

Research on the Talent Training Mode and Mechanism of "Post Course Competition Certificate" in Biomedical Specialty from the Perspective of Educational Psychology

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Abstract: The integration of post course competition and certificate is a new "four in one" education model proposed by the National Vocational Education Conference. Its value logic lies in that it is an inevitable requirement for deepening the integration of industry and education, an innovative option for high-quality development of vocational education, and an integration mechanism for vocational education. The theoretical basis behind this model is cross-border integration theory, structural embeddedness theory, and system synergy theory. Its internal logical relationship is an internal integration relationship, an essential relationship with curriculum as the core, and a functional relationship with complementary functions. The implementation path of this model is "four modernizations cooperation", that is, post guidance - post work tasking, curriculum realization-work task curriculum, ability improvement - integration of competition and teaching, terminal inspection - certificate acceptance standard. The curriculum system of "post course connection" was designed based on the requirements of post ability. With the help of the second classroom, "competition, certification and promotion of learning" was realized. The integration effect of "post course competition, certification" was clarified under the multi-dimensional evaluation system. With the reform of the curriculum system of higher vocational colleges as the core, the problem of the orientation and path of talent training in higher vocational colleges was fundamentally solved. The cultivation of biopharmaceutical professionals in higher vocational colleges under the comprehensive education mode of "post course competition certificate" can cultivate first-line craftsmen with advanced skills in the biopharmaceutical industry to meet the social needs.

1. Introduction

Entering the new era of vocational education development, vocational education is required to develop in a typed, high-quality and adaptive way, which is a new goal and demand that echoes the new era, implements the new vision, and seeks new development. To achieve this goal and vision, new means and ways must be used to drive the implementation. The proposed comprehensive training model of post course competition integration is such implementation means and innovative mechanism.

2. Research Contents and Methods

2.1. The Concept and Value of Post Course Competition Certificate Financing Mode

2.1.1. Definition of the Concept of Post Course Match Certificate Financing Mode

The connotation of the post course competition certificate is that the post is a professional post, the course is a training course, the competition is a skill contest, and the certificate is a professional qualification certificate or skill level certificate. Rongtong emphasizes that the four are organic links and integration. Model, Modern Chinese Dictionary believes: "Model is the standard of something or the standard style that people can follow." Professor Chen Lixuan believes that: "Mode refers to both people's cognitive style and practical behavior. From the perspective of cognitive style, mode is an abstract and simplified reflection of the main elements of the structure or process of something and the interrelationship or interaction mode between the elements. It is a relatively stable structure and procedure, and a normative form that can reflect a certain law. From the perspective of practical behavior, mode refers to the procedure or behavior that people solve problems or engage in practical activities is the specification [1]. The talent training mode is the application of the mode in the talent training field, covering, penetrating and guiding the whole Process. The talent training mode is an integrated education system and method paradigm. It is an appropriate method design, an optimized program specification, a carrier of teaching ideas, and a wisdom strategy for educating people. "Post course competition certificate" is a new concept proposed by the National Vocational Education Conference on April 13, 2021. This new integration of the "four in one" has formed an innovative concept of vocational education talent training, or an innovative model with potential for promotion. It is reasonable that it has won high-end recognition and policy recommendations at the national level.

2.1.2. Value Inquiry of Post Course Competition Certificate Financing Training Mode

Value is a philosophical category. It is the integration of meaning and utility, which permeates and determines people's judgment, choice and pursuit of things. The integration model of post course competition and certificate is also a concept cluster containing value, pregnancy and content. Its value is reflected as follows: only when human behavior has value support and value load, can it be meaningful behavior with philosophical thinking, and it is rational and conscious behavior. Only when human thinking and behavior practice move to the "deep" of value is the gospel of high-end pursuit and development.

(1) It is an inevitable requirement for deepening the integration of industry and education. Deepening the integration of industry and education is the inherent essence and core feature of vocational education, and also an inevitable requirement for the reform and development of vocational education proposed in 2017's Several Opinions of the General Office of the State Council on Deepening the Integration of Industry and Education and 2019's Implementation Plan of the State Council on National Vocational Education Reform. However, as far as the practical effect

is concerned, there are still problems such as insufficient deepening, difficulty in seeking long-term effect, poor validity and lack of innovation. Therefore, deepening the integration of industry and education must have a new starting point and destination. The post course competition certificate integration mode guides people to pay attention to the post, the professionalism of vocational education, the industry standards, the curriculum education, the skills competition, and the documentary evidence integration. These are the meanings of deepening the integration of industry and education. With this mode, the attributes of vocational education type education can be guaranteed, and the characteristics of vocational education can be highlighted, the goal of deepening the integration of industry and education can be realized.

(2) It is an innovative option for high-quality development of vocational education. The high-quality development of vocational education is an important part of the foundation of the national governance system, and also an inevitable requirement for the country to enter a new era of "strong" development. In September 2020, the Ministry of Education and other nine departments issued the Action Plan for Improving the Quality and Excellence of Vocational Education (2020-2023), which further requires to "implement the action to improve the governance capacity of vocational education", improve the quality assurance mechanism of multi governance, and promote the high-quality development of vocational education. Whether forging the long board of the supply chain of the industrial chain, or making up for the short board of the supply chain of the industrial chain, or even making up for the short board of the livelihood field, vocational education is required to accelerate the development of high-quality development[2]. High quality development of vocational education is easy to know but difficult to practice. It needs innovation drive and innovation empowerment to promote, reach and realize. The talent training mode of post course competition and certificate integration is an innovation to enhance the adaptability of vocational education and reflect the characteristics of type education. It combines the necessary elements of vocational education to form a new model link and practice paradigm. It is a new innovation variety and innovation option launched by vocational education in the context of high-quality development demands.

(3) It is the integration mechanism of vocational education. The mechanism mainly refers to the relationship and interaction mechanism between things or among various elements within things. Professor Chen Yuwan said: "The mechanism is to implement some organizational design and operational arrangements of the system to ensure that the expected results are achieved" [3]. The high-quality development of vocational education or the policy and system demands for enhancing adaptability cannot be realized by the system or system itself. It can only be translated into reality by the innovative design of the operating mechanism and the practical ability. The post course match certificate is such an integrated education mechanism, which forms a structured "four in one" comprehensive education mechanism through the combination of four core elements with internal links. From the perspective of composition, this mechanism is the integration of the essential elements of vocational education, which will inevitably reflect the characteristics and innovation of vocational education; From the perspective of cohesion and coherence, the existence of each link is restricted to serve the overall goal of education, and each transition is closer to the completion of this process and the realization of the goal. They are the logical chain and innovation chain formed by the combination of elements with different functions, and a new breakthrough point and quality growth point of education for vocational education.

2.2. Theoretical Basis of Post Course Competition Certificate Financing Training Mode

Any academic research should have its own theoretical basis and theoretical mechanism. It is the foundation and connotation of academic research, and also the yardstick to measure and identify the

value and grade of research achievements. In other words, the research without theoretical support is superficial, and the research without theoretical consideration is the research of the poor. The emergence of post course competition certificate training mode is not accidental. In addition to the goal guidance of talent training, practice and innovation, it also has its own theoretical basis and theoretical support.

2.2.1. Theory of Cross-border Integration

The theory of cross-border integration is the original theory and characteristic theory of vocational education. Transboundary is the essential theory of vocational education first proposed by Mr. Jiang Dayuan. He believes that vocational education is a cross-border education, which is reflected in the following aspects: at the school running system level, it is the cooperation between schools and enterprises, breaking the "siege" of closed enterprises and schools; At the level of talent training, it has crossed the separate "boundary" separating work and study; At the social function level, it has transcended the "barriers" of the respective positioning of economy and education. Professor Zhang Jian believes that "integration is the theoretical root, the soul of characteristics, the foundation of existence, the root of methods, the basis of disciplines and the way of philosophy of vocational education" [4]. The cross-border theory attaches importance to finding the internal connection and essential tie of things, and emphasizes the interaction, connection and integration of things with different boundaries or attributes, which is the theoretical essence of the post course competition to prove that things or elements with different attributes cross their respective boundaries and knot together. Integration is the process of integration, fusion and integration of things, and the process of innovation and construction of a purposeful value whole. If the cross-border theory is the basis for the essential cognition and integration of things, then the integration theory is the way of its method and realization form. Both laid a foundation together

The theoretical foundation of the integration model of course, competition and certificate.

