argued that the model of higher education quality assurance system was a theoretical model or theoretical schema with some typical characteristics formed on the basis of analyzing, abstracting and generalizing the interests of each subject and the mechanism of realizing quality needs, which was in essence a high level generalization of the concepts, mechanisms and methods of higher education quality assurance.The research of model can be based on practice, generalization, induction, synthesis and construction of models; on the other hand, under the guidance of theory, analogy, deduction, analysis and construction of a variety of models, and then applied in practice to solve different practical problems.

2. Components of an internal quality assurance model in higher vocational education

Brown &Moberg (1980) synthesized the model from the System Approach and the Contingency Approach, indicating that the elements of the model include 1) Environment; 2) Technology; 3) Structure; 4) Mana gement Process; and 5) Decision Making.

Warren, B & Moberg &Dennis, J (1980) stated that the elements of the model include 1) Model Principles; 2) Model Goals; 3) Model Inputs; 4) Model Process; 5) Model Outputs; and 6) Success Factors.

Wang Wenjing (2002) Regardless of which teaching model had a certain structure and procedure, it was generally believed that the structure of a teaching model included the following elements:1) guiding ideology or theoretical basis; 2) objectives; 3) operational procedures; 4) conditions for realization; and 5) teaching strategies and assessment.

Uthai Bunprasert (2008) stated that the format should contain the following elements:1) the necessity and significance of the style; 2) principles; 3) the purpose of the model;4) implementation/management mechanisms; 5) handling procedures; 6) implementation methods and tools for assessment; 7) conditions for the success of the model; and 8) recommendations for the implementation of the model

Benjawan Keesukphan et al. (2008) proposed the concept that the elements of the model consisted of 1) principles; 2) goals; 3) objectives; 4) main characteristics of the model; 5) guidelines for the implementation of the model; 6) success factors for the use of the model; and 7) important results that will be produced by using the format

Zhang Liang (2010) stated that a pattern was a rule consisting of three parts this rule described the relationship between a particular environment, problem and solution. A model consisted of three elements: 1) what environmental conditions the model applies to; 2) what problems the model can solve; and 3) what the solution to the problem is.

Teera Runcharoen (2010) proposed six elements of a model: 1) the rationale of the model; 2) the objectives of the model; 3) the systems and mechanisms of the model; 4) the operational methods; 5) guidelines for evaluating the model; and 6) the conditions of the model.

In summary, different scholars had conducted in-depth studies on models from different perspectives and had proposed their own model elements. Despite the differences in specific terminology and expressions, these models basically included seven key components: 1) Principles: the basic guidance or norms used in developing the model. 2) Objectives: the specific goals that the development model hopes to achieve. 3) Approaches: the approaches or methods used in developing the model. 4)

Procedures: the specific implementation steps and management processes used in developing the model. 5) Evaluation: the specific implementation steps and management processes used in developing the model. The results of the comprehensive analysis of these elements could provide theoretical support and practical guidance for the development of an internal quality assurance system model in Guangxi higher vocational colleges.

3. Develping a model of internal quality assurance system in higher vocational education

Bunchom Srisa-at (2004) stated that research using models can be divided into two steps: **the first step is to create or develop the model. The second step is to accurately test the model reliability and validity**. The validity of the model consists of two parts: developing the model and verifying the model reliability and validity:

(1) Creating the model or developing the model, the researcher would determine the accuracy of the model or other topics and the results of related studies or research by creating or developing (already developers in the same topic), which would help to determine the various elements or variables in the model, including the relationship between these elements or variables or the order of the elements. In the modelling process, the development of the model must be based on the principle of rationality as an important foundation, which will be greatly benefited by a significant amount of research work. Researchers may assume that models are developed first and then improved based on information. Through the study of theories, concepts, models or related research findings. Or through the study of individual sub-elements or variables. Important sub-elements or variables that make up the structure of the model can be selected.

(2) Accurate testing of model reliability and validity. After the first stage of developing a model, it is necessary to test the model's credibility. This was because, although the developed model was developed on the basis of others' modelling conceptual theories and previous research results, it was only a hypothesis-based model that requires further validation.

Saman Asavaphum (2006) proposed the following ideas and guiding principles for developing models: **1. Model Research.** Analyzing and researching the principles and data of the model. **2. Demonstration Designing and Demonstrating**

the New Model to obtain a better model than the existing one. There was no need to trial the model at this stage, only to arrange demonstration opportunities for consideration by interested parties, e.g. in the form of questionnaires or seminars, interviews with experts, and for experts and practitioners to consider and evaluate the use of the model in order to assess its feasibility and to make comments or recommendations. **3. Model Development.** Three rounds of research were required by the researcher: **modelling research, designing a new model, and trialing the new model in a real-world situation**. The number of rounds used depended on the research project. In summary, models used for maximum benefit must include important features with structural relationships. Predictions could be made about outcomes, predictions could be extended more widely and could lead to new ideas for developing models, and researchers must study these concepts. Creating models theoretically analyses and synthesizes stored data, identified relationships between model elements, clearly defined the structure and propositions of the model, drawn conclusions to explain the expected phenomena of the study, tested and improved the model before it was implemented, and evaluated the model after it had been implemented.

In summary, development of internal quality assurance model in higher education institutions would provide guidelines to the achievement of optimizational goals. Model development was a approach of designing and proposing the research and development of new models based on relevant theories, principles and methods to obtain better models than the existing ones, and researching them based on literature analysis, actual performance and other aspects, and then presenting them as a system. This study formulated and developed a model of internal quality assurance system in Guangxi higher vocational colleges and adopted the following development methodology: **1) study of the constituent components; 2) study of the current state, desired state, and priority needs; 3) create a model; and 4) evaluation of the suitability and feasibility of the model**.

Relevant research

1. Relevant research of internal quality assurance in higher vocational education in China

It was found that research related to quality assurance in higher vocational education in China mainly focuses on higher vocational education, higher vocational institutions, education quality assessment, teaching effectiveness, self-assessment, teaching quality, Sino-foreign cooperation, internationalization of education, and talent cultivation. However, the number of Chinese domestic treatises on internal quality assurance in higher vocational colleges was relatively small, with the earliest being Research and Practice of Teaching Quality Monitoring and Evaluation in Higher Vocational Education, edited by a number of scholars, including Li Minghui, in 2007, and a monograph on Quality Assurance and Evaluation in Mass Higher Education, published by scholar Zhang Weijiang in 2011. In summary, the current construction of internal quality assurance system on higher vocational colleges was dominated by journal literature, and the number of master's and doctoral theses and high-quality academic monographs is relatively small. At the same time, the identity of the researchers is mostly dominated by managers and front-line teachers of higher vocational schools (Liu Fengcun, 2019).

At present, China has carried out in-depth research on the construction of internal quality assurance system in higher vocational colleges, specifically focusing on the following aspects:

1.1 Theoretical research related to internal quality assurance system in higher vocational institutions

First, research on the quality concept of higher vocational education. Some scholars suggested that the concept of quality of education mainly included two aspects: the concept of teaching quality and the concept of talent quality, which was the understanding of education quality by the main body of students, the main body of educators, teachers and school management workers, and mainly referred to the application of certain quality standards and indexes to evaluate the quality of teaching and students(Zhou Yan'an, 2008) . It is suggested that the quality concept of higher vocational education has gone through three stages of change: "knowledge quality concept", "ability quality concept" and "overall quality concept" (Yan

Dongqiang,2010). Some researchers believe that in order to adapt to social needs and school development, higher vocational education should advocate and set up various quality concepts, such as specialised quality concepts, adaptive quality concepts and diversified development quality concepts, etc., to highlight the school's specialised quality objective system and quality standard system(Zhang Li,2009).

Second, research on the connotation of internal quality assurance system. Research on internal quality assurance system of higher vocational colleges from the perspective of theoretical significance. Yang Yingsong (2012) believed that the quality of education was the key to measure the level of human resources in a country. The establishment of internal quality assurance system in higher vocational colleges could stimulate the school's endogenous motivation to improve the concept of quality, promote the healthy development of higher vocational education, and expand the national exchange and cooperation and other important significance. Guo Guangjun &Jin Jianxiong(2020) believed that the establishment of internal quality assurance system was an inevitable requirement for the state to establish a sound education quality assurance system, and the establishment of internal quality assurance system could deepen the improvement of higher vocational education and help higher vocational make up for the short board of quality. Hu Na (2018) believed that the construction of a quality assurance system was influenced by the trend of lifelong education, and higher vocational colleges had made adjustments in self-management to adapt to the development of social and economic transformation, industrial structure upgrading, and to face up to the quality short board. Vocational education cultivates high-tech and skilled talents for the society, and the social and industrial transformation required higher vocational to keep a keen sense of smell when cultivating talents. Lin Yueru & Shi Weiping (2018) mentioned that the “diagnosis and improvement” of teaching in higher vocational colleges was an inevitable requirement for improving the quality of higher vocational education. In the context of socio-economic transformation of higher vocational education, the shift from level assessment to diagnosis and improvement was destined to happen. After the implementation of the “separation of management, operation and assessment”, the guarantee of the quality of higher vocational teaching needed to be composed of independent diagnosis and improvement of institutions, educational administrative departments in line with the social tripartite assessment, and

the three complement each other to promote the improvement of the quality of higher vocational education. Chi Yunxia & Wang Zhenjie & Zhang Shuyan (2019) pointed out that the purpose of the establishment of the internal quality assurance system is to improve the quality of talent training, reflecting the fundamental requirement of "student-centred". Zhang Ting & Que Mingkun(2019) suggested that higher vocational education should adhere to the quality development was the requirement of the social environment, the quality needs of innovation and development, the dual mission of higher vocational colleges to establish morality and cultivate people, and the cross-border dynamic search for talent cultivation.

Third, research on the content framework of internal quality assurance system in higher vocational colleges and universities. It was proposed to establish a "five-in-one" internal quality assurance system, i.e., objects system, subjects system, environment system, means system and objectives system(Liu Fengcun,2016). Some scholars proposed the route of "system design→system operation→system effectiveness" to explore in depth the development and application of internal quality assurance in higher vocational colleges, the framework structure of the construction of internal quality assurance system and the effectiveness of its operation and other aspects. Zhao Jinghui (2016) believed that when constructing an internal quality assurance system, the system built by unilaterally considering a certain factor was not comprehensive, so to establish a perfect internal quality assurance system needed to start from the standard, and the system was required to be able to have self-diagnosis and correction in the complete closed loop with early warning and feedback functions. The improvement of the quality assurance system of vocational education from the school alone was not feasible, in the establishment of the internal quality assurance system, the government would do a good job in guiding, social enterprises to participate in supervision. Hu Na (2018) believed that along with the promotion of diagnosis and improvement, the framework of "Five Vertical, Five Horizontal and One Platform" proposed by experts of the Diagnostic and Improvement Commission had played a good role as a reference for the national higher vocational diagnosis and improvement. The Five Vertical mainly divide the role of the administration in the internal quality assurance system, forming five diagnostic elements of Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance

System , Supervision and Control System; the other Five Horizontal focused on dividing the talent cultivation work of faculties and departments, forming the five diagnostic elements of School level, Major level, Curriculum level, Teacher level, Student level; and One Platform refers to the internal quality assurance system's support platform, i.e., the information platform. Chi Yunxia & Wang Zhenjie & Zhang Shuyan (2019) also mentioned the system framework of “Five Vertical, Five Horizontal and One Platform” in “Research on the Construction of Internal Quality Assurance System of Higher Vocational Colleges and Universities in the Context of Diagnostic and Reform”, Chi Yunxia added “One Core”, which was referred to as “1515”. The “1515” framework. “One Core” referred to the quality of cultivating high-quality technical and skilled talents as the core, five subjects are five horizontal observation levels, five systems are five vertical levels, and the platform refers to the information technology platform, which was also known as the information management system. In this study, the construction of internal quality assurance system of higher vocational colleges referred to the process of quality management and independent assurance of higher vocational colleges in all aspects of the talent cultivation process, i.e., the “55821” Diagnostic and Improvement Model officially put forward by the Ministry of Education of China at present.

1.2 Research on the construction of internal quality assurance system in higher vocational colleges

The construction of internal quality assurance system in higher vocational colleges in the process of development had gradually been attached importance to people, the awareness of quality assurance was increasing, and the results it had achieved were obvious to all. However, a variety of problems inevitably arise in the process of rapid development. This researcher had made a collation of the following:

First, the misplaced and single subject of quality assurance. Traditionally, the main body of quality evaluation was mostly the school leaders and the relevant staff of the profession responsible for quality assurance, and they were responsible for the professional construction, curriculum management, teaching evaluation, and the self-assessment of the students, thus neglecting the quality assurance of the stakeholders, such as the teachers and the student groups. And some researchers suggested that the evaluation of the quality of talent training would be the

most relevant and close to the main body, and the main quality assurance body was the group with the greatest interest(Yang Yingsong,2008).

Second, the awareness of internal quality assurance in higher vocational colleges was weak. China's internal quality assurance system had been relying on the traditional government-led “top-down” external quality assurance, quality assurance process was the government issued guiding policies and documents, the regions and higher vocational colleges in accordance with the implementation of fixed standards and indicators, often accompanied by mandatory meaning. Therefore, under the traditional system of quality management, higher vocational colleges had a poor sense of autonomy, and the schools did not link the survival and development of the schools with quality assurance, and all stakeholders, including the relevant staff, did not take the diagnosis and improvement as their own responsibility.

Third, the evaluation findings are homogenised. Some commentators have pointed out that the dilemmas in the construction of internal quality assurance in higher vocational colleges were different from the problems that occur in the assessment of undergraduate colleges. For example, there were four major assessment complexes: subject complex, appraisal complex, undergraduate complex, and quantitative complex (Yang Yingsong,2009).

Fourth, the lack of effective feedback mechanism. First of all, some scholars had suggested that it was difficult to achieve timely communication and effective and rapid resolution of problems in all aspects of internal quality assurance, even if problems were found and good feedback was given, but there was a lack of follow-up to improve the problems and tracking checks. Therefore, even if the feedback mechanism was established, it was difficult to effectively play its role and function(Zheng Jin,2013). Secondly, feedback had a strong utilitarian character, for example, a study showed that whether they could successfully graduate and found a good job take the first place in students' needs, much higher than school management information, class discipline and learning atmosphere, which were only 25.6%, 20.3% and 10.1% at the same time. Examination results and employment information were the main focus of students' feedback, accounting for 70.1% and 50.9%, respectively (Liu Fengcun,2016).

Fifth, research on the problems and countermeasures of the "Diagnostic and Improvement" Model of the internal quality assurance system of higher vocational colleges in China. Xu Guoqing (2017) argued that the "Diagnostic and Improvement " Model was different from the previous model of "assessment" from the outside, and that the thinking of the Diagnostic and Improvement Model was not to establish a large number of indicators for testing, but to establish a diagnostic thinking path for different problems. Instead of establishing a large number of indicators for testing, the thinking of the Diagnostic and Improvement Model was to establish a diagnostic thinking path for different problems. Lin Yueru & Shi Weiping (2018) pointed out that in the process of promoting the Diagnostic and Improvement Model for higher vocational education, there were two major difficulties: how to shift from traditional assessment thinking to internal problem solving in terms of concepts; how to guarantee the authenticity, scientificity and feasibility of "diagnostic and improvement" in terms of tools; schools would play a leading role and form a Diagnostic and Improvement Model. In the process of "diagnosis and improvement", there were two major difficulties: how to shift from traditional assessment to internal problem solving; how to guarantee the authenticity, scientificity and feasibility of "diagnosis and improvement" in terms of tools; how to play the main role of the school to form a regular"diagnosis and improvement"system; how to avoid the tendency of campaigning and utilitarianism by the government; and how to provide theoretical support to"diagnosis and improvement"by strengthening the relevant research in the academic circle. Zhuang Guozhen (2020) also believes that there are debates in the theoretical and practical fields about whether diagnosis and improvement is an assessment, whether diagnosis and improvement should be carried out on a school-by-school basis, and whether diagnosis and improvement should start from the standard or the result; in order to solve these problems, it was necessary to set up the concept of "big diagnosis" in terms of ideological understanding, and answer the question"what is diagnosed" and "how is it diagnosed" in terms of top-level design,and to build a diagnosis and improvement model coordinated with hierarchical diagnosis and list-type improvement in terms of specific operation. Zhao Mengcheng & Xu Chengping (2020) reflected on the current "lively" practice of Diagnosis and Improvement Model based on the perspective of the subject's participation and sense of access, and believed that

the most important subjects in the current practice field - teachers and students - were‘absent’. Teachers and students were seriously absent, which was due to the long-term dependence on the path of the external assessment model, misinterpretation of the concept of governance of vocational education in research and design, and the transitional cult of scientism.

1.3 Research on countermeasures for the construction of internal quality assurance system in higher vocational colleges

The relevant research mainly proposed optimization strategies for the construction of domestic internal quality assurance system from three levels: macro, meso and micro.

First, change the function of the government and do a good job of regulating and leading. Some commentators believe that the government should give full play to the role of macro-control and change from the traditional government-led single quality assurance subject to a pluralistic quality assurance subject such as higher vocational colleges, third-party employers, and the government(Peng Huifen,2014) . Some researchers pointed out that under the concept of “separation of management, operation and evaluation”, the government had to simplify and decentralise the government, so that higher vocational colleges can became the main body of quality assurance, and the government only needed to do a good job in leading and supervising(Fan Guorui,2017).

Second, the multi-party participation in the construction of quality assurance system ensured the ‘comprehensiveness’ of quality assurance. It had been pointed out that it is necessary to establish a modern intelligent information platform to effectively collect, collate and analyse information from all aspects, so as to scientifically and effectively promoted the construction of internal quality assurance system in higher vocational colleges. And some higher vocational colleges had developed Campus Resource Planning (CRP) to effectively process quality assurance data and information6.

Third, establish a scientific and diversified quality concept. Most scholars believed that it was necessary to enrich the traditional single view of quality and establish a diverse, scientific, effective and characteristic view of quality. Some of them believed that higher vocational colleges should determine scientific quality standards

and objectives, develop quality assurance systems and mechanisms, and establish modern quality consciousness and culture, etc. (Liu Fengcun,2019). On the whole, “quality assurance” and “connotation construction” were important keywords for the development of higher vocational education, and along with the current diagnosis and improvement of higher vocational colleges, the issue of the construction of the internal quality assurance system of higher vocational colleges had gradually been put on the agenda and had became the Hot issue. Domestic scholars in China had conducted in-depth understanding and investigation on the concept and characteristics of internal quality assurance, the results achieved, the existing problems and the corresponding strategies from different perspectives.

2. Relevant research of internal quality assurance in higher vocational education in other countries

Quality assurance of higher vocational education in foreign developed countries after a long period of development, the theory and practice of vocational education quality assurance research to achieve greater results. The current establishment of a series of quality assurance model and had been a relatively complete and mature vocational education system. Foreign research on quality assurance in vocational education could be generally categorized into theory and practice.

2.1 Theoretical research on internal quality assurance in vocational education

Through the search and optimization of the literature, it could be concluded that researchers in foreign developed countries mainly conducted theoretical research on the quality assurance system of vocational education from various aspects, such as quality standards, audit system, quality assurance and internal control mechanism. For example, in 2003, Gibb, an Australian scholar, elaborated on the quality assurance mechanism of vocational education in his country, in which he particularly pointed out that teaching practice is largely influenced by the quality assurance mechanism (Liu Fengcun, 2019). Compared with the research on the construction status of quality assurance system from a transnational perspective using the method of charts and graphs, Billing in 2004 used a comprehensive approach to describe and study the current status of the construction of the quality assurance system. Billing had comprehensively used multiple methods to describe the progress of quality assurance

in vocational education, and together with scholar Lim, he had studied the strategies and methods for the construction of vocational education quality assurance system(Hamish Coastes,2009). Romanian researchers John Hart & Adela Rogo jinaru (2007) conducted an in-depth study in 2007 on the development of national qualifications frameworks, qualification levels and quality assurance frameworks in vocational education as part of the reform of vocational education quality assurance. Hamish Goates(2009) conducted an in-depth study on the development of quality assurance systems in Australia. Scholar Hamish Goates gave a detailed introduction to the development history trends of Australian vocational education quality indicator standards, quality measures and tools for indicator measurement, and emphasized on aspects such as data collection and application as well as quality indicator definitions, which gave us a clear understanding of quality indicators and other aspects of quality assurance in Australian vocational education quality assurance. Jean-Raymond Massion & Mounir Baati &Erwin Seyfried (2010) describes the meaning of "quality" in vocational education in Europe.

2.2 Research on the practice of internal quality assurance system in vocational education

From the perspective of practice, the research in foreign developed countries mainly focused on the development of vocational education quality assurance system, the quality evaluation model of vocational education quality assurance and the optimizational framework of vocational education quality assurance. For example, two Australian scholars, Frank Wogbe Agbola & Daniel Kenneth Lambert (2010), had discussed the Australian training framework (AQTF) and the challenges it faced, and described in detail the history of the development of vocational education, the characteristics of each stage, and made it clear that the quality assurance is established under the market system. Researchers Barbara Polityńska & Rene J.T.van Rijsselt &Lilliana (2012) introduced the dilemma of quality assurance in vocational education and the trend of its development. On the whole, quality assurance of vocational education in foreign developed countries started early, developed quickly, was extensive and more systematicity and comprehensive compared with China, such as research on the concept of quality assurance of vocational education, exploration of assurance frameworks and models, and research on quality indicators and standards,

etc. The most progress was that many foreign countries had made a lot of progress in quality assurance of vocational education. What was most progressive was that many foreign countries guarantee the quality assurance of vocational education legally and had formulated a series of vocational education quality assurance policies and legal regulations. Of course, the quality assurance of vocational education in developed countries also faces many problems, but in general it was still very inspiring for the construction of the quality assurance system of vocational education in China, which started late, and it was worthwhile for Chinese scholars to learn from it and improve it.

CHAPTER III
RESEARCH METHODOLOGY

This chapter gave an outline of the research design and procedures for "Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi,China". This research procedure was divided into three phases. Each phase was presented in details consisting of steps of procedures and expect outcomes as shown in figure.

According to the three types of research questions, the researchers investigated the research answers in three stages. They were:

Phase 1: Study the components of internal quality assurance system in higher vocational colleges in Guangxi,China by using analysis and synthesis of internal quality assurance system in higher vocational colleges from principles, concepts, theories and related research.

Stage 1: Review the literature from documents, textbooks, books, articles and summarize the components of internal quality assurance system in higher vocational colleges in Guangxi.

Stage 2: The suitability evaluation of the components of an internal quality assurance system in higher vocational colleges in Guangxi by five experts.

Phase 2: Explore the current state, desired state, priority needs and $PNI_{modified}$ of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China

Stage 1: A draft of the questionnaire was constructed by the investigators on the basis of the conponents identified in the first stage and sent to five experts to assess its applicability in order to obtain an authentic questionnaire.

Stage 2: The authentic questionnaires and interviews were conducted.

Phase 3: Develop a model of internal quality assurance system in higher vocational colleges in Guangxi,China

Stage 1: By studying, analyzing, and synthesizing relevant works, literature, and policy documents, This study concluded that the preliminary components of the internal quality assurance system model in higher vocational colleges in Guangxi. In-

depth interviews with expers from the components,concepts, principles, approaches, procedures, evaluation, and other relevant elements of the model for developing a model.

Stage 2: Draft a model of internal quality assurance system in higher vocational colleges in Guangxi,China.

Stage 3: Evaluate the model of internal quality assurance system in higher vocational colleges in Guangxi,China.

Each phase was presented in details consisting of steps of procedures and expected outcomes as shown in figure 4.

