World Journal of Educational Research
ISSN 2375-9771 (Print) ISSN 2333-5998 (Online)
Vol. 11, No. 3, 2024
www.scholink.org/ojs/index.php/wjer

Original Paper

Study on the Design of Learning Micro-processes in Secondary Vocational Courses

Niu Linlin[1], Liu Ying[1*] & Liu Xia[2]

[1] Faculty of Mechanical Engineering, Tianjin University of Technology and Education, Tianjin, China.

[2] Hebei Locomotive Technician College, Hebei, China

[*] Liu Ying, Faculty of Mechanical Engineering, Tianjin University of Technology and Education, Tianjin, China

Received: May 07, 2024 Accepted: June 11, 2024 Online Published: June 29, 2024

doi:10.22158/wjer.v11n3p139 URL: http://dx.doi.org/10.22158/wjer.v11n3p139

Abstract

Following the law of vocational growth of intermediate students and the learning path from perceptual practice to rational cognition of intermediate vocational professional courses, for the direction of the development of curriculum and teaching, centering on the learning tasks, learning micro-processes are designed according to the learning objectives and Task content. By summary the meaning of the learning micro-processes and the five major components through the literature, creating assumptions, and combining the existing learning micro-processes and learning process research model, the research process of the learning micro-processes is determined, and the design principle.Take "Contactor interlock positive and negative turn control circuit" in the lesson of "Electrical Control Line Installation and Maintenance" in secondary vocational school as an example,

Based on the learning tasks and goals, we analyze and sort them out, to divide the micro-process into various learning level stages and learning performance descriptions and provide references for the study of learning micro-processes in secondary vocational education.

Keywords

learning process, learning micro-processes, secondary vocational education, electrical control

1. Introductory

Vocational education, as a significant part of the national education system, has trained A substantial amount of high-quality workers and technically skilled personnel for China's modernization.As a part of vocational education, secondary education has the significant task of training skilled laborers and is a noteworthy foundation for China's economic and social development. However, at the level of

teaching in vocational education, there are three major separation problems at the current level: the separation of teaching and learning, the separation of knowledge and behavior, and the separation of instruction and evaluation.Based on the current research on the learning process in the field of education, the development of the learning micro-process should be explored to promote the teaching of secondary vocational specialized courses.

1.1 Learning Micro-processes

Learning micro-processes are proposed under the theory of the learning process to promote the teaching reform of secondary professional courses. The main difference between the Learning process and Learning micro-processes is shown in Table 1. Learning micro-processes describe the progress and development of a student's knowledge and ability about a topic or task in a certain period.It is essentially an exquisite version of the micro-teaching plan.In comparison with the learning process, the learning micro-processes operate in a shorter period, are easier to implement with the teacher as the principal developer rather than the expert, and are more in line with the type of secondary vocational education, taking into account the characteristics of secondary education and the intellectual structure of the students.

Table 1. Learning Processes Versus Learning Micro-Processes

Comparison term	Difference	
	Learning process	Learning micro-processes
Levels and characteristics	High profile and theoretical	Grassroots and operational
corresponding dimension	academic program	Course or unit of study
operating cycle	Generally 6~8 years	1~N number of hours
main body of research	Educational, psychological, curricular, etc.	Teachers, industry practitioners
content unit	general concept	Mini-Themes or Mini-Tasks
development cost	loud	beneath

In short, the learning micro-processes are a sequence that most students go through in much the same way. If reaching a level is compared to a destination, then the learning micro-processes are like a ‘map’ in which teachers and students can find out where they are in their learning journey. The purpose of the micro-processes is not only to know whether students have reached a certain level, met a standard, or acquired certain knowledge and skills, but also to let teachers know where students are going next. The micro-processes development path is shown in Figure 1.