2.2.2. Structural Embedding Theory

The concept of embeddedness was put forward by Karl Polanyi, who emphasized the social embeddedness of economic subjects and believed that economy was not independent, but "embedded" in politics and culture: "In principle, human economy is immersed in his social relations." Granovett's classification of structural embeddedness and relational embeddedness is a more refined analytical framework. Structural embeddedness not only emphasizes the overall function and structure of social networks, but also pays attention to the structural position of economic units in social networks; Relationship embeddedness mainly refers to the interactive relationship between the two parties based on the reciprocal relationship [5]. Here, can we consider that structural embeddedness is the structural embeddedness of elements of things, and relational embeddedness is the embeddedness of human relationships. The post course match certificate financing is inclined to the structural embedding of things, but does not exclude the embedding of the relationship between the subject and the person behind the things. For example, the post course integration is a kind of mutual embedding of objects and elements. The post guides the positioning of the course, and the course echoes the embedding of the post. It is a two-way embedded integration process, and behind it is the relationship embedding of the school enterprise cooperation. The embeddedness theory explains to a large extent that education and economy, as well as vocational posts, are embedded in each other. If they are not embedded, there will be an adaptive dilemma, which will deviate from the cross-border nature of vocational education and lose the basic characteristics of vocational education.

2.2.3. System Coordination Theory

System generally refers to a whole composed of the same or similar things according to a certain order and internal relations. System theory was founded by American biologist Bertalanffy in the 1940s. He believed that to explain the phenomena of things, we should regard them as the sum of related things, that is, as a whole network with special overall level functions and attributes [6]. Systematology deepens the philosophical view of universal connection of things, and also reveals the systematic existence of things. Synergy theory is a theory that studies the common characteristics and synergetic mechanism of different things. It came into being in the 1970s and was founded by German physicist Haken. Synergy theory emphasizes the interaction between system structure and elements, and seeks for the synergy and orderliness of the structure function of things from the old state to the new configuration, so as to achieve the realization of self-organization system. According to the viewpoint of system theory and synergism, the post course match certification financing model can be regarded as a new configuration and self-sufficient system. The structural elements of the system are inherently logical and orderly coordinated. They are closely linked and interacted with each other to play the role of their respective elements and form an organic adaptive and collaborative innovation system.

In a word, cross-border integration theory, structural embeddedness theory, system synergy theory, these different theoretical resources constitute the academic mechanism and logical support behind the post course match certification model. Supporting and achieving the rationality and inevitability of its existence from different perspectives, these theories are not only important theoretical resources for us to deeply understand this innovative model, but also will certainly expand the theoretical horizon for this model research, consolidate the theoretical foundation, identify the theoretical positioning, and improve the theoretical grade.

2.3. Thinking about the Logical Relationship of the Post Course Competition Certificate Financing Training Mode

Modern Chinese dictionaries have three meanings for the interpretation of relations: one is the state of interaction between things; the second is the connection of a certain nature between people or between people and things; the third is the influence or importance on relevant matters [7]. Relationship is a philosophical category that characterizes the relationship between things. It is an internal connection and logical tie between people, things and things, people and things, etc. How are post course competition certificates, as four independent elements, linked together? What is the logical relationship between them? How do these relationships achieve internal self-consistency, synergy, and overall functionality? This is what our research must seriously consider and respond to.

2.3.1. Logical Relationship of Internal Integration

On the surface, the four elements of post course match certificate seem to have little relationship, but they have an internal logical relationship. From the perspective of the training process, the post course match certificate forms a complete training process based on educating people. Post is the logical starting point of vocational education. That is to say, vocational education is to obtain the knowledge, ability and accomplishment points needed to be competent for the post through the backward deduction of post ability analysis, and then cultivate them through courses. Class is the core of vocational education. It comes from the post. It sets up the knowledge, ability and accomplishment points required by the post analysis to be competent for the post as a curriculum, and cultivates the sufficient knowledge, key ability and necessary character of highly skilled talents.

The competition is the strengthening and sublimation of skill training. In essence, competition is a unique means of cultivating curriculum ability. Vocational education is empowering education, which needs to highlight and strengthen the ability training and cultivation of students. The national, provincial and school skill competitions are the best carrier and means of strengthening training found in addition to the regular practice training. Certificate is the end of vocational education. After three years of study and training in the post competition, the students finally ended up with a perfect graduation certificate and vocational skill level certificate.

2.3.2. The Essential Relationship of Curriculum as the Core

Philosophy is a science that studies the essence and relationship of things. Essence refers to the fundamental nature of things, which is the deep and inherent relationship behind things. The mode of post course competition, certification and accommodation is a training paradigm with education as the core, and the underlying and deep essential relationship is the curriculum. It is a method set for curriculum, a process implemented by curriculum, and a goal achieved by curriculum. Curriculum is the core of "Beichen, for example, is the place where the stars arch". The post course competition certificate is an educational model formed by clustering around the curriculum. The logical relationship between the four is that the post determines the course, the course educates people, the competition guides the course, and the verification of the course.

2.3.3. Functional Relationship with Complementary Functions

The functional relationship of post education is guidance. Professional posts have two functional attributes: one is the essential space for talent employment; the second is the logical starting point of the curriculum. The former is the occupation ownership of students to settle down and get the means of living, and is the terminal realization of talent training. At the same time, the post is the guiding starting point of the talent cultivation cycle, the goal and basis of curriculum development. The curriculum of vocational education is not derived from the discipline knowledge system, but is constructed according to the post needs. Post is the basis of curriculum construction, curriculum is the setting of corresponding posts, posts are the goal of curriculum, and curriculum is the support of service posts. They are embedded and interacted with each other. The function of education is to implement. That is, through the implementation of a set of curriculum system, through teachers' teaching, empowerment and moral cultivation, it realizes the implementation and completion of the training process of skilled talents. The functional relationship of competition and education is sublimation. It can be regarded as the high-end extension and optimization means of the ability training system. Different from general training, it is a training with clear objectives and task orientation, an enhanced training aimed at achieving the goal of superb skills, first-class ability and excellent results, and a real implementation mechanism aimed at the training and selection of high-end skilled talents, skilled craftsmen and craftsmen from large countries. At the same time, the skills contest is also an acceptance of the training results of the curriculum ability, which can be seen as a unique and important supplement to the evaluation system and a real value-added empowerment evaluation. The function of education is acceptance. It is an affirmation and recognition of talents' professional abilities, qualifications and standards in the form of documentary evidence materialization, a summative evaluation and symbolic demonstration of a series of training processes and mechanisms, a skill passport, a symbol of identity and a proof of reaching the standard.

2.3.4. Training Mode and Innovative Practice of Post Course Competition Certificate Financing

The integration of "post course competition certificate" cannot stay in the creation of the concept, but must find the "destination", transform it to the implementation level, and put it into practice, so as to give play to the effectiveness and function of education. Guangdong Lingnan Vocational and Technical College (hereinafter referred to as "our college") is an innovative exploration and practice of the integration of "post, course, competition and teaching" and the "four modernizations" collaborative training mode of "post, course, competition and certification".

2.3.4.1. Position Guidance-job Assignment

When we divide the "integration of industry and education, school enterprise cooperation, combination of work and learning, and integration of knowledge and practice" into workplaces and learning fields, professional posts belong to the category of "industry, enterprise, industry and bank", and "teaching, learning and knowledge" belongs to the "learning field". How to combine the "workplace" with the "learning field" to make the integration of vocational posts and school education run through is related to the practice of deepening the integration of industry and education, school enterprise cooperation at the school level and the implementation of the teaching level of "integration of work and learning, knowledge and practice". To achieve this and realize the integration of post and course, we need to take the post guidance as the guidance to transform the post work into a task.

(1) Post guidance function. The professional post is directly related to the talent demand, which determines the nature, category, specialty and ability of the required talents. It is the logical starting point for the implementation of the education process in the form of occupation, and has a multiple guidance function. First, demand guidance. That is, job demand determines the setting position and direction of specialties, which is conducive to the construction of specialty groups that map the industrial chain. If the specialties offered do not match, couple and adapt to the needs of economic and social development and professional posts, it will result in dislocation of talent training and imbalance between supply and demand. Second, talent specification guidance. Different professional posts have different requirements for talent specifications, which determine the knowledge structure, ability characteristics and quality standards of talents. It has a guiding and guiding role in training competent professionals. Third, employment guidance. Vocational education is employment education. Whether the trained talents are suitable for their posts and have post abilities is directly related to the quality and realization of students' employment.

(2) Job assignment. In 2017, the Opinions of the General Office of the State Council on Deepening the Integration of Industry and Education required that "the task-based training model oriented to the real production environment of enterprises should be implemented." From the perspective of implementation, professional posts are people's work platforms, forming a logical link with what people should do and what they should have. Each post has many specific jobs, and each job should be supported by specific capabilities. According to the British theory of competency structure system, "a certain level of professional qualification includes several competency units, each unit includes several learning outputs, and each learning output is described by a series of evaluation indicators". [8] Vocational education is to establish the relationship between work and post ability, and the job task is the only link between students and industry enterprises. Task operationalization requires that enterprise experts, curriculum experts and teachers work together to sort out job fields, tasks and professional abilities, transform them into specific teaching tasks and projects that can be taught and learned, and establish a project library to lay a feasible foundation and logical premise for the integration of post and course and the integration of

course and teaching. At the same time, in the process of transformation, it is necessary to connect specific tasks with action capabilities, so as to conform to industry standards, conform to production or work processes, highlight skills and characteristics, and reflect advanced teaching models. For example, the school converts the actual work tasks or job training contents into work order tasks, and implements "work order system" project-based teaching.