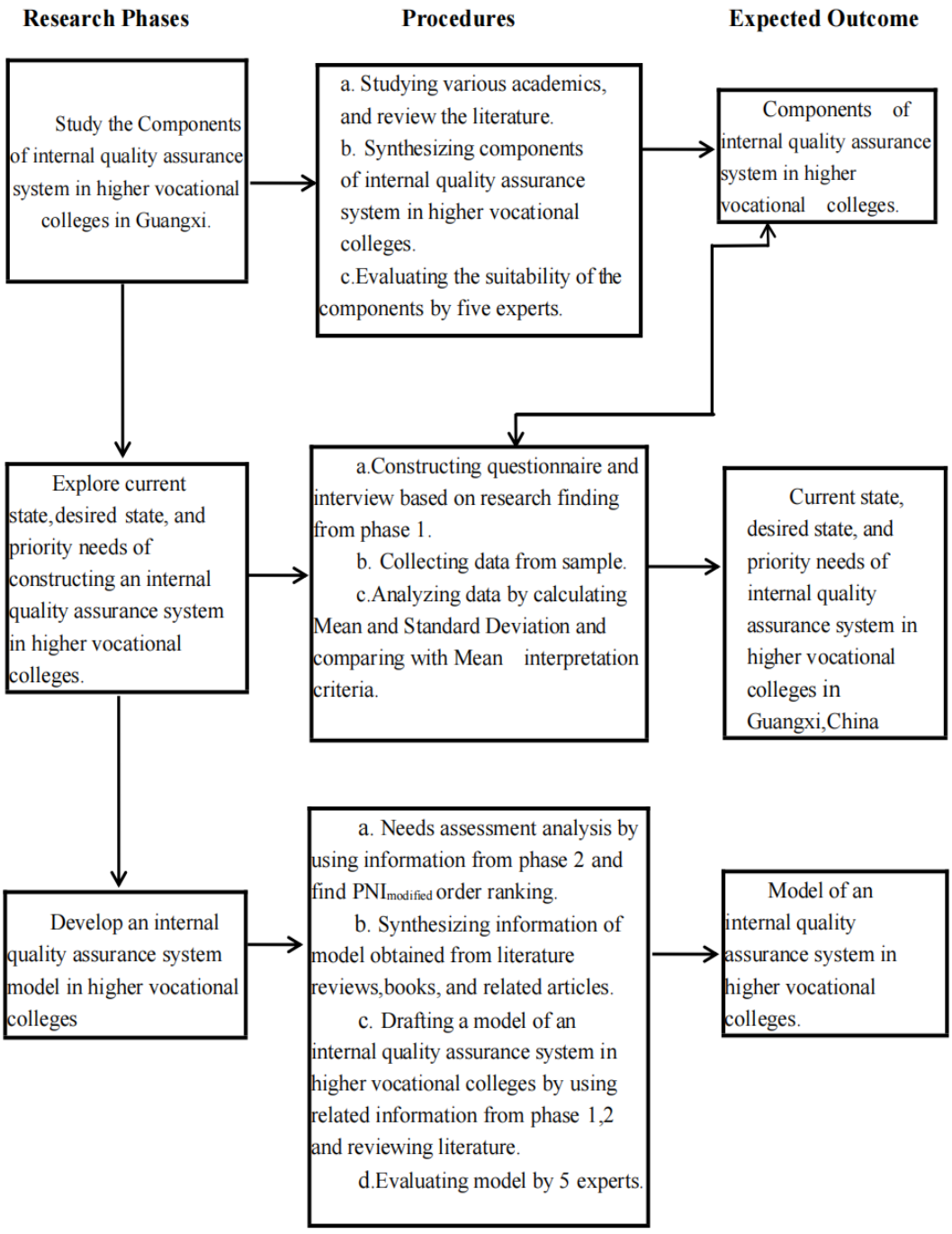


Figure 4 The carrying out research process of developing a model of an internal quality assurance system in higher vocational colleges in Guangxi, China

The details of each phase are as follows:

Phase 1: Study the components of internal quality assurance system in higher vocational colleges in Guangxi,China by using analysis and synthesis of internal quality assurance system in higher vocational colleges from principles, concepts, theories and related research.

1. Procedure

Studying the applicability of the components of internal quality assurance system in higher vocational colleges in Guangxi,China serves as an important basis for the design of the questionnaire. **First**, the researcher organized and integrated the literature, analyzed and synthesized the internal quality assurance system from the principles, concepts, theories and related studies to find out the factors affecting the construction of internal quality assurance system in higher vocational colleges in Guangxi,China.**Then** the evaluation form containing these components was sent to five experts to evaluate and test the validity of the components.

2. Five experts

In order to evaluate and test the suitability of the components of internal quality assurance system in higher vocational colleges in Guangxi, this study selects presidents or provincial quality evaluation experts with master's degree or above, familiar with professional knowledge and work experience in education evaluation, education management, quality management, teaching and learning, and other professional knowledge and work experience of higher vocational colleges etc. as candidates to evaluate the components of the system. The names and qualifications of the experts were listed below:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(3) Liu Cunxiang, Professor of Guangxi Vocational College of Water Resource and Electric Power,Vice-President;

(4) Hu Yingqing, Professor of Guangxi College of Sports and Education, President;

(5) Wang Zihao, Associate Professor, Director of the Office Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges, Guangxi Zhuang Autonomous Region.

3. Research instrument

3.1 Types of research instruments

The evaluation form containing the components of internal quality assurance system in higher vocational colleges in Guangxi was sent to five experts to verify the content validity.

3.2 Instrument structure

The specific construction of the research instrument was as follows: based on the literature review and previous empirical studies on internal quality assurance system in higher vocational colleges, the preliminary components of internal quality assurance system in higher vocational colleges in Guangxi were integrated. The researcher then wrote the components into an evaluation form and sent it to five experts.

4. Data collection

In order to collect the data for the study, the researcher needed a request letter from the Faculty of Education, Mahasarakham University, requesting the expert's permission to access the assessment form. This letter could be used to introduce the experts and the evidence of the institution before the experts in order to make the data collection process smooth, accurate and effective. Then, the letter and content of the components of internal quality assurance system in higher vocational colleges in Guangxi could be discussed by email to 5 experts in order to validate and check the validity of the content, and then relevant adjustments could be made to construct the questionnaire form. The researchers obtained all the questionnaires within 2 weeks.

5. Data manipulation and analysis

5.1 The investigators' progress

The integrity of the data was verified against the variables studied.

5.2 Data analysis of the questionnaire

The researcher used content analysis techniques to summarize, analysis and synthesis and used the analyzed data to classify items into data analysis tables. To generate the results of this paper, the researchers used the SPSS statistical package

program to find the Mean Score and Standard Deviation for each policy implementation component.

Finally, the results of the outcomes of internal quality assurance system in higher vocational colleges in Guangxi.

Phase 2: Explore the current state, desired state , priority needs and $PNI_{modified}$ of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China

1. Procedure

In this phase, the researcher constructed the first draft of the questionnaire based on the components identified in the first phase. The evaluation form included the components of the questionnaire, which was sent to five experts for verifying the validity of the questionnaire. The experts evaluated the applicability of the questionnaire, which was an important basis before conducting the survey.

After that, the researcher received a questionnaire for a period of 2 weeks. It was then analyzed to obtain an authentic questionnaire.

2. Population and sample

To obtain a sample for this study, the researcher used a Stratified Random Sampling technique to obtain samples of certified presidents, middle-level leaders, administrators, and full-time front-line teachers from higher vocational colleges in Guangxi. The population size is 306, including 4 presidents, 39 middle-level leaders, 70 administrators, and 193 full-time front-line teachers. The sample was obtained using the formula of Yamane (1973).

Formula

$$n = \frac{N}{1 + Ne^2}$$

The meanings are

n = sample size

N = population

e = confidence level (95%)

Then the result of sample size was shown in the table 6.

Table 6 Population and sample

No.	Kinds of Population	Total Population	Total Sample
1	presidents	15	4
2	middle-level leaders	183	39
3	administrators	332	70
4	full-time front-line teachers	906	193
Total		1436	306

3. Research instrument

2.3.1 Type of research instrument

Part I (Questionnaire): Basic information. This part investigated gender, age, education, the type of college, position, years of participation in the workforce, education, professional title, years of contacting with the Diagnosis and Improvement Model.

Part II (Questionnaire): Using the five-scale questionnaire and the priority question form as research tools, the current state and desired state of internal quality assurance system in higher vocational colleges in Guangxi, China were investigated.

"5" means current state and desired state at the highest level

"4" means current state and desired state at the high level

"3" means current state and desired state at the medium level

"2" means current state and desired state at the low level

"1" means current state and desired state at the lowest level

2.3.2 Instrument construction

Based on the components of internal quality assurance system in higher vocational colleges in Guangxi, the questionnaire was designed. The first draft of the questionnaire was submitted to the consultant for correction, which accurate questionnaire were sent to 5 experts:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(3) Yang Changpeng, Professor of Guangxi College of Sports and Education, Secretary;

(4) She Yabin, Doctor, Professor of Guangxi College for Preschool Education, Director of Academic Affairs and Research Management;

(5) Mai Qihao, Professor of Beihai Vocational College,Guangxi, Vice-president.

To validate and examine validity, content validity was established through the Project Objective Concordance Index (IOC) to improve the relevance of the questionnaire items to the terms defined in Chapter I. The accuracy of the questionnaire content validity was valided when the IOC standard value was greater than or equal to 0.7. Then the questionnaire was revised according to the experts advice and recommendations and returned to the consultant for adjustment before trial. The IOC was made as the following considerations:

+1 refers to experts are agree that the question responds to the component content

0 refers to experts are not sure that the question responds to the component content

-1 refers to experts are disagree that the question does not respond to the component content

The researcher pre-tested the questionnaire to find discriminant and relicompetence values.

Index of Conformity (IOC)=0.80-1.00. Item classification competence was found by finding the simple correlation coefficient between the item score and the total score from Pearson's Simple Correlation Coefficient 0.690 or more. The researcher took the question with a discrimination value and uses Cronbach's alpha coefficient method to find the confidence value of the entire version, with the Standard being 0.921 and above, by observing the item-to-item total correlation.

Conduct a authentic questionnaire. Then datas were collected from the sample group.

4. Data collection

2.4.1 Invitation letter and approval letter

In order to make the data collection process more effective, smooth and beneficial, application for invitation letters from the Faculty of Education, Mahasarakham University, which was send to Guangxi College for Preschool Education, requesting cooperation in answering the questionnaire, and requesting assistance in collecting data from the designated sample group. The researchers obtained approval from Guangxi College for Preschool Education. Then the approval letter was accompanied by a research instrument, including a formal evaluation form, questionnaire, which was sent to the interviewees and experts involved in the data collection process.

2.4.2 Questionnaire distribution and data collection

The researcher prepared the questionnaire with the help of the Questionnaire Star web site and generated an electronic link to the questionnaire, which was then sent to the quality management offices of the three selected higher vocational institutions, requesting for help in mobilizing a wide range of presidents, middle-level leaders, administrators, and full-time front-line teachers in their institutions to complete the questionnaire.T he questionnaires were collected within4 .weeks researcher conducted a questionnaire survey on 306 people. Then 100% is extracted from the sample. The researchers verified the effectiveness of the method through score average interpretation and entered the data into a computer program to obtain data output for analysis with the SPSS statistical package program.

5. Data manipulation and analysis

Data for this study were analyzed using software programs of SPSS statistical package. This study was divided into two parts to analyze the current state and desired state of internal quality assurance system in higher vocational colleges in Guangxi.

Part I (Questionnaire): The background investigation used descriptive statistics to analyze the demographic data of the respondents, including frequency (f), percentage (%) (including gender, age, education, years of participation in the workforce, education, professional title, years of contacting with the Diagnosis and Improvement Model).

Part II (Questionnaire): The current state and desired state of internal quality assurance system in higher vocational colleges in Guangxi were analyzed using the Mean and Standard Deviation (SD). In order to explain the average scores of

respondents on the current state and desired state of internal quality assurance system in higher vocational colleges in Guangxi, the researcher based the explanation on the average scores proposed by Boonchom Sri-saard (2010). The average scores are explained as follows:

4.51 - 5.00 means current /desired state very high level
3.51 - 4.50 means current /desired state high level
2.51 - 3.50 means current /desired state moderate
1.51 - 2.50 means current /desired state low level
1.00 - 1.50 means current /desired state very low level

Phase 3: Develop a model of an internal quality assurance system in higher vocational colleges in Guangxi, China

1. Semi-structured interviews for model development

After concluding the preliminary components of the internal quality assurance system model in higher vocational colleges in Guangxi, in-depth interviews with expers were mainly conducted in face-to-face interviews and semi-structured forms.

2. Draft a model of internal quality assurance system in higher vocational colleges in Guangxi

According to the results of the depth interview in the second stage, combined with the current state, desired state and priority needs of constructing an internal quality assurance system in Guangxi higher vocational colleges, trying to propose a model for constructing an internal quality assurance system in Guangxi higher vocational colleges on the basis of the framework of the existing interview questions and formulate the first draft of the model.

3. Evaluate the model of an internal quality assurance system in higher vocational colleges in Guangxi

The evaluation form and the draft model were sent to five experts to evaluate the the suitability and feasibility of the model to constructing internal quality assurance system in higher vocational colleges in Guangxi.

4. Experts

This study selected five experienced experts who were leaders or provincial quality evaluation experts with master's degree or above, familiar with professional

knowledge and work experience in education evaluation, education management, quality management/quality evaluation, teaching and learning, and other professional knowledge and work experience of higher vocational colleges etc. as candidates to evaluate the the suitability and feasibility of the model, proposing some suggestions to develop a model of internal quality assurance system in higher vocational colleges in Guangxi. The names and qualifications of five experts are listed below:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2)Yang Changpeng,Guangxi College of Sports and Education, Secretary;

(3) Liu Cunxiang, Professor of Guangxi Vocational College of Water Resource and Electric Power,Vice-President;

(4) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(5) Wang Zihao, Associate Professor, Director of the Office Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges, Guangxi Zhuang Autonomous Region.

5. Research instrument

5.1 Type of Research Instrument

The evaluation form was designed and used to interview 5 experts to collect the raw data. The evaluation form was divided into the following two parts:

Part I: (Open question): focusing on soliciting the opinions of five experts had fully developed a draft model to construct internal quality assurance system in higher vocational colleges in Guangxi.

PartII: (Scale closed questions): This part of questionnaire focused on evaluating the model appliccompetence and possibility of internal quality assurance system in higher vocational colleges in Guangxi.

5.2 Instrument construction

The detailed construction of the study instrument was as follows:

5.2.1 Study, analyze, and synthesize relevant works, literature, and policy documents, This study concluded that the preliminary components of the internal quality assurance system model in higher vocational colleges in Guangxi using content

analysis. After completing the first study, the evaluation form was designed according to the components of internal quality assurance system model in higher vocational colleges in Guangxi.

5.2.2 Draft a evaluation form was suggested to the consultant for editing and correction for accuracy.

5.2.3 Finally, an evaluation form was presented to 5 experts for data collection.

6. Data collection

6.1 Prepare a letter requesting the cooperation of the Faculty of Education with the experts.

6.2 Submit a request outline of cooperation paper and structured interview form to the expert for assistance in the interview

6.3 Coordinate with the experts, and request the interview date and time.

6.4 Interview at the specified date and time.

7. Data manipulation and analysis

During this phase of the research, the collected data was analyzed through software program. The evaluation form was divided into two parts and asks experts to evaluate the model. Qualitative data from experts' specific recommendations for components were analyzed using a content analysis approach to develop a comprehensive model. This study used descriptive statistical methods and quoted expert opinions to develop a model of internal quality assurance system in higher vocational colleges in Guangxi.

The researcher manipulated the Mean Scores of data responses and results by validating the analyzed data and interpreting the data. Use the average interpretation criterion (Boonchom Sri-saard, 2010).

4.51 - 5.00 refers to suit competence and possibility is very high

3.51 - 4.50 refers to suit competence and possibility is high

2.51 - 3.50 refers to suit competence and possibility is medium

1.51 - 2.50 refers to suit competence and possibility is low

1.00 - 1.50 refers to suit competence and possibility is very low

CHAPTER IV
DATA ANALYSIS RESULTS

Research on developing a model of internal quality assurance system in higher vocational colleges in Guangxi,China. The researcher analyzed the data in the following order:

1. Symbols used to data analysis results
2. Steps for data analysis results
3. Results of data analysis

Symbols used to data analysis results

Presentation of data analysis results and interpretation of data analysis results.The researcher defined symbols representing various meanings as follows:

$\overline{X}$	replaces	Mean
SD	replaces	Standard Deviation
$PNI_{modified}$	replaces	Priority Need Index modified
N	replaces	Population
I	replaces	Importance or Desired State
D	replaces	Degree of success or Current State

Steps for data analysis results

Results of the analysis were divided into 3 phases:

Phase1: Study the components of the internal quality assurance system in higher vocational colleges in Guangxi, China.

Phase2: Explore the current state, desired state and $PNI_{modified}$ of construting an internal quality assurance system in higher vocational colleges in Guangxi, China.

Phase3: Develop a model of internal quality assurance system in higher vocational colleges in Guangxi, China.

Results of data analysis

Phase 1: Study the components of the internal quality assurance system in higher vocational colleges in Guangxi, China

These phase was divided into 2 steps:

Step1: The research results found that the internal quality assurance system in higher vocational colleges in Guangxi included 9 components as follows:

(1) Quality Assurance Philosophy (Quality Perspective);(2) Organizational System; (3)Subject System;(4)Objective System(Objectives Chain); (5)Criteria System (Criteria Chain); (6)Operation System; (7)Mechanism Guarantee System; (8)Quality Culture; (9)School-based Information Management Platform.

Step2: Evaluation the components suitability of the internal quality assurance system in higher vocational colleges in Guangxi. The results were shown in Table 7.

Results of the evaluation of the components suitability of the internal quality assurance system of higher vocational colleges in Guangxi by experts.

Table 7 Mean and level of components suitability of an internal quality assurance system in higher vocational colleges in Guangxi

Items	**Components of the internal quality assurance system in higher vocational colleges in Guangxi**	$\bar{x}$	**SD**	**Interpret**
1	Quality Assurance Philosophy (Quality Perspective)	4.80	0.402	Highest Suitable
2	Organization System	4.40	0.491	High Suitable
3	Subject System	4.50	0.482	High Suitable
4	Objective System(Objective Chain)	4.82	0.401	Highest Suitable
5	Criteria System(Criteria Chain)	4.81	0.400	Highest Suitable
6	Operation System	4.80	0.400	Highest Suitable
7	Mechanism Guarantee System	4.65	0.432	Highest Suitable
8	Quality Culture	4.63	0.431	Highest Suitable

9	School-based Information Management Platform	4.70	0.424	Highest Suitable
Total		**4.68**	**0.435**	**Highest Suitable**

From the table 7, it was found that the components suitability of an internal quality assurance system of higher vocational colleges in Guangxi were level overall at very high ($\bar{x}$=4.68). Considering each aspects, it was found that the suitability levels were ranked from highest to lowest as follows: 1) Objective System(Objective Chain) very high ($\bar{x}$=4.82), 2) Criteria System(Criteria Chain) very high ($\bar{x}$=4.81), 3) Quality Assurance Philosophy (Quality Perspective) very high ($\bar{x}$=4.80), 4) Operation System very high ($\bar{x}$=4.80), 5) School-based Information Management Platform very high ($\bar{x}$=4.70), 6) Mechanism Guarantee System very high ($\bar{x}$=4.65), 7) Quality Culture very high ($\bar{x}$=4.63), 8) Subject System high ($\bar{x}$=4.50), 9) Organization System high ($\bar{x}$=4.40).

Phase 2: Explore the current state, desired state , priority needs and $PNI_{modified}$ of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China

Part I: The results for respondent demographics were shown in Table 8:

Table 8 The results of showing the frequency and percentages of respondent demographics

project	(n = 306)	
	frequency	percentage
Interviewee		
Presidents	4	1.3
Middle-level leaders	39	12.74
Administrators	70	22.88
Full-time front-line teachers	193	63.08

project	(n = 306)	
	frequency	percentage
Years of participation in the workforce		
Within 2 years	11	3.59
3-5 years	27	8.82
6-10 years	89	29.09
11-15 years	124	40.53
15 years (not included) or more	55	17.97
Highest level of education		
Undergraduate	56	18.30
Master's Degree	215	70.26
Doctor's Degree	35	11.44
Professional title		
Teaching assistant	23	7.52
Lecturer	89	29.08
Associate professor	128	41.83
Professor	66	21.57
Years of contacting with/ learn about the internal quality assurance system		
No contact, no knowledge	17	5.56
Up to 1 year	34	11.11
2-3 years	43	14.05
4-5 years	89	29.08
More than 5 years	123	40.19

Table 8 shows the demographic information of the respondents. Among them, there were presidents 4 people(1.3%), middle-level leaders 39 people(12.74%), administrators 70 people(22.88%), full-time front-line teachers 193 people(63.08%); about the item "Years of contacting with/ learn about the internal quality assurance system", there were "No contact, no knowledge"17 people(5.56%), "Up to 1 year" 34 people(11.11%), "2-3 years" 43 people (14.05%), "4-5 years" 89 people (29.08%), "More than 5 years" 123 people (40.19%).

Part II: The results of current, desired state and PNI $_{modified}$ of the internal quality assurance system of higher vocational colleges in Guangxi were shown in Table 9:

Table 9 The current state, desire state and PNI $_{modified}$ of the internal quality assurance system in higher vocational colleges in Guangxi

Items	Components	Current state(n=306)			Desire state(n=306)			PNI $_{modified}$	Ranking
		$\bar{x}$	SD	Interpret	$\bar{x}$	SD	Interpret		
1	Quality Assurance Philosophy (Quality Perspective)	2.63	0.327	medium	4.57	0.189	very high	0.738	5
2	Organizational System	3.49	0.324	medium	4.62	0.233	very high	0.325	8
3	Subject System	3.51	0.291	high	4.59	0.226	very high	0.307	9
4	Objective System(Objective Chain)	2.67	0.245	medium	4.76	0.149	very high	0.784	3
5	Criteria System (Criteria Chain)	2.49	0.342	low	4.83	0.168	very high	0.936	1

Items	Components	Current state(n=306)			Desire state(n=306)			PNI modified	Ranking
		$\bar{x}$	SD	Interpret	$\bar{x}$	SD	Interpret		
6	6.Operation System	2.66	0.179	medium	4.81	0.114	very high	0.812	2
7	Mechanism Guarantee System	3.01	0.210	medium	4.70	0.167	very high	0.559	7
8	Quality Culture	2.78	0.250	medium	4.75	0.171	very high	0.709	6
9	School-based Information Management Platform	2.68	0.213	medium	4.68	0.153	very high	0.746	4
Total		**2.85**	**0.094**	—	**4.70**	**0.063**	—	**0.662**	—

From the table 9, it was found that the current state of an internal quality assurance system of higher vocational colleges in Guangxi were overall level at medium ($\bar{x}$=2.85). Considering each aspects, it was found that the current state levels were ranked from highest to lowest as follows: 1)Subject System, 2)Organization System,3)Mechanism Guarantee System, 4)Quality Culture, 5)School-based Information Management Platform, 6)Objective System(Objective Chain), 7)Operation System,8)Quality Assurance Philosophy (Quality Perspective),9) Criteria System (Criteria Chain).

The desired state of the internal quality assurance system of higher vocational colleges in Guangxi was overall level at very high ($\bar{x}$= 4.70). Considering all aspects, It was found that the level of desired state was ranked from highest to lowest as follows: 1)Criteria System (Criteria Chain),2)Operation System,3)Objective System(Objective Chain), 4) Quality Culture,5)Mechanism Guarantee System, 6)School-based Information Management Platform,7)Organizational System , 8)Subject System,9)Quality Assurance Philosophy (Quality Perspective)

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was Criteria System (Criteria Chain), the second was Operation

System, and the third was Objective System(Objective Chain), the fourth was School-based Information Management Platform, the Fifth was Quality Assurance Philosophy (Quality Perspective), the sixth was Quality Culture, the seventh was Mechanism Guarantee System, the eighth was Organization System, the ninth was Subject System.

Table 10 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Quality Assurance Philosophy (Quality Perspective)

Items	**Questions**	**Current**		**Desired**		**PNI** $_{modified}$	**Ranking**
		$\bar{x}$	**SD**	$\bar{x}$	**SD**		
1	Your school has construced an internal quality assurance system in place.	3.17	0.433	4.71	0.455	0.486	8
2	Your school has developed a student-centred view of quality and has clear quality objectives.	2.65	0.681	4.68	0.466	0.765	5
3	you think the internal quality assurance system can promote the quality of talent cultivation in schools.	2.40	0.675	4.42	0.494	0.844	4
4	Leaders, teachers, and students in your school are highly motivated to the diagnosis and improvement of the	2.45	0.682	4.29	0.456	0.750	6

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	internal quality assurance system.						
5	Your school's leadership places a strong emphasis on internal quality assurance systems.	2.37	0.587	4.46	0.500	0.887	3
6	Teachers and students in your school are familiar with the basic framework, connotation and process of the diagnosis and improvement of the internal quality assurance system.	2.63	0.650	4.34	0.476	0.649	7
7	Your school has a robust internal quality assurance system and has an annual program of work to implement it.	2.33	0.484	4.69	0.462	1.017	2
8	Your school has received at least one Provincial-level Diagnostic and Improvement Review of its internal quality assurance system.	3.32	0.519	4.75	0.433	0.433	9
9	Your school familiarizes teachers and students	2.35	0.477	4.77	0.419	1.035	1

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	with the concepts, connotations, frameworks, processes and methods of the internal quality assurance system through training, lectures and other means.						
Total		**2.63**	**0.327**	**4.57**	**0.189**	**0.738**	—

From the table 10 it was found that the current state of the components of "Quality Assurance Philosophy (Quality Perspective)" was overall level at medium ($\bar{x}$=2.63). Considering each items, it was found that the current state levels ranked most was the item of "Your school has received at least one Provincial-level Diagnostic and Improvement Review of its internal quality assurance system" ($\bar{x}$=3.32), the second was the item of "Your school has constructed an internal quality assurance system in place"($\bar{x}$=3.17) , and the least was the item of "Your school has a robust internal quality assurance system and has an annual program of work to implement it"($\bar{x}$=2.33).