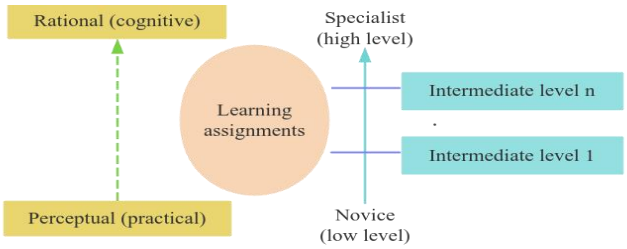

Figure 1. Learning Micro-Processes Development Route Model

The learning process usually consists of a low anchor point, several intermediate levels, and a high anchor point.Students at a low level of 'novice'(with their prior knowledge and experience) in the process of accomplishing a learning task in a course of study→There are many intermediate levels (competencies of knowledge and skills acquired by the students) in the high-level 'expert' stage (attainment of the objectives of the course tasks).

1.2 Learning about Micro-processes Hypothesis Creation

The research process for identifying learning micro-processes should begin with identifying the constituent elements, then designing the hypotheses, and ultimately determining the design process. A whole process must include five components: learning or expression objectives, process variables, achievement levels, learning performance, and achievement assessment, Processes are by nature hypothetical, speculative models that need to be tested in practice and are based on the following three assumptions before design:

Hypothesis 1: As students progress through the learning task, their understanding deepens, their practical skills improve, and all aspects of their approach to learning and depth of thinking are optimized.

Hypothesis 2: Students' progress on the task is staged, with an overall degree of increase, and progress between levels is more variable than progress within levels. The former is more variable than the latter.

Hypothesis 3: It is possible to find 'easily measurable or visible behavioral manifestations' to describe the level of performance as the student performs the learning task.

1.3 Learning the Micro-processes Research Process

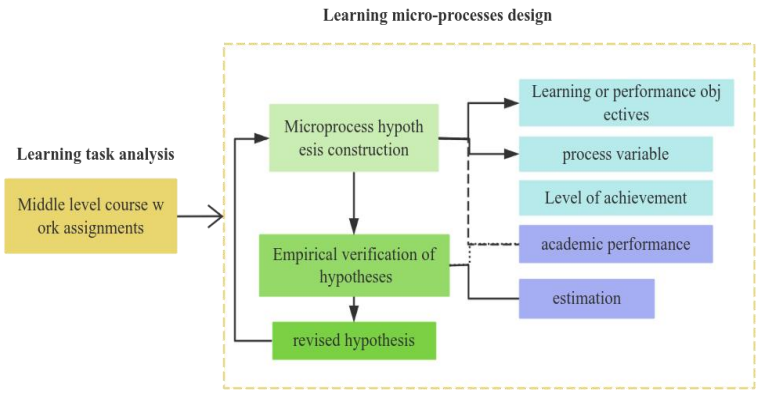

Figure 2. Learning Micro-processes Research Process Map

As shown in Figure 3, it has been found in most studies that the learning process roughly goes through the process of hypothesis construction, practice verification, and revision of hypotheses, and the learning micro-processes should also go through these three processes. The first step of the study is——for the researcher to identify the course learning task to be studied, analyze the learning task, and then design the learning micro-processes afterward.

1.4 Micro-processes Hypothesis Construction

The course learning tasks mentioned in this paper refer to the course learning tasks of the core curriculum of secondary vocational specialties, and the learning or performance objectives in the learning micro-processes are determined according to the task objectives required to be achieved. There are two ways to divide the achievement level chronologically: one is to divide the low level, intermediate level, and high level, i.e., the starting point refers to the student's previous knowledge and experience; the endpoint is usually the social expectation, i.e., people expect that students should know and be able to do something when they reach the top of the process. with multiple intermediate levels between the two endpoints, The other is based on the grade level the student is in.

Learning micro-processes focus on the process of students' accomplishing a learning task in the classroom, so the division of their achievement level should not be based on different grades, and should be studied around the knowledge and skills involved in a learning task in the secondary curriculum instead of a mere core concept, therefore, taking the six stages of remembering, understanding, applying, analyzing, evaluating, and innovating in Bloom's Cognitive Structural Learning Theory as a reference idea, the students were hypothesized to be divided into four levels during task learning, as shown in Figure 4.