2.3.4.2. Course Realization-curriculum Based Work Tasks

The transformation of post work into curriculum is the core and key step to achieve the goal of education, which is conducive to building a curriculum system that maps the technology chain. To realize this transformation, we should start with the determination of the curriculum content, the curriculum implementation structure and the logical elements of the curriculum evaluation method, practice the implementation mechanism of the curriculum based work task, and realize the innovation of curriculum education. The specific practices of our biopharmaceutical technology specialty are as follows:

(1) Determine the course content based on the position backward. It is the real curriculum logic of vocational education to determine the content of the curriculum by backward deduction of post work. It is an applied curriculum system based on the ability training goal and action logic, and an enabling curriculum to ensure the "placement" of the curriculum in the ability. It requires that the content of the curriculum must aim at the needs of the post, match the professional standards and work processes, and absorb new knowledge, new technologies, new processes and new methods of industry development. The course content closely related to the post is deduced and confirmed by the method of cause tracing, as shown in the example in Table 1.

(2) Construct the curriculum structure system of "three types of progressive". "Three types of progressive", namely, the curriculum structure system of "platform+post module+industry application" (see Figure 1). The platform course serves the courses of all posts or some posts, focusing on the building of students' professional basic abilities. The post module courses refer to several professional core courses of the post group integrated with X related certificates, which cultivate students' professional core competence for the relevant post group. The industry application practice course refers to the industry application practice course combined with the local regional economic characteristics, local advantageous industries, and school characteristic majors. This kind of course helps students to effectively master the special skills in the application of biopharmaceutical technology, and ultimately cultivate the biopharmaceutical innovative technology skilled talents who face the industrial characteristics, meet the needs of regional economy, and have outstanding capabilities. These three kinds of courses form professional basic courses to professional core courses and then to application practice courses, forming a complete course structure system of logical progression. Among them, the platform type course - tamping the foundation and cultivating the students; Post module course - enabling fixed capital; Industry application course - promoting development. It has a hard core effect of landing support and quality assurance to cultivate students' common basic abilities, job competency and core quality.

(3) Create a "five level advanced" teaching evaluation model. The action curriculum based on post tasks needs to form a feedback adjustment mechanism with evaluation as the end point to ensure the mechanism and function of dynamic optimization and circular improvement. During the implementation of modular teaching, researchers implement modular learning process management according to the requirements of 1+X vocational skill level certificate, in the mean time, the researchers establish a growth oriented teaching evaluation mechanism in combination with learning conditions, and the researchers use the "five level advanced" evaluation model to evaluate professional knowledge, skill literacy, the ability to complete simple tasks and the ability to complete tasks in the work field of course results evaluation through classroom process evaluation.

The acquisition of vocational skill grade certificate evaluates the post ability, and finally evaluates the talent training quality through the enterprise's employment satisfaction, so that the talent training evaluation standard can be seamlessly connected with the industry's employment standard (see Figure 2).

Table 1: Analysis of Some posts and corresponding courses (taking biotechnology major as an example)

Work area	Task	Corresponding courses	
		Core courses	Related courses
Biopharmaceutical strain post	Strain culture, strain preservation, strain rejuvenation, strain screening, and microbial inoculation	Gene engineering, immobilized enzyme technology, biological purification and separation, microbial inoculation and culture	Applied Microbiology and Immunology, Biochemistry, Molecular Biology, Inorganic Chemistry, Organic Chemistry, Human and Microbiology
Biopharmaceutical fermentation post	Culture medium preparation, disinfection and sterilization, microbial fermentation control, continuous culture, and fermentation equipment maintenance	Microbial fermentation control technology, microbial continuous culture technology	Extended culture technology of microorganisms, Applied Microbiology and Immunology, Biochemistry, Inorganic Chemistry, Organic Chemistry
Biopharmaceutical refining post	Fermentation liquor pretreatment, solvent extraction technology, ion exchange separation technology, distillation technology, plate and frame filtration technology, precipitation separation	Physical chemistry, chemical engineering principles, biological separation and purification, and biopharmaceutical refining process	Microbial fermentation parameter control process, Applied Microbiology and Immunology, Biochemistry, Inorganic Chemistry, Organic Chemistry
Biopharmaceutical laboratory quality inspection post	Sampling and processing, quality inspection of raw materials, intermediates and finished products	Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Pharmaceutical Analysis	Fermentation equipment, Applied Microbiology and Immunology, Biochemistry

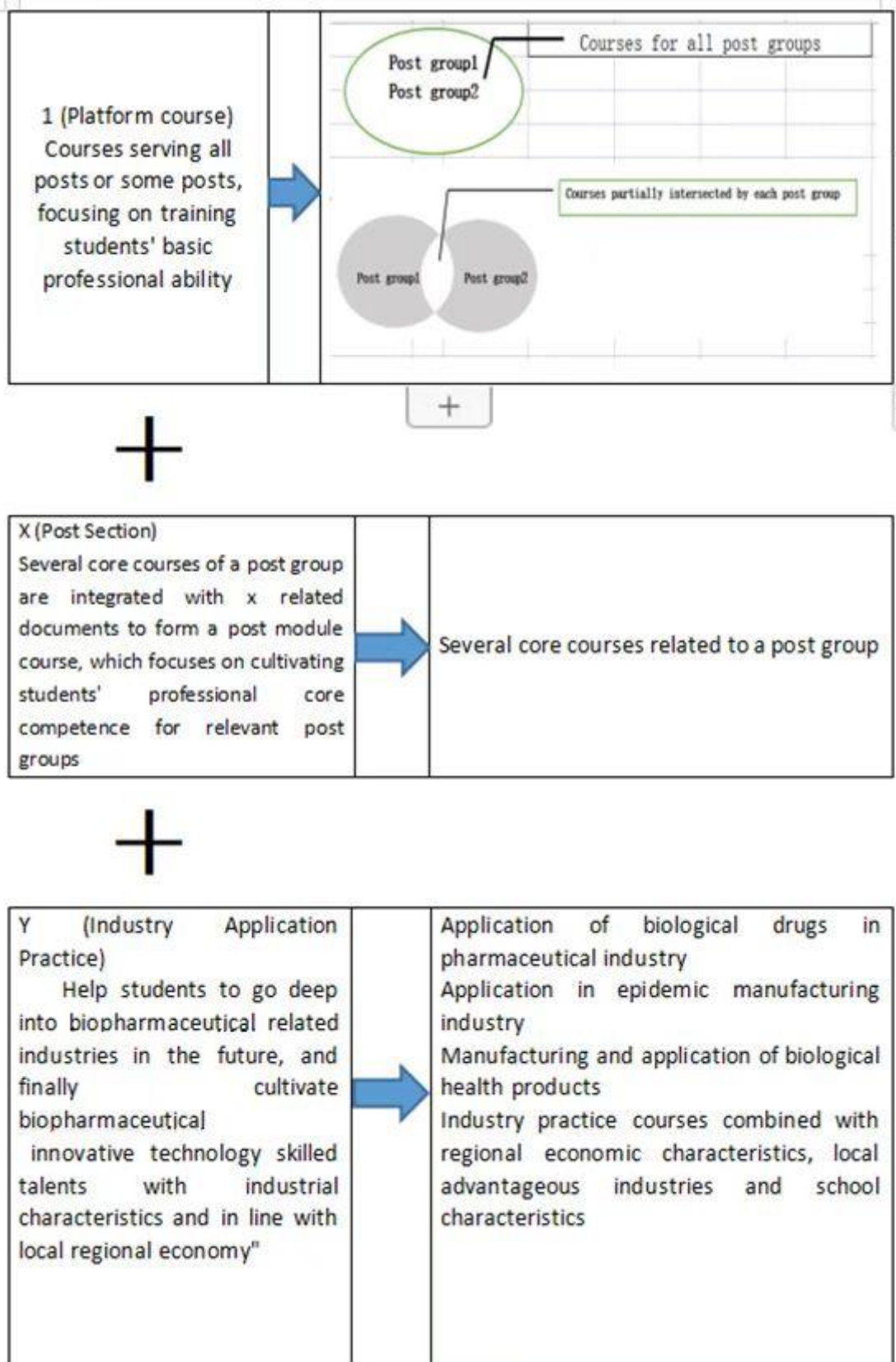


Figure 1: "Platform+Position Module+Industry Application" curriculum architecture