The desired state of the components of "Quality Assurance Philosophy (Quality Perspective)" was level overall at very high ($\bar{x}$=4.57). Considering each items, it was found that the desired state levels ranked most was the item of "Your school familiarizes teachers and students with the concepts, connotations, frameworks, processes and methods of the internal quality assurance system through training, lectures and other means"($\bar{x}$=4.77), the second was the item of "Your school has constructed an internal quality assurance system in place"($\bar{x}$=4.71), and the least was the item of "Leaders, teachers, and students in your school are highly motivated to the diagnosis and improvement of the internal quality assurance system"($\bar{x}$=4.29).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of "Your school familiarizes teachers and students with the concepts, connotations, frameworks, processes and methods of the internal quality assurance system through training, lectures and other means"($PNI_{modified}$=1.035). the second was the item of "Your school has a robust internal quality assurance system and has an annual program of work to implement it"($PNI_{modified}$=1.017) , and the least was the item of "Your school has received at least one Provincial-level Diagnostic and Improvement Review of its internal quality assurance system"($PNI_{modified}$=0.433).

Table 11 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Organization System

Items	**Questions**	**Current**		**Desired**		**PNI** $_{modified}$	**Ranking**
		$\bar{x}$	**SD**	**$\bar{x}$**	**SD**		
1	Your school's organization is clear and well set up.	3.63	0.675	4.65	0.478	0.280	5
2	The departments in your school are categorized into five systems, namely, decision-making and command system, quality generation system, support service system, resource building system and supervision and control system, according to their roles in the internal quality assurance system.	3.31	0.872	4.66	0.474	0.406	3

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
3	Your school has departmental responsibilities and job responsibilities.	3.64	0.622	4.73	0.444	0.299	4
4	Your school has clear and reasonable work standards and assessment criteria for each position.	3.63	0.704	4.54	0.499	0.251	7
5	Your school has a dedicated internal quality assurance management unit.	3.86	0.417	4.72	0.452	0.222	8
6	Your school has different levels of quality assurance optimizations or teams.	3.15	0.862	4.63	0.483	0.472	1
7	In your school, school leaders, functional department leaders, functional department administrators, teaching unit leaders, teaching unit administrators, and education and teaching supervisors are well equipped to play the roles of decision-making and directing, quality generation, support	3.45	0.801	4.34	0.474	0.258	6

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	services, resource building, and supervision and control.						
8	Better co-ordination between optimizations in your school to ensure the quality of education in your school.	3.23	0.923	4.70	0.459	0.455	2
Total		**3.49**	**0.324**	**4.62**	**0.233**	**0.325**	—

From the table 11 it was found that the current state of the components of "Organization System" was overall level at medium ($\bar{x}$=3.49). Considering each items, it was found that the current state levels ranked most was the item of "Your school has a dedicated internal quality assurance management unit" ($\bar{x}$=3.86), the second was the item of "Your school has departmental responsibilities and job responsibilities"($\bar{x}$=3.64) , and the least was the item of "Your school has different levels of quality assurance optimizations or teams"($\bar{x}$=3.15).

The desired state of the components of "Organization System" was level overall at very high ($\bar{x}$=4.62). Considering each items, it was found that the desired state levels ranked most was the item of "Your school has departmental responsibilities and job responsibilities"($\bar{x}$=4.72), the second was the item of "Your school has a dedicated internal quality assurance management unit."($\bar{x}$=4.72), and the least was the item of "In your school, school leaders, functional department leaders, functional department administrators, teaching unit leaders, teaching unit administrators, and education and teaching supervisors are well equipped to play the roles of decision-making and directing, quality generation, support services, resource building, and supervision and control"($\bar{x}$=4.34).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of "Your school has different levels of quality assurance

optimizations or teams."($PNI_{modified}$=0.472). the second was the item of "Better co-ordination between optimizations in your school to ensure the quality of education in your school."($PNI_{modified}$=0.455) , and the least was the item of "Your school has a dedicated internal quality assurance managementunit" ($PNI_{modified}$=0.222).

Table 12 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Subject System

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
1	Your school's internal quality assurance system is divided into different and clearly defined levels of responsibility.	3.62	0.658	4.69	0.465	0.294	4
2	Your school's internal quality assurance system has five areas of responsibility: school, major, curriculum, teacher and student.	3.80	0.487	4.48	0.501	0.179	5
3	Your school's internal quality assurance body has clear and relatively independent elements of assurance.	3.59	0.706	4.66	0.476	0.297	3
4	You are familiar with the quality assurance content and workflow of your	3.16	0.667	4.69	0.465	0.481	1

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	own personal and your position.						
5	You recognise the content and practice of quality assurance in your role.	3.37	0.767	4.42	0.495	0.311	2
Total		**3.51**	**0.291**	**4.59**	**0.226**	**0.307**	—

From the table 12 it was found that the current state of the components of "Subject System" was overall level at high ($\bar{x}$=3.51). Considering each items, it was found that the current state levels ranked most was the item of "Your school's internal quality assurance system has five areas of responsibility: school, major, curriculum, teacher and student" ($\bar{x}$=3.80), the second was the item of "Your school's internal quality assurance system is divided into different and clearly defined levels of responsibility"($\bar{x}$=3.62) , and the least was the item of "You are familiar with the quality assurance content and workflow of your own personal and your position"($\bar{x}$=3.16).

The desired state of the components of "Subject System" was level overall at very high ($\bar{x}$=4.59). Considering each items, it was found that the desired state levels ranked most was the item of "Your school's internal quality assurance system is divided into different and clearly defined levels of responsibility"($\bar{x}$=4.69), and the same ranking was "You are familiar with the quality assurance content and workflow of your own personal and your position"($\bar{x}$=4.69), the second was the item of "Your school's internal quality assurance body has clear and relatively independent elements of assurance"($\bar{x}$=4.66), and the least was the item of "You recognise the content and practice of quality assurance in your role"($\bar{x}$=4.29).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of "You are familiar with the quality assurance content and workflow of your own personal and your position"($PNI_{modified}$=0.481). the second was the item of "You recognise the content and practice of quality assurance in your role"($PNI_{modified}$=0.311) , and the least was the item of " Your school's internal quality

assurance system has five areas of responsibility: school, major, curriculum, teacher and student"($PNI_{modified}$=0.179).

Table 13 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Objective System (Objective Chain)

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
1	The Charter of your school has a clear positioning (direction) and talent cultivation objectives.	3.01	0.682	4.63	0.483	0.541	8
2	Your school has a medium-term development plan (e.g., the 14th Five-Year Plan) with clear objectives and targets.	2.84	0.415	4.79	0.405	0.686	6
3	The four levels of your school, i.e., major, curriculum, teacher and student, will formulate their own medium-term development plans (i.e., professionals development plan, curriculums development plan, teachers development	2.98	0.274	4.66	0.474	0.562	7

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	plan, and students development plan) based on the medium-term development plan of the school (e.g., the 14th Five-Year Plan).						
4	Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator.	2.22	0.412	4.89	0.311	1.208	1
5	Your school is able to translate the annual objectives and tasks of the five levels of medium-term development planning, namely, school, major,	2.53	0.756	4.81	0.395	0.903	2

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	curriculum, teacher and student into the annual objectives and tasks of the school's priorities for implementation.						
6	Each department and teaching unit in your school prepares an annual work plan based on the annual priority objectives, and specifies the timeframe for completion, the responsible person and the completion criteria.	2.42	0.735	4.58	0.494	0.889	3
7	Teachers and students in your school have a 3-year personal development plan and annual personal development plans.	2.63	0.672	4.82	0.382	0.836	4
8	The system of objectives ("Objective Chain") at each level of your school has been developed in such a way that it is 'connected and coherent'.	2.71	0.727	4.87	0.341	0.796	5
Total		**2.67**	**0.245**	**4.76**	**0.149**	**0.784**	—

From the table 13 it was found that the current state of the components of “Objective System(Objective Chain” was overall level at medium ($\bar{x}$=2.67). Considering each items, it was found that the current state levels ranked most was the item of “The Charter of your school has a clear positioning (direction) and talent cultivation objectives” ($\bar{x}$=3.01), the second was the item of “The system of objectives ("Objective Chain") at each level of your school has been developed in such a way that it is ‘connected and coherent’”($\bar{x}$=2.98) , and the least was the item of “Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator”($\bar{x}$=2.22).

The desired state of the components of “Subject System” was level overall at very high ($\bar{x}$=4.76). Considering each items, it was found that the desired state levels ranked most was the item of “Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator”($\bar{x}$=4.89), the second was the item of “Your school's internal quality assurance body has clear and relatively independent elements of assurance”($\bar{x}$=4.87), and the least was the item of “Each department and teaching unit in your school prepares an annual work plan based on the annual priority objectives, and specifies the timeframe for completion, the responsible person and the completion criteria”($\bar{x}$=4.58).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of “Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator”($PNI_{modified}$=1.208). the second was the item of “Your school is able to translate the annual objectives and tasks of the five levels of medium-term development planning, namely, school, major, curriculum, teacher and student into the annual objectives and tasks of the school's priorities for implementation”($PNI_{modified}$=0.903) ,

and the least was the item of “The Charter of your school has a clear positioning (direction) and talent cultivation objectives”($PNI_{modified}$=0.541).

Table 14 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Criteria System (Criteria Chain)

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
1	Your school has established relatively independent and complete management criterias, development standards and work standards at five levels: school, major, curriculum, teacher and student.	2.52	0.739	4.81	0.390	0.911	4
2	Your school's quality standards for the 5 principal dimensions have been developed in accordance with the SMART principles and are consistent with the actual need to achieve the objectives.	2.44	0.767	4.91	0.293	1.009	2
3	Your school has a relatively well-developed hierarchical and	2.35	0.775	4.74	0.440	1.019	1

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	categorical management system for each of the five levels: school, major, curriculum, teacher and student.						
4	Your school has performance appraisal criteria for the achievement of objectives at five levels: school, programme, curriculum, teacher and student.	2.50	0.743	4.80	0.403	0.921	3
5	Your school's system of standards (‘chain of standards’) creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission.	2.67	0.595	4.89	0.311	0.835	5
	Total	**2.49**	**0.342**	**4.83**	**0.168**	**0.936**	—

From the table 14 it was found that the current state of the components of “Criteria System (Criteria Chain)” was overall level at low ($\bar{x}$=2.49). Considering each items, it was found that the current state levels ranked most was the item of “Your school's system of standards (‘chain of standards’) creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission” ($\bar{x}$=2.67), the second was the item of “Your school has established relatively

independent and complete management criterias, development standards and work standards at five levels: school, major, curriculum, teacher and student"($\bar{x}$=2.52), and the least was the item of "Your school has a relatively well-developed hierarchical and categorical management system for each of the five levels: school, major, curriculum, teacher and student"($\bar{x}$=2.35).

The desired state of the components of "Criteria System (Criteria Chain)" was level overall at very high ($\bar{x}$=4.83). Considering each items, it was found that the desired state levels ranked most was the item of "Your school's quality standards for the 5 principal dimensions have been developed in accordance with the SMART principles and are consistent with the actual need to achieve the objectives"($\bar{x}$=4.91), the second was the item of "Your school's system of standards ('chain of standards') creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission"($\bar{x}$=4.89), and the least was the item of "Your school has a relatively well-developed hierarchical and categorical management system for each of the five levels: school, major, curriculum, teacher and student"($\bar{x}$=4.74).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of "33.Your school has a relatively well-developed hierarchical and categorical management system for each of the five levels: school, major, curriculum, teacher and student"($PNI_{modified}$=1.019). the second was the item of "Your school's quality standards for the 5 principal dimensions have been developed in accordance with the SMART principles and are consistent with the actual need to achieve the objectives"($PNI_{modified}$=1.009) , and the least was the item of " Your school's system of standards ('chain of standards') creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission"($PNI_{modified}$=0.835).

Table 15 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Operation System

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
1	Your school has established and implemented a continuous improvement mechanism based on the PDCA Cycle or the "8" Type Quality Improvement Spiral .	2.70	0.499	4.87	0.334	0.803	5
2	Your school's internal quality assurance system work programme can be advanced in accordance with the implementation progress, and can basically achieve the set quality assurance objectives.	2.82	0.433	4.79	0.410	0.698	9
3	Your school has an appropriate quality assurance team in place to monitor the quality of the objectives and criterias.	3.01	0.543	4.69	0.462	0.561	11

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
4	The five levels of responsibility in your school (school, major, curriculum, teacher and student) are able to perform regular quality control of objectives and criterias according to the PDCA Cycle or the "8" Type Quality Improvement Spiral .	2.68	0.469	4.61	0.488	0.723	7
5	Your school's internal quality assurance system has established an operational mechanism for "Diagnosis and Improvement".	2.85	0.430	4.95	0.223	0.734	6
6	Your school's internal quality assurance system regularly analyzes the causes and takes action to correct deviations in accordance with the Diagnosis and Improvement Model, so that the quality of	2.36	0.827	4.85	0.361	1.051	2

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	education meets the desired goals.						
7	Each of the five levels of internal quality assurance bodies in your school has undertaken the preparation of a cyclical diagnostic analysis of internal quality assurance.	2.45	0.696	4.73	0.447	0.928	4
8	The communication between the vertical system and the horizontal body of the quality assurance system within your school is smooth.	2.09	0.729	4.81	0.395	1.295	1
9	Satisfaction of teachers, students, employers, and other stakeholders at your school has continued to improve.	2.53	0.617	4.93	0.253	0.947	3
10	The internal quality assurance system of your school is functioning well, and	2.90	0.516	4.87	0.338	0.678	10

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	the quality of school governance, teaching management and talent cultivation continues to improve.						
11	After construction and improvement, your school has built a networked, full-coverage, internal quality assurance system with strong early warning function and incentive function.	2.83	0.845	4.87	0.338	0.723	8
Total		**2.66**	**0.179**	**4.81**	**0.114**	**0.812**	**—**

From the table 15 it was found that the current state of the components of "Operation System" was overall level at medium ($\bar{x}$=2.66). Considering each items, it was found that the current state levels ranked most was the item of "Your school has an appropriate quality assurance team in place to monitor the quality of the objectives and criterias"($\bar{x}$=3.01), the second was the item of "The internal quality assurance system of your school is functioning well, and the quality of school governance, teaching management and talent cultivation continues to improve"($\bar{x}$=2.90), and the least was the item of "The communication between the vertical system and the horizontal body of the quality assurance system within your school is smooth"($\bar{x}$=2.09).

The desired state of the components of "Operation System" was level overall at very high ($\bar{x}$=4.81). Considering each items, it was found that the desired state levels ranked most was the item of "Your school's internal quality assurance system has established an operational mechanism for 'Diagnosis and

Improvement’”($\bar{x}$=4.95), the second was the item of “Satisfaction of teachers, students, employers, and other stakeholders at your school has continued to improve”($\bar{x}$=4.93), and the least was the item of “The five levels of responsibility in your school (school, major, curriculum, teacher and student) are able to perform regular quality control of objectives and criterias according to the PDCA Cycle or the ‘8’ type quality improvement spiral mechanism”($\bar{x}$=4.61).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of “The communication between the vertical system and the horizontal body of the quality assurance system within your school is smooth”($PNI_{modified}$=1.295). the second was the item of “Your school's internal quality assurance system regularly analyzes the causes and takes action to correct deviations in accordance with the Diagnosis and Improvement Model, so that the quality of education meets the desired goals”($PNI_{modified}$=1.051) , and the least was the item of “Your school has an appropriate quality assurance team in place to monitor the quality of the objectives and criterias”($PNI_{modified}$=0.561).

Table 16 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system on higher vocational colleges in Guangxi, classified by the item of component of Mechanism Guarantee System

Items	**Questions**	**Current**		**Desired**		**PNI** $_{modified}$	**Ranking**
		$\bar{x}$	**SD**	**$\bar{x}$**	**SD**		
1	Your school has established a complete quality assurance system in the form of "Five Verticals, Five Horizontals and One Platform".	3.20	0.480	4.79	0.407	0.499	6

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
2	Your school establishes a systematicity, complete and operational "Diagnosis and Improvement" mechanism at the five levels of school, major, curriculum, teacher and student(before, during and after segment).	2.96	0.445	4.70	0.459	0.589	3
3	Your school's quality assurance system has been continuously improved and perfected, and regular annual reports on the quality of personnel training and internal quality assurance are published.	2.92	0.370	4.61	0.488	0.582	4
4	Your school has established a system for information collection and	2.67	0.632	4.67	0.470	0.750	1

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	platform management.						
5	Your school has a more complete incentive system for teachers and students.	3.25	0.886	4.70	0.458	0.446	8
6	Your school has formed a regular information feedback diagnostic analysis and improvement mechanism.	3.17	0.609	4.60	0.490	0.452	7
7	Your school's continuous improvement system is scientifically designed to better achieve continuous improvement.	2.86	0.473	4.75	0.431	0.661	2
8	Your school has established a management and operation mechanism to regularize the construction of an internal quality assurance system.	3.09	0.491	4.76	0.427	0.540	5
Total		**3.01**	**0.210**	**4.70**	**0.167**	**0.559**	—

From the table 16 it was found that the current state of the components of “Mechanism Guarantee System” was overall level at medium ($\bar{x}$=3.01). Considering each items, it was found that the current state levels ranked most was the item of “Your school has a more complete incentive system for teachers and students”($\bar{x}$=3.25), the second was the item of “Your school has established a complete quality assurance system in the form of ‘Five Verticals, Five Horizontals and One Platform’ ”($\bar{x}$=3.20), and the least was the item of “Your school has established a system for information collection and platform management”($\bar{x}$=2.67).

The desired state of the components of “Mechanism Guarantee System” was level overall at very high ($\bar{x}$=4.70). Considering each items, it was found that the desired state levels ranked most was the item of “Your school has established a complete quality assurance system in the form of ‘Five Verticals, Five Horizontals and One Platform’ ”($\bar{x}$=4.79), the second was the item of “Your school has established a management and operation mechanism to regularize the construction of an internal quality assurance system”($\bar{x}$=4.76), and the least was the item of “Your school has formed a regular information feedback diagnostic analysis and improvement mechanism”($\bar{x}$=4.60).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of “Your school has established a system for information collection and platform management”($PNI_{modified}$=0.750). the second was the item of “Your school's continuous improvement system is scientifically designed to better achieve continuous improvement”($PNI_{modified}$=0.661) , and the least was the item of “Your school has a more complete incentive system for teachers and students”($PNI_{modified}$=0.661).

Table 17 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of Quality Culture

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
1	Teachers and students in your school are becoming more quality conscious.	3.12	0.478	4.80	0.403	0.539	5
2	Your school is fully engaged in the development of an internal quality assurance system.	2.64	0.520	4.80	0.398	0.819	2
3	Your school has evolved a culture of quality that is shared by staff and students.	2.14	0.744	4.87	0.341	1.273	1
4	Your school has constructed a mechanism to evaluate the satisfaction level at 5 levels.	2.72	0.633	4.68	0.466	0.724	3
5	The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System,	3.15	0.505	4.58	0.494	0.453	6

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
	Operation System, etc.) is good.						
6	Your school's internal quality assurance quality culture is strong and distinctive.	2.93	0.460	4.79	0.405	0.637	4
Total		**2.78**	**0.250**	**4.75**	**0.171**	**0.709**	—

From the table 17 it was found that the current state of the components of "Quality Culture" was overall level at medium ($\bar{x}$=2.78). Considering each items, it was found that the current state levels ranked most was the item of "The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System, Operation System, etc.) is good" ($\bar{x}$=3.15), the second was the item of "Teachers and students in your school are becoming more quality conscious"($\bar{x}$=3.12) , and the least was the item of "Your school has evolved a culture of quality that is shared by staff and students"($\bar{x}$=2.14).

The desired state of the components of "Subject System" was level overall at very high ($\bar{x}$=4.59). Considering each items, it was found that the desired state levels ranked most was the item of "Your school has evolved a culture of quality that is shared by staff and students"($\bar{x}$=4.87), the second was the item of "Teachers and students in your school are becoming more quality conscious"($\bar{x}$=4.80), as well as the item of "Your school is fully engaged in the development of an internal quality assurance system"($\bar{x}$=4.80), and the least was the item of "The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System, Operation System, etc.) is good"($\bar{x}$=4.58).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of "Your school has evolved a culture of quality that is

shared by staff and students"($PNI_{modified}$=1.273). the second was the item of "Your school is fully engaged in the development of an internal quality assurance system"($PNI_{modified}$=0.819) , and the least was the item of " The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System, Operation System, etc.)is good" ($PNI_{modified}$=0.453).

Table 18 The current state, desired state and $PNI_{modified}$ of an internal quality assurance system in higher vocational colleges in Guangxi, classified by the item of component of School-based Information Management Platform

Items	**Questions**	**Current**		**Desired**		**PNI** $_{modified}$	**Ranking**
		$\bar{x}$	**SD**	**$\bar{x}$**	**SD**		
1	Your school has established an information platform for internal quality assurance system (referred to as the "Diagnosis and Improvement" Platform).	3.13	0.595	4.68	0.467	0.496	9
2	Your school's informatization platform ("Diagnosis and Improvement" Platform) can realize the functions of collecting, monitoring, early warning and analyzing relevant information and data in three stages: before, during and after segment.	2.96	0.563	4.78	0.416	0.612	7

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
3	Your school's information management platform ("Diagnosis and Improvement" Platform) can well support the operation of the internal quality assurance system.	2.87	0.517	4.68	0.466	0.634	6
4	Your school's database collection and management platform for talent cultivation status is in regular operation.	3.31	0.666	4.65	0.477	0.407	10
5	Your school's talent training status database collection and management platform provides effective process support for internal quality assurance system work.	3.08	0.670	4.62	0.486	0.499	8
6	Your school's information platform ("Diagnosis and Improvement" Platform) can better reflect the status of the school's talent cultivation work.	2.36	0.634	4.66	0.473	0.974	4

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
7	Your school's information technology platform ("Diagnosis and Improvement" Platform) regularly collects (including organizing teachers and students to fill in) data related to quality assurance in the horizontal 5 levels.	2.31	0.599	4.64	0.482	1.007	3
8	Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data collection.	2.12	0.654	4.60	0.490	1.169	2
9	Your school utilizes an information-based platform ("Diagnosis and Improvement" Platform) for daily management and quality management process monitoring, and carries out data analysis on a regular basis.	2.14	0.749	4.79	0.407	1.238	1

Items	Questions	Current		Desired		PNI modified	Ranking
		$\bar{x}$	SD	$\bar{x}$	SD		
10	Your school uses an information technology platform ("Diagnosis and Improvement" Platform) with comprehensive early warning functions, which not only improves the information of school management, but also provides important references for the school leadership's decision-making.	2.55	0.692	4.74	0.442	0.860	5
Total		**2.68**	**0.213**	**4.68**	**0.153**	**0.742**	—

From the table 18 it was found that the current state of the components of “School-based Information Management Platform” was overall level at medium ($\bar{x}$=2.68). Considering each items, it was found that the current state levels ranked most was the item of “Your school's database collection and management platform for talent cultivation status is in regular operation” ($\bar{x}$=3.31), the second was the item of “Your school's database collection and management platform for talent cultivation status is in regular operation”($\bar{x}$=3.13), and the least was the item of “Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data collection”($\bar{x}$=2.12).