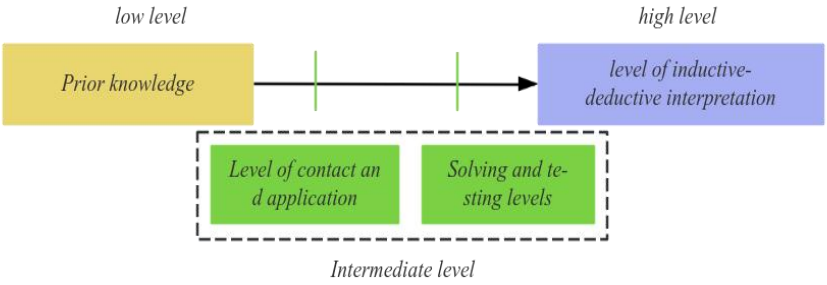

Figure 3. Learning Micro-processes Achievement Level Model

From low level to high level are existing knowledge level (the students' own knowledge and skill system before the beginning of the course learning tasks), connection and application level (the students' ability to apply the two in practical training through the learning of new knowledge, combined with their existing knowledge and experience), answer and test level (the students' ability to understand the causes of the problem and solve the issue during the task learning), inductive deductive interpretation level (students' ability to integrate the knowledge and skills of the task and finally form their concepts after practicing the learning task and thinking about the process). Given the hypothetical

construction stage, the performance depicted refers to the students' due performance, i.e., the extent to which the students should have mastered and understood certain knowledge and skills after reaching a certain level, and ought to have externalized the knowledge and skills in practical operation and problem-solving.

1.5 Empirical Verification and Revision of Hypotheses

There are three main approaches to empirical testing of learning process research: instructional interventions, horizontal surveys, and longitudinal surveys,This study employs instructional interventions, i.e., after completing the learning micro-processes hypothesis construct, under the micro-processes-guided instructional practice, observe student performance, intervention measure based on the logical reasoning of knowledge understanding and skill mastery of the learning task to generate a new way of guided learning. The practice involves collecting information on two aspects of student performance: first, the actual performance of task-based learning in instruction guided by learning micro-processes theory; and second, the actual performance under traditional instruction, and comparing whether the former is better or not by comparing it to the former's mastery. Compare the actual performance with the hypothetical due performance, to complete the validation of the hypothesis and correct the deficiencies, improve the evaluation rules according to the student's learning performance, and construct reasonable micro-processes

2. Design Principles

a. Using the learning task as a base

Through the course learning tasks to let students know what should be done, the process of the task relies on the teacher to design the problem to promote student learning enthusiasm, with the problem to trigger students to think about how to do it, the task ultimately points to the students to obtain their concepts——the students through the process of practicing the concepts should be mastered to delve further deeper the concepts constructed as their knowledge and experience. The concepts ultimately obtained by each learning task will also be The concepts finally acquired in each learning task will also be the original knowledge and experience that students have at the beginning of the next new task.

b. Tasks should be analyzed in an integrated manner

The Key learning task of the secondary vocational curriculum is different from that of ordinary high school, which is not purely learning theoretical experience, but the integration of science and practice, so the micro-processes should reflect doing. Learning micro-processes should be the theory and practice developed together. The analysis of the learning task should be followed by the principle of integration of theory and practice.

c. Level-defined performance descriptions should be tailored

It should be unambiguous what to learn at what level, and the knowledge and skills to be mastered at each level should be described in detail in terms of learning performance, that is, what concepts students can understand and what ideas they can understand through what skills operations, to grasp the

learning performance of students in the learning process. The description of learning performance at each level can also be used as a basis for evaluating students.

2.1 Contactor Interlock Forward and Reverse Control Circuit as an Example

Based on the learning tasks and objectives, the learning content is analyzed and constructed, according to which the student's performance in learning new knowledge is analyzed and divided into levels, to complete the design of learning micro-processes. Science Education Publishing House 'electrical control installation and maintenance' in work task six 'crane forward and reverse control circuit installation and maintenance' as an example, the task is analyzed, the design of the task objectives, and then the task of learning micro-process design. The electrical control circuit installation and maintenance course is one of the main courses of secondary vocational school processing and manufacturing direction of electromechanical specialties, which has a very practical and broad application, focusing on both theoretical knowledge and practical training.It has a high impact on students' professional competence, and this course is highly theoretical and requires a high degree of practice.