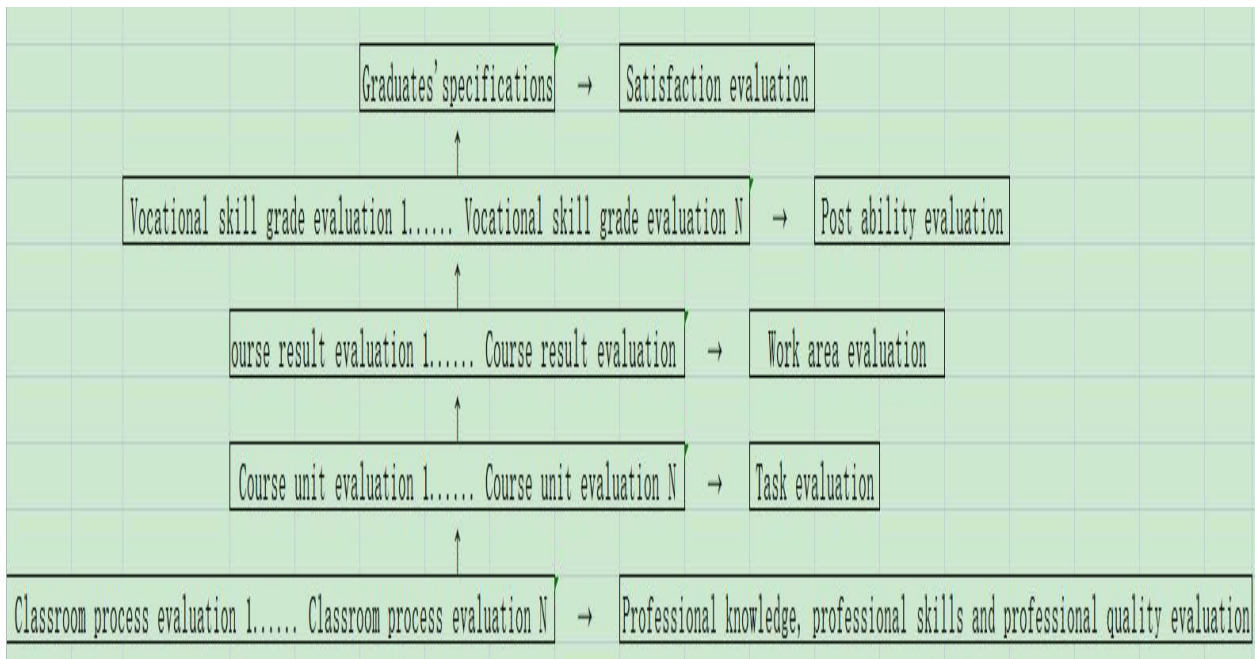


Figure 2: "Five level Advanced" course evaluation model

2.3.4.3. Capability Improvement-integration of Competition and Teaching

The vocational skills competition is an integral part of the curriculum system and can be seen as a high-end extension and optimization means of the ability training system. Representing the direction of vocational education and highlighting the characteristics of vocational education are the natural means for vocational education to improve its quality and nurture its talents. They are also the universal educational mechanism and logical necessity universally recognized and practiced by the world. The importance of the skills contest lies in: "First, it is conducive to the renewal of vocational education concepts and the establishment of the" ability based "idea; Second, it is conducive to highlighting the characteristics of vocational education and promoting the deepening of curriculum reform; Third, it is conducive to the integration of school enterprise cooperation, promoting the transformation of talent training mode; Fourth, it is conducive to demonstrating teaching effectiveness and promoting the improvement of teaching quality; Fifthly, it is conducive to the selection of top skilled talents, promoting the whole society to attach importance to vocational education, and optimizing the environment of vocational education. " [9] The implementation of skills competition should attach importance to the integration of competition and teaching. Achieve the coordination of competition education, the universalization of competition resources and the practice of competition training.

(1) The competition educates people cooperatively. It is one of our important experiences to combine skills competition with teaching and to cooperate with enterprises to educate people. For example, the biopharmaceutical specialty of our hospital and the event cosponsor jointly made a comprehensive exploration and practice on the integration of competition and teaching of the two participating events, namely, the "Biochemical Experiment Skills Competition" and the "Agricultural Product Quality Inspection Competition". We improved the integration scheme of competition and education, jointly guided competition and training, and implemented collaborative education, which comprehensively solved the problem of "two skins" between skill competition and daily teaching. At the same time, the three-level competition mechanism of national, provincial and school has been fully integrated into the teaching process, and the two have achieved remarkable

results in a win-win situation. Our school has won three consecutive championships on national and provincial track above.

(2) Universalization of competition resources. Open the "competition and teaching integration" campus productive training base, and create an environment where students can freely enter and exit the training place in time and space. Students can use their spare time to enter and exit the training room "all day" with passwords, fingerprints and so on to carry out project training. In this way, the competition resources will benefit all students, provide each student with the opportunity to exercise, create a fair learning and training environment, rather than just serving a few competitors, so that the skills competition will become an unfair alternative "elite" education, "pinching the top" education, which is fundamentally contrary to the concept of integration of competition and education and benefit all students. Only the universalization of competition resources, allowing more students to enjoy high-quality teaching resources, participating in innovation and entrepreneurship, skills competitions and other activities, and developing and cultivating their professional skills and professional quality are the original intention of the skills competition.

(3) The actual training of the event. The process of integrating talents and educating talents in skill competitions must be practical. First, set up realistic events. That is, select real typical projects that originate from industry enterprises and can be connected with posts, so that the posts can be consistent and the real skills required by the posts can be trained. Second, we should compete with high-end competition skills. That is, the competition of skills. We should try our best to absorb the cutting-edge technologies and skills of industry development, and play the role of benchmarking, guiding and leading in the competition. Third, the competition schedule training should be strict. Namely, competition training process I

We must be strict with requirements, keep improving, and practice strict training according to the standards of craftsmen and masters. Fourth, the evaluation of competition results should be fair. Eliminate cheating and other interference in the evaluation process, and ensure the objectivity, fairness and reliability of the evaluation results.

2.3.4.4. Terminal Inspection-certificate Acceptance Compliance

The certificate referred to here includes the graduation certificate and vocational skill grade certificate, which is a proof of reaching the standard of learning results and a testing mechanism. The post course competition certificate financing is a model with the end point of obtaining evidence, forming a complete talent training chain. Learning without certificates is not up to standard learning; a certificate without study is a fake certificate of water injection. In other words, the certificate is the ultimate indicator of one vote veto. Without a certificate, it means the failure and poor quality of the study. Only when the study reaches the standard and the certificate is obtained, can the model of complete elements and the process of complete outcome be achieved. The 1+X certificate system proposed in the National Vocational Education Reform Implementation Plan, where "1" is the graduation certificate and "X" is the vocational skill grade certificate, is not only an effective measure to promote the reform of "three education", but also the connotation of the terminal test of student training. Our approach is as follows: First, we attach importance to the acquisition and employment of double certificates for students' documentary evidence integration, closely follow the requirements of new technologies, new processes and new specifications in the relevant vocational skill grade certificates in the biopharmaceutical field, integrate the industry standards and the ability requirements and new changes of typical vocational posts (groups) based on the professional work process, cultivate students' vocational skills, and obtain the "X" certificate that is tested and recognized by the industry, Provide support for their employment with dual certificates when they graduate, and increase the number of high-quality employment for students.

The second is to attach importance to the process empowerment of course certificate integration, integrate the industry standards, job requirements and examination contents in the course teaching, sort out the corresponding relationship between the assessment points of relevant vocational skill level certificate standards and the relevant contents and the knowledge, skills and accomplishments of the course contents, study the integration path of vocational skill level certificates and professional (group) course contents, and connect the industry, job requirements Applying the "three types of progressive" curriculum structure system of ability training to implement the course card integration teaching has achieved ideal teaching results.

2.4. Comprehensive Education Mechanism of "Post Course Match Certificate"

As for how to build a comprehensive education mechanism for vocational education, scholars at home and abroad have made a relatively in-depth discussion from behaviorism learning theory, constructivism learning theory, vocational ability evaluation and other aspects. From the perspective of domestic practice, some vocational schools have carried out the localized reform of training highly skilled talents with "post course competition certificate" integration, formed "course certificate integration", "competition teaching integration", "competition certificate course integration" and other modes, and achieved remarkable results.