The desired state of the components of “School-based Information Management Platform” was level overall at very high ($\bar{x}$=4.68). Considering each items, it was found that the desired state levels ranked most was the item of “Your school utilizes an information-based platform ("Diagnosis and Improvement" Platform) for daily management and quality management process monitoring, and carries out data

analysis on a regular basis”($\bar{x}$=4.79), the second was the item of “Your school's informatization platform ("Diagnosis and Improvement" Platform) can realize the functions of collecting, monitoring, early warning and analyzing relevant information and data in three stages: before, during and after segment”($\bar{x}$=4.78), and the least was the item of “Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data collection”($\bar{x}$=4.60).

The Priority Need Index modified ($PNI_{modified}$) was found in order as follows: the first was the item of “Your school utilizes an information-based platform (Diagnosis and Improvement Platform) for daily management and quality management process monitoring, and carries out data analysis on a regular basis”($PNI_{modified}$=1.238). the second was the item of “Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data collection”($PNI_{modified}$=1.169) , and the least was the item of “Your school's database collection and management platform for talent cultivation status is in regular operation”($PNI_{modified}$=0.407).

Through the questionnaire survey, the researchers put forward to an effective programme to construct an internal quality assurance system of higher vocational colleges in Guangxi to all the samples, and found the gap between the current and the desired state of constructing an internal quality assurance system in higher vocational colleges in Guangxi.

Phase 3: Develop a model of an internal quality assurance system in higher vocational colleges in Guangxi,China

Step 1: Analysis and present the semi-structured interview results

According to the results of the study on the Piority Needs Index modified ($PNI_{modified}$) of internal quality assurance system in higher vocational colleges in Guangxi,China, creating an interview with 10 experts separately to develop an internal quality assurance system model in higher vocational colleges in Guangxi,China. The results of the data analysis of two groups of 10 experts on relevant elements of the model (5 per group) were presented as follows:

1. Components of an internal quality assurance system model in higher vocational colleges in Guangxi,China

By studying, analyzing, and synthesizing relevant works, literature, and policy documents, this study concluded that the components of the internal quality assurance system model of higher vocational colleges included 7 aspects as follows: 1) Principles: the basic guidance or norms used in developing the model. 2) Objectives: the specific goals that the development model hopes to achieve. 3) Approaches: the approaches and methods used in developing the model. 4) Procedures: the specific implementation steps and management processes used in developing the model. 5) Evaluation: the specific implementation steps and management processes used in developing the model. The 5 components of the model were consistent with the opinions of experts, which were presented as follows:

"... The internal quality assurance system of higher vocational colleges is a part of the quality assurance system, which generally also includes seven elements: principles, objectives, approaches, procedures and evaluation, and these elements constitute a complete part of the quality assurance system model ..."

(Interviewee expert 1 , 22 October, 2024: interview)

"... The principles, objectives, approaches, procedures and evaluation constitute the complete structure of the internal quality assurance system model, which is consistent with the core principles of the system construction theories such as Total Quality Management Theory, PDCA Cycle Theory and Continuous Improvement Theory..."

(Interviewee expert 2, 22 October, 2024: interview)

"...The seven components of the model constitute a complete system, covering all components of the internal quality assurance system as well as various links, which can effectively guarantee the continuous improvement of the internal quality of higher vocational colleges, and is an effective and complete system.... "

(Interviewee expert 3 , 24 October, 2024 : interview)

"...These five components are very appropriate and effective for the development of internal quality assurance system model of higher vocational colleges, which is a complete system. This big system is consistent with the small system and operation law of each component of the internal quality assurance system, which can effectively organize the components of quality objectives, quality contents and quality

subjects of higher vocational colleges to form a bigger networked circulatory system, which can effectively guarantee the operation of the quality system...”

(Interviewee expert 4, 24 October, 2024 : interview)

“...The seven components of the model are very appropriate, containing principles, objectives, approaches, procedures and evaluation, totally 5 parts, which more completely encompasses the various elements and links of the internal quality assurance system, forming a larger virtuous circle system and effectively guarantee the construction, operation and evaluation of internal quality assurance system in higher vocational colleges.... ”

(Interviewee expert 5, 24 October, 2024 : interview)

2. Principles, approaches, procedures, and evaluation of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China

2.1 Principles of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China

From semi-structured interviews with 5 experts on key issues of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China, The principles of developing a model were Principle of systematicity, Principle of scientificity, Principle of participation of multiple subjects, and Principle of continuous improvement. The experts interviewed unanimously insisted on the following:

“...The construction of internal quality assurance system of higher vocational colleges and universities needs to follow Principle of systematicity，Principle of scientificity，Principle of participation of multiple subjects，Principle of continuous improvement. Internal quality assurance system is a complex system, only as a whole, comprehensively analyse the various elements in order to carry out effective control, and at the same time, the construction of the internal quality assurance system of higher vocational colleges and universities must be guided by scientific theories and the use of scientific thinking and methods, in order to promote the school to obtain the maximum development. In operation, it is necessary to fully mobilize the enthusiasm of each subject, participate in the work of quality assurance, diagnose problems according to the cycle, put forward improvement measures, continuous improvement

and upgrading, and guarantee the improvement of education quality and the implementation of the objectives of training skilled and technical talents. Therefore, these four principles are in line with the actual needs of the construction of the internal quality assurance system model of higher vocational colleges and universities, which is an interrelated whole... ”

(Interviewee expert 1, 17 October, 2024: interview)

“...These four principles are from different perspectives and dimensions of the construction of internal quality assurance system of higher vocational colleges and universities to guide the direction, can effectively guide the relevant responsible parties to follow the corresponding norms and standards, can effectively guarantee the quality of education and teaching in higher vocational colleges and universities and the quality of talent cultivation....”

(Interviewee expert 2, 17 October, 2024: interview)

“...The principle of systematicity, the principle of scientificity, the principle of participation of multiple subjects and the principle of continuous improvement are the rules that should be followed when constructing the internal quality assurance system of higher vocational colleges and universities. The rules or standards proposed from the systematicity nature of the internal quality assurance system, the scientific nature of the construction and operation, the plurality of the participating subjects and the continuous development can effectively guide the construction and operation of the system and can ensure the improvement of the quality of education and teaching.... ”

(Interviewee expert 3, 18 October, 2024: interview)

“...The principle of systematicity, the principle of scientificity, the principle of participation of multiple subjects and the principle of continuous improvemen are a multi-dimensional whole. The principle of systematicity is the foundation, the principle of scientificity emphasizes the principle of dual attributes of higher education as well as the characteristics and traditions of the university, and also emphasizes the goal and mission of the institutions of higher education to serve the economic and social development of the local region, and the principle of multiple subjects emphasizes the need to involve all the subjects concerned in the process of the system's operation. The principle of continuous improvement is a reiteration of the

purpose of the establishment of the system. The purpose of the construction of the internal quality assurance system is not to be assessed at a certain stage, but to be improved continuously, cyclically, iteratively and upgraded. ...”

(Interviewee expert 4, 18 October, 2024: interview)

“...These four principles comprehensively summarize the basic norms of the construction of internal quality assurance system in higher vocational colleges and universities, which can effectively guarantee the achievement of the system's construction goals, and are very effective and reasonable construction principles, which are worthwhile to be practised and applied by all the relevant subjects in the construction of internal quality assurance system....”

(Interviewee expert 5, 18 October, 2024: interview)

2.2 Approaches of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China

From semi-structured interviews with 5 experts on key issues of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China, the approaches of an internal quality assurance system model were the PDCA Cycle and the “8” Type Quality Improvement Spiral. The interviews with the five experts were as follows:

“...The internal quality assurance system of higher vocational colleges operates in accordance with the PDCA Cycle, in which planning and scheduling are first formulated, then corresponding measures are taken to implement the objectives and tasks, and then self-checking, self-summarizing, diagnosing problems and finding reasons are carried out in accordance with the objectives and standards, and then improvement measures are finally put forward to solve the existing problems and transfer to the next cycle. With the development of information technology in education, the ‘55821’ Diagnosis and Improvement Model advocated by the Ministry of Education also requires the establishment of a School-based Information Management Platform for the whole process of data collection, analysis, early warning and management of internal quality management, the relevant data with the help of the diagnostic reform platform, The operation method is based on the principle of the “8” Type Quality Improvement Spiral, which is divided into two parts: the dynamic cycle and the static cycle...”

(Interviewee expert 1 , 17 October, 2024: interview)

"...PDCA Cycle is the basic operation method of the internal quality assurance system of higher vocational colleges, and the internal quality assurance system Diagnosis and Improvement Model recommended by the Ministry of Education of China has deepened the transformation of the PDCA Cycle principle on the basis of the operation principle of the Diagnosis and Improvement Platform, forming the "8" Type Quality Improvement Spiral, which effectively supports the school-based quality assurance system of higher vocational colleges running on the information platform ..."

(Interviewee expert 2 , 17 October, 2024: interview)

"...These two methods, one supporting the implementation and operation of the regular objectives offline, and "8" Type Quality Improvement Spiral for the implementation and operation of the objectives and tasks with the support of the information technology platform, complement each other to support the normal operation of the internal quality assurance system in higher vocational colleges...."

(Interviewee expert 3 , 18 October, 2024: interview)

"...The '8' Type Quality Improvement Spiral is an internal quality assurance system with Chinese characteristics developed by Chinese scholars on the basis of PDCA, combined with the '55821' Diagnosis and Improvement Model with the help of data collection, early warning and analysis functions of the information technology platform. The combination of the two effectively supports the operation of the quality system. ..."

(Interviewee expert 4 , 18 October, 2024: interview)

"...The '8' in the'55821' diagnosis and reform model in China refers to the '55821' Diagnosis and Improvement Model, which realizes the monitoring, early warning and feedback of target data with the help of the school-based information management platform, The PDCA Cycle is a general operating principle and method for the target tasks in the case of offline operation without the help of the platform, which is a comprehensive guiding principle for the quality self-assurance of each quality subject. The combination of the two can effectively support the operation of the internal quality assurance system as well as the achievement of the goal...."

(Interviewee expert 5 , 18 October, 2024: interview)

2.3 Procedures of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China

From semi-structured interviews with 5 experts on key issues of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China, the procedures of an internal quality assurance system model included 4 elements interviewed with the five experts : Conceptual Level, Input Level, Process Level and Output Level.

"...The construction of internal quality assurance system is a process model framework, reflecting the theory of Total Quality Management and the core connotation of the PDCA Cycle, with implicit theoretical guidance, then run according to the procedure of 'Input - Process - Output' to form a closed loop, week after week, cycle after cycle, spiral upward, continuous operation, forming a model mechanism of operation...."

(Interviewee expert 1 , 17 October, 2024: interview)

"...Conceptual Level, Input Level, Process Level and Output Level are the operating procedures of the internal quality assurance system model of higher vocational colleges. These components include both theoretical and practical aspects, avoiding the lack of theoretical support for the previous procedure of 'input - process - output', which is a relatively complete closed loop. Closed loop, can effectively guarantee the implementation and operation of the internal quality assurance system..."

(Interviewee expert 2 , 17 October, 2024: interview)

"...These four elements constitute the components of the internal quality assurance system model of higher vocational colleges, forming a large closed-loop system that effectively encompasses the various subsystems, elements and processes of the system, which is a more ideal operating procedure..."

(Interviewee expert 3 , 18 October, 2024: interview)

"...I strongly agree with the opinion that Conceptual Level, Input Level, Process Level and Output Level are the components of the internal quality assurance system model for higher vocational colleges. These four components form a complete closed-loop system that encompasses the content, methods and processes of the internal quality assurance system, which can effectively guarantee the construction,

implementation and operation of the system, and is in line with the inherent logic of quality improvement in quality management....”

(Interviewee expert 4 , 18 October, 2024: interview)

“...These four components, including both theory and practice, are a large circular system that conforms to the basic logic of quality management and can effectively support the operation of internal quality assurance embodiments....”

(Interviewee expert 5, 18 October, 2024: interview)

2.4 Evaluation of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China

From semi-structured interviews with 5 experts on key issues of developing an internal quality assurance system model in higher vocational colleges in Guangxi,China, the evaluation methodology of an internal quality assurance system model adopted Five-stage Approach to Diagnosis and Improvement Model. The interviews with the five experts were as follows:

“...The internal quality assurance system of higher vocational colleges is currently advocated by the ‘55821’ Diagnosis and Improvement Model , which is a new type of internal and external fusion method based on the internal self-assurance of the institution and supplemented by the external peer expert assessment, and better interprets the core idea of the fourth-generation assessment. School self-assurance is the main focus to stimulate the initiative of the quality body to self-assure quality, emphasizing that ‘quality depends on self-assurance in the final analysis’, and the Diagnosis and Improvement Sampling Review carried out by the expert group organized by the Provincial Department of Education is a kind of external expert assessment, which can enhance the credibility and effectiveness of the internal quality assurance. Combined efforts to jointly promote the internal quality of higher vocational colleges and universities....”

(Interviewee expert 1 , 17 October, 2024: interview)

“...The basic connotation of the Diagnosis and Improvement Model of internal quality assurance in higher vocational colleges is to establish a quality assurance and operation system that takes the development of teachers and students as the root, the quality culture as the driving force, and the improvement of the school's connotation as the purpose, and is guided by advanced quality management theories

and concepts, and promotes the spiral improvement through the identification of its own problems, and establishes a quality assurance and operation system that is linked up and down, organically complementary, with early warning function and incentive function. A quality assurance and operation system with early warning function and incentives is established at the levels of school, major, curriculum, teacher and student, which is linked up and down and organically complementary. At present, the Ministry of Education advocates and practices evaluation methodology of combining internal and external quality assurance, with self-diagnosis and improvement as the main focus, supplemented by external review, which can well guarantee the benign operation of the internal quality assurance system, and promote the improvement of the quality of talent cultivation....”

(Interviewee expert 2 , 17 October, 2024: interview)

“... At present, the Diagnosis and Improvement Model adopts the evaluation methodology which is mainly based on the school's independent diagnosis and improvement and supplemented by the external expert's review. The school's independent diagnosis and improvement emphasizes the self-checking of the previously formulated objectives, plans and measures, the diagnosis of the problems, the investigation of the causes and the proposal of the improvement measures, which is spontaneous in motivation and autonomous in nature, and the purpose of which is to improve the quality and the optimizational innovation, and to form the school's self-control quality culture gradually. The Diagnosis and Improvement Review organized by the Department of Education is an external assessment method, which is a powerful supplement to the school's internal autonomous diagnosis and reform, and the integration of the two is of great significance to the effective operation and normalization of the internal quality assurance system of higher vocational colleges....”

(Interviewee expert 3 , 17 October, 2024: interview)

“...The core of the construction of the internal quality assurance system of higher vocational colleges lies in improving the quality of teaching and the quality of talent training, enhancing the sense of access and satisfaction of teachers and students, and ensuring that the schools have a continuous, stable and high level of quality output and results output. The evaluation methodology currently adopted is the Five-stage Approach to Diagnosis and Improvement Model of internal and external

integration, and the cycle of independent diagnosis and improvement within the school is generally one year, and the cycle of diagnosis and improvement experts organized by the Department of Education to visit the school for Diagnosis and Improvement Review is generally three years. The motivation of independent diagnosis and improvement is endogenous and autonomous, while the review by external experts is externally applied and mandatory, and the combination of internal and external effectively guarantees the regular development and effective operation of the current diagnosis and improvement mode in each higher vocational colleges, and effectively guarantees the enhancement of the quality of talent cultivation in higher education.....”

(Interviewee expert 4 ,18 October, 2024: interview)

“...The evaluation methodology of the current internal quality guarantee system of higher vocational colleges in China adopts the Five-stage Approach to Diagnosis and Improvement Model, which includes both the autonomous diagnosis and improvement of the school and the part of external expert peer review, combining internal and external, and focusing on internal, effectively guaranteeing the operation of the quality system, which is very effective in ensuring the effective operation of the system and improving the quality of higher education personnel training....”

(Interviewee expert 5 , 18 October, 2024: interview)

By summarizing the interviews with the five experts mentioned above, and combining the results of the previous studies on the nine components of an internal quality assurance system and the seven components of the model, the researcher came up with a conclusion that the components, concepts, principles, contents, approaches and procedures for developing a model of the internal quality assurance system in Guangxi's higher vocational colleges , as shown in Table19 and Figure 5:

Table 19 Components of an internal quality assurance system model in higher vocational colleges in Guangxi

Contents / Components	Detailed Contents
1.Principles	1)Principle of systematicity; 2)Principle of scientificity; 3)Principle of participation of multiple subjects; 4)Principle of continuous improvement
2. Objectives	1)To achieve continuous improvement of the internal quality assurance system; 2)To continuously improve the quality of talent training; 3) To increase the satisfaction of teachers, students, parents, enterprises, society and other stakeholders.
3.Approaches	1) PDCA Cycle ; 2) “8” Type Quality Improvement Spiral
4. Procedures	1) Conceptual Level ; 2) Input Level; 3) Process Level; 4)Output Level
5.Evaluation	1)Five-stage Approach to Diagnosis and Improvement Model: Annual independent diagnosis and improvement within the institution + Site- visit and review by experts organized by the provincial education administrative department every three years——including “Establishment of expert panel - Self-assessment - Online peer review - Peer review by on-site visit - Publication of evaluation reports” five stages.

Step 2. Display the model of an internal quality assurance system in higher vocational colleges in Guangxi,China

Part I: Introducing a model for an internal quality assurance system in higher vocational colleges in Guangxi

The purpose of developing an internal quality assurance system model in higher vocational colleges in Guangxi was to guide higher vocational colleges to proactively establish and improve their internal quality assurance mechanisms, to stimulate them to establish a sense of self-assurance and to proactively carry out continuous and effective quality control in order to improve the quality of education and teaching. higher vocational colleges could find out the shortcomings of each elements in each link of talent cultivation work, improve them, and took the problem as a guide to carry out self "symptom finding", "cause determination", "symptomatic treatment", and finally achieved self-improvement and improvement. This study argued that the model of internal quality assurance system in higher education institutions was a theoretical model or theoretical schema with some typical characteristics formed on the basis of analyzing, abstracting and generalizing the interests of each subject and the mechanism of realizing quality needs, which was in essence a high level generalization of the concepts, mechanisms and methods of higher education quality assurance.The model consisted of five components: Principles, Objectives, Approaches, Procedures, and Evaluation, as follows:

1. Principles

The construction of the internal quality assurance system of higher vocational colleges and universities must be guided by scientific theories and the use of scientific thinking and methods in order to promote the maximum development of the school. In the development and operation of the model, it is necessary to fully mobilize the enthusiasm of all the main bodies, participate in the work of quality assurance, diagnose the problems in accordance with the cycle, put forward improvement measures, continuous improvement and upgrading, and guarantee the improvement of the quality of education as well as the implementation of the objectives of training skilled and technical talents. There are four basic principles to be followed in the development of the internal quality assurance system model of Guangxi higher vocational colleges: Principle of systematicity,Principle of scientificity, Principle of participation of multiple subjects, Principle of continuous improvement.

1）Principle of systematicity

2）Principle of scientificity

3）Principle of participation of multiple subjects

4）Principle of continuous improvement

2. Objectives

The purpose of the construction of internal quality assurance system in higher vocational colleges was to improve the quality of talent cultivation of the school, which required the school to gather the elements of talent cultivation such as professional setting and conditions, teacher team and construction, curriculum system and reform, classroom teaching and practice, school management and system, school-enterprise co-operation and innovation, quality monitoring and effectiveness according to its own philosophy of running a school, school orientation, talent cultivation objectives, to find out the deficiencies and continuously improve the quality of education and teaching and the satisfaction of all stakeholders. Improvement was made to continuously improve the quality of education and teaching and the satisfaction of all stakeholders. The development of the internal quality assurance system model in higher vocational colleges aimed to form certain theoretical frameworks or schemas with typical characteristics, which were easy to learn from and operate in practice. The objectives of its development were threefold: To achieve continuous improvement of the internal quality assurance system, to continuously improve the quality of talent training, and to increase the satisfaction of teachers, students, parents, enterprises, society and other stakeholders.

1) To achieve continuous improvement of the internal quality assurance system

2) To continuously improve the quality of talent training

3) To increase the satisfaction of teachers, students, parents, enterprises, society and other stakeholders

3. Approaches

PDCA Cycle is the basic approach for the operation of internal quality assurance system model in higher vocational colleges. The “55821” Diagnosis and Improvement Model of internal quality assurance system recommended by the Ministry of Education of China puts special emphasized on the construction and functioning of the School-based Information Management Platform. On the basis of combining the operation principle of

the Diagnosis and Improvement Platform, it deepened the transformation of the PDCA cycle principle, and forms the “8” type quality improvement spiral, which could effectively support the internal quality assurance system in higher vocational colleges operated by the School-based Information Management Platform. The “8” Type Quality Improvement Spiral effectively supported the internal quality assurance system in higher vocational colleges operated by the School-based Information Management Platform, and the combination of the two can effectively support the operation of the internal quality assurance system and the achievement of the goals. Therefore, the approaches of internal quality assurance system model in higher vocational colleges in Guangxi includes two aspects:the PDCA Cycle and the “8” Type Quality Improvement Spiral.

1) The PDCA Cycle

2) “8” Type Quality Improvement Spiral

4. Procedures

The development of internal quality assurance system model in higher vocational colleges was a framework of process activities including Before the event, During the event and After the event, which embodied the core connotation of the theory of Total Quality Management, System Theory, Fourth Generation Evaluation Theory and PDCA Cycle theory; and it was also a continuous operation mechanism that contained both theory and practice, and was in the spiral cycle at all times. Therefore, the internal quality assurance system model of Guangxi higher vocational colleges contained four operational procedures: Conceptual Level, Input Level, Process Level and Output Level.

1) Conceptual Level

2) Input Level

3) Process Level

4) Output Level

5. Evaluation

The “55821” Diagnosis and Improvement Model of internal quality assurance system of higher vocational colleges advocated by the Ministry of Education of China was a new type of internal and external integration approach which was based on the internal self-assurance of the school and supplemented by the external peer expert review. “School self-assurance” meant “School Self-diagnosis and Improvement”, which emphasised that quality should be assured by itself in the final analysis; “External peer expert review” meant Sample

Review by experts organized by provincial education administrations, so as to improve the credibility of the school's internal quality self-assurance by external review. The school's independent diagnosis and improvement emphasized self-checking, diagnosing problems, searching for reasons and proposing improvement measures for the objectives, plans and measures formulated before, and its motive was spontaneous and autonomous in nature, aiming at quality improvement and optimizational innovation, and gradually forming the school's self-control quality culture. The diagnostic and improvemental Sample Review organized by the Department of Education and carried out by the experts at the school's site was an external assessment approach, which was a powerful complement to the internal independent diagnostic and improvemental of the school. The integration of the two was important for the effective operation and regularization of the internal quality assurance system in higher education institutions. As this evaluation approach originated from the "55821" Diagnosis and Improvement Model advocated by the Ministry of Education of China, it consisted of internal and external parts, and included "Establishment of expert panel - Self-assessment - Online peer review - Peer review by on-site visit - Publication of evaluation reports", so it was called the "Five-stage Approach to Diagnosis and Improvement Model". In conclusion, the evaluation approach of the internal quality assurance system model in Guangxi's higher vocational colleges would also adopt this method to carry out comprehensive evaluation from both internal and external aspects.

