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Exploration of Talent Cultivation and Curriculum Construction for the Five Year Unified System

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Abstract: ***Introduced the design elements of a five-year consistent talent training plan for the electronics major, provided training objectives and professional abilities, constructed a curriculum system for connecting vocational and secondary schools, and demonstrated in detail the requirements for knowledge and skills points in the electrical and electronic technology course. Designed the selection principles and assessment plan for vocational and secondary school students to be promoted to vocational colleges.***

Keywords: Five Year Consistent System; Secondary and Higher Vocational Articulation; Curriculum System; Select.

1. INTRODUCTION

The five-year consistent talent cultivation method refers to the segmented talent cultivation of vocational and secondary schools, which divides the cultivation of students into two stages. The first three years of students study in vocational schools, and after the completion of the three years of study, they are transferred to vocational colleges for exams. After passing the exams, they are promoted to the corresponding vocational colleges and continue their professional studies for two years. They pass the assessment results in vocational colleges and obtain a full- time vocational college graduation certificate.

Practice has proven that the key to cultivating five-year consistent talent is to design a reasonable talent training plan, construct an integrated curriculum system for higher vocational education, and adopt a scientific assessment mechanism.

2. DESIGN OF TALENT CULTIVATION PLAN

The segmented training of vocational and secondary vocational talents in the "3+2" five-year consistent system should pay attention to the hierarchical requirements of talent training in vocational and secondary vocational stages, reflecting the characteristics of the segmented connection model.

Taking the electronic information engineering technology major as an example, this article explains the main differences in the design elements of talent cultivation plans between the secondary and higher vocational stages.

2.1 Professional Name and Code

The professional name of secondary vocational schools is Electronic Technology Application, while the professional name of vocational colleges is Electronic Information Engineering Technology (610101).

2.2 Train Objective

The goal of secondary vocational school is to combine the needs of regional economic and social development for talents, connect with the electronic information industry, cultivate students' solid electrical foundation, focus on mastering basic electrical courses such as circuits, analog electronic technology, digital electronic technology, and cultivate students' ability to analyze, design, and apply electronic circuits. In addition, students should possess good professional and psychological qualities, a positive attitude, and a sense of compliance with laws and regulations.

The goal of higher vocational education is to combine the talent needs of regional economic and social development, connect with the electronic information industry, rely on industries such as instruments and meters, applied electronics, communication equipment, and cooperate with electronic information product production and manufacturing enterprises and maintenance companies, cultivate students with good professional ethics, adapt to the frontline production needs in the field of electronic information engineering, and engage in electronic information product design High quality technical and skilled professionals in positions such as process design, as well as cultivating high-quality skilled professionals in positions such as electronic information product production management, quality inspection, and maintenance, as well as composite talents engaged in electrical product marketing.

2.3 Decomposition of Vocational Abilities in Secondary and Higher Vocational Education

Vocational school graduates majoring in electronics mainly focus on application technology related fields such as enterprises, institutions, and companies, engaging in frontline positions such as electronic product assembly, testing and debugging, as well as sales and after-sales service of electronic products. Vocational college graduates are engaged in electronic product design, production process management, product technical support, and other work. Decomposition of vocational abilities in secondary and higher vocational education is showed in table 1.

Table 1: Breakdown of Vocational Ability in Secondary and Higher Vocational Education

	Secondary vocational school	higher vocational colleges
Core competencies	Circuit analysis and calculation; Electronic circuit production and debugging	Electronic product design and research and development, electronic product production management, electrical product sales and technical services
Individual project capabilities	(1) Circuit analysis and computing ability; (2) Analysis and application capabilities of analog electronic circuits; (3) Analysis and application capabilities of digital electronic circuits	(1) Having the ability to produce and analyze electronic circuits; (2) Having the ability to apply and design microcontroller systems; (3) Having the ability to compile electronic product technical documents and manage production; (4) Having the ability to install and debug electronic products; (5) Possess the ability to develop simple electronic products. (6) Possess marketing capabilities for electrical products.

3. CURRICULUM SYSTEM CONSTRUCTION

3.1 The Construction of the Curriculum System for Connecting Middle and Higher Vocational Education

Special attention should be paid to the construction of the curriculum system for connecting vocational and secondary education, and the designed professional curriculum system is shown in Table 2.