2.4.1. Basic Concept: Cultivate Students' comprehensive Professional Ability

Vocational ability exists in specific vocational activities. Developing vocational ability based on actual work and organizing courses are the key links of vocational education curriculum development. However, different understanding of the concept of vocational ability will affect the goal orientation of vocational education curriculum and even the learning results. The traditional vocational education curriculum follows the behaviorism learning theory. Thorndike (E.L.) believes that the process of action skill learning is essentially a chain formation process of a series of stimulus responses. On the basis of experiments, he proposed that learning activities should follow three important learning principles: the law of preparation, the law of practice and the law of effect, which were used to explain the phenomenon of "using the advanced and discarding the retired". The vocational education curriculum based on behaviorism believes that vocational ability is vocational skills, which cultivate students' vocational skills to complete certain, repetitive and decomposable tasks. Modules of Employeable Skills (hereinafter referred to as MES courses) and Competency Based Education (hereinafter referred to as CBE courses) of the International Labour Organization belong to this category. Based on the ability view of task, focusing on the needs of the post, it believes that knowledge is the basis for mastering skills and developing abilities, takes knowledge learning as the support means for acquiring skills, emphasizes that "theoretical knowledge must be sufficient", forms the idea that "practice is more important than theory", and constitutes a vocational education curriculum with the main feature of "theory serves practice". It challenges the traditional teaching philosophy of subject courses that "knowledge accumulation is better than practical experience". However, the behaviorist concept of vocational education curriculum originates from "competency based training", which regards vocational ability as the behavior of completing isolated work tasks, forms a thinking paradigm that can obtain comprehensive ability by simply overlapping multiple abilities, and does not establish the relationship between operational ability and mental intelligence and the overall understanding of the profession, and does not conduct an overall analysis of learners' career growth laws and career development, which is lack of consideration on the systematicness, integrity, complexity and education of professional activities.

With the deepening of vocational education curriculum reform, people's understanding of the connotation of vocational ability has gradually changed, which is typically based on the concept of

constructivism. Witrock (M.C.) believes that learning is a process in which learners actively construct internal psychological representations. It includes not only structural knowledge, but also a large number of nonstructural experience backgrounds. Therefore, learning is a generative process. Situational learning theory based on constructivism believes that the essence of learning is a process in which individuals participate in real situations and practices, interact with others and the environment, cultivate their ability to participate in practical activities, improve the level of socialization, and adapt to culture and obtain membership of a specific practice community. Therefore, the vocational education curriculum based on constructivism believes that vocational ability is a situational comprehensive ability. The understanding of vocational ability turns to include comprehensive psychological representations such as knowledge, skills and attitudes, and pays more attention to the special significance of different situations on the acquisition of vocational ability. The learning field curriculum in Germany belongs to this category, which is different from MES curriculum and CBE curriculum. The learning field curriculum believes that professional ability is a complex structure composed of multiple levels, and the explicit behavior structure is just the embodiment of the internal psychological structure. The explicit behavior structure that only focuses on professional ability is shallow, and skilled workers trained according to this concept cannot face the changing working world. Based on this, courses in the learning field focus on cultivating students' complex professional abilities. In the implementation of courses in the field of learning, students are regarded as the main actors of learning. The teaching process takes the action ability in the professional context as the goal, the action process in the learning context based on the professional context as the approach, the independent planning, implementation and evaluation actions as the method, the interactive cooperative actions between teachers and students as the way, the action process emphasizing the self construction of students as the learning process, and the professional ability. The evaluation standard is the action ability formed after the integration of method ability and social ability. It can be seen that the vocational education curriculum based on constructivism believes that skill learning is essentially based on the real working situation. The learning process is to establish a community of practice, pursue the consistency of learning and application, and emphasize the presentation of knowledge in the real situation of knowledge practical application, so that learners can think and practice like experts and "masters"; Learn through social interaction and collaboration, and improve professional ability, master professional skills, obtain professional qualifications, obtain professional promotion, and achieve career transformation through skill learning.

In other studies, the understanding of professional ability is also comprehensive. For example, the study of Competence Measurement (COMET) comprehensively interprets the ability, and divides the professional ability into four levels: nominal ability, functional ability, process ability and design ability; The report of the International Labour Organization emphasizes the need for more autonomous, adaptable and multi-functional workers, and the understanding of ability emphasizes more on the overall ability of individuals, especially the ability to communicate, solve problems and work in teams, rather than simply technical skills. Although there are many definitions of vocational ability at present, the current curriculum reform of vocational education pays attention to the integrity of ability, reflecting the cognitive trend of the concept of comprehensive vocational ability. The newly revised Vocational Education Law defines vocational education as "education carried out to cultivate high-quality technical and skilled personnel and enable the educated to have the professional ethics, scientific culture, professional knowledge, technical skills and other professional comprehensive qualities and action abilities required for engaging in a certain profession or achieving professional development", which reflects this idea. Through the above analysis, the academic support for the comprehensive education of "post course competition certificate" is more clear: guided by Marxist practice theory, the constructivism and

action oriented teaching ideas are reasonably absorbed, the development of students' ability is the main body, the focus is shifted from specific skills to comprehensive professional abilities, the typical professional tasks in complex and changeable work situations are found, determined and described, and they are pedagogically treated to develop knowledge, skills Comprehensive analysis of ability and accomplishment. On this basis, the core feature of the design, engineering and learning integrated theory and practice curriculum is "learning content is work, and learning is realized through work".

2.4.2. Content Elements: Building a "Four in One" Education System

"Post" is the direction of students' skill learning. Vocational education is oriented to the work system, and the work system structure determines the content orientation of vocational education curriculum, including the posts facing the specialty, the job tasks of the posts, and the professional ability to complete the tasks. The position depends on the situation, and the specific goal of talent training is clearly defined. It is carried out through the work position facing the specialty. Work tasks are the content of post professional activities and the link between individuals and posts. From the perspective of the post, tasks are responsibility requirements, while from the perspective of the individual, they are reflected in the professional ability required to complete work tasks. Analyzing the work tasks of posts is the intermediate link to achieve the docking of course content and post ability requirements. Typical work tasks are summarized from post work tasks. They are comprehensive tasks with a complete work process structure. They reflect typical work content and methods in the profession, and contain important "hidden knowledge" and skills. The process of completing typical work tasks can promote the professional ability development of practitioners. The analysis of typical tasks provides concise, basic and important information for the curriculum design of vocational education, and provides an important direction for learners to learn skills. With the advent of the intelligent era, the occupational system with detailed division of labor and clear boundary has been deeply reconstructed, the original occupation or post has been continuously upgraded and transformed, the talent boundary has become blurred, and the job division has been replaced by flexible, holistic, problem solving oriented comprehensive work tasks. The enterprise has significantly broadened and improved its requirements for employees' knowledge, ability and quality, and needs more compound talents who integrate technical theory and skills operation. This requires that vocational education should not simply aim at the standardized operation posts when determining the curriculum orientation, but should analyze the post group as a whole.

"Class" is the basis of students' skill learning. Knowledge, skills, tasks and products (services) are the basic elements of the curriculum content of vocational education, which constitute four curriculum models: disciplines, skills training, tasks and projects. Position, task and ability are important variables of project curriculum positioning, and position positioning is the starting point of project curriculum development logic. The project curriculum designs learning tasks based on the integrity of the work world, so that students can learn relevant knowledge and develop comprehensive ability in the process of completing the work tasks. This is a "curriculum model that takes work tasks as the reference point for curriculum setting and content selection, and projects as the unit to organize activities as the main learning method". Considering the order of students' ability development and the convenience of teaching organization, knowledge learning is no longer used as a means to promote ability development, and the traditional pattern of separating knowledge, skills and work tasks has changed. The curriculum is jointly agreed by the enterprise and the school. The learning field is "found" from professional activities through scientific methods, rather than "thought" through subjective guesses. It provides students with the skills and knowledge services needed in work, realizing the integration of thinking knowledge from "what conditions" to "what occasions". Only in the real learning situation, when students complete specific tasks and try to

think about practical problems, can these knowledge be organically linked with work tasks in students' cognitive structure, and realize the active supply from the objective demand of "ability post matching" to the active supply of "post course matching".

"Competition" is the demonstration and benchmark of course teaching. Vocational skills competition is an organized professional competition activity focusing on highlighting operational skills and solving practical problems according to the national vocational skills standards and in combination with the actual production and operation work. Bartley, S., former president of the World Skills Organization, pointed out that vocational skills can change the world, and vocational skills competition is an experimental field for achieving excellence, achieving progress, and testing new ideas for change. At present, China has formed a professional skills competition system based on school competition, provincial competition as the fulcrum, travel competition as the supplement, national competition as the leader, and world competition as the peak. It explores the simultaneous competition between teachers and students from the separate competition between teachers and students, and extends from the domestic track to the international track. The vocational school skills competition is positioned at the high-end display of school education and teaching, leading the teaching standard with the competition standard. The content of the competition is based on teaching, higher than teaching, leading the teaching. The results of the competition test the quality of education and teaching, and the results of the competition transform to promote research, teaching, learning and reform. By restoring the real situation, the competition reflects the complete task, assesses the comprehensive ability, tests the contingency ability, assesses the professional quality, reflects the educational characteristics and highlights the educational function. The content of the competition is required to be integrated with the industrial demand, professional standards, teaching process and quality evaluation, closely combined with vocational skills training, vocational skills identification, performance assessment, technical innovation and production work, providing a platform for technical and skilled talents to show their skills and learn from each other, and becoming the only way for the growth of excellent technical and skilled talents.