1) Five-stage Approach to Diagnosis and Improvement Model

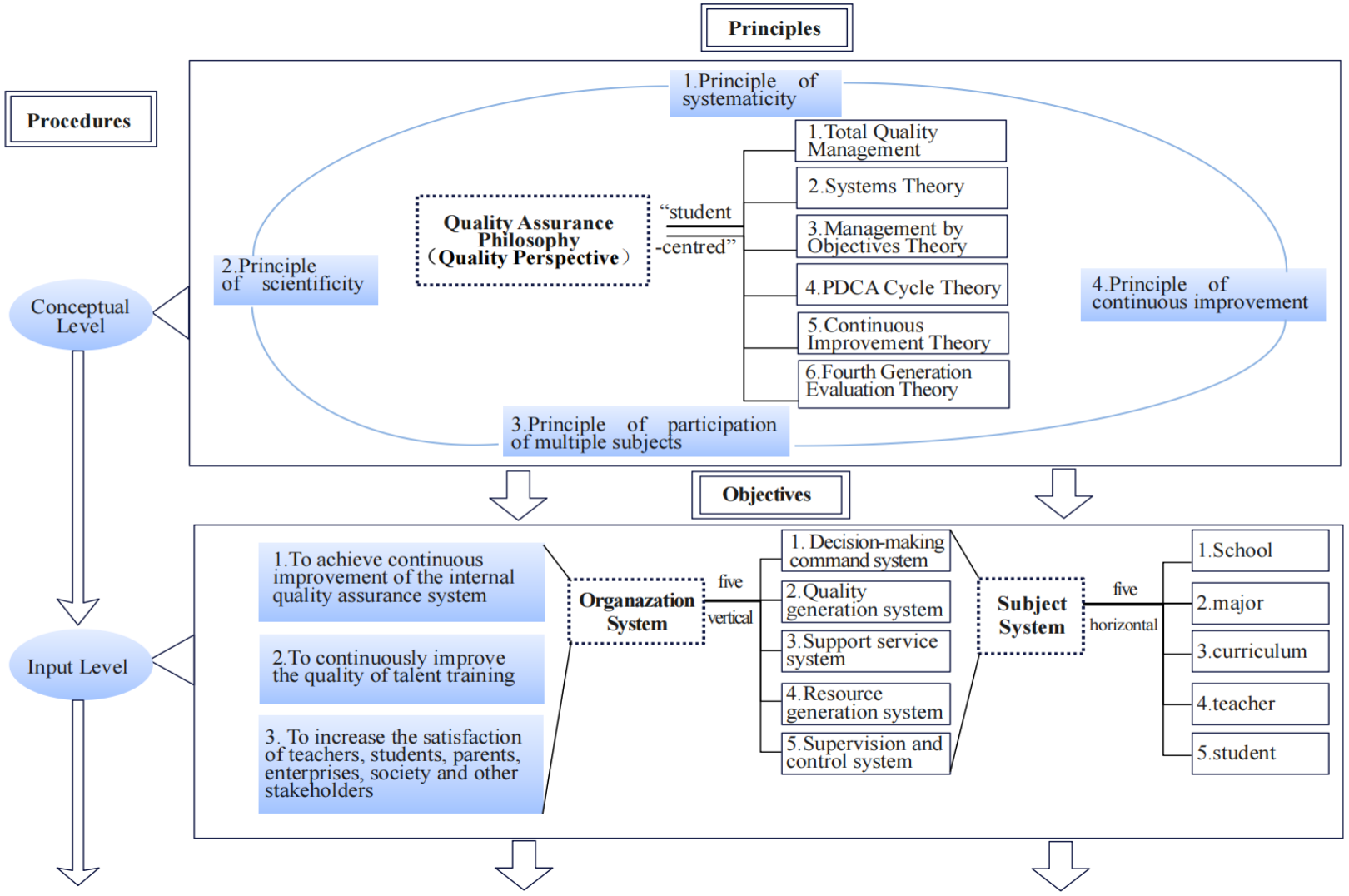
(i)Establishment of expert panel;

(ii)Self-assessment;

(iii)Online peer review;

(iv)Peer review by on-site visit;

(v) Publication of evaluation reports.


Principles
Procedures
1.Principle of systematicity
1.Total Quality Management
2.Systems Theory
3.Management by Objectives Theory
4.PDCA Cycle Theory
5.Continuous Improvement Theory
6.Fourth Generation Evaluation Theory
Quality Assurance Philosophy (Quality Perspective)
"student -centred"
2.Principle of scientificity
4.Principle of continuous improvement
3.Principle of participation of multiple subjects
Conceptual Level
Objectives
1.To achieve continuous improvement of the internal quality assurance system
2.To continuously improve the quality of talent training
3. To increase the satisfaction of teachers, students, parents, enterprises, society and other stakeholders
Organazation System
five
vertical
1. Decision-making command system
2.Quality generation system
3.Support service system
4.Resource generation system
5.Supervision and control system
Subject System
five
horizontal
1.School
2.major
3.curriculum
4.teacher
5.student
Input Level

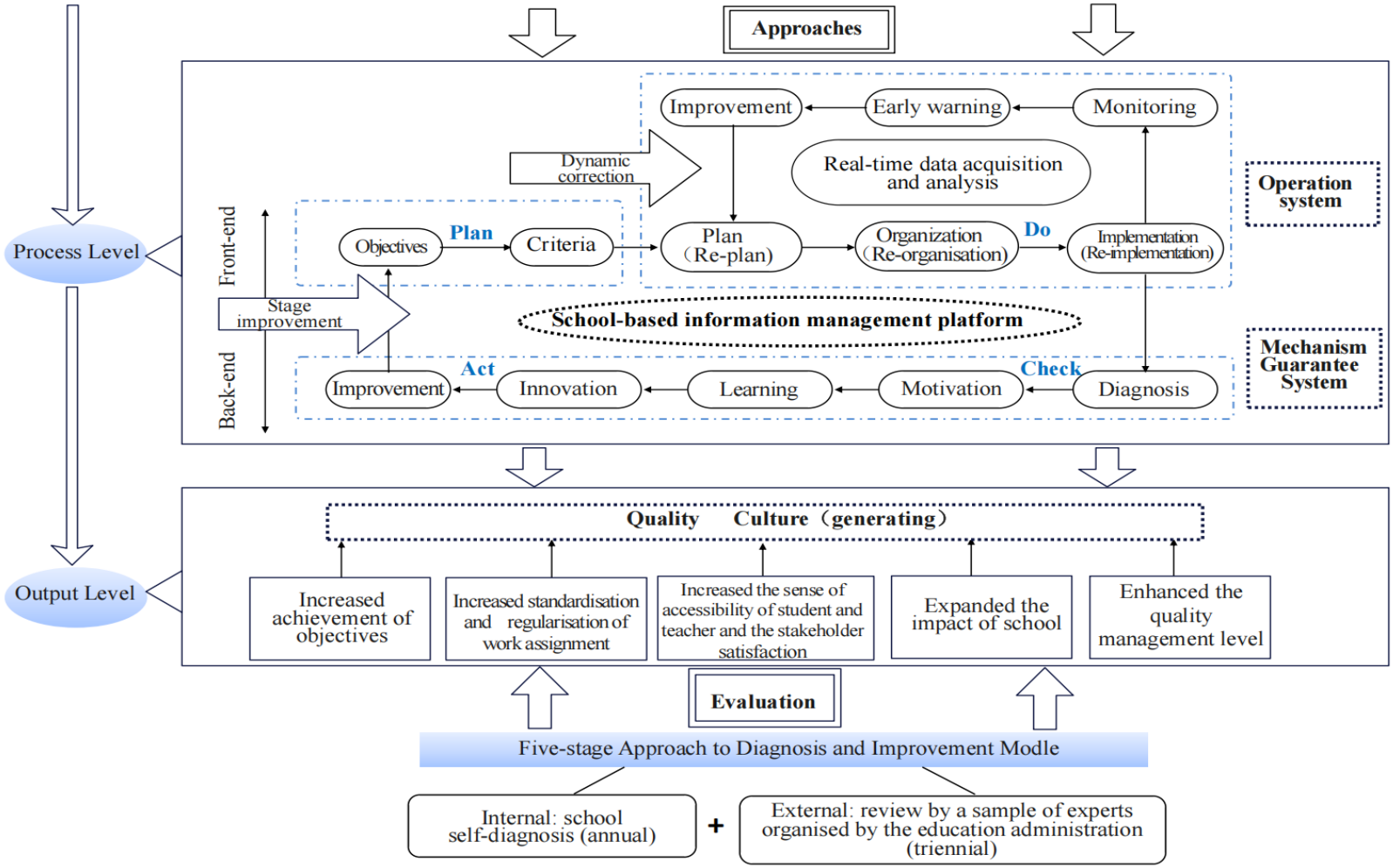


Figure 5 A model of an internal quality assurance system in higher vocational colleges in Guangxi,China

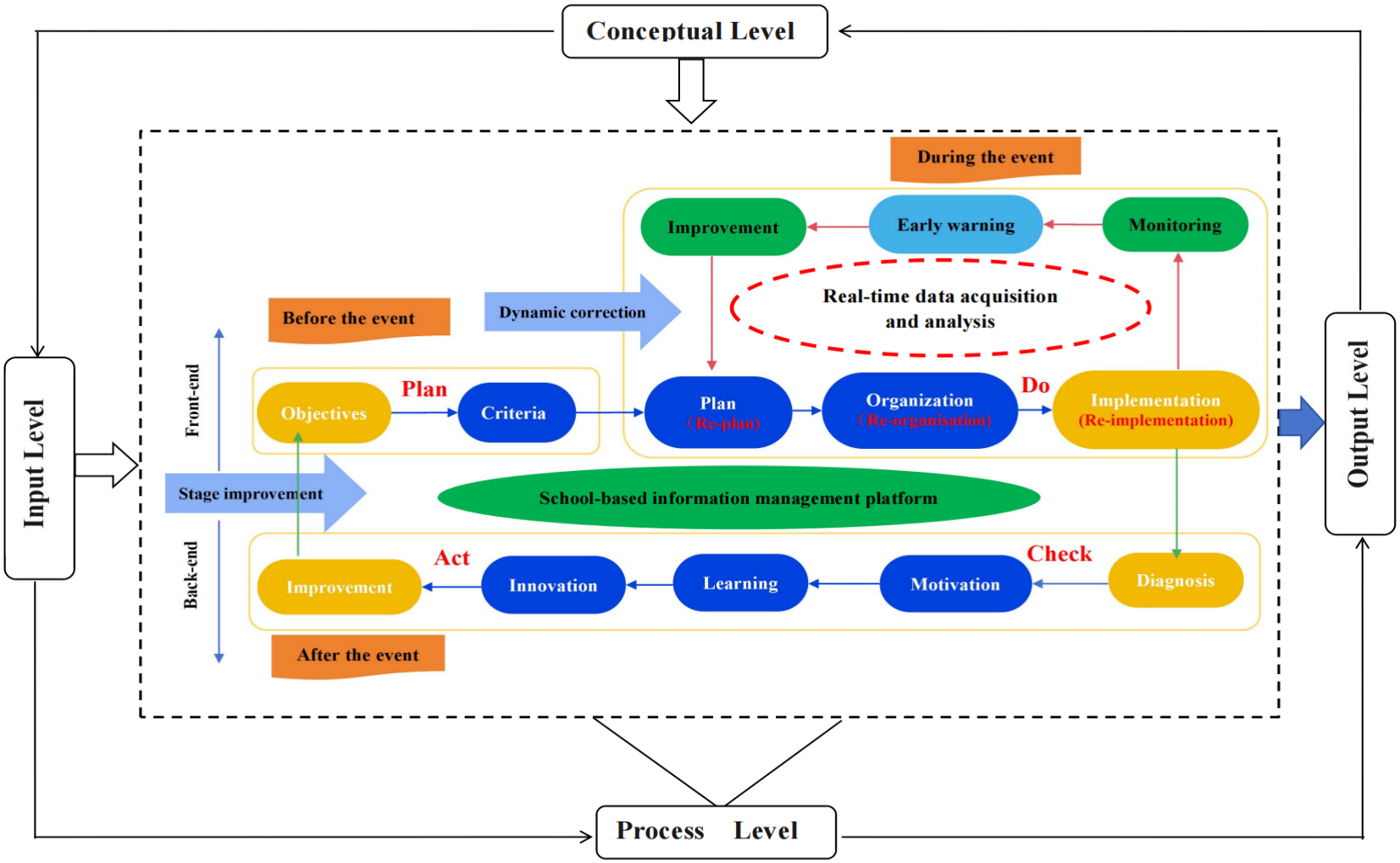


Figure 6 The detailed process of an internal quality assurance system model in higher vocational colleges in Guangxi, China

Part II: Details of an internal quality assurance system model in higher vocational colleges in Guangxi, and the model components are as follows:

1. Principles

The construction of an internal quality assurance system for higher vocational colleges was the key to improving the quality of education and realizing the sustainable development of the institutions. The purpose of studying and exploring the construction principles of the internal quality assurance system of higher vocational education was to make the relevant subjects consciously comply with the corresponding rules or standards in their work. The development of internal quality assurance system model in higher vocational colleges should follow: Principle of systematicity, Principle of scientificity, Principle of participation of multiple subjects, and Principle of continuous improvement.

1) **Principle of systematicity** is the basis for the construction of the internal quality assurance system of higher education institutions, because it is originally a whole system composed of many subsystems, and when constructing the internal quality assurance system, it should take the improvement of teaching quality as a criterion, coordinate the interrelationships between the subsystems, integrate all factors affecting the quality as well as all links, grasp them in all directions, and form an interacting, mutually reinforcing Organic whole, promote the overall improvement of education quality.

2) **Principle of scientificity** means that the internal quality assurance system of higher vocational colleges must be guided by scientific theories, and on the basis of highlighting the “higher education nature” and “vocational education nature” of higher vocational education, scientific thinking and methods should be applied to promote its maximum development.

3) **Principle of participation of multiple subjects** refers to the participation of all relevant interested subjects in the construction and operation of the internal quality assurance system of higher vocational colleges. It is necessary to improve the quality consciousness of all staff, so that leaders, teachers, students and part-time personnel of industrial enterprises in higher vocational colleges are concerned about the quality of education in higher vocational colleges, and all of them consciously and actively participate in the work.

4) **Principle of continuous improvement** refers to the fact that the internal quality assurance system of higher vocational colleges is a process of continuous improvement, which is not static but a dynamic development process. The quality of education in higher vocational colleges needs to be continuously improved with the demands of the social market economy.

2. Objectives

Students cultivated by vocational education are the main source of technical and skilled talents, which is of great significance to enhance the quality of human capital and promote the industrial upgrading and high-quality development of regional economy. Continuously improving the quality of talent training and promoting the high degree of integration of vocational literacy and vocational skills are the intrinsic pursuits of the generation and development history of higher vocational colleges, and the continuous improvement of the quality of talent training through the improvement of the internal quality assurance system of education has become the inevitable way for higher vocational colleges to achieve high-quality and connotative development. At present, some higher vocational colleges have the following problems in the construction of internal quality assurance system: firstly, the enthusiasm is not high and the endogenous power is insufficient, for example, the lack of self-quality assurance of the sense of responsibility of the master, the lagging behind in the construction of the faculty, and the imperfection of the optimizational structure. Secondly, insufficient participation of multi-party subjects, thirdly, imperfect systems and standards, fourthly, backward information technology construction, and fifthly, lack of quality culture. Therefore, higher vocational colleges are in urgent need of a more perfect internal quality assurance system model to guarantee the quality of schooling and enhance the ability to run schools. The essence of the internal quality assurance system model development is to establish a spontaneous quality management mechanism to ensure that the school has a continuous, stable, high level of quality output, more emphasis on the quality of the main body of “self-diagnosis and improvement”, highlighting the quality of the main body of the independent control, independent assurance and operation mechanism of the “subjectivity”, “development” and “normalization”, Its “subject” shifts from the other to itself, and its purpose “changes from proving to improving”, so as to achieve the purpose of improving the

modernisation level of school governance system and governance capacity. The internal quality assurance system model of Guangxi higher vocational colleges developed in this study has three objectives:

1)To achieve continuous improvement of the internal quality assurance system.

2) To continuously improve the quality of talent training.

3)To increase the satisfaction of teachers, students, parents, enterprises, society and other stakeholders.

3. Approaches

PDCA Cycle is the basic approach for the operation of internal quality assurance system model in higher vocational colleges. The “55821” Diagnosis and Improvement Model of internal quality assurance system recommended by the Ministry of Education of China puts special emphasized on the construction and functioning of the School-based Information Management Platform. On the basis of combining the operation principle of the Diagnosis and Improvement Platform, it deepened the transformation of the PDCA cycle principle, and forms the “8” type quality improvement spiral, which could effectively support the internal quality assurance system in higher vocational colleges operated by the School-based Information Management Platform. The “8” Type Quality Improvement Spiral effectively supported the internal quality assurance system in higher vocational colleges operated by the School-based Information Management Platform, and the combination of the two can effectively support the operation of the internal quality assurance system and the achievement of the goals. Therefore, the approaches of internal quality assurance system model in higher vocational colleges in Guangxi includes two aspects:the PDCA Cycle and the “8” Type Quality Improvement Spiral.

1) The PDCA Cycle

The PDCA cycle is a process methodology to implement quality management work in accordance with the sequence of the four phases of Plan (P), Do (D), Check (C) and Act (A). the PDCA is a work cycle, and it is a cycle of moving forward. Like a wheel moving forward, week after week, continuous cycle, upgrade iteration. PDCA cycle can be used for all levels of quality objectives, the objectives of each level in accordance with the PDCA logical approach to quality management, the

formation of a large ring set of small rings, a ring of a ring, a ring of a spiral upward cycle, layer by layer to solve the problem and so that the entire optimizational cycle rotates; after each of the After each PDCA cycle should be summed up, and then put forward the next cycle of new goals, measures, and then the second cycle, so that the wheel of quality management continues to move forward. Each cycle of quality level and management level will improve one step.

The PDCA cycle is divided into four phases, and the four phases are specifically divided into **eight steps**: first, analyses the current conditions and finds out the existent problems. Second, finds out various causes resulting in those problems. Third, identifies the major factors from various causes. Fourth, works out the solution and improvement plan according to the major factors. Fifth, Carries out the plan and measures. Sixth, checks the implements according to requirements of the plan. Seventh, summarizes experiences and consolidates achievements. Eighth, turns problems that haven't been solved or appear newly into the next cycle.

2) "8" Type Quality Improvement Spiral

The "8" Type Quality Improvement Spiral is the basic operation unit of the internal quality assurance system model of higher vocational colleges and universities, and it is the innovative performance of the "55821" Diagnosis and Improvement Model. It integrates the working method of "Front-stage + Back-stage" in the information technology era and the dynamic and static balance provided by network information technology in the diagnosis and improvement of internal quality assurance system, The superimposed operation of "Static Cycle" and "Dynamic Cycle" can effectively implement the important measures for internal quality assurance improvement under the school-based information management platform. The "Front-stage" is the preliminary and basic work of diagnosis and improvement of the internal quality assurance system, responsible for the process of diagnosis and improvement of "objectives - criteria - plan - optimization - implementation- diagnosis - motivation - learning - innovation - improvement", dynamic correction, to provide process guarantee for quality improvement. The " Back-stage" is the key link and substantive work of the diagnosis and improvement of internal quality assurance system, which is the continuation of the work of the "Front-stage", and is responsible for "diagnosis - motivation - learning - innovation - improvement" and so on, and effectively promotes

quality enhancement by summarizing the gains and losses, analyzing the problems, and proposing improvement measures. ‘Static Cycle’, that is the process of “objectives - criteria - plan - optimization - implementation- diagnosis - motivation - learning - innovation - improvement”, reflects a complete workflow. The “Dynamic Cycle”, i.e. the process of issuing timely warnings based on the data obtained from the real-time monitoring of “plan - optimization - implementation” and making timely improvements to the work in progress, is a reflection of the fact that the quality generation process can be improved in a timely manner. The process of quality generation is a time-bound improvement of the problems identified in the quality generation process, which can ensure the smooth and effective generation of quality.

The two spirals intersect in the “plan - optimization - implementation” process, forming an organic whole that is complementary, interactive and indispensable. The input level elements of the internal quality assurance system, such as the optimizational system, the main system, the target system and the standard system, are all based on the School-based Information Management Platform to carry out independent diagnosis and improvement in accordance with the “8” Type Quality Improvement Spiral. At the same time, the Five vertical systems - “Decision-making Command System, Quality Generation System, Support Service System, Resource Assurance System , Supervision and Control System” are all in accordance with the principle of “objectives - criteria - plan - optimization - implementation- diagnosis - motivation - learning - innovation - improvement”.

4. Procedures

The internal quality assurance system model of Guangxi higher vocational colleges contained four operational procedures: Conceptual Level, Input Level, Process Level and Output Level. Specific activities for each tier are listed in the table 20 Shown.

Table 20 Specific activities of an internal quality assurance system model in higher vocational colleges in Guangxi

Procedures	Contents	Activities
Conceptual Level	Quality Assurance Philosophy (Quality Perspective)	1. Organize the study of relevant national and provincial policies and documents to understand the spiritual connotation 2. Integrate the spirit of the policy into the formulation of the school's work plan according to the diagnosis and reform work plan of the higher education administrative departments. 3. Develop a manual for learning theoretical knowledge related to the diagnosis and reform model, and distribute it to every staff and student for learning. 4. Organize various forms of quality theory training within the school, and organize leaders and teachers to participate in thematic training outside the school, so as to improve their theoretical level and quality awareness. 5. In the development and practice of the internal quality assurance system '55821' diagnosis and reform model, learning by doing, strengthening the understanding of the theory, and guiding the work practice with the theory. 6. Promote the concept of the 'diagnosis and reform' model, disseminate the quality culture, and enhance the quality consciousness of teachers and students.
	Organization	1. Clarify the school's internal optimizational setup, sort out departmental responsibilities and job duties. 2. Set up the optimizational structure for the construction of the internal quality assurance system of the school, and establish a four-level quality assurance optimization, namely, 'the general level of the school - the level of the administrative department which coordinates the quality of

Procedures	Contents	Activities
Input Level	System	majors, courses, teachers and students - the level of the second-level teaching units --Set up a four-level quality assurance optimization ‘at the general level of the university - at the level of the administrative department coordinating the quality generation of majors, courses, teachers and students - at the level of the second-level teaching unit - at the level of the professional level’, and set up a diagnostic team. 3. Define the composition and responsibilities of the diagnosis and reform team at each level, divide the work and co-operate with each other to promote the diagnosis and improvement of the school's internal quality assurance system.
	Subject System	1. Put the administrative departments and teaching units set up within the school in accordance with their roles in the internal quality system, and attribute them one by one to the five longitudinal systems - decision-making and commanding, quality generation, resource construction, support services and supervision and control systems. 2. Define the horizontal five quality generating subjects as: school, profession, course, teacher and student. This is the framework basis for the construction of the target system. 3. Define the administrative departments that co-ordinate the five levels of schools, majors, courses, teachers and students, such as the Quality Management Office is responsible for co-ordinating the school level, the Teaching Affairs Management Department is responsible for co-ordinating the two levels of majors and courses, the Personnel Management Department is responsible for co-ordinating the teachers‘ level, and the Student Work

Procedures	Contents	Activities
		Management Department is responsible for co-ordinating the students' level.
	Objective System (Objective Chain)	1. Create a goal system according to the goals and tasks of the school diagnosis and reform work programme. 2. According to the theory of goal management, formulate the 'five-year construction plan' at the levels of school, profession, curriculum, teachers and students. 3. According to the SMART principle, decompose the objectives and tasks, prepare the annual work plan, form a list of annual key tasks at the school level, professional level, curriculum level, teacher level and student level, and implement the tasks to the departments and responsible persons, with a clear timeframe and standard for completion.
	Criteria System (Criteria Chain)	1. According to the national and provincial standards, establish and improve the standard system at school level, professional level, curriculum level, teacher level and student level. 2. The standard system at each level should include standard documents for management, construction (development) and work at the level, such as the standard documents at the professional level, which need to include professional talent training programme, professional resource construction standards, professional internship training standards, etc.
	Operation System	1. Offline: The objectives and standards of the five levels of quality subjects, namely, schools, professions, courses, teachers and students, should be operated according to the principle of PDCA cycle. 2. Online: Relying on the school-based information

Procedures	Contents	Activities
Process Level		management platform, the objectives and tasks of the five levels of quality subjects should be operated according to the '8' quality improvement spiral on the diagnosis and reform platform. 3. Combined with the completion of the objectives and tasks of the quality subjects at the five levels of 'front stage' and 'back stage', self-diagnosis and problem analysis are carried out to complete the self-diagnosis and assessment, and the quality analysis report at each level is compiled.
	Mechanism Guarantee System	1. Prepare relevant working systems for the development of diagnosis and improvement models of the internal quality assurance system, normalized operation, evaluation and incentives. 2. Prepare the relevant system of target performance assessment and incentives in accordance with the theory of target management.
	School-based Information Management Platform	1. Procurement of an information management platform specifically designed to ensure the diagnosis and reform of the internal quality assurance system. 2. Customized development in accordance with the characteristics and needs of the school. 3. Build the internal quality assurance operation mechanism on the platform according to the 'five vertical and five horizontal' elements. 4. According to the '8' quality improvement spiral, promote the operation of the target tasks at each level, achieve real-time data collection, analysis, early warning, annual self-diagnosis and evaluation, and generate quality analysis reports at each five levels.
		1. The quality awareness of the leaders and staff of the

Procedures	Contents	Activities
Output Level	Quality Culture	management, teachers, students and co-operative enterprises has been continuously improved, forming a good atmosphere for all staff to participate in quality management. 2. Target management is more scientific and the degree of achievement has been improved. 3. Work is more standardized and regulated. 4. The sense of achievement of students and teachers is enhanced, and the satisfaction of stakeholders is improved. 5. The school's ability to operate has been strengthened, and its social influence has been expanded. 6. school governance capacity and management level have been improved.