2.2 Mission Objective

Based on the textbook and existing research references, the theory and practice of forward and reverse control circuits related to the knowledge and skills of the operation steps to analyze the contactor interlock forward and reverse control circuits requires students to master the circuit task requirements, working principle, operation process, list of components, safety testing, troubleshooting, and other knowledge and skills. Through a series of learning to achieve the ability to use instrumentation tools to detect the correct, mounting circuit, safe operation, and independent troubleshooting ability. Through the analysis of the student's learning situation, students have already studied low-voltage power distribution appliances, low-voltage control appliances, electric and continuous operation, and self-locking control circuits, and have the metacognitive ability to learn this task. Therefore, the following task objectives were designed according to the student's current level of learning process:

1. By reading the task introduction be able to identify the task requirements and be able to list the electrical components of a forward and reverse control circuit for a three-phase cage asynchronous motor.

2. Through the reading of circuit diagrams the three-phase cage asynchronous motor forward and reverse control circuit working principle for a simple description of the operation of the process of its general plan.

3. Through group cooperative inquiry, one can install a three-phase cage asynchronous motor forward and reverse control circuit, with meters, tools to detect the correctness of the circuit installation, and the safety regulations for the correct power operation, to cultivate the learning habits of group cooperation and communication.

4. Be able to use instruments and tools to detect and analyze faults in the forward and reverse control circuits of three-phase cage asynchronous motors, and be able to troubleshoot independently, clarify the

working principle of the circuits, and cultivate the ability of self-evaluation and self-reflection.

For the above task objectives, based on the student's cognitive law as well as the law of physical and mental development set, the student's knowledge and skills of learning micro-process level is gradually increased from low to high, from simple to complex, around the installation of the detection of forward and reverse control circuits of the gradual development of this task.

2.3 Organization of Tasks

In power drag control circuits, there is often a positive and negative motor control, so that the production of mechanical moving parts to achieve the positive and negative direction of the motion control requirements, such as the control of the crane's rise and fall movement, which is the motor positive and negative motion process. The knowledge and skills required to master the portion of forward and reverse control circuits are summarized and analyzed. Task content learning requires both theoretical knowledge and practice. The principal learning content of forward and reverse control circuits within the textbook is sorted out, as shown in Figure 5.

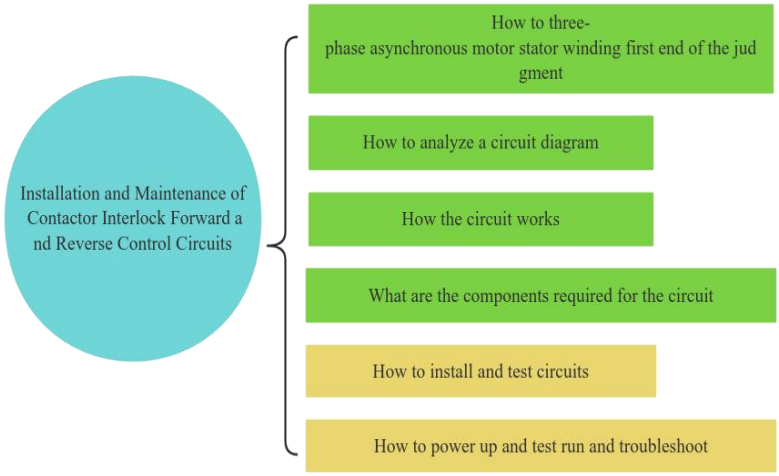

Figure 4. Forward and Reverse Control Circuits Main Learning Content

The learning task requires students to learn the task of "contactor interlock forward and reverse control circuit" and master the following questions - How to distinguish the stator winding head and end? How to analyze the circuit diagram to clarify the working principle? What are the components required for the circuit? How to install and test the circuit? How to power the circuit trial? How to troubleshoot the fault?