Table 2: Curriculum System for Connecting Secondary Vocational and Vocational Education

Training stage	course type	Course Name
Secondary vocational school stage	specialized courses	Professional Cognition, Circuit Fundamentals and Project Training, Analog Electronic Circuit Fundamentals, Digital Electronic Circuit Fundamentals, Electrical Technology Fundamentals Training, Electronic Technology Fundamentals Training, Electrical and Electronic Comprehensive Training, Mechanical Drawing
Vocational college stage	professional foundations	C language programming, circuit and electrician, analog electronic technology, digital electronic technology, comprehensive training of electrical technology, comprehensive training of analog electronic technology, and comprehensive training of digital electronic technology
	Professional core courses	Single chip technology, electronic system design and practice, electronic product production process design, small intelligent electronic product development, electronic product production management, quality management and control, SMT process and equipment
	Professional expansion courses	Communication electronic circuits, printed circuit board design and production, electronic measurement technology, power electronics technology, automatic detection technology, small electronic product appearance design, switch power supply design and application, programmable logic devices and applications, electrical control and PLC
	Comprehensive	Professional social practice, graduation comprehensive practice, and

	practical courses	on-the-job internship

Curriculum connection between electronic information major of secondary and higher vocational, The main issue is the connection between electrical technology, electronic technology, and electrical and electronic training courses, Through multiple exchanges and collaborations between teachers in Secondary vocational schools and higher vocational colleges, the knowledge and skills that must be mastered in electrical and electronic courses in vocational schools have been sorted out, as well as the consolidation and improvement of the content of electrical and electronic technology courses in vocational schools.

3.2 Requirements for Knowledge Points of Electrical and Electronic Technology Courses in Secondary Vocational Education

The knowledge points of the electrical technology course in the secondary vocational stage are shown in Table 3.

Table 3: Knowledge Points of Electrical Technology Course in Secondary Vocational Education

Numble	Course module	Knowledge points
1	Understanding Circuits	Concept of circuit
		Current, resistance, energy, power
		Ohm's law
2	Simple DC circuit	Series, parallel, and hybrid connection of resistors Multimeter and resistance measurement
3	Complex DC circuit	Calculation of potential Kirchhoff's law branch current method Superposition theorem Davining's theorem Voltage source and current source
4	Capacitance and Inductance	Capacitor Connection of capacitors Charging and discharging of capacitors Self inductance and mutual inductance transformer
5	AC circuit	Understanding AC Power Single component sinusoidal AC circuit Series circuit of resistance, capacitance, and inductance Power of AC circuit
6	resonant circuit	Series resonant circuit Parallel resonant circuit
7	Three-phase sinusoidal AC circuit	Three-phase AC power supply Connection of three-phase loads Power of three-phase circuit Safe electricity usage

The knowledge points of electronic technology courses in secondary vocational education are shown in Table 4.

Table 4: Knowledge Points of Electronic Technology Courses in Secondary Vocational Education

Numble	Course module	Knowledge points
1	Diode application circuit	Basic knowledge of semiconductor diodes
		Single-phase rectifier circuit Other diode application circuits
2	Transistor amplifier circuit	Basic knowledge of semiconductor triodes Overview of amplifiers Common emitter amplifier circuit common collector amplifier
3	Integrated operational amplifier	Negative feedback amplification circuit DC amplifier Differential amplification circuit

4	Power amplifier circuit	Basic operational circuit The concept of power amplification OTL power amplifier circuit Integrated power amplifier circuit
5	DC POWER SUPPLY	Transistor regulated power supply Integrated voltage regulator and application circuit
6	Fundamentals of Digital Logic and Logic Gate Circuits	Characteristics of Digital Systems and Digital Circuits Switching characteristics of transistors Logic gate circuit Relationship between logic circuit diagram, Truth table and logic function Simplification of logical functions
7	Combinational logic circuit	Basic knowledge of Combinational logic Encoder, decoder, and display
8	Integrated trigger	RS flip-flop jk flip-flop D trigger T trigger and T 'trigger Application of integrated triggers
9	Sequential Logic	register Binary counter Application of Sequential logic Basic concepts of pulses
10	Pulse waveform generation and shaping circuit	Multivibrator 555 integrated timer

3.3 Technical Points of Electrical and Electronic Technology Course in Secondary Vocational Education

3.3.1 Component Identification and Testing

(1) Resistance: Able to recognize color coded resistance, correctly read resistance values and errors; Able to measure resistance values and calculate errors; Conversion of Conversion of units of electrical resistance.

(2) Capacitance: Able to recognize capacitance; Be able to identify the polarity of Electrolytic capacitor and read the capacity and withstand voltage value; Able to read digital representation of capacitance capacity and calculate capacitance errors; Know capacitance Conversion of units.

(3) Potentiometer: can detect Potentiometer; Can read the resistance value of Potentiometer represented by three digits.

(4) Diode: can distinguish the positive and negative polarity of the diode; Can distinguish the quality of diodes; Able to use light emitting tubes and voltage regulators correctly.

(5) Triode: able to distinguish the pins and types of crystal transistors; Can distinguish the quality of crystal transistors; I will test the current amplification coefficient of the crystal transistor.

3.3.2 The Use of Commonly Used Electronic Instruments and Meters

(1) Can correctly use a multimeter to measure DC voltage, DC current, resistance value, capacitance, and detect diodes and transistors.

(2) Be able to use the signal generator correctly to generate sine waves, square waves, and triangular waves.

(3) Being able to use an oscilloscope correctly to observe signal waveforms and be able to measure the period, frequency, and amplitude of the signal.

(4) Be able to correctly use a DC regulated power supply to output single or dual DC voltage, and be able to correctly power the circuit.