6. Evaluation

The “55821” Diagnosis and Improvement Model of internal quality assurance system of higher vocational colleges advocated by the Ministry of Education of China was a new type of internal and external integration approach which was based on the internal self-assurance of the school and supplemented by the external peer expert review. “School self-assurance” meant “School Self-diagnosis and Improvement”, which emphasized that quality should be assured by itself in the final analysis; “External peer review” meant Sample Review by experts organized by provincial education administrations, so as to improve the credibility of the school's internal quality self-assurance by external review.

The School self-assurance emphasized self-checking, diagnosing problems, searching for reasons and proposing improvement measures for the objectives, plans and measures formulated before, and its motive was spontaneous and autonomous in nature, aiming at quality improvement and optimizational innovation, and gradually forming the school's self-control quality culture. The Sample Review to Diagnosis and Improvement organized by the Department of Education and carried out by the experts at the school's site was an external assessment approach, which was a

powerful complement to the internal independent diagnostic and improvemental of the school. The integration of the two was important for the effective operation and regularization of the internal quality assurance system in higher education institutions. As this evaluation approach originated from the “55821” Diagnosis and Improvement Model advocated by the Ministry of Education of China, it consisted of internal and external parts, and included “Establishment of expert panel - Self-assessment - Online peer review - Peer review by On-site Visit - Publication of evaluation reports”, so it was called the “Five-stage Approach to Diagnosis and Improvement Model”. In conclusion, the evaluation approach of the internal quality assurance system model in Guangxi's higher vocational colleges would also adopt this method to carry out comprehensive evaluation from both internal and external aspects.

The document of the Ministry of Education of China on the implementation programme for the diagnosis and improvement of the internal quality assurance system of higher vocational colleges pointed out that the results of the Sample Review were divided into two categories: “validity” and “to be improved”. If the evaluation conclusion was “to be improved”, the reviewed higher vocational institution could have a one-year improvement period, and can take the initiative to apply for review again after one year. In the case of a “validity” conclusion, it meant that the institution does not need to undergo sampling review within three years of the same cycle. It focused on emphasizing diagnosis and improvement, and identifying problems in a timely manner based on feedback information for correction and improvement.

1) Five-stage Approach to Diagnosis and Improvement Model

Stage 1: Establishment of expert panel

The optimizational structure for the external assessment is implemented by setting up a relevant expert organizing committee led by the education administrative department. At the same time, the education administrative departments of each province, in accordance with the requirements of the national policy and the implementation programme, formulate the implementation programme for the diagnosis and improvement of the internal quality assurance system of higher vocational colleges in their own provinces, which will be used to guide the construction of the internal quality assurance system of individual higher vocational colleges.

Stage 2: Self-assessment

Each higher vocational college , in accordance with the requirements of the provincial implementation programme and relevant policies, formulates the institution's diagnosis and improvement implementation programme, specifies the work objectives and tasks, completion progress, responsible persons, completion standards, etc., prepares a list of work tasks and promotes the relevant diagnosis and improvement work in a timely manner in accordance with the list, and implements self-diagnosis and improvement in accordance with the year.

Stage 3: Online peer review

Institutions accepting the Sample Review are required to provide electronic copies of relevant materials for the current cycle (three years) in accordance with the "Review Contents" in the "*Notice on the Issuance of Guidelines for the Review of Diagnosis and Improvement of Internal Quality Assurance Systems in Higher Vocational Institutions (Trial)*" published by the Ministry of Education in 2018, and to send the materials to the inbound experts half a month in advance. The experts review the school's internal quality assurance online. The experts review online the materials related to the construction of the school's internal quality assurance system, which basically include the framework elements of "Five Vertical, Five Horizontal and One Platform", as well as the components of the internal quality assurance system such as Organization System, Subject System, Objective System (Objective Chain), Criteria System (Criteria Chain), Operation System,Mechanism Guarantee System,Quality Culture, School-based Information Management Platform.The main elements of the expert on-site review are shown in Table 21 Shown.

Table 21 The main elements of expert on-site review

Content of the review	**request**
	Review the scientificity, systematicity, feasibility, implementation and effectiveness of the target chain and standard chain (referred to as the two chains). Review the scientificity, coverage, feasibility, implementation and effectiveness of the construction of the five levels of the 'octagonal quality improvement spiral' (the spiral for

Content of the review	request	
(i)	short). Review the driving and operation of the school's quality culture and mechanism engine (the engine for short) and its effectiveness.	
Construction and operation of an internal quality assurance system	1. Construction and implementation of Objective System And Criteria System ("Double Chain" building)	(1) Whether the school development plan has become a system, whether the school development objectives have been transferred to the professional, curriculum and teacher levels, and whether the objectives are linked up and down to form a chain. Whether the responsibilities of school institutions are clear, whether job work standards are established, and whether there is an effective mechanism for the implementation of standards and systems. (2) Whether the objectives and standards of the professional construction plan are in line with the school's plan, and whether they are appropriate to its own foundation. Whether the objectives and standards are clear, specific and testable. (3) Whether the objectives and standards of the curriculum construction planning are in line with the professional construction planning, and whether they are appropriate to its own foundation. Whether the objectives and standards are clear, specific and testable. (4) Whether the teacher's personal

Content of the review	request	
		development goals are appropriate to the school's teacher construction plan and professional construction plan and other related requirements, and whether the teacher has formulated a personal development plan and the corresponding goals and standards. Whether the objectives and standards are clear, specific, testable and appropriate to their own foundation. (5) Whether students have formulated personal development plans, and whether their personal development goals are appropriate to the school's talent cultivation programme and quality education requirements. Whether the school has established a system to guide students in making personal development plans.
	2. Establishment and operation of the "8" Type Quality Improvement Spiral	(1) Whether the school has an operational mechanism for the decomposition, implementation, diagnosis and improvement of planning and annual objectives and tasks. Whether there is a monitoring, early warning and improvement mechanism for the implementation process, and whether the methods and means are convenient and operable. Whether the school has

Content of the review	request	
		established a diagnosis and improvement system for various optimizations to perform their duties, and whether the methods and means are operable and effective. (2) Whether to establish a system for diagnosis and reform of professional and course construction and course teaching quality, whether the content of diagnosis and reform helps to achieve the goals, whether the diagnosis and reform cycle is reasonable, and whether the methods and means of diagnosis and reform are convenient and operable. (3) Whether a self-diagnosis and reform system for teachers' personal development is established, whether the cycle is reasonable, and whether the methods are convenient and operable. (4) Whether the school guides students to carry out self-diagnosis and reform, whether the cycle is reasonable, and whether the methods are convenient and operable. (5) Whether the diagnostic conclusions of the five levels are based on data and facts, whether the statements in the self-diagnostic report are clear and specific, and whether the improvement measures are

Content of the review	request	
		effective.
	3. The driving role and effectiveness of the "twin engines" of the Mechanism Guarantee System and Quality Culture	(1) Whether school leaders attach importance to the diagnosis and reform and promote it in a solid manner, and whether teachers, students and staff generally accept the concept of diagnosis and reform and implement it in their conscious actions. (2) Whether the school has established a system of assessment and incentives in line with the internal quality assurance system, combining assessment and self-diagnosis and reform, reflecting the change from external supervision to self-diagnosis and reform. (3) Whether the self-diagnosis and reform of each subject tends to be normalized gradually. Teachers, students and staff are satisfied with the school diagnosis and reform work and have a sense of gain.
(ii) Platform construction	Review the support of the school platform for the operation of the internal quality assurance system, focusing on the top-level design, construction, application and effectiveness of the platform.	
	1. Whether the school carries out top-level design for the construction of information technology management platform according to intelligent	(1) Be able to realize the source and immediate collection of data. (2) Be able to eliminate information silos and realize real-time open sharing of data. (3) Capable of data analysis and real-time presentation of analysis results.

Content of the review	request	
and application	requirements, and whether the platform architecture has the function of real-time and normalized support for school diagnosis and reform work.	
	2. Whether the school follows the top-level design blueprint and pushes forward the construction of the platform in a solid manner.	On-site inspection of the construction of the platform and operation demonstration to explain the construction situation
	3. What has the school done in terms of data analysis and application, and what results have been achieved.	

Stage 4: Peer review by on-site visit

The expert group enters the school for Site Review, through data analysis, state inspection, surface survey, in-depth discussion, sampling and analysis, and multi-dimensional construction.

The expert group visit the school to work for 1-2 days, according to “listening to the school level diagnosis and improvement work on-site report - listening to the major, curriculum, teacher, student level diagnosis and improvement work on-site report - group discussion separately with school leaders, middle-level leaders, full-time teachers, students - experts on-site inspection of information - expert

feedback on-site". After the on-site review, a report on Sample Review will be formed, and feedback on the review and recommendations will be given to the school in the form of a meeting exchange.

Stage 5: Publication of evaluation reports.

Based on the results of the two parts of the Sample Review, the provincial education administration will publish the conclusions of the reviewed institutions in a document for the public.

Step 3: Results of evaluating the suitability and feasibility of an internal quality assurance system model, and the conditions for successful use of the model in higher vocational colleges in Guangxi,China.

1. Results of evaluating the suitability and feasibility of an internal quality assurance system model in higher vocational colleges in Guangxi,China.

The evaluations of the five experts effectively proved the suitability and feasibility of the internal quality assurance system model of higher vocational colleges in Guangxi , as shown in Table 22.

Table 22 Mean and Standard Deviations of the suitability and feasibility level of the internal quality assurance system model in higher vocational colleges in Guangxi

Items of model components	Suitability			Feasibility		
	$\bar{x}$	SD	Interpret	$\bar{x}$	SD	Interpret
1. Concepts	4.73	0.331	Very high	4.73	0.331	Very high
2. Principles	4.69	0.364	Very high	4.58	0.370	Very high
3. Objectives	4.71	0.351	Very high	4.70	0.364	Very high
4. Contents	4.69	0.362	Very high	4.73	0.335	Very high
5. Approaches	4.70	0.362	Very high	4.69	0.362	Very high
6. Procedures	4.67	0.376	Very high	4.70	0.364	Very high
7. Evaluation	4.69	0.368	Very high	4.71	0.357	Very high

It was pointed out from Table 22 that the components of the internal quality assurance system model of higher vocational colleges in Guangxi was 1) Concepts, 2) Principles,3)Objectives,4)Contents, 5) Approaches, 6)Procedures,7) Evaluation,which all had very high suitability and feasibility level.

2. The conditions for successful use of the model in higher vocational colleges in Guangxi,China.

The essence of the internal quality assurance system of higher vocational colleges was to establish a spontaneous quality management mechanism to ensure that the school has a continuous, stable and high level of quality output, emphasizing more on the quality of the main body of "self-diagnosis and improvement", highlighting the main body of the quality of the generation of independent control, independent assurance and operation mechanism. It emphasized the "subjectivity", "development" and "normalization" of the independent control, independent assurance and operation mechanism of the quality generating body, and shifted the "subject" from the other party to itself, and changed the purpose from proving to improving (Yang Yingsong, 2017).

The conditions for the successful implementation of the Diagnosis and Improvement Model of the internal quality assurance system in Chinese higher vocational colleges: First, the construction of the objective system and the criteria system was the logical starting point for the construction of the internal quality assurance system.The second was to establish the concept of "Quality comes down to self-assurance" consciousness and emphasized that institutions were the primary responsible body for quality assurance, and must take the responsibility of independent guarantee; the third was to emphasize that quality was the product of the process, and must be all staff, all process and all participation, i.e. the "three wholes" to put it into practice; and the fourth was to emphasize the importance of the role of modern information technology, which must be relied on to support (Yang Yingsong&Yuan Hongzhi&He Xitao,2019) .

The key to the successful implementation of the Diagnosis and Improvement Model of internal quality assurance system in higher vocational colleges lied in the school's ability to focus on the core connotation of "quality autonomy assurance", "tailor-made" goals and standards, cultivate the school's endogenous development power, and build an effective

mechanism of "Diagnosis and Improvement" with a problem-oriented approach (Wang Qiuyi, 2020).

The Diagnosis and Improvement Model of internal quality assurance system in higher vocational colleges in China emphasized that institutions were the first responsible body for quality assurance, and that they needed to establish a quality culture and improve the quality standard system. In the application and implementation of the Diagnosis and Improvement Model, five integrations were needed: first, the school-based characteristics were integrated into the annual implementation program of diagnosis and improvement, second, the short board weaknesses were integrated into the development goals, third, the development goals were integrated into the construction of standards, fourth, the Diagnosis and Improvement work was integrated into the daily work, and fifth, the platform data analysis was integrated into the top design and decision-making decisions (Xu Jie, 2021).

CHAPTER V
CONCLUSION

Research on Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China, the researcher summarized the results of data analysis, discussed the results, and made suggestions, as follows:

1. Research objectives
2. Research results
3. Discussion
4. Suggestions

Research Objectives

1. To study the components of internal quality assurance system in higher vocational colleges in Guangxi, China.

2. To explore the current state, desired state and priority needs of internal quality assurance system in higher vocational colleges in Guangxi, China.

3. To develop a model of an internal quality assurance system in higher vocational colleges in Guangxi, China.

Research Results

The full results of this study were reported according to the order of study questions:

1. The results of the study found that the components of internal quality assurance system in higher vocational colleges in Guangxi included nine components: 1) Quality Assurance Philosophy (Quality Perspective), 2) Organization System, 3) Subject System, 4) Objective System (Objective Chain), 5) Criteria System (Criteria Chain), 6) Operation System, 7)Mechanism Guarantee System, 8)Quality Culture, 9) School-based Information Management Platform.

2. Explore the current state, desired state , priority needs and $PNI_{modified}$ of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China.The results summarize that the current state of constructing an internal

quality assurance system in higher vocational colleges in Guangxi,China was overall level at medium ($\bar{x}$=2.85), having significant room for enhancement and improvement, providing important support for this study. And as a result of the study, it was found that the desired state of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China was was overall level at very high ($\bar{x}$= 4.70).The Priority Need Index modified ($PNI_{modified}$) was found in order from the highest to the lowest as follows: the first was Criteria System (Criteria Chain), the second was Operation System, and the third was Objective System(Objective Chain), the fourth was School-based Information Management Platform, the Fifth was Quality Assurance Philosophy (Quality Perspective), the sixth was Quality Culture, the seventh was Mechanism Guarantee System, the eighth was Organization System, and the ninth was Subject System. The $PNI_{modified}$ value respectively were 0.936, 0.812, 0.784, 0.746, 0.738, 0.709, 0.559, 0.325, 0.307.

3. Develop a model of an internal quality assurance system in higher vocational colleges in Guangxi,China. The results found that the model included seven components: 1) Concepts, 2)Principles, 3)Objectives, 4)Contents, 5)Approaches, 6) Procedures, 7)Evaluation. Results for evaluating the suitability and feasibility of the components of the model were all very high.

Discussion

1. Based on the research questions, the general discussion of the results of this study is as follows:

According to the findings of the study on the components of internal quality assurance system in higher vocational colleges in Guangxi. it was found that the components of internal quality assurance system consisted of 9 elements by starting from the research and synthesis of the literature by various scholars, which were verified by 5 experts: 1) Quality Assurance Philosophy (Quality Perspective), 2) Organization System, 3) Subject System, 4) Objective System (Objective Chain), 5) Criteria System (Criteria Chain), 6) Operation System, 7)Mechanism Guarantee System, 8)Quality Culture, 9) School-based Information Management Platform.

2. The current state, desired state , priority needs and $PNI_{modified}$ of constructing an internal quality assurance system in higher vocational colleges in Guangxi,China. were explored as follows:

2.1 The current state of constructing an internal quality assurance system in higher vocational colleges in Guangxi

It was found that the current state of an internal quality assurance system of higher vocational colleges in Guangxi were overall level at medium ($\bar{x}$=2.85). Considering each aspects, it was found that the current state levels were ranked from highest to lowest as follows: 1)Subject System, 2)Organization System,3)Mechanism Guarantee System, 4)Quality Culture, 5)School-based Information Management Platform,6)Objective System(Objective Chain), 7)Operation System,8)Quality Assurance Philosophy (Quality Perspective),9) Criteria System (Criteria Chain). From the ranking order, the construction and development of the constituent parts of the internal quality assurance system in Guangxi's higher vocational colleges was uneven and varied. When developing the internal quality assurance system model, it was necessary to focus on and strengthen the modules with relatively low scores, such as Criteria System (Criteria Chain), Quality Assurance Philosophy (Quality Perspective), Operation System, the Objective System (Objective Chain), School-based Information Management Platform, and Quality Culture. Attention and investment in these modules would effectively guarantee the regular, sustainable and effective operation of the internal quality assurance system model of higher vocational colleges, and promote the school's internal quality assurance system model sustainable and effective operation, and promote the improvement of the quality of talent cultivation in schools.

2.2 The desired state of constructing an internal quality assurance system in higher vocational colleges in Guangxi

The desired state of the internal quality assurance system of higher vocational colleges in Guangxi was overall level in very high ($\bar{x}$= 4.70). Considering all aspects, It was found that the level of desired state was ranked from highest to lowest as follows: 1)Criteria System (Criteria Chain),2)Operation System,3)Objective System(Objective Chain), 4)Quality Culture, 5)Mechanism Guarantee System, 6)School-based Information Management Platform, 7)Organizational System, 8)Subject System,9)Quality Assurance Philosophy (Quality Perspective). From the

mean value of each dimension, it could be seen that there were obvious differences in the developmental expectations between the components of the internal quality assurance system in Guangxi's higher vocational colleges. These differences in expectations reflected the strong needs and expectations of participants in internal quality assurance in higher vocational colleges and related stakeholders for autonomous internal quality assurance, and also reflected from the side the shortcomings and shortcomings of the current construction of internal quality assurance system in higher vocational colleges in Guangxi, which urgently needed to be given enough attention and improvement in the future work.

Because the ranking of expectation conditions reflected the importance ranking of different components in the minds of participants and stakeholders in the construction of internal quality assurance system or the ranking of problems to be solved under the ideal state, it was of great significance to the development and operation of internal quality assurance system model. Guangxi higher vocational colleges should give targeted importance tilts based on the order of these expectations when developing internal quality assurance system models, such as Criteria System (Criteria Chain), Operation System, Objective System (Objective Chain), Quality Culture, Mechanism Guarantee System (Mechanism Guarantee System), and Quality Culture (Mechanism Guarantee System). In response to these modules, when preparing the annual diagnosis and improvement work programme, vigorous measures would be taken to enhance and improve them in a timely manner, so as to ensure the holistic development of the internal quality assurance system of the institution, effectively enhance the sense of accessibility of teachers and students, increase the satisfaction of stakeholders, and promote the enhancement of the quality of human resources training.

2.3 Priority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi

The Priority Needs Index modified ($PNI_{modified}$) was found in order from high to low as follows: the first was Criteria System (Criteria Chain), the second was Operation System, the third was Objective System(Objective Chain), the fourth was School-based Information Management Platform, the fifth was Quality Assurance Philosophy (Quality Perspective), the sixth was Quality Culture, the seventh was

Mechanism Guarantee System, the eighth was Organization System, and the ninth was Subject System.

From a comprehensive viewpoint, the order of priority needs for the development of an internal quality assurance system model in higher vocational colleges in Guangxi was Criteria System (Criteria Chain), Operation System, Objective System(Objective Chain), School-based Information Management Platform, Quality Assurance Philosophy (Quality Perspective), and Quality Culture. This indicated that the current problems of these six components were relatively prominent, the degree of attention was insufficient, or the construction effect was not satisfactory. This indicated that the above six components were currently facing problems, have not been given enough attention, and have not been constructed in a satisfactory manner. The analysis of the Priority Needs Index provides important references for the educational administrative departments that prepare policies related to the internal quality assurance system of higher vocational colleges, the participants in the development of the internal quality assurance system model in higher vocational colleges, and the experts and peers who carried out the Diagnosis and Improvement Review, so as to formulate policies, build programme, and provide consultancy in a targeted manner, and to help higher vocational colleges to better promote the construction of the internal quality assurance system and improve the quality of talent cultivation.

2.3.1 Objective System(Objective Chain) and Criteria System (Criteria Chain)

The quality goal was the direct embodiment of the concept of quality in higher education (Lin Ke, 2008), and it was also the top priority of internal quality assurance work. "Quality comes down to self-assurance", and the logical starting point for the construction of the Diagnosis and Improvement Model of the internal quality assurance system was the creation of an "Objective Chain" and a "Criteria Chain" for school development and talent cultivation (Yang Yingsong & Yuan Hongzhi, 2020). Construct a quality target system to provide a source of power for the construction of internal quality assurance system, while the quality standard was the bottom line to measure the achievement of the target, but also an important basis for the effectiveness of quality construction and evaluation of the objectives, the scientific and effective quality criteria system was an important prerequisite for the operation of the internal

quality assurance system (Wang Sheng, 2023). Therefore, the development of the Diagnosis and Improvement Model of the internal assuranc system in higher vocational colleges, the first task should be to formulate a clear Objective System (Objective Chain) and a Criteria System (Criteria Chain), according to the school running orientation and development goals, from School, Major, Curriculum, Teacher, and Student horizontal five levels to establish a relatively independent and up and down to echo, left and right through the chain of objectives, mutually supportive, and at the same time, combined with the national, regional and national development needs. At the same time, a clear, streamlined and focused chain of criteria was formulated in accordance with the development needs of the country and the region (Xu Jie, 2021; Wang Qiunyi, 2020; Wang Zucheng & Kong Xianghua &Yun Liang, 2019). The formulation of objectives and criteria for higher vocational colleges must follow the basic principles and methods of the Total Quality Management Theory, Systems Theory, and Management by Objectives Theory, and the formulation of the criteria system should follow the SMART principle, and formulate the objectives of the hain), according to the logical relationship of "specific objectives, measurable tasks, achievable work, relevant behaviours and clear deadlines", “School, Major, Curriculum, Teacher, and Student”, five levels of responsibility for the main body of the goal achievement standards (Wang Sheng, 2023).

2.3.2 Operation System

The development of Diagnosis and Improvement Model of internal quality assurance system in higher vocational colleges was not a work limited to the theoretical level of discussion, but a practical work applied at the practical level, and it was a regular practical work carried out over a long period of time and constantly recycled, so as to continuously promoted the development of the school itself and the quality of talent cultivation (Xu Jie, 2021). After solving the problem of quality awareness, objectives and criteria, whether the quality-related measures could be carried out throughout and implemented consistently, it was necessary to have a complete set of operating systems, the need for organic integration of daily work and diagnostic improvement work, the establishment of their own "8" Type Quality Improvement Spiral, the formation of a new way of working, process and format(Yang Yingsong& Zong Meijuan, 2017). Therefore, higher vocational colleges should

improve the internal quality management optimization, establish a standing Operation System and related mechanisms, and implement the whole process management of objectives and criteria according to the requirements of PDCA Cycle Theory and Continuous Improvement Theory, so as to make the quality management form a closed loop (Zhang Ting& Que Mingkun, 2019). At the same time, higher vocational colleges should also make use of the information technology platform, rely on the digital technology of big data information, and according to the "8" Type Quality Improvement Spiral, collected the key diagnostic elements of the school's educational goals, educational philosophy, type orientation, professional environment and conditions, curriculum system construction, and industry-teaching fusion construction, etc., and then, after comparing the quality results and the set goals, the school would search for deficiencies and timely warnings, organize and categorize the deviation data generated by the quality, analyze the various factors affecting the internal quality, and provide the basis and reference for the subsequent improvement work.

2.3.3 School-based Information Management Platform

The Internet, cloud computing and other emerging technologies were profoundly affecting the shape of education and teaching and the path of quality generation in Chinese colleges and universities. If a perfect internal quality assurance system was built on the basis of more symmetrical and comprehensive quality information, the more precise the disclosure, mining, analysis and application of quality information, the more big data coild be used to drive quality assurance like refinement (Ji Guoju & Wu Daguang &Xue Chenglong, 2018). Therefore, the School-based Information Management Platform was crucial to whether the internal quality assurance system in higher vocational colleges could effectively implement process management, early warning analysis and diagnostic improvement (Zhang Ting& Que Mingkun, 2019). In developing and operating the School-based Information Management Platform, institutions should pay attention to the authenticity, scientificity, collectability, dynamism and interactivity of the data, and follow the principles of System Theory, Continuous Improvement Theory and the "8" Type Quality Improvement Spiral. On the one hand, the construction of the platform was continuously improved to realize the stability and sharing of the basic data, and to provide real-time dynamic and comprehensive feedback on the quality status of the five

levels of School, Major, Curriculum, Teacher, and Student; on the other hand, the school-based characteristics were integrated into the development and construction of the platform, and the data analysis was applied to the top-level design and decision-making of the school (Lin Yueru & Shi Weiping, 2018).

