



# Research of Teaching Mode Based on the Theory of Deliberate Practice

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**Abstract.** The four elements of deliberate practice include well-defined goals, extreme focus, effective feedback, and practice in the stretching zone. In terms of professional learning, in order to further promote the cultivation of students' skills and literacy, trainers need to use certain methods to continuously stimulate students' independent thinking ability, guide them to integrate knowledge and action, and help students to have a goal and repeat practice step by step according to the principle of deliberate practice, and finally break through themselves. This paper takes the practical course Line Protection and Inspection as an example, starting from the four elements of deliberate practice, studies and analyzes the teaching mode that can continuously standardize the job habits of students, deepen the cultivation of knowledge, ability and quality goals, improve the professional skill level of students, and meet the needs of talent training, so as to provide reference ideas for the teaching mode of professional training classes.

**Keywords:** Deliberate Practice, Teaching Mode, Expertise

## 1 Introduction

In 2019, the Central Committee of the Communist Party of China and the State Council issued the Modernization of China's Education 2035, which put forward eight basic concepts for promoting the modernization of education: pay more attention to morality first, pay more attention to all-round development, pay more attention to everyone, pay more attention to lifelong learning, pay more attention to teaching students according to their aptitude, pay more attention to the integration of knowledge and action, pay more attention to integrated development, and pay more attention to co-construction and sharing<sup>[1]</sup>.

In traditional classes, the class form is mainly based on knowledge impartation, and the teaching activities and teaching structure are mostly carried out by the trainer, which leads to the class being too rigid, and the main position of the students in the class can not be fully reflected and respected, which ignore the normal needs of the students' psychological development and suppress the enthusiasm and initiative of the

students' learning. The learning effectiveness of the students is low, and it is urgent to change the teaching mode.

With the development and growth of media technology, contemporary students have gradually enriched the channels for receiving information, and prefer to accept new things through participation and interaction. So the result of students are:

Learning > Thinking > Action > Change

The account of growth weight is exactly the opposite:

Learning < Thinking < Action < Change

Therefore, the path to change needs to be constantly provoked by thought and action<sup>[2]</sup>.

Deliberate practice is a purposeful and planned repetitive exercise, which pays more attention to the feedback of high concentration and purpose, and challenges the individual's existing abilities, <sup>[1]</sup>which lies in the improvement and enhancement of specific skills, which is the key point to its difference from traditional mechanical repetitive exercises. The four elements of deliberate practice include well-defined goals, extreme focus, effective feedback, and practice in the stretching zone. In terms of professional learning, in order to further promote the cultivation of students' skills and literacy, trainers need to use certain methods to continuously stimulate students' independent thinking ability, guide them to integrate knowledge and action, and help students repeat practice in a targeted and step-by-step manner according to the principle of deliberate practice, so as to finally break through themselves and meet the needs of the post.

## 2 Clarify Goals and Learn According to Needs

### 2.1 Carry Out All-Round Research to Understand Multi-Dimensional Needs and Educational Goals

Extensive research, including students, teachers, as well as on-site employees and experts in colleges and universities, fully obtain the list of job ability requirements, clarify the professional and technical skills required for the post, adjust the importance and difficulty of training in a timely manner, and teach according to needs and aptitude<sup>[3]</sup>. At the same time, the whole process of carried out by the course is fully investigated to understand the psychological and cognitive characteristics of the students, and to do a good job in the analysis of the learning situation.

As a practical course, *Line Protection Inspection* focuses on the three dimensions of "organizational needs, job needs, and personal needs", conforms to the sustainable development and market challenges of the power industry, supports the strategic goals of the State Grid Corporation of China, connects with job needs, optimizes and improves the course in an all-round way, and uses cross-border thinking to create a new way of talent training with high fit and inject talent vitality. The trainees are from the newly recruited employees of the State Grid Corporation of China and have been exposed to on-site work to varying degrees. The on-site workflow of the relay protection profession includes design, installation, commissioning, defect maintenance, regular inspection, accident analysis, and the commissioning methods

and skills of the relay protection device are almost the same as those before commissioning in the regular inspection after commissioning. It can be seen that the line protection inspection work accounts for nearly 30% of the entire workflow of relay protection, which is of great significance. The mastery of this skill is an important prerequisite for other skills such as design adjustment, defect elimination, accident analysis and other skills in on-site work, and is the basis for professional work. Therefore, in the introduction part of the course, the knowledge objectives, skill objectives, and emotional objectives are clarified, which together constitute the course objectives, and inform the students of the principles and knowledge points that need to be mastered, the practical skills and the quality improvement that they need to have in the whole process. At the same time, the key assessment items of relay protection professional training are divided into Line Protection Inspection and Transformer Protection Inspection, each accounting for 50%. The two are similar in terms of inspection process, steps, safety measures, methods, standards and specifications, etc., and the proficiency of line protection and inspection is helpful to further learn transformer protection inspection.