"Certificate" is the evaluation and test of learning achievements. Realize "documentary integration", and form a certificate system of vocational qualification certificate, vocational skill grade certificate, industry qualification certificate, training certificate, etc. The certificate setting is demand oriented, problem oriented and goal oriented with respect to the mastery of post core vocational skills. The certificate development is based on the industry standard, improve the evaluation certificate system for highly skilled talents, respond to the industry enterprise certificate, and improve the teaching standard system. The courses covered the requirements of professional qualification standards. On the basis of defining the professional qualification certificates, skill level certificates, internationally accepted qualification certificates, and industrial enterprise certification standards related to the specialty, the qualification requirements of different countries and enterprises in different industries for personnel engaged in the profession were analyzed. The contents and requirements of vocational qualification examination were infiltrated into the course content to enable students to obtain academic certificates and corresponding vocational qualification certificates Vocational skill grade certificate and training certificate.

2.4.3. Financing Mechanism: Docking and Integration, Reconstruction and Transformation

To realize the comprehensive education of "post course competition certificate", we need to design a sound financing mechanism of "integration, reconstruction, transformation and transformation", design courses according to the law of career development, and establish an organic link between "job requirements", "professional qualifications", "competition content" and "learning content". Guided by professional action fields (typical work tasks) and work processes, identify and describe professional abilities, and focus on training students to have comprehensive

professional qualities and action abilities related to work processes.

Docking and integrating "physical reaction". Promote the integration of posts and courses, take posts as the direction, set up courses based on posts and courses, improve the content of courses, combine morality and technology, and enhance the adaptability of skill learning. We should promote the integration of competition and class, take competition as the guide, promote the class with competition, and enhance the interest of peer learning. We should promote the integration of certificate and course, take certificate as test, take certificate and course as test, and enhance the practicality of learning. The "post course competition certificate" is a four in one, and the content elements are integrated with each other, which helps to achieve the precise connection between social needs and talent training, production process and teaching process, post standards and curriculum content, and build a high-quality technical and skilled personnel training system.

Reconstruct the "chemical reaction". Skill learning takes the post (post requirements, work tasks, professional abilities) as the direction, summarizes the post group from the industry demand, and separates the professional group; Skill learning is a process oriented resource development based on courses and method ability; Tasks are post factors, while abilities are human factors. The process of determining the learning content is the process of subjectifying the objective results of vocational analysis to teaching according to the school education requirements. The learning content is the result of "typical work tasks" and "learning objectives" of the curriculum gradually approaching from two directions and achieving coordination. To promote the reconstruction and reconstruction of "post course competition certificate" is to take post course integration as the main body, set courses based on posts, change posts and courses, teach students in accordance with their aptitude, and cultivate people; Assisted by the integration of competitions and courses, taking competitions as the benchmark, the competition content is based on teaching, higher than teaching, leading teaching, promoting peer exchange, and integrating teaching content and standards with the goal of skills competition, ability and quality requirements; Supported by the integration of certificate and course, and taking certificate as the test of learning achievements, textual research learning, as a supplement, reinforcement and improvement of course learning, is embodied in the documentary evidence integration of course content. Through the "post course competition certificate", it links industry and employment, connects market and learning situation, combines learning situation cognition based on experience and intuitive feelings with learning situation analysis based on scientific and accurate big data, helps teachers transform from experience oriented to scientific oriented, implements accurate teaching for learners, and cultivates the knowledge, ability and quality required for professional posts (groups).

Convert into "biological reaction". The "post course competition certificate" integration should be included in the talent training program, integrated into education and teaching, and achieve the unity of courses and courses. Classroom teaching occupies the central position in the "post course competition certificate", and reestablishes morality, cultivates people, and integrates knowledge with practice; In the benign development of the combination of learning and training, learning and competition, production and teaching, and work and learning under the guidance of the project, improve the experimental training conditions, and integrate the advanced professional standards embodied in the professional certificate into the talent training program; Design and develop courses and textbooks according to the actual production and post needs, and timely incorporate the latest technology, new process, new materials, new specifications, typical production cases, etc. into the teaching content; Promote project teaching and simulation teaching, develop a modular and systematic practical training curriculum system, innovate the education mechanism in inheritance, and improve students' practical level and practical ability. The core of post course transformation is to cultivate and inherit the spirit of model workers, labor spirit and craftsmanship, and realize the combination of morality and technology. The core of competition course transformation is to give

full play to the orientation, navigation, flag building and catalytic role of the competition in course teaching, so as to promote teaching, learning, construction and reform through competition. The core of certificate course transformation is to play the role of certificate in consolidating, strengthening and improving course teaching, reflecting the comprehensive ability required by professional activities and personal career development, and expanding employment and entrepreneurship skills. (See Figure 3)

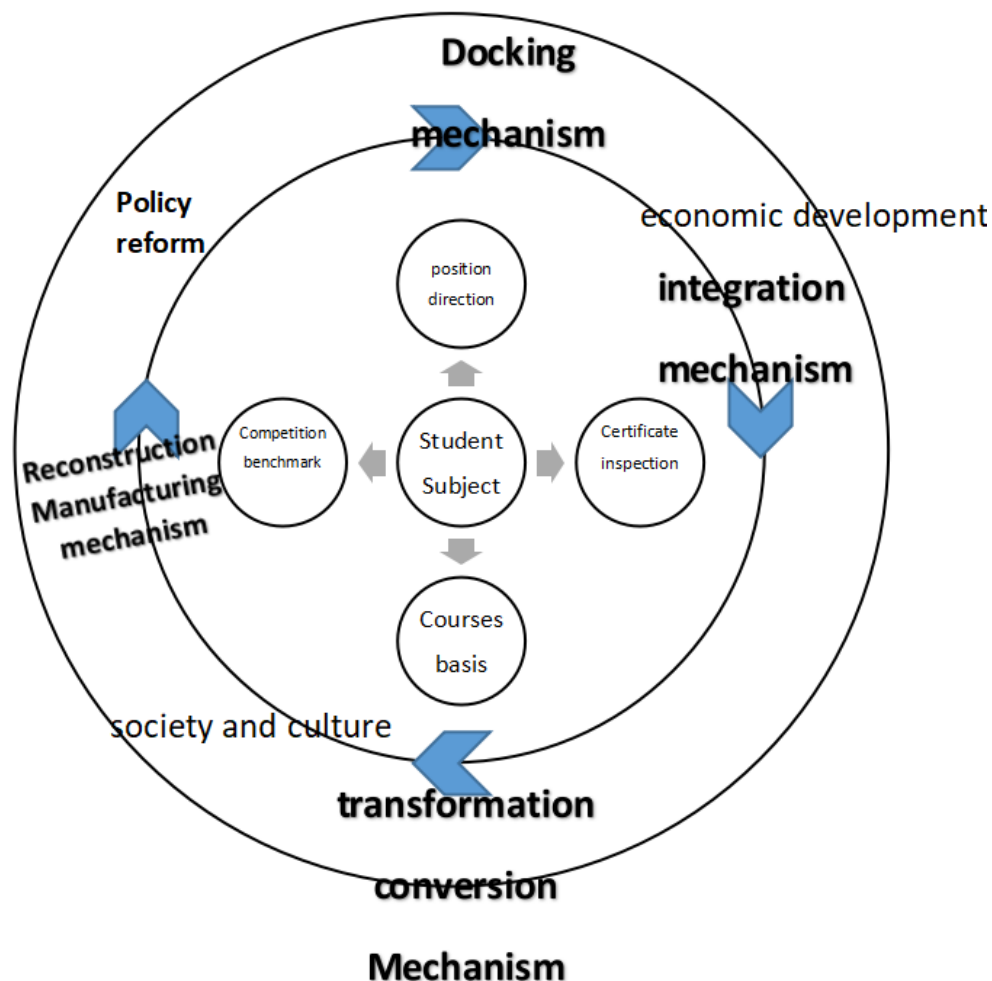


Figure 3: Training Model of 'post course competition certificate'

2.5. Implementation Path of "Post Course Competition Certificate" Comprehensive Education

"Post course competition certificate" comprehensive education is a personalized training mode formed on the basis of "integration of vocational education, knowledge and practice, and combination of work and learning". The training goal focuses on career development, the teaching content highlights comprehensive professional ability and professional quality, and the curriculum development focuses on task analysis oriented by work process. Encouraging students to participate in the working process and production process and forcing the reform of vocational education and teaching is conducive to promoting the systematic improvement of teaching materials, teachers and teaching methods, and improving the quality requirements for the training of technical talents. For example, Shenzhen Vocational and Technical College and Huawei cooperated to implement the "course certificate integration" teaching, which improved the quality of skilled personnel training;

Jinhua Vocational and Technical College implements the "match certificate integration", integrating the match certificate into the education program, curriculum and evaluation; Shandong Vocational and Technical College implements the comprehensive education of "post course competition certificate" to promote the improvement of curriculum quality and ability. All these have laid a practical foundation and explored the implementation path for the integration of "post course competition certificate".