2.3.4 Quality Assurance Philosophy (Quality Perspective) and Quality Culture

Total Quality Management Theory, System Theory and Fourth Generation Evaluation Theory all contain the systemic concept, which is the basic idea and working method for the effective implementation of the Diagnosis and Improvement Model of internal quality assurance system in higher vocational colleges (He Yiting, 2021). To guide the construction of internal quality assurance system of higher vocational colleges with the systemic concept was basically to refine the systemic concept and transform the systemic concept into practical operational strategies and action plans, and the dominant logic was to transform the important connotations such as "forward-looking thinking, global planning, strategic layout and holistic advancement" put forward by the systemic concept into specific logical paths. It was mainly embodied in the design of quality objectives of forward-looking thinking, the quality standard system of global planning, the quality assurance system of strategic layout, and the operation system of holistic promotion of diagnosis and improvement (Chi Yunxia & Xie Yuan & Li Xinli, 2021).

Quality culture was the main internal driving force of quality assurance in higher education, and it was also conducive to the formation of long-term mechanism and virtuous cycle of quality assurance construction (Song Haisheng, 2023). The core of the construction of internal quality assurance system in higher education was the recognition and participation of the whole staff, higher education institutions should take the preaching and training of quality theory and quality concept as a breakthrough, and opened up the construction of quality culture in depth, which needed to internalise the idea of autonomous quality assurance into the quality-seeking behaviour of every manager, teacher and student in the school (Chen Xiangping, 2017). Quality culture includes quality concept, quality awareness, mechanism culture, material culture, spiritual culture and so on. Among them, mechanism culture was the "root" of school quality culture, which was the sum of management documents, quality standards,

performance evaluation system documents, etc., formulated by higher vocational colleges to realize a series of quality improvement goals of the school, and should pay attention to the role of these documents in the management of school education quality, and formulate a system in accordance with the quality value of the school according to the situation of the school. Material culture is the "form" of school quality culture, which was the foundation and guarantee of the quality culture of vocational colleges and universities, and was embodied in campus style, building architecture, humanistic landscape, etc. And spiritual culture was the essence of school quality culture. Spiritual culture was the "God" of school quality culture, which enhanced the ideological protection of institutional culture and material culture, was the recognition of the quality concept and quality values by all teachers and students, and was the source of power for the sustainable improvement of the quality of education. Therefore, the cultivation of campus spiritual culture should continuously strengthen the knowledge and concept of quality assurance, help teachers and students to establish quality awareness, quality goals and quality initiatives, and form a sense of quality anxiety (Li Yunshan & Wang Mei et al., 2021)). Therefore, higher vocational colleges should actively strengthen the construction of quality culture, and in the process of continuous self-reflection, borrowing and creation, move from the explicit quality assurance system norms to the implicit quality culture self-awareness, and build a series of top-down quality assurance culture system that can reflect the nature, characteristics and connotation of higher vocational education.

3. Develop a model of internal quality assurance system in higher vocational colleges in Guangxi,China

The research results had shown that the model included seven components: 1) Principles, 2) Objectives, 3) Approaches, 4) Procedures, 5) Evaluations. As the Table19 and the Figure 5 shown.

1) Principles: the basic guidance or norms used in developing the model.

2) Objectives: the specific goals that the development model hopes to achieve.

3) Approaches: the approaches and methods used in developing the model.

4) Procedures: the specific implementation steps and management processes used in developing the model.

5) Evaluation: the specific implementation steps and management processes used in developing the model.

Suggestions

1. Suggestions for using the results of the study

In order to promote the construction of internal quality assurance system in Guangxi higher vocational colleges, provide participants with an operable construction path and basic framework, and at the same time enhance the effect of the construction of internal quality assurance system in Guangxi higher vocational colleges to ensure that the quality of talent cultivation is improved, the researcher recommended the results of this study as follows:

1）Before construction, each institution should familiarize itself with the relevant theories, principles, components, approaches and other elements of the internal quality assurance system, and systematically and scientifically construct an internal quality assurance system with school-based characteristics according to the school's operating definition and actual situation.

2) Clarify the school's main position of Self-assurance in the internal quality assurance system and stimulate the endogenous motivation.

3) Strengthen the learning and application of the concept, focus on the balanced development and construction of the system's constituent parts on the basis of the reference model, and scientifically and rationally develop an internal quality assurance system model that meets the actual needs of your school.

4) Accurately build an Objective System and a Criteria System, and form an Objective Chain and a Criteria Chain that are connected up and down, left and right.

5) Promote the normalization and effective operation of the objectives and tasks at all levels in accordance with the "8" Type Quality Improvement Spiral, improve the School-based Information Management Platform, and give full play to the function of making decisions with data.

6) Improve the Mechanism Guarantee System, perfect the internal quality assurance system management, development, evaluation and other aspects of the system, set up the whole staff, endogenous quality concept, to create a modern governance quality culture, fulfilling the driving role of the “Double Engines” .

2. Suggestions for future research

1) Research on the development of a model for improving the effectiveness of the internal quality assurance system of Guangxi's higher vocational colleges.

2) Research on the influencing factors of the effectiveness of the internal quality assurance system of Guangxi's higher vocational colleges under the concept of “student-centred”.

3) To study the strategies for improving the internal quality assurance system in Guangxi's higher vocational colleges.

4) Research on the programme for developing the internal quality assurance system in Guangxi's higher vocational colleges.

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APPENDIX

Appendix I

List of experts

List of experts to evaluate the components of model

Five Experts who were chosen to evaluate and check the suitability of competence components of internal quality assurance system in Higher Vocational Colleges in Guangxi. This study selected presidents or provincial quality evaluation experts with master's degree or above, familiar with professional knowledge and work experience in education evaluation, education management, quality management, teaching and learning, and other professional knowledge and work experience of higher vocational colleges etc. as candidates to evaluate the components of the model. The names and qualifications of the experts were listed below:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(3) Liu Cunxiang, Professor of Guangxi Vocational College of Water Resource and Electric Power,Vice-President;

(4) Hu Yingqing, Professor of Guangxi College of Sports and Education, President;

(5) Wang Zihao, Associate Professor, Director of the Office Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges, Guangxi Zhuang Autonomous Region.

List of experts to evaluat the research tools

Based on the components of internal quality assurance system in higher vocational colleges in Guangxi, the questionnaire was designed. The first draft of the questionnaire was submitted to the consultant for correction, which accurate questionnaire were sent to 5 experts:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(3) Yang Changpeng,Guangxi College of Sports and Education, Secretary;

(4) She Yabin, Doctor, Professor of Guangxi College for Preschool Education, Director of Academic Affairs and Research Management;

(5) Mai Qihao, Professor of Beihai Vocational College,Guangxi, Vice-president.

List of experts participating in the interview

Develop a program to enhance competence of competence of arts teachers in universities under the backgroung of “New Liberal Arts” in Ningxia. In-depth interviews with 5 experts for studying the principles, methods and times for developing competence of art teachers. The experts' standards were as follows:1) have expertise in the field of education and training educational management, educational research or educational psychology, with at least a doctoral degree. 2) experience in teaching and educational leadership.3) teaching and advising postgraduate students in the above fields. The experts' names and qualification:

(1) Yang Changpeng, Professor of Guangxi College of Sports and Education, Secretary;

(2) Li Yanrong, Professor of Guangxi College for Preschool Education, Vice-president.

(3) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(4) Wang Zihao, Associate Professor, Director of the Office Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges, Guangxi Zhuang Autonomous Region;

(5) She Yabin, Doctor, Professor of Guangxi College for Preschool Education, Director of Academic Affairs and Research Management.

List of experts to evaluate the suitability and feasibility of the program

This study conducted in-depth interviews around the model development to construct internal quality assurance system in higher vocational colleges in Guangxi. Combined with the current state, desired state and piority needs of constructing an internal quality assurance system in higher vocational colleges in Guangxi, the interviews were mainly conducted in face-to-face interviews and semi-structured forms.

The evaluation form and the draft model were sent to five experts to evaluate the the suitability and feasibility of the model to constructing internal quality assurance system in higher vocational colleges in Guangxi.

This study selected five experienced experts who were leaders or provincial quality evaluation experts with master's degree or above, familiar with professional knowledge and work experience in education evaluation, education management, quality management/quality evaluation, teaching and learning, and other professional knowledge and work experience of higher vocational colleges etc. as candidates to evaluate the the suitability and feasibility of the model, proposing some suggestions to develop a model of internal quality assurance system in higher vocational colleges in Guangxi. The names and qualifications of five experts are listed below:

(1) Wen Ping, Doctor, Professor of Guangxi College for Preschool Education, President;

(2) Yang Changpeng,Guangxi College of Sports and Education, Secretary;

(3) Liu Cunxiang, Professor of Guangxi Vocational College of Water Resource and Electric Power,Vice-President;

(4) Wu Yan, Professor of Guangxi College for Preschool Education, Director of Quality Management Office;

(5) Wang Zihao, Associate Professor, Director of the Office Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges, Guangxi Zhuang Autonomous Region.

Appendix II

Research tools

MAHASARAKHAM UNIVERSITY ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS

Certificate of Approval

Approval number: 502-513/2024

Title : Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

Principal Investigator : Liang Xiaoli
Responsible Department : Faculty of Education
Research site : Guangxi Province, China

Review Method : Expedited Review

Date of Manufacture : 14 August 2024 **expire :** 13 August 2025

This research application has been reviewed and approved by the Ethics Committee for Research Involving Human Subjects, Mahasarakham University, Thailand. Approval is dependent on local ethical approval having been received. Any subsequent changes to the consent form must be re-submitted to the Committee.

Ratree S.

(Assistant Professor Ratree Sawangjit)
Chairman

Approval is granted subject to the following conditions: (see back of this Certificate)

Experts evaluation Form

The components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China

Statement

1. Evaluation the suitability of the components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China, divided into 3 parts as follows:

Part 1. General information of expert.

Part 2. Evaluating the suitability of components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

Part 3. Suggestions regarding the components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

The researcher hopes to receive your kindness , thank you very much.

Yours sincerely

.....

Part 1. General information of expert

1. Name .....

2. Position .....

3.Institution .....

Part 2. Evaluating the suitability of components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

Instructions please check a mark enter in suitability fields. You have taken actions that suitability according to the following criteria:

5 means suitability at the highest level

4 means suitability at the high level

3 means suitability at the medium level

2 means suitability at the low level

1 means suitability at the lowest level

NO.	Components	Suitability				
		5	4	3	2	1
1	Quality Assurance Philosophy (Quality Perspective)					
2	Organization System					
3	Subject System					
4	Objective System (Objective Chain)					
5	Criteria System (Criteria Chain)					
6	Operation System					
7	Mechanism Guarantee System					
8	Quality Culture					
9	School-based Information Management Platform					

Part 3. Suggestions regarding the components of an Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

……

……

Questionnaire

Developing a Model of Internal Quality Assurance System in the Vocational Colleges in Guangxi，China

Statement

1.Questionnaire aims to study current state and desired state of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

The questionnaire consists of 2 parts as follows:

Part 1: General information of the respondents.

Part 2: Current state and desired state of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China.

2. Respondents please answer all questions in the questionnaire.

3. Survey results will be used for research purposes only. without any impact on the respondents.

4. Thank you to all respondents who cooperated in answering the questionnaire

Mrs. Xiaoli Liang

Doctoral degree students Doctor of Education Program (Ed.D.)

Major: Educational Administration and Development.

Faculty of Education Mahasarakham University

Part I: General information for the questionnaire responses.

Explanation: This questionnaire is a questionnaire about personal characteristics. Please mark √ in □that matches your status

1. Gender

□□Male

□□Female

2. Age

□□Between 25 - 35 years

□□Between 36 and 40 years of age

□□ Between 41 and 45 years of age

□□Between 46 and 50 years of age

□□>50 years

3. Years of participation in the workforce

□□Within 2 years

□□3-5 years

□□6-10 years

□□11-15 years

☐□15 years (not included) or more

4. Your highest level of education

☐□Undergraduate

☐□Master's Degree

☐□ Doctoral Degree

5. Your current professional title

☐□Teaching assistants

☐□ College lecturers

☐□ Associate professors in higher education

☐□College professors

6. How many years have you been in contact with/learn about the Diagnosis and Improvement of the internal quality assurance system (Diagnosis and Improvement Model).

☐ No contact, no knowledge

☐ Up to 1 year

☐ 2-3 years

☐ 4-5 years

☐ More than 5 years

Part II: Questionnaire regarding opinions regarding the current state and desired state of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China. please check a mark √ enter in the current state and desired state fields. You have taken actions that current state and desired state according to the following criteria:

A special reminder:

"5" means current state and desired state at the highest level

"4" means current state and desired state at the high level

"3" means current state and desired state at the medium level

"2" means current state and desired state at the low level

"1" means current state and desired state at the lowest level

Title	Current state					Desired state				
	5	4	3	2	1	5	4	3	2	1
Part I Quality Assurance Philosophy (Quality Perspective)										
1.Your school has construced an internal quality assurance system in place.										
2.Your school has developed a student-centred view of quality and has clear quality objectives.										
3.you think the internal quality assurance system can promote the quality of talent cultivation in schools.										
4.Leaders, teachers, and students in your school are										

highly motivated to the diagnosis and improvement of the internal quality assurance system.										
5.Your school's leadership places a strong emphasis on internal quality assurance systems.										
6.Teachers and students in your school are familiar with the basic framework, connotation and process of the diagnosis and improvement of the internal quality assurance system.										
7.Your school has a robust internal quality assurance system and has an annual program of work to implement it.										
8.Your school has received at least one Provincial-level Diagnostic and Improvement Review of its internal quality assurance system.										
9.Your school familiarizes teachers and students with the concepts, connotations, frameworks, processes and methods of the internal quality assurance system through training, lectures and other means.										
Part II Organization System										
10.Your school's organization is clear and well set up.										
11.The departments in your school are categorized into five systems, namely, decision-making and command system, quality generation system, support service system, resource building system and supervision and control system, according to their roles in the internal quality assurance system.										
12.Your school has departmental responsibilities and job responsibilities.										
13.Your school has clear and reasonable work standards and assessment criteria for each position.										
14.Your school has a dedicated internal quality assurance management unit.										
15.Your school has different levels of quality assurance optimizations or teams.										
16.In your school, school leaders, functional department leaders, functional department administrators, teaching unit leaders, teaching unit administrators, and education and teaching supervisors are well equipped to play the roles of decision-making and directing, quality generation, support services, resource building, and supervision and control.										
17.Better co-ordination between optimizations in your										

school to ensure the quality of education in your school.										
Part III Subject System										
18.Your school's internal quality assurance system is divided into different and clearly defined levels of responsibility.										
19.Your school's internal quality assurance system has five areas of responsibility: school, major, curriculum, teacher and student.										
20.Your school's internal quality assurance body has clear and relatively independent elements of assurance.										
21.You are familiar with the quality assurance content and workflow of your own personal and your position.										
22.You recognise the content and practice of quality assurance in your role.										
Part IV Objectives System (Objective Chain)										
23.The Charter of your school has a clear positioning (direction) and talent cultivation objectives.										
24.Your school has a medium-term development plan (e.g., the 14th Five-Year Plan) with clear objectives and targets.										
25.The four levels of your school, i.e., major, curriculum, teacher and student, will formulate their own medium-term development plans (i.e., professionals development plan, curriculums development plan, teachers development plan, and students development plan) based on the medium-term development plan of the school (e.g., the 14th Five-Year Plan).										
26.Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator.										
27.Your school is able to translate the annual objectives and tasks of the five levels of medium-term development planning, namely, school, major, curriculum, teacher and student into the annual objectives and tasks of the school's priorities for										

implementation.										
28.Each department and teaching unit in your school prepares an annual work plan based on the annual priority objectives, and specifies the timeframe for completion, the responsible person and the completion criteria.										
29.Teachers and students in your school have a 3-year personal development plan and annual personal development plans.										
30.The system of objectives ("Objective Chain") at each level of your school has been developed in such a way that it is ‘connected and coherent’.										
Part V Criteria System (Criteria Chain)										
31.Your school has established relatively independent and complete management criterias, development standards and work standards at five levels: school, major, curriculum, teacher and student.										
32.Your school's quality standards for the 5 principal dimensions have been developed in accordance with the SMART principles and are consistent with the actual need to achieve the objectives.										
33.Your school has a relatively well-developed hierarchical and categorical management system for each of the five levels: school, major, curriculum, teacher and student.										
34.Your school has performance appraisal criteria for the achievement of objectives at five levels: school, programme, curriculum, teacher and student.										
35.Your school's system of standards (‘chain of standards’) creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission.										
Part VI Operation System										
36.Your school has established and implemented a continuous improvement mechanism based on the PDCA Cycle or the "8" Type Quality Improvement Spiral .										
37.Your school's internal quality assurance system work programme can be advanced in accordance with the implementation progress, and can basically achieve the set quality assurance objectives.										
38.Your school has an appropriate quality assurance										

team in place to monitor the quality of the objectives and criterias.										
39.The five levels of responsibility in your school (school, major, curriculum, teacher and student) are able to perform regular quality control of objectives and criterias according to the PDCA cycle or the "8" Type Quality Improvement Spiral .										
40.Your school's internal quality assurance system has established an operational mechanism for "Diagnosis and Improvement".										
41.Your school's internal quality assurance system regularly analyzes the causes and takes action to correct deviations in accordance with the Diagnosis and Improvement Model, so that the quality of education meets the desired goals.										
42.Each of the five levels of internal quality assurance bodies in your school has undertaken the preparation of a cyclical diagnostic analysis of internal quality assurance.										
43.The communication between the vertical system and the horizontal body of the quality assurance system within your school is smooth.										
44.Satisfaction of teachers, students, employers, and other stakeholders at your school has continued to improve.										
45.The internal quality assurance system of your school is functioning well, and the quality of school governance, teaching management and talent cultivation continues to improve.										
46.After construction and improvement, your school has built a networked,full-coverage, internal quality assurance system with strong early warning function and incentive function.										
Part VII Mechanism Guarantee System										
47.Your school has established a complete quality assurance system in the form of "Five Verticals, Five Horizontals and One Platform".										
48.Your school establishes a systematicity, complete and operational "Diagnosis and Improvement" mechanism at the five levels of school, major, curriculum, teacher and student(before, during and after segment).										
49.Your school's quality assurance system has been										

continuously improved and perfected, and regular annual reports on the quality of personnel training and internal quality assurance are published.										
50.Your school has established a system for information collection and platform management.										
51.Your school has a more complete incentive system for teachers and students.										
52.Your school has formed a regular information feedback diagnostic analysis and improvement mechanism.										
53.Your school's continuous improvement system is scientifically designed to better achieve continuous improvement.										
54.Your school has established a management and operation mechanism to regularize the construction of an internal quality assurance system.										
Part VIII Quality Culture										
55.Teachers and students in your school are becoming more quality conscious.										
56.Your school is fully engaged in the development of an internal quality assurance system.										
57.Your school has evolved a culture of quality that is shared by staff and students.										
58.Your school has constructed a mechanism to evaluate the satisfaction level at 5 levels.										
59.The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System, Operation System, etc.) is good.										
60.Your school's internal quality assurance quality culture is strong and distinctive.										
Part IX School-based Information Management Platform										
61.Your school has established an information platform for internal quality assurance system (referred to as the "Diagnosis and Improvement" Platform).										
62.Your school's informatization platform ("Diagnosis and Improvement" Platform) can realize the functions of collecting, monitoring, early warning and analyzing relevant information and data in three stages: before, during and after segment.										
63.Your school's information management platform										

("Diagnosis and Improvement" Platform) can well support the operation of the internal quality assurance system.										
64.Your school's database collection and management platform for talent cultivation status is in regular operation.										
65.Your school's talent training status database collection and management platform provides effective process support for internal quality assurance system work.										
66.Your school's information platform ("Diagnosis and Improvement" Platform) can better reflect the status of the school's talent cultivation work.										
67.Your school's information technology platform ("Diagnosis and Improvement" Platform) regularly collects (including organizing teachers and students to fill in) data related to quality assurance in the horizontal 5 levels.										
68.Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data collection.										
69.Your school utilizes an information-based platform ("Diagnosis and Improvement" Platform) for daily management and quality management process monitoring, and carries out data analysis on a regular basis.										
70.Your school uses an information technology platform ("Diagnosis and Improvement" Platform) with comprehensive early warning functions, which not only improves the information of school management, but also provides important references for the school leadership's decision-making.										

Interview form

Interview of Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China

Statement

1. Interview form to interview for opinions about internal quality assurance system in in Higher Vocational Colleges in Guangxi, China.

2. The information obtained from the interview will be used as information to develope a model of internal quality assurance system in Higher Vocational Colleges in Guangxi, China.

3. The interview is divided into 2 parts as follows.

Part 1: General information of the interviewee.

Part 2: Interview of developing a model of internal quality assurance system in Higher Vocational Colleges in Guangxi, China

The researcher hopes to receive your kindness, and thank you for this opportunity.

Yours sincerely

Mrs. Xiaoli Liang……..

Part I : General information of the interviewee.

Please type "√" in the □ suitable for your personal situation, or fill in the relevant information at the "space".

1.Gender:

□ Male

□ Female

2.Age:

□25~30 years

□35~40 years

□45~50 years

□ >50 years

4.Education level:

□ Under bachelor's degree

□ Bachelor's degree

□ Master's degree

□ Doctoral degree

5.Professional position:

□ Assistant Professor

□ Lecturer

□ Associate Professor

□ Professor

6.Type of position:

□ School leader

□ Middle-level leader

□ Administrators

□ front-line full-time teacher

7.Familiarity with internal quality assurance systems in higher vocational institutions:

□ Very familiar,

□ Familiar

□ Not sure,

□ Not familiar,

□ Very unfamiliar

8.Post Title: ……
……

Part II : Developing a model of internal quality assurance system in higher vocational colleges in Guangxi, China

I. Outline of the expert interviews

1. What is the current status of internal quality assurance system construction in Guangxi higher vocational colleges?

2. What do you think should be paid attention to in the construction of internal quality assurance system in higher vocational colleges?

3. How should higher vocational colleges develop a culture of quality?

4. How to do a good job of collecting and feeding back relevant information in the Diagnosis and Reform Process?

5. How do you think the "all-volunteer" nature of the construction of internal quality assurance systems in higher education colleges can
be achieved and how can the initiative of stakeholders be mobilized?

6. How to effectively involve business and third-party employers in quality assurance?

7. What are the results of the current efforts to build internal quality assurance systems within higher vocational colleges?

8. What are the areas of resistance to the effective promotion of the Diagnostic Reform Process?

9. How would you optimize the current dilemma of developing an internal quality assurance system?

10.Suggestion ……

II. Outline of the interview with the school director

1. Please provide a brief overview of the development of an internal quality assurance system in your school?

2. In your opinion, how does the school develop and establish a system of objectives system and criteria system (Objectives Chain and Criteria Chain) for quality assurance?

3. When your school carries out the diagnosis and improvement of the internal quality assurance system, how do the departments and divisions communicate and cooperate effectively with each other? How to form a synergy to promote the work?

4. Is your school's current system of internal safeguards adequate?

5. Regarding the implementation program of the diagnosis and improvement of the internal quality assurance system of your school, what do you think are the characteristics of the construction of the internal quality assurance system of your school? How effective is the current implementation?

6. What is the level of participation of teachers, students and relevant staff in the internal quality assurance process in your school? Are they aware of the school's quality assurance system and quality objectives?

7. Has the school done a good job of building an information technology platform? What is the current status of the construction and how is it running? What do you think are the advantages of the construction of the informatization platform? What are the current problems?

8. What do you think is the effect of the mechanism for diagnosis and improvement of the internal quality assurance system in your school? What kind of problems still exist?

9. What do you think are the most critical tasks to be performed in order to do a good job of diagnosing and improving the internal quality assurance system in schools?

10. What are your thoughts and suggestions on the problems of the current diagnosis and improvement of the internal quality assurance system?

11.Suggestion

……

……

III. Outline of Interviews with Middle-Level Leaders

1. Please provide a brief description of the internal quality assurance system in place in your school and the department responsible for it, taking into account your departmental responsibilities.

2. In your opinion, how does the school develop and establish a system of objectives and standards (chain of objectives and standards) for quality assurance?