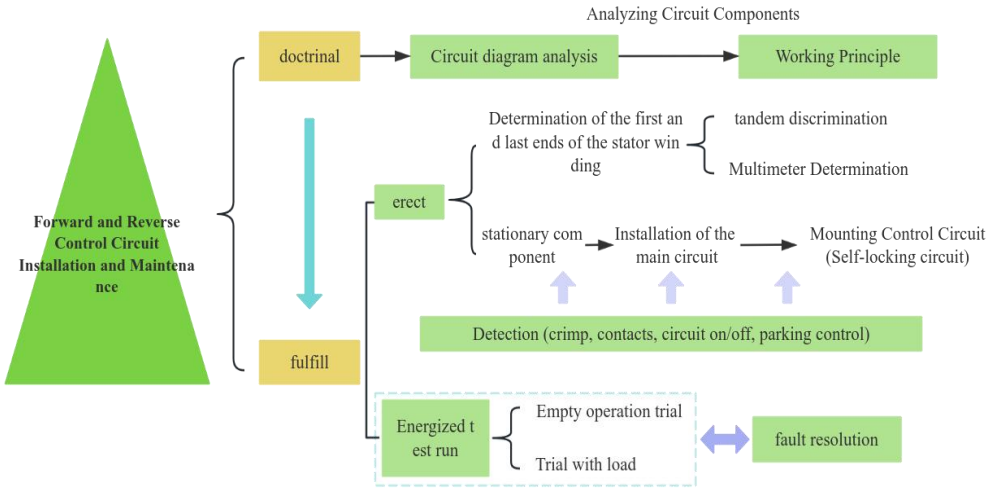

Figure 5. Forward and Reverse Control Circuits Related Knowledge and Skills Combing

Through analysis, the learning content of forward and reverse control circuits is roughly divided into theory and practice. Figure 6 shows the knowledge and skills connected to forward and reverse control circuits. Students are required to learn the identification method of the stator winding ends of the three-phase asynchronous engine, and then carry out the basic knowledge of the positive and negative rotation control circuit, that is, analyze the schematic diagram of the circuit, sort out the working principle of the schematic diagram of the circuit, and identify the required components in the process. After the completion of the theoretical knowledge, the circuit installation, detection, power-on test, and troubleshooting tasks are completed.

2.4 Design Examples

The starting point of students' learning is their previous learning experience of low-voltage distribution appliances and control appliances, electric control circuits, and self-locking forward control circuits commonly used in this course. The starting point difference between students is the variation in their grasp of the knowledge point in theory and practice, such as identification, detection, installation, and maintenance. After learning the installation and maintenance of the forward and reverse control circuit, students can achieve the objectives of various course tasks as the endpoint, that is, students can eventually form their rational concepts and practical skills through the practical operation.

Theoretically, it can clarify the task requirements and summarize the working principle of the positive and negative rotation control circuit, the name and use of the application components, and the circuit fault analysis. In practice, it can independently install, test, and debug the positive and negative rotation control of the three-phase cage asynchronous motor successfully and safely power on the operation, and gradually develop occupational mobility and professional quality during the process from the starting point to the endpoint. Through continuous improvement of their learning level to improve their ability.

As shown in the learning micro-processes design in Table 2, the student's Learning performance in

learning new knowledge is analyzed and the learning level is split according to the learning content. With students' pre-concept as the starting point of learning micro-processes and the task goal of "contactor interlocking forward and reverse control circuit" as the end point of learning microprocessors, the intermediate level of learning micro-processes is established according to students' understanding degree of theoretical knowledge of the learning task and proficiency in grasping practical operation skills, perform a presentation description. Then, the assessment points and criteria are determined according to the description of the learning level

The intermediate level of the learning micro-process is determined according to the student's understanding degree of the theoretical knowledge of the learning task and their proficiency in grasping the practical skills. In the learning content as micro-processes advance, the content follows the degree of gradual increase in learning tasks mainly by the installation and testing of circuits, debugging and analysis, and the concept of obtaining and understanding the principle of the main. Regarding learning methods, there are mainly students' independent analysis, group cooperation and communication, and teachers' explanations. In terms of evaluation, we set up diagnostic evaluation before the task is carried out, group mutual evaluation, students' self-assessment, and teachers' evaluation during the task process, and follow the combination of process evaluation and summative evaluation.