2.5.1. Integrate into the Training Program of Technical Talents

The human pursuit of labor saving and production efficiency is endless. The emergence of any new technology will impact the original production order and market demand, and will have a profound impact on the main working forms of society. As Amara (R.) said, "People always overestimate the short-term effect of a technology, but underestimate its long-term impact." Any technology is also a double-edged sword. In the long run, enabling technologies make skills more valuable, benefit everyone, improve production efficiency and drive economic growth; Alternative technologies have eliminated routine jobs while creating jobs that require higher skills. People's adaptation to new technologies depends to a large extent on their educational background. There is a subtle "competition" relationship between technological change, education and the gap between rich and poor. There is a continuous competition between science and technology and education. Economic growth and income gap are the results of this competition. According to the traditional view, technological progress will leave some people behind, and only those repetitive, routine and predictable labor can be easily replaced by machines. For those who have only "ordinary" skills and abilities, there is no worse time than now, because computers, robots and other technologies are mastering these skills at an extraordinary speed. There is no better time for people with special skills or good education than now, because they can use technology to create and obtain value. However, in fact, the threat of AI to job opportunities has gone beyond the conventional scope of work in the traditional sense, and almost all work will gradually be included in the conventional and predictable scope.

The impact of AI on employment, first of all, plays a role in the occupation with medium technical level. With the improvement of intelligence level and the expansion of application scope, it gradually spreads to both high technical level and low technical level. The widening gap between skilled workers and unskilled workers has been further magnified by the huge differences between the technical and non-technical fields. Education has always been a way for people to adapt to accelerating technological change. It is necessary to further improve the skills formation system and reeducation and re training system, increase the supply of skilled workers through upgraded vocational education, and require high-quality vocational education to empower people. It can be seen that the changing socio-economic trend has changed vocational education from "supply driven" to "demand driven". In the future, it still needs to meet the requirements of sustainable development and lifelong learning, which may become "development demand driven" in the future. Therefore, it is necessary to strengthen the scientificity, appropriateness and operability of the training program, reflect the education oriented and employment oriented development model, attach equal importance to imparting basic knowledge and cultivating professional ability, and strengthen the cultivation of students' professional quality and professional technology accumulation. Integrate the labor model spirit, labor spirit and craftsmanship spirit into the whole process of talent cultivation, and follow the laws of vocational education, technical skill talent growth and students' physical and mental development. Integrate the basic concept and content requirements of "post course competition certificate" comprehensive education into the whole process of technical and skilled personnel training, formulate talent training plans by classification according to industry demand forecast and learning situation analysis, reasonably determine talent

training objectives, talent specifications, curriculum, class hour arrangement, teaching process, assessment methods and graduation requirements, and improve the education method of combining morality and technology, emphasizing both theory and practice, using both hands and brains, and combining work and learning.

2.5.2. Compile and Select Practical Textbooks Integrating Theory and Practice

Textbooks are the key elements of education and teaching, and the basic carrier of moral cultivation. The construction of vocational education textbooks can neither follow the "instructions" of enterprise training, nor copy the "textbooks" of general education. According to the overall design of "post course competition certificate" comprehensive education, it is necessary to reflect the characteristics of real operation and practice, timely reflect new knowledge, new ideas and new concepts, and teach new technologies, new processes, new methods and new norms. Through the introduction of typical production cases, we will create more high-quality teaching materials that can help Bacon cast souls, enlighten wisdom and increase wisdom and adapt to the requirements of the times, and form diversified teaching materials such as paper teaching materials, loose leaf teaching materials, workbook teaching materials, and digital teaching materials. In the process of textbook development, it should be designed according to post analysis, work field analysis, typical work task analysis, learning field description, learning situation and curriculum design, teaching evaluation and other steps. Appropriate teaching materials should have "voice" and "students". Starting from students' work and life experience, they should stimulate their interest in learning, cause students to have problems and think, and highlight students' professional activities; the structure and visualization of the teaching content enable the textbook to change from expository to conversational, and from knowledge expository to dialogue with learners. (See Figure 4)

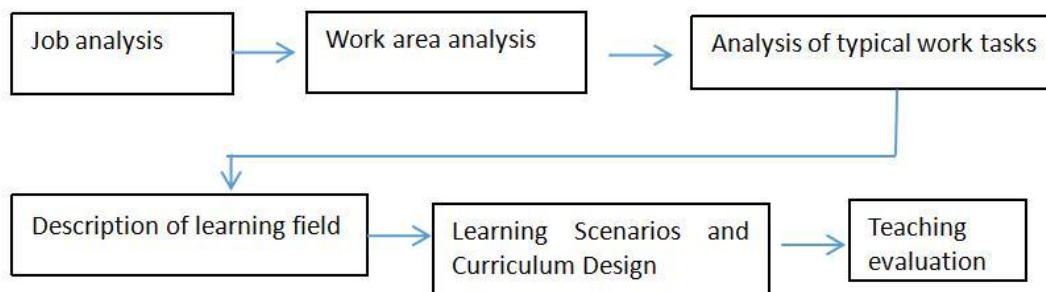


Figure 4: The logic map of teaching material development of the training mode of higher vocational talents

2.5.3. "Double Qualified" Teachers Who Can Be Said to Be Able to Do Good Guidance

The Second International Conference on Technical and Vocational Education pointed out that "among the most basic requirements of technical innovation and vocational education, the role of teachers is always the first." Teachers are the real subjects of curriculum development, and their motivation or resistance to curriculum reform depends on their recognition of curriculum development. Vocational education, as an education to cultivate students' comprehensive professional quality and action ability, should undoubtedly turn "doing" into the main form of teaching. However, "doing" should not only be understood as a way to make skills more proficient, but should enable students to quickly enter the path of ability growth, provide direct experience and opportunities for practical application of knowledge, effectively promote students' active construction of knowledge, turn the "doing" achievements into products, and become the most important and effective means to evaluate students' ability level.

Vocational education teachers are different from enterprise trainers and teachers of general education. Long term knowledge teaching has destroyed teachers' practical ability and practical thinking, so that they only pay attention to the process elements (knowledge) of practice, but pay little or no attention to the outcome elements (achievements) of practice. Vocational teachers should have "relevant personal character, morality, professional and teaching qualifications and adequate job preparation", professional teachers should have relevant professional qualifications, and have practical skills and experience according to the needs of training objectives; Even public course teachers, "in addition to their own qualifications in the field of teaching, they should also understand the nature of learners' technical and vocational education special programs". The development of new technologies will not weaken the role of teachers in any way. It is necessary to promote the technicalization of teachers and the technicalization of technicians, optimize the structure of teachers' abilities, build a high-level, structured teaching innovation team that meets the needs of "post course competition certificate" comprehensive education, and provide strong teacher support for comprehensively improving the quality of high-quality and complex technical talents.

2.5.4. Carry out Demonstration Teaching of Combining Hands and Brains

The content of the general education curriculum is mainly theoretical knowledge. Symbolized memory and understanding are the main ways to obtain knowledge. It emphasizes training people's character in liberal arts. The content of vocational education curriculum is the method of "doing" and "doing" itself. "Doing" is the main way to obtain technical knowledge, emphasizing the cultivation of people's professional ability in the content with clear objectives [10]. The comprehensive education of "post course match certificate" emphasizes the effectiveness of vocational teaching, requires the improvement of the ability training mechanism of three layers of progressive basic training, simulation exercise and practical practice, and implements the apprenticeship system with Chinese characteristics; Popularize project teaching, case teaching, situational teaching, modular teaching and other teaching methods, and widely use heuristic, inquiry, discussion, participation and other teaching methods; Accelerate the construction of intelligent teaching support environment, promote the deep integration of modern information technology and education and teaching, promote the reform of classroom teaching, and improve the quality of classroom teaching. Its purpose is to realize the transformation from teacher centered to student-centered teaching method, realize the transformation from knowledge and skill oriented teaching to action oriented teaching, and realize the transformation from the separation of theory and practice to the integration of theory and practice.

2.6. In the Process of Applying the "Post Course Competition Certificate" to Cultivate Higher Vocational Talents, the Principle of Educational Psychology is Always Applied to Cultivate Students' independent Learning Ability and Self Innovation Ability, so that Students Can Realize Consciously Innovative Learning and Cultivate Students' Good Habit of Lifelong Learning

College students are an important part of national human resources. Colleges and universities shoulder the important mission of cultivating diversified college students, and also bear the important responsibility of changing the fate of college students. They should focus on cultivating high-quality, application-oriented talents, and provide each college student with opportunities for growth and development. To truly achieve this goal, it is necessary to strengthen the cultivation of college students' self-management ability, so that students can manage their own thoughts, psychology, behavior and goals independently and consciously, achieve self-management, restraint and motivation, and finally achieve the goal of self-struggle. As a psychology subject, educational

psychology bases its research on the educational situation and intervenes in the teaching psychology of educators and the learning psychology of students. Teachers in colleges and universities need to strengthen the study and application of educational psychology, strengthen the cultivation of students' autonomous learning ability, and skillfully enhance students' autonomous learning ability with the help of educational psychology education. Students' autonomous learning is a very important link. In this link, students' learning is mostly spontaneous and active, with great enthusiasm. In specific teaching, teachers should adopt more correct teaching methods, guide students to solve problems themselves and carry out independent learning. Teachers in higher vocational colleges should always guide students and improve their autonomous learning ability. Starting from awakening self-consciousness, teachers should skillfully guide students to develop in the direction of autonomous learning, and change the ideas and consciousness of passive acceptance; starting from stimulating students' motivation of autonomous learning, cultivate students' enthusiasm of autonomous learning; starting from the specific teaching methods, we should try our best to improve the students' ability of autonomous learning [11-15].