3. How are the development plan and annual work plan of your department formulated?

4. How does your department promote the diagnosis and improvement of internal quality assurance systems?

5. How does your department communicate and cooperate effectively with other departments and teaching units, and how does it form a synergy to promote various tasks?

6. Is your school's current system of internal safeguards adequate?

7. Regarding the implementation program of the diagnosis and improvement of the internal quality assurance system of your school, what do you think are the characteristics of the construction of the internal quality assurance system of your school? How effective is the current implementation?

8. What is the level of participation of teachers, students and relevant staff in internal quality assurance in your school? Are they aware of the school's quality assurance system and quality objectives?

9. Has the school done a good job of building an information technology platform? What is the current status of the construction and how is it running? What do you think are the advantages of the construction of the informatization platform? What are the current problems?

10. In your opinion, how effective is the mechanism for diagnosis and improvement of the internal quality assurance system in your school? What

kind of problems still exist?

11. Do you have any suggestions for the current diagnosis and improvement of the internal quality assurance system?

12.Suggestion

……

IV. Outline of interviews with administrators

1. Are you familiar with the basic framework of the school's internal quality assurance system?

2. In the context of your position, please briefly discuss the internal quality assurance system that your department is responsible for building?

3. How are the medium-term development plan and annual work plan of your department formulated?

4. How does your department promote the diagnosis and improvement of the internal quality assurance systems?

5. Do you have a personal development plan and an annual development plan, and how are they formulated?

6. Are your job responsibilities, job work standards and personal development standards clear? Are they effective in carrying out the work of the post and personal development?

7. Regarding the implementation program of the diagnosis and improvement of the internal quality assurance system of your school, what do you think are the characteristics of the construction of the internal quality assurance system of your school? How effective is the current implementation?

8. How involved are you in internal quality assurance? Do you know about the school's quality assurance system and quality objectives?

9. Has the school done a good job of building an information technology platform? What is the current status of its construction and operation? What do you think are the advantages of the information platform? What are the current problems?

10. What do you think is the effect of the internal quality assurance system diagnosis and improvement mechanism in your school? What problems still exist at present?

11. What suggestions do you have for the current diagnosis and improvement of the internal quality assurance system?

12.Suggestion

……

V. Outline of interviews with front-line teachers

1. To what extent are you aware of the school's quality objectives for human resource development and the related quality assurance system?

2. How do you evaluate the mechanisms related to quality assurance of teaching and learning built into the school's internal quality assurance system?

3. How would you assess the mechanisms related to teacher development built into the school's internal quality assurance system?

4. What is your overall feeling about the diagnosis and improvement of the internal quality assurance system?

5. Does your institution organize regular "Diagnosis and Reform" of the internal quality assurance system for you and other teachers? What are the details of the work?

6. Has the college organized for you and other teachers to participate in the evaluation of the development of the internal quality assurance system? How often?

7. Has the diagnosis and improvement of the school's internal quality assurance system increased your workload?

8. Do schools use the results of teacher quality assurance evaluations as a basis for rewards and sanctions?

9. In your opinion, what are the results of the internal quality assurance system in your institution?

10. What do you consider to be unsatisfactory about the current implementation of the assessment for higher vocational institutions? How should it be improved?

11.Suggestion

……

Model evaluation Form

Developing a model of internal quality assurance system in higher vocational colleges in Guangxi,China.

Statement

1. Evaluation of suitability and feasibility of the model of internal quality assurance system in higher vocational colleges in Guangxi,China divided into 2 parts as follows:

Part 1: General information of experts

Part 2: Evaluation of suitability and feasibility of the model of internal quality assurance system in higher vocational colleges in Guangxi,China.

Part 3: Suggestions regarding the the model of internal quality assurance system in higher vocational colleges in Guangxi,China.

The researcher hopes to receive your kindness , thank you very much.

Yours sincerely

……..

Part 1 General information of experts

1. Name .....

2. Position .....

3.Institution .....

Part 2 Evaluation of suitability and feasibility ofthe model of internal quality assurance system in higher vocational colleges in Guangxi,China

Instructions please check a mark. ✓ enter in suitability fields. You have taken actions that suitability and feasibility according to the following criteria:

5 means suitability/feasibility at the highest level

4 means suitability/feasibility at the high level

3 means suitability/feasibility at the medium level

2 means suitability/feasibility at the low level

1 means suitability/feasibility at the lowest level

Items	**suitability**					**feasibility**				
	5	4	3	2	1	5	4	3	2	1
1. Concepts										
2. Principles										
3.Objectives										
4.Contents										
5. Approaches										
6.Procedures										
7.Evaluation										

Part 3 Suggestions regarding the model of internal quality assurance system in higher vocational colleges in Guangxi,China

.....

.....

Appendix III

Research Tool Evaluation Form

Expert Index of Concordance Assessment Form (IOC)

illustration:

In order to more scientifically determine the core competencies of internal quality assurance system in higher vocational colleges, please make a judgment on the proposed Items with the project of Objective Alignment Index (IOC). The IOC was considered as follows:

"1" refers to experts agree with the item responds the content.

"0"refers to the contents of the indicators and indicators are unsuitable

"-1" refers to experts disagree with the contents

Please type "√" in the corresponding form, and you can also specify the modification opinions in the postscript.

No.	Items	Opinion			Suggestion
		+1	0	-1	
Part I Quality Assurance Philosophy (Quality Perspective)					
1	Your school has construced an internal quality assurance system in place.				
2	Your school has developed a student-centred view of quality and has clear quality objectives.				
3	you think the internal quality assurance system can promote the quality of talent cultivation in schools.				
4	Leaders, teachers, and students in your school are highly motivated to the diagnosis and improvement of the internal quality assurance system.				
5	Your school's leadership places a strong emphasis on internal quality assurance systems.				
6	Teachers and students in your school are familiar with the basic framework, connotation and process of the diagnosis and improvement of the internal quality assurance				

	system.				
7	Your school has a robust internal quality assurance system and has an annual program of work to implement it.				
8	Your school has received at least one Provincial-level Diagnostic and Improvement Review of its internal quality assurance system.				
9	Your school familiarizes teachers and students with the concepts, connotations, frameworks, processes and methods of the internal quality assurance system through training, lectures and other means.				
Part II Organization System					
10	Your school's organization is clear and well set up.				
11	The departments in your school are categorized into five systems, namely, decision-making and command system, quality generation system, support service system, resource building system and supervision and control system, according to their roles in the internal quality assurance system.				
12	Your school has departmental responsibilities and job responsibilities.				
13	Your school has clear and reasonable work standards and assessment criteria for each position.				
14	Your school has a dedicated internal quality assurance management unit.				
15	Your school has different levels of quality assurance optimizations or teams.				
16	In your school, school leaders, functional department leaders, functional department administrators, teaching unit leaders, teaching unit administrators, and education and teaching supervisors are well equipped to play the roles of decision-making and directing, quality generation, support services, resource building, and supervision and control.				
17	Better co-ordination between optimizations in your school to ensure the quality of education				

	in your school.				
Part III Subject System					
18	Your school's internal quality assurance system is divided into different and clearly defined levels of responsibility.				
19	Your school's internal quality assurance system has five areas of responsibility: school, major, curriculum, teacher and student.				
20	Your school's internal quality assurance body has clear and relatively independent elements of assurance.				
21	You are familiar with the quality assurance content and workflow of your own personal and your position.				
22	You recognise the content and practice of quality assurance in your role.				
Part IV Objectives System (Objective Chain)					
23	The Charter of your school has a clear positioning (direction) and talent cultivation objectives.				
24	Your school has a medium-term development plan (e.g., the 14th Five-Year Plan) with clear objectives and targets.				
25	The four levels of your school, i.e., major, curriculum, teacher and student, will formulate their own medium-term development plans (i.e., professionals development plan, curriculums development plan, teachers development plan, and students development plan) based on the medium-term development plan of the school (e.g., the 14th Five-Year Plan).				
26	Your school has prepared an annual task breakdown table for the five levels of school, major, curriculum, teacher and student in accordance with the medium-term development plan (the 14th Five-Year Plan), specifying the annual targets and, completion standards and timeframes for the completion of each indicator.				
27	Your school is able to translate the annual objectives and tasks of the five levels of				

	medium-term development planning, namely, school, major, curriculum, teacher and student into the annual objectives and tasks of the school's priorities for implementation.				
28	Each department and teaching unit in your school prepares an annual work plan based on the annual priority objectives, and specifies the timeframe for completion, the responsible person and the completion criteria.				
29	Teachers and students in your school have a 3-year personal development plan and annual personal development plans.				
30	The system of objectives ("Objective Chain") at each level of your school has been developed in such a way that it is ‘connected and coherent’.				
Part V Criteria System (Criteria Chain)					
31	Your school has established relatively independent and complete management criterias, development standards and work standards at five levels: school, major, curriculum, teacher and student.				
32	Your school's quality standards for the 5 principal dimensions have been developed in accordance with the SMART principles and are consistent with the actual need to achieve the objectives.				
33	Your school has a relatively well-developed hierarchical and categorical management system for each of the five levels: school, major, curriculum, teacher and student.				
34	Your school has performance appraisal criteria for the achievement of objectives at five levels: school, programme, curriculum, teacher and student.				
35	Your school's system of standards (‘chain of standards’) creates a transfer and articulation of standards across the 5 levels that effectively supports the achievement of the target mission.				
Part VI Operation System					
36	Your school has established and implemented				

	a continuous improvement mechanism based on the PDCA Cycle or the "8" Type Quality Improvement Spiral .				
37	Your school's internal quality assurance system work programme can be advanced in accordance with the implementation progress, and can basically achieve the set quality assurance objectives.				
38	Your school has an appropriate quality assurance team in place to monitor the quality of the objectives and criterias.				
39	The five levels of responsibility in your school (school, major, curriculum, teacher and student) are able to perform regular quality control of objectives and criterias according to the PDCA cycle or the "8" Type Quality Improvement Spiral .				
40	Your school's internal quality assurance system has established an operational mechanism for "Diagnosis and Improvement".				
41	Your school's internal quality assurance system regularly analyzes the causes and takes action to correct deviations in accordance with the Diagnosis and Improvement Model, so that the quality of education meets the desired goals.				
42	Each of the five levels of internal quality assurance bodies in your school has undertaken the preparation of a cyclical diagnostic analysis of internal quality assurance.				
43	The communication between the vertical system and the horizontal body of the quality assurance system within your school is smooth.				
44	Satisfaction of teachers, students, employers, and other stakeholders at your school has continued to improve.				
45	The internal quality assurance system of your school is functioning well, and the quality of school governance, teaching management and talent cultivation continues to improve.				
46	After construction and improvement, your				

	school has built a networked,full-coverage, internal quality assurance system with strong early warning function and incentive function.				
Part VII Mechanism Guarantee System					
47	Your school has established a complete quality assurance system in the form of "Five Verticals, Five Horizontals and One Platform".				
48	Your school establishes a systematicity, complete and operational "Diagnosis and Improvement" mechanism at the five levels of school, major, curriculum, teacher and student(before, during and after segment).				
49	Your school's quality assurance system has been continuously improved and perfected, and regular annual reports on the quality of personnel training and internal quality assurance are published.				
50	Your school has established a system for information collection and platform management.				
51	Your school has a more complete incentive system for teachers and students.				
52	Your school has formed a regular information feedback diagnostic analysis and improvement mechanism.				
53	Your school's continuous improvement system is scientifically designed to better achieve continuous improvement.				
54	Your school has established a management and operation mechanism to regularize the construction of an internal quality assurance system.				
Part VIII Quality Culture					
55	Teachers and students in your school are becoming more quality conscious.				
56	Your school is fully engaged in the development of an internal quality assurance system.				
57	Your school has evolved a culture of quality that is shared by staff and students.				
58	Your school has constructed a mechanism to				

	evaluate the satisfaction level at 5 levels.				
59	The effect of internal quality system construction in your school (in terms of Organization System, Objective System, Criteria System, Operation System, etc.) is good.				
60	Your school's internal quality assurance quality culture is strong and distinctive.				
Part IX School-based Information Management Platform					
61	Your school has established an information platform for internal quality assurance system (referred to as the "Diagnosis and Improvement" Platform).				
62	Your school's informatization platform ("Diagnosis and Improvement" Platform) can realize the functions of collecting, monitoring, early warning and analyzing relevant information and data in three stages: before, during and after segment.				
63	Your school's information management platform ("Diagnosis and Improvement" Platform) can well support the operation of the internal quality assurance system.				
64	Your school's database collection and management platform for talent cultivation status is in regular operation.				
65	Your school's talent training status database collection and management platform provides effective process support for internal quality assurance system work.				
66	Your school's information platform ("Diagnosis and Improvement" Platform) can better reflect the status of the school's talent cultivation work.				
67	Your school's information technology platform ("Diagnosis and Improvement" Platform) regularly collects (including organizing teachers and students to fill in) data related to quality assurance in the horizontal 5 levels.				
68	Your school's information platform ("Diagnosis and Improvement" Platform) has realized real-time, accurate and complete data				

	collection.				
69	Your school utilizes an information-based platform ("Diagnosis and Improvement" Platform) for daily management and quality management process monitoring, and carries out data analysis on a regular basis.				
70	Your school uses an information technology platform ("Diagnosis and Improvement" Platform) with comprehensive early warning functions, which not only improves the information of school management, but also provides important references for the school leadership's decision-making.				

Table 23 Conformity index (IOC), the content of the questionnaire

Items	Experts					Together	IOC	Results of consideration
	1st person	2nd person	3rd person	4th person	5th person			
1	+1	+1	+1	+1	+1	5	1.00	consistent
2	+1	+1	+1	+1	+1	5	1.00	consistent
3	+1	+1	+1	+1	+1	5	1.00	consistent
4	+1	+1	+1	+1	+1	5	1.00	consistent
5	+1	+1	+1	+1	+1	5	1.00	consistent
6	+1	+1	+1	+1	+1	5	1.00	consistent
7	+1	+1	+1	+1	+1	5	1.00	consistent
8	+1	+1	+1	+1	+1	5	1.00	consistent
9	+1	+1	+1	+1	+1	5	1.00	consistent
10	+1	+1	+1	+1	+1	5	1.00	consistent
11	+1	+1	+1	+1	+1	5	1.00	consistent
12	+1	+1	+1	+1	+1	5	1.00	consistent
13	+1	+1	+1	+1	+1	5	1.00	consistent
14	+1	+1	+1	+1	+1	5	1.00	consistent
15	+1	+1	+1	+1	+1	5	1.00	consistent
16	+1	+1	+1	+1	+1	5	1.00	consistent
17	+1	+1	+1	+1	+1	5	1.00	consistent
18	+1	+1	+1	+1	+1	5	1.00	consistent
19	+1	+1	+1	+1	+1	5	1.00	consistent
20	+1	+1	+1	+1	+1	5	1.00	consistent
21	+1	+1	+1	+1	+1	5	1.00	consistent
22	+1	+1	+1	+1	+1	5	1.00	consistent
23	+1	+1	+1	+1	+1	5	1.00	consistent
24	+1	+1	+1	+1	+1	5	1.00	consistent
25	+1	+1	+1	+1	+1	5	1.00	consistent

26	+1	+1	+1	+1	+1	5	1.00	consistent
27	+1	+1	+1	+1	+1	5	1.00	consistent
28	+1	+1	+1	+1	+1	5	1.00	consistent
29	+1	+1	+1	+1	+1	5	1.00	consistent
30	+1	+1	+1	+1	+1	5	1.00	consistent
31	+1	+1	+1	+1	+1	5	1.00	consistent
32	+1	+1	+1	+1	+1	5	1.00	consistent
33	+1	+1	+1	+1	+1	5	1.00	consistent
34	+1	+1	+1	+1	+1	5	1.00	consistent
35	+1	+1	+1	+1	+1	5	1.00	consistent
36	+1	+1	+1	+1	+1	5	1.00	consistent
37	+1	+1	+1	+1	+1	5	1.00	consistent
38	+1	+1	+1	+1	+1	5	1.00	consistent
39	+1	+1	+1	+1	+1	5	1.00	consistent
40	+1	+1	+1	+1	+1	5	1.00	consistent
41	+1	+1	+1	+1	+1	5	1.00	consistent
42	+1	+1	+1	+1	+1	5	1.00	consistent
43	+1	+1	+1	+1	+1	5	1.00	consistent
44	+1	+1	+1	+1	+1	5	1.00	consistent
45	+1	+1	+1	+1	+1	5	1.00	consistent
46	+1	+1	+1	+1	+1	5	1.00	consistent
47	+1	+1	+1	+1	+1	5	1.00	consistent
48	+1	+1	+1	+1	+1	5	1.00	consistent
49	+1	+1	+1	+1	+1	5	1.00	consistent
50	+1	+1	+1	+1	+1	5	1.00	consistent
51	+1	+1	+1	+1	+1	5	1.00	consistent
52	+1	+1	+1	+1	+1	5	1.00	consistent
53	+1	+1	+1	+1	+1	5	1.00	consistent
54	+1	+1	+1	+1	+1	5	1.00	consistent
55	+1	+1	+1	+1	+1	5	1.00	consistent
56	+1	+1	+1	+1	+1	5	1.00	consistent
57	+1	+1	+1	+1	+1	5	1.00	consistent
58	+1	+1	+1	+1	+1	5	1.00	consistent
59	+1	+1	+1	+1	+1	5	1.00	consistent
60	+1	+1	+1	+1	+1	5	1.00	consistent
61	+1	+1	+1	+1	+1	5	1.00	consistent
62	+1	+1	+1	+1	+1	5	1.00	consistent
63	+1	+1	+1	+1	+1	5	1.00	consistent
64	+1	+1	+1	+1	+1	5	1.00	consistent
65	+1	+1	+1	+1	+1	5	1.00	consistent
66	+1	+1	+1	+1	+1	5	1.00	consistent
67	+1	+1	+1	+1	+1	5	1.00	consistent
68	+1	+1	+1	+1	+1	5	1.00	consistent
69	+1	+1	+1	+1	+1	5	1.00	consistent
70	+1	+1	+1	+1	+1	5	1.00	consistent

Reliability level and validity level of the current and desired state query

Table 24 Reliability level of the current state

Components	Cronbach's Alpha	Number of items
Quality Assurance Philosophy (Quality Perspective)	0.962	9
Organization System	0.953	8
Subject System	0.931	5
Objective System (Objective Chain)	0.952	8
Operation System	0.931	5
Criteria System (Criteria Chain)	0.965	11
Mechanism Guarantee System	0.953	8
Quality Culture	0.940	6
School-based Information Management Platform	0.963	10

Table 25 Validity level of the current state

KMO Quantity of Sample Suitability		0.903
Bartlett's Test of Sphericity	Approx. Chi-Square	8735.325
	df	2415
	Sig.	0.000

Table 26 Reliability level of the desired state

Components	Cronbach's Alpha	Number of items
Quality Assurance Philosophy (Quality Perspective)	0.961	9
Organization System	0.944	8
Subject System	0.935	5
Objective System (Objective Chain)	0.947	8
Operation System	0.924	5
Criteria System (Criteria Chain)	0.960	11
Mechanism Guarantee System	0.946	8
Quality Culture	0.941	6
School-based Information Management Platform	0.961	10

Table 27 Validity level of the desired state

KMO Quantity of Sample Suitability		0.845
Bartlett's Test of Sphericity	Approx. Chi-Square	9532.640
	df	2415
	Sig.	0.000

Appendix IV

Letter requesting assistance

FACULTY OF EDUCATION
MAHASARAKHAM UNIVERSITY

79/2 Muang, Maha Sarakham,
44000, THAILAND
Tel/fax +66 43 713 174
Email: cia.edu@msu.ac.th

MHESI No. 0605.5 (2) / 764 Date: September 15, 2024

Data Collection Permission Request

To: Whom It May Concern
Guangxi College for Preschool Education,
Nanning, Guangxi Province, China

Our student, **Mrs.Liang Xiaoli**, student ID **65010561023** majoring in the **Ed.D. Educational Administration and Development Program** is currently undertaking a research project titled " **Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China**" under the guidance of Assoc. Prof. Pacharawit Chansirisira.

To ensure this project's success and quality, we seek your permission to allow our students to process data collection within your institution.

The details of the data collection areas follows:

Thesis title: Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China
Period of data collection: October 2024 to November 2024
Thesis advisor: Assoc. Prof. Pacharawit Chansirisira

We believe that your institution provides a valuable environment and resources that are essential for the successful execution of this research. The data collection process will be carried out diligently and with the utmost respect for your institution's policies and procedures. We acknowledge that the student has made the necessary preparations, including obtaining the Thesis title approval from our institution

Should you require any further information or clarification regarding this permission, please feel free to contact us by email.

Yours sincerely,

Assoc. Prof. Chowwalit Chookhampaeng
Dean, Faculty of Education,
Mahasarakham University

FACULTY OF EDUCATION
MAHASARAKHAM UNIVERSITY

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44000, THAILAND
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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Dr. Wen Ping**
The President of Guangxi College for Preschool Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

To ensure the successful execution and the highest quality of this research project, we are seeking your valuable expertise and experience. Therefore, I am formally inviting you to serve as the expert reviewer for the research instrument designed for this thesis project.

Your participation in this academic endeavor is highly valued and appreciated. Should you require any further information or have questions regarding this invitation, please do not hesitate to contact us by email.

Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)
Dean, Faculty of Education,
Mahasarakham University

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Wu Yan**
The Director of Quality Management Office,Guangxi College for Preschool Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Dean, Faculty of Education,

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: Prof. Dr. Liu Cunxiang
The Vice-principal of Guangxi Vocational College of Water Resource and Electric Power

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Dean, Faculty of Education,

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Hu Yingqing**
The President of Guangxi College of Sports and Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023**, majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)
Dean, Faculty of Education,
Mahasarakham University

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Assoc. Prof. Wang Zihao**
The Director of The Office of Quality Assurance Diagnosis and Improvement of Higher Vocational Colleges in Guangxi

Our student, **Mrs. Xiaoli Liang, student ID 65010561023**, majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Yang Changpeng**
The Secretary of Guangxi College of Sports and Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Dr. She Yabin**
The Director of Academic Affairs and Research Management, Guangxi College for Preschool Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Mai Qihao**
The Vice-principal of Beihai Vocational College, Guangxi

Our student, **Mrs. Xiaoli Liang, student ID 65010561023** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Li Yanrong**
The Vice-principal of Guangxi College for Preschool Education

Our student, **Mrs. Xiaoli Liang, student ID 65010561023**, majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Mahasarakham University

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MHESI No. 0605.5 (2) / CL765 Date: September 16, 2024

Expert Reviewer Invitation

To: **Prof. Dr. Zheng zhongping**
The Vice-principal of Guangxi Health Professional and Technical College

Our student, **Mrs. Xiaoli Liang, student ID 65010561023,** majoring in the Ed.D. Educational Administration and Development Program is currently undertaking a research project titled **"Developing a Model of Internal Quality Assurance System in Higher Vocational Colleges in Guangxi, China"** under the supervision of Assoc. Prof. Pacharawit Chansirisira.

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Yours sincerely,

(Assoc. Prof. Chowwalit Chookhampaeng)
Dean, Faculty of Education,
Mahasarakham University

Appendix V

Photographs of producting the thesis

July 2024, Survey in vocational colleges in Phetchaburi,Thailand

December 2024, accompanied President Wen Ping of Guangxi College for Preschool Education to conduct a research on talent cultivation demand in enterprises cooperating with the school and enterprise.

December 2024, Participation in the Annual Workshop to Summarise the High Quality Development of Higher Vocational Institutions in China

Expert interviews (I)

Expert interviews (II)

January 2023, Guangxi College for Preschool Education Convoked Diagnosis and Improvement review Work Arrangement Meeting

In March 2023, Guangxi College for Preschool Education welcomed the second round of Diagnosis and Improvement review expert group for On-site visit

BIOGRAPHY

NAME	Xiaoli Liang
DATE OF BIRTH	June 5, 1985
PLACE OF BIRTH	Hengzhou, Nanning City, Guangxi Province, China
ADDRESS	No.77, Minzu Avenue, Qingxiu District, Nanning, Guangxi
POSITION	Deputy Director of School Office in Guangxi College for Preschool Education
PLACE OF WORK	No.77,Minzu Avenue,Qingxiu District,Nanning, Guangxi
EDUCATION	2004 - 2008 (Bachelor's degree), majoring in Hanyu International Education (HIE), graduated from Guangxi Normal University 2008 - 2011 (Master's degree), majoring in Linguistics and Applied Linguistics, graduated from Guangxi Normal University 2022 - 2025 (Ph.D.), majoring in Educational Administration and development, Doctoral studied at Mahasarakham University