Table 2. "Forward and Reverse Control Circuits" Learning Micro-Processes Design

Horizontal segmentation	Description of Learning Levels		Evaluation points and criteria
	knowledge-related	skill	
Level of inductive-deductive interpretation	Analyze the circuit control from the circuit diagram, form your understanding of the working principle, and make clear the required components and installation and testing methods.	Independently perform wiring, energizing, testing and troubleshooting tasks.	a. Independently and safely complete wiring tasks at once. b. Independently analyze and solve circuit faults. c. Independently and correctly draw circuit diagrams. d. Explain the working principle.
Solving and testing levels	Know how to carry out testing, power-on test drive, and clarify the precautions of the actual operation process.	Can judge and deal with the fault phenomenon generated by the motor during power-on test drive, and can detect and solve the problem sequentially.	a. Safe energized operation. b. Solve the faults of the circuit operation in a timely manner. c. Correctly use the multi-meter to test the circuit
Level of contact and application	Learn how to identify the first and last ends of the stator windings of a motor, and learn the basics of electric circuits.	Group cooperation and communication, the use of a multi-meter for stator winding first and end discrimination, the reverse circuit to change the phase sequence of the task, respectively, the installation of the principal circuit and control circuit	a. Safe identification of the first and last ends of stator windings b. Main motor phase change accurately c. Installation of the main circuit and control circuit wiring neatly and safely, the wire color selection is correct
Prior knowledge	Can describe the role of AC contactors and thermal relays, and can analyze the principle according to the circuit diagram, but is not clear on how the reverse circuit operates and is not clear on the description of the control of electrical appliances such as circuit diagram buttons, contactors, etc.	Knowledge of safe wiring methods, independent installation of pointing/continuous control circuits, and contactor self-locking tasks, but will not perform phase sequence change wiring. Can test circuits with a multimeter, but will not use a multi-meter to identify the first and last ends of stator windings	a. Component identification and clear role b. Independently carry out the installation of positive rotation circuit

3. Advantages of Integrating Learning Micro-processes into the Classroom

3.1 Close to the Reality of Vocational Education and Follow the Law of Vocational Growth of Secondary Students

Intermediate teaching emphasizes the cultivation of students' abilities and pays more attention to the cultivation of students' cultural literacy and professional skills, especially for the cultivation of students' practical operation ability, and its main purpose is to cultivate practical skilled talents. Influenced by traditional teaching thinking, most of the current intermediate vocational colleges and universities still have the phenomenon of unclear self-positioning, sticking to the theoretical cognitive level of learning, disregarding the rules of the intermediate students' vocational growth, which is unfavorable to the future vocational development of intermediate students.It is not conducive to the future career development of vocational students.The micro-process of core professional courses for secondary vocational schools fully understands the characteristics of secondary vocational education, fits the reality, builds a typical path in line with the development of secondary vocational students, follows the development route of students from sensibility to rationality, from practice to cognition, and better promotes the growth of students.

3.2 Positioning Learning Levels to Strengthen Self-Awareness and Enhance Student Motivation

Nowadays, secondary vocational teaching still exists as indoctrination teaching, this kind of teaching is not student-centered, teachers only rely on their cognition to teach content, not appropriate for students who want to review what they learned, and students can not digest the knowledge in a certain period, but also certainly unable to apply knowledge to practice, greatly reducing the motivation of the students to learn. The learning micro-processes focus on the development of knowledge and skills of the students and divide the learning level, describing the degree of mastery of knowledge and skills, it allows students to precisely identify where they are in the micro-processes, to understand their next learning trend or make up for the shortcomings of the current stage, this helps to promote students' enthusiasm for learning

3.3 Advocating the Integration of Science and Practice and Promoting the Integration of Students' Knowledge and Action

Whether it is practice over theory or theory over practice, the dichotomy between theory and practice is regular in vocational colleges and universities, once the essence of the misunderstanding of “theory applied to practice” results in over-emphasis on the importance of theoretical knowledge, and vocational colleges and universities focusing on cultivating the practical ability of students does not mean that they despise the theoretical knowledge, but the coordinated development of the two. Moreover, the focus on developing practical ability in secondary vocational colleges and universities does not mean that theoretical knowledge is ignored, but that the two are created in a coordinated manner, and there is no phenomenon of avoiding the importance of theory, let alone comparing the importance of theory and practice.