In the past, under the concept and mode of higher education, professional courses or public courses were taught in a unified way, with teachers playing a leading role, and the classroom became a "talking room" for teachers. In this context, students' enthusiasm for learning is absent, teaching is boring and stereotyped, and the overall effect is not ideal. Students' desertion and sleeping are very common. Although the teacher explained the knowledge carefully, the students had no interest in learning, and it was difficult to avoid plagiarism in the form of quantitative homework. For a long time, students have no autonomy in learning. When encountering problems, they can only seek help from classmates and teachers, and cannot form independent thinking and learning inquiry ability. Make full use of educational psychology, guide teaching work with more scientific theories, develop comprehensive teaching design in combination with students' characteristics and subject nature, better mobilize students' enthusiasm for learning, and make them actively integrate into the classroom. Under the guidance of teachers, students can participate in knowledge learning and inquiry, think independently, master learning methods and skills, and promote the development of independent learning ability. It can be seen that the application of educational psychology is an important guidance for the current reform of higher education [16-21].

Teachers in colleges and universities should strengthen communication with students and awaken their self-consciousness. Educational psychology believes that the teacher-student relationship is the most important interpersonal relationship in the entire education process. Teachers' words and deeds have a profound impact on students, or stimulate students, or harm students, making students tired of learning. Therefore, teachers need to fully understand the personality characteristics of students, especially those who lack interest in learning. They should pay attention to timely encouragement in the classroom, build a harmonious relationship between teachers and students, and enable students to independently complete the assignments assigned by teachers. This is the first step to cultivate students' autonomous learning ability. At the same time, respect students. Respect is based on equality. Teachers should create a democratic classroom atmosphere, give students full respect and care, understand the emotional needs of students, so that students can trust teachers and talk to teachers about their troubles. Teachers should help students analyze problems with empathy, so that students can understand the truth, promote students' self-transformation in love, maintain a positive and optimistic learning attitude, and gradually establish a sense of independent learning [13] [21-28].

College teachers should stimulate students' motivation of autonomous learning and cultivate students' enthusiasm for autonomous learning. Educational psychology believes that human activities are always caused by a certain motivation, and students' learning is dominated by learning motivation. American psychologists have classified students' learning motivation. The first category

is social communication motivation, and the second category is honor motivation. Social communication motivation refers to that students love teachers from the bottom of their hearts, are willing to listen to teachers' knowledge, and work hard to gain teachers' trust, recognition and care. The motivation of honor is to obtain praise and encouragement from others through learning. Both of them are important learning motivations in the cultivation of students' autonomous learning ability. Teachers should consciously stimulate and mobilize students' enthusiasm for learning and participation. At the same time, the author believes that the goal is also an important factor to stimulate learning motivation. In the process of teaching implementation, teachers can use the goal difference strategy to guide students to develop independently. That is to say, in combination with the individual differences of students, we should formulate different autonomous learning goals for them. We should not only ensure that the difficulty of goal setting is consistent with the actual situation of students, but also have a certain degree of challenge, which is helpful to deeply tap students' desire and ability to explore knowledge and promote the development of autonomous learning. In this process, guide students to discover laws, identify right and wrong, constantly reflect in independent learning, truly become the master of learning, and finally achieve the goal of self-construction and realization [29-32].

With the continuous development of modern information technology, teachers need to master new teaching methods, enhance the interest and attraction of the classroom, and mobilize the enthusiasm of students to participate in classroom learning [10]. Especially for students with poor learning ability, we should strengthen independent learning guidance after class to help students complete their learning tasks. On the basis of fully understanding students' learning needs, we should scientifically design teaching content and methods, and use multimedia, micro classes, mini classes, teaching videos, micro videos and other teaching methods to strengthen independent learning guidance while teaching. That is to say, let students find learning materials through the network, make learning plans independently, learn to make scientific use of independent learning time, and do a good job in the management of independent learning. In a word, we should rely on the theoretical knowledge of educational psychology to promote the cultivation of students' autonomous learning ability [15] [16] [33-35].

Educators in higher vocational colleges should analyze the deep-seated problems of training highly skilled talents from the perspective of educational psychology, transfer the relevant experience and methods of "post course competition certificate" to the teaching of biomedical courses, and guide teachers to analyze the bottleneck of teaching methods of biomedical courses based on educational psychology (such as lagging ideas and single teaching methods). For example, from the perspective of educational psychology, we can examine the professional development law of teachers of biomedical professional courses, or compare the psychological change law of expert teachers and novice teachers in the teaching process, based on which we can update the teaching concept, improve the teaching methods, and further improve the teaching effect.[17][36,37].

3. Results

The curriculum system of "post course connection" is designed based on the requirements of post ability. With the help of the second classroom, "competition, certification and promotion of learning" is realized. The integration effect of "post course competition, certification" is clarified under the multi-dimensional evaluation system. With the reform of the curriculum system of higher vocational colleges as the core, the problem of the orientation and path of talent training in higher vocational colleges is fundamentally solved.

Taking the integrated design of post course competition certificate comprehensive education as the breakthrough point, promote the integration of multiple elements in all directions and in the

whole process. First, vocational schools should take curriculum construction as the core, rely on teaching achievements such as "curriculum certificate integration" and "competition teaching integration", and carry out an integrated design for the link and integration of the four elements of post curriculum competition certificate. In this process, the main responsibilities of schools and enterprises should be clarified, and all staff, all process and all direction education should be implemented. Second, vocational schools should ensure that the needs of "posts" are recognized accurately and representative, and the selection of "competitions" and "certificates" should be guaranteed by quality and specification. The curriculum teaching reform should be implemented in the way of system construction, integration, module sequencing, and integration of learning and testing. Third, vocational schools should integrate the teaching staff from all sides, eliminate institutional barriers, establish a joint and effective promotion system and implementation plan, avoid duplication and conflict in the promotion of various elements, and build a diversified working pattern. At the same time, vocational schools should also pay attention to the mutual transformation of the learning achievements of the post course competition certificate, and gradually improve the work assessment, incentive and evaluation mechanism. Fourthly, vocational schools should strictly follow the integration principle of post standards, curriculum standards and competition standards, take students as the center, and actively link the four systems of industry, education, competition and certificate, so as to cultivate students' abilities comprehensively and integrally, and output high-quality technical and skilled talents to enterprises and society. It can be seen from Table 2 that the effect of the "post course competition certificate" integration training mode for higher vocational talents is better than the traditional education mode.

Table 2: Comparison of the effect of traditional education mode and "post course competition certificate" integration training mode for higher vocational talents

Compare items Effect Pattern	Graduates' employment rate	Graduates' employment professional counterpart rate	Proportion of wages above 6000 yuan	Proportion of wages above 5000 yuan	Proportion of wages above 4000 yuan	Proportion of wages above 3000 yuan
Traditional education mode	85%	75%	10%	20%	35%	35%
"Post course competition certificate" integration training mode	100%	98%	60%	35%	5%	0

4. Conclusion

The training of biopharmaceutical professionals in higher vocational colleges under the comprehensive education mode of "post course competition certificate" can cultivate first-line craftsmen in the biopharmaceutical industry with advanced skills to meet social needs. In a word, post course competition and certificate integration is a reform and innovation mode of vocational education talent training. Vocational schools should thoroughly implement the requirements of the national vocational education reform, actively explore, actively practice, and combine with the school's talent training positioning to form an effective mechanism and promotion path suitable for their own characteristics of "four in one" and in-depth integration of post course competition

certificates, so as to cultivate more high-quality, complex and highly skilled talents for high-quality economic development. In the subject of education, it is very important for teachers to attract students' attention from their interests and psychological needs; First of all, it causes students' attention from a professional point of view, resonance from an emotional point of view, and motivation from a psychological point of view. In particular, how to cultivate students' good psychological quality, improve their innovation ability, strong anti pressure ability and professional competitiveness from the perspective of psychology; How to use the Internet to improve students' interest in learning and how to make better use of information technology to conduct in-depth teaching reform research on the courses of biopharmaceutical specialty in higher vocational colleges based on the educational concept of "post course competition certificate" mutual integration and training of advanced skilled talents in higher vocational colleges, and apply the research results to the teaching of other courses in higher vocational colleges is the direction of the author in the future.

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