3.3.3 Circuit Welding and Debugging

(1) Proficient in using electric soldering irons to manually solder circuits on general circuit boards (independent pads).

(2) Can complete the installation and debugging of the following circuits according to the circuit schematic: diode application circuit, transistor single transistor amplification circuit, proportional operation circuit, integrated power amplifier circuit, DC stabilized power supply circuit, integrated logic gate circuit application, count decoding display circuit, frequency divider circuit, 555 timer application.

3.4 Course Content of Electrical and Electronic Technology in Higher Vocational Education

In higher vocational education, the application of Kirchhoff's law for non closed circuits, the application of superposition theorem and Thevenin's law, the analysis and calculation of resonant circuits, and the emphasis on transient circuit analysis and three element method calculation should be emphasized in the DC circuit of electrical engineering courses. For AC circuits, the analysis and calculation of phasor method, resonant circuit analysis and calculation, and the analysis and calculation of voltage, current, and electrical power of AC circuits should be taught. In the vocational stage of analog electronic technology, the focus is on teaching special diodes and their application circuits, the differences and different application scenarios of the three basic configuration amplifier circuits, and the application of integrated analog circuits is emphasized. In the part of digital electronic technology, the key content is the establishment method of logic function and Karnaugh map diagram simplification, the application of integrated Combinational logic, the application of integrated counter, the application of 555 timer, etc.

4. ASSESSMENT PLAN CONCLUSION

Table 5: Scoring Rules for Practical Assessment

Scoring Elements	Technical Requirements	Score	scoring rubric
Component screening	Correct selection of components according to the circuit schematic diagram (10 points)	10	10 points will be given if all components are selected correctly. One point will be deducted for selecting the wrong component until all points are deducted.
install workmanship	1. The circuit connection is correct and welding is completed; (5 points) 2. The component layout is reasonable, neat, and standardized; The connection is straight and without crossing; (5 points) 3. The solder joints are bright, smooth, and free of burrs, with a moderate amount of solder and no false soldering; (5 points)	15	1. If all components are welded and connected, 5 points will be given; Complete partial component welding or partial wiring, score 0-4 points as appropriate. 2. The component layout is reasonable, neat and standardized, and the wiring is basically straight and without crossing; Get 5 points; If the layout is slightly unreasonable, the plugins are not standardized or neat, or there are many intersecting connections, a score of 0 to 4 points may be given as appropriate. 3. If the welding quality is good, 5 points will be given; If the solder joint is not smooth, has burrs, and there is too much or too little tin in the solder joint, a score of 0 to 4 points may be given as appropriate.
test	1. The circuit can achieve corresponding functions; (10 points) 2. Able to correctly test circuit parameters; (10 points)	20	1. Can observe clear signals from various parts of the circuit using electronic instruments, 10 points will be given; 5 points will be given if some signals can be observed, but the signals are unstable or unclear (including circuit reasons and inexperience in instrument use); If there is no signal, 0 point will be given; 2. If the circuit parameters are measured, 10 points will be given; If the measurement result has a significant error, 5 points will be given; 0 point will be given for not being able to measure;
	1. According to safety		

Ethical safety standards	regulations, tools are fully equipped; (2 points) 2. Comply with safe electricity usage and operating regulations; (3 points) 3. Abide by the discipline of the examination room and clean the workstation; (1 point)	5	1. According to safety regulations, if the tools are fully equipped, 2 points will be given; If it is necessary to borrow tools or take away the tools, materials, and devices provided by the test venue at the end, 0 point will be given. Comply with safe electricity usage and operating regulations, 2 points; 0 point for safety issues; Abide by the discipline of the examination room and clean the workstation, 1 point will be given; 0 point for not organizing.

By using information technology, we will monitor the academic status of vocational school students throughout the process, dynamically eliminate students who do not meet academic standards, and improve the integrated student academic quality evaluation system for vocational and secondary education. For students transferred from vocational schools to higher vocational colleges, based on the assessment and evaluation mechanism of "valuing selection and combining rewards and punishments", exemption programs will be established to focus on rewarding students with outstanding skills, clarify the elimination mechanism, and cancel the selection qualification of students who have been punished for staying on campus or above. In addition, design a selection and assessment system for promoting vocational school graduates to higher vocational schools, and select qualified vocational school graduates. The selection assessment is divided into theoretical assessment and practical assessment. The theoretical assessment is based on the closed book method, accounting for 50%, while the practical assessment is based on circuit production and testing, accounting for 50%. And design the scoring rules for practical assessment as shown in Table 5.

5. CONCLUSION

The connection between vocational and secondary schools should distinguish the actual situation of different schools and majors, and be combined with social development. To reflect the requirements of talent cultivation. The purpose of the integrated design of the connection between vocational and secondary schools is to cultivate high-quality technical and skilled talents with noble moral character and exquisite skills for society. The key is the design of talent cultivation plans, and the core is the construction of curriculum systems.

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