3.4 Focusing on the Learning Process and Effectively Promoting the Consistency of Tasks and Assessment

The current evaluation and assessment methods are mainly based on the midterm and final exams, only the final test to define the students' performance, resulting in the evaluation being too one-sided, resulting in evaluation lagging far behind the teaching and learning, is not conducive to the students' timely reflection, timely correction, limiting the space for students to make progress. In contrast, the learning micro-processes focus on the learning process of the students, real-time attention to the performance of the students' learning and evaluation of the students, timely feedback and guidance, effectively strengthening the process of assessment, can better promote the consistency of the task and evaluation to promote the efficiency of student learning.

4. Summary

The design study of learning micro-processes primarily analyzes the content of learning tasks, determines the learning objectives, and divides the learning levels of achievement levels by taking the six stages of memorization, comprehension, application, analysis, evaluation, and innovation in Bloom's cognitive structural learning theory as the reference idea, i.e., low level 1: existing knowledge level, intermediate level 2: linking and applying level, intermediate level 3: Answer and check level, and high level 4: Inductive Deductive Explanation level. Learning performance descriptions for learning levels based on course task objectives and the logical sequence of learning content.

The teaching of secondary professional courses should be from perceptual to rational, and students' learning develops according to the route from practice to cognitive, and the learning micro-processes reveal the development path of students' thinking and practice activities of a certain teaching content step-by-step from simple to complex, from low level to high level, starting from practice in line with the cultivation goal of secondary vocational schools, and line with the cultivation requirements of skilled personnel in vocational education.

References

Chen, Y. Z., & Yu, Q. (2024). Challenges and Countermeasures in the Construction of Evaluati on System of Municipal Secondary Education. *Education Science Forum*, *2024*(12), 34-36.

Cui, Y. (2022). Teaching Reform of “Installation and Maintenance of Electrical Control Lines” Course for Middle-school Electromechanical Majors Based on Students' Core Literacy. Gua ng Xi Agricultural Mechanization, (02), 50-51. Retrieved from https://kns.cnki.net/kcms2/arti cle/abstract?v=f1ZyUc11mdoi-U93mTmt__ULR4w1Ka1K1F_LE00s18vGUK6RNTlhLibe8lWK SxDlA4Sljo6YQbIK0nyEaTDO9se9n9P4YplMszztXnS3HYdpaNk3j6IXG1nJdLKU0N02f4qL26 NTpqC6wzSiH0K3-w==&uniplatform=NZKPT&language=CHS

Gao, X. Y. (2019). *A study of PCK learning process of chemistry teacher trainees*. Yangzhou University. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdor7L1LUf

sKsEHbVrSdvOO7hShlbjoyWjCyFn6H_Ya-PGwodMtU6x4kUy9t8ZQiQode_v4qpPnWFzl54_hB3gbu93U36NJ0jKmtL7OxB3mRoaQ5RY6OnASLgw_HxtIn59MwV1S4tqVFqg==&uniplatform=NZKPT&language=CHS

Guo, Q., & Liu, Z. G. (2021). Visual analysis of learning process research. *Higher Education Exploration*, (03), 80-87. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdpPTgG3WzvGGm09UIZjrtga3vhNyrGrzSflj1x-p8nDm8bQn7oTen4QnS_k5aN3LIpfHESEk8iHYmPi9CwK0c2Sc5EtglegxF-3jiV-yxoFJbS5IPAF2THhARWSfE2Otq-2ni3R6of4Gg==&uniplatform=NZKPT&language=CHS

Li, Q. (2017). *A Study of Students' Learning Process of Science Concepts*. Southwest University. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdrMTtt1TaZeraPxLhZg-NplqBgGgU28D6dPQzUALYaUPZX-MEJL4xQNIwjq83cq349PZoNkhEYfpj69XtqvLFOZv8qjnX4UFdyMBWTQbBPRMu4H4d5MFhozdCF799SjpAvzyhwtqcImPA==&uniplatform=NZKPT&language=CHS

Mohan, L., Chen, J., & Anderson, C. W. (n.d.). *Developing a Multi-year Learning Progression for Carbon Cycling in Socio-Ecological Systems.Submitted to Journal of Research in Science Teaching*. Retrieved from http://edr1.educ.msu.edu/EnvironmentalLit/publicsite/files/General/ProjectPaper/608_ MultiYear_Carbon_Final.pdf

Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdqka8z8ZFH5lezuaUY0i5nBFAh1YbjzVkhqzhlDzhWyyjVzK5KeXxFgNc220i9-ApmGs5VFIu-mcqXfZO-NXuy1wg2zM-pBvzJ82I40oXeT6QXtu9CwaByQnt58vFSZ3Q1xg0owc7CqPQ==&uniplatform=NZKPT&language=CHS

Si, H. X. (2013). A review of learning process research methods. *Studies in Foreign Education*, *40*(11), 21-28. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdqkHZmTtpT6klbrsVltba-z8bm97DmfO33_flAoU_PyR6eLGZ0aTm--6aM7mWPSgHdapJpyQqGEELjPqYhd7jejab9xJvayx2vL5IkaNdaAm4xpbiWXw8NL1VNUGtNCiGc=&uniplatform=NZKPT&language=CHS

Tang, G. Q. (2023). *Research on the Application of Gamification Teaching in Intermediate Electrical Control Line Installation and Maintenance Course*. Changchun Normal University. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdqiO54qxpRqdOzTHWg9NdnqyeuUlftPKxEguhHBRqWQkKZHZIJWGQGe4NzWoS3fzrtnd23c4BnzPAyReFWb5BY_t3nubcAtb6tPyMCdwggpYnpPzU7qp7GOALYzqIRpzJU_i5egrp7Uxw==&uniplatform=NZKPT&language=CHS

Weslin, & Yuan, E. J. (2010). New Trends and Implications of Science Education Research in the United States: Promoting the Coherence of Curriculum, Instruction and Assessment through the Learning Proces. *Curriculum, Teaching Material and Method*, *30*(10), 98-107. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdrX5t-fv5SV4i9WMS9bVhEtpeKQGwfhkvXpiY_f_p_GWl-kdIdQKO1p_L1c-kMFoq-KylAuhBJgzRTYRvDf5fuJAFjuj

9Usqy48eaVHMOnf0GJn3XxFrYSYsjIiW7lGJ9A=&uniplatform=NZKPT&language=CHS

Xu, H. J. (2023). Problems and Countermeasures of Talent Cultivation in Secondary Schools--T aking Rehabilitation Auxiliary Apparatus Technology and Application Specialty as an Exam ple. *Asia-Pacific Education*, *2023*(24), 189-192. Retrieved from https://kns.cnki.net/kcms2/art icle/abstract?v=f1ZyUc11mdqPE2IKPw9afed3tuJugDzDRZ2-YE8iQWFfMrx85_T8JrLff60QAQ or0gkhYPEb7JNceINNUuPb6ZKJU25BzYNb9ikVXZHywNXboH0wbvEEFGZr04SyO3H11vTu C38ey8DJIE13uXfmWA==&uniplatform=NZKPT&language=CHS

Zhang, G. H. (2015). Learning micro-process:New ideas for teaching reform of middle school professional courses. *Vocational and Technical Education*, *36*(23), 8-12. Retrieved from http s://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdpv1WCnAin4wo_25aGO-artqpZOsfkrQg WIfJgCPIaIZO6k79t3a9Q3bXc8JxMfV6eRPXvQGX76QBf3C1Af9HEZlBOvkGim2NuLKYPV B0BwgyCaqmzNXtKlAs61FOTMGEb0ATBKzbpZWA==&uniplatform=NZKPT&language=CH S

Zhang, G. H. (2023). Learning micro-processes: A life perspective on the creation of a new pa radigm for VET teaching and learning. *Chinese Vocational and Technical Education*, *2023* (14), 12-18. Retrieved from https://kns.cnki.net/kcms2/article/abstract?v=f1ZyUc11mdoXfQW 7Xgu2ID3dHXFtqeIfw501RvuW5VLT6daJIFyjrOg25l2HtkhTvh6U_znT9STVUtFBolHDG5Pf26 RUfcuInxfgKSfzVZGhf0yxxlwFr7i9ULdW1bcDB37jJ5iLwZnmpimklRnkjQ==&uniplatform=N ZKPT&language=CHS