## 2.2 Change the Traditional Training to the Training and Clarify the Training Mode

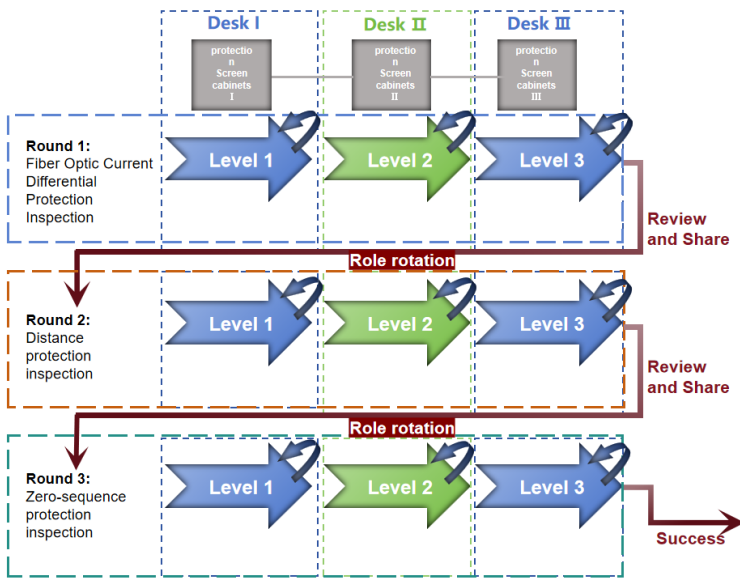


Fig. 1. Schematic Diagram of the Clearance Process

As a practical course, *Line Protection Inspection* has a long cycle and deep professionalism, and innovates the "single traditional training" into "immersive training": according to the classification of line protection, it is divided into three rounds of tasks, that is, "three horizontal"; For each type of line protection and commissioning,

it is divided into three steps according to the complete practical operation and debugging process, that is, "three verticals", which is summarized as the "3+9" training mode of breaking through three rounds and passing nine levels (see Fig. 1). Innovate the training mode to help the trainees further refine the whole process operation process of line protection and inspection, and the training process is more pertinent, easy to find problems, focus on breakthroughs, ensure the effective transfer and application of knowledge, and enhance the craftsman spirit of excellence in the whole process.

### **2.3 Based on the OBE Concept, Clarify the Learning Objectives in the Whole Process**

The structure of the course is clear, starting from the introduction, the practical training runs through it, the review is accompanied by three rounds of passing, and finally ends with the assessment. The task list of different stages and different regions was sorted out and refined for the students, so that the students could clarify "what to learn", "how to learn" and "why to learn", establish a sense of goal, stimulate learning motivation, find the right learning direction, and guide students to integrate knowledge and action, and be goal-oriented, which is conducive to their independent exploration of course learning and promotes the smooth and efficient training. Set up a review in stages, review the problems in a timely manner, facilitate the students to understand the problems existing in the previous stage, summarize and improve them in real time, and apply them to the next stage of practical training, avoid repeated mistakes, improve the operation specifications, strengthen the understanding and memory of knowledge points, enhance the students' self-confidence and sense of gain, comprehensively improve their knowledge, ability and quality ability, and adapt to the needs of professional development and enterprise employment.

## **3 Focus on Efficiency and Focus on Learning**

### **3.1 Clarify the Role of the Class and Guide the Students to Overcome Difficulties**

The trainer acts as the facilitator and facilitator of the class to ensure the efficient and smooth teaching process. The first is to give the students as the passers, make a badge for each student, clarify the identity, increase the opportunity for each student to practice hands-on exercises through the form of group practice, and pass the level in turn according to the group, so as to enhance team cohesion. The second is to give the trainer a NPC (non-player character) to guide the development of the level and evaluate the results, so that the students can maintain a high level of professional concentration and ensure that the level is passed with high standards and strict requirements. At the same time, the traditional debugging rules stipulate that the trainees can freely choose the role to perform, the division of labor is inevitably difficult differences, there are often "thigh mentality" backward students in the group members, with the psychology of "I can't, I can't learn", usually choose a relatively simple role, complete relatively simple operation steps, do not understand the complete training operation

process, greatly affect the training effect, resulting in the trainees do not adapt to the rigor and normative requirements of the on-site job, there is a certain degree of potential safety hazards. In order to avoid this situation, the trainees are required to carry out a large rotation of roles in the group before each round of tasks, so as to ensure that after three rounds, the trainees can achieve full coverage in all aspects of the whole process of protection and debugging, and eliminate skill gaps and dependence in the group.

### 3.2 Break Through One by One

Surveys have shown that people instinctively move within their comfort zone and instinctively choose to learn with simple content, but often end up being bored and distracted due to a lack of challenge<sup>[4]</sup>. If the difficulty is too high, it may lead to the activity directly entering the difficult area, causing it to be too difficult and lose confidence and choose to escape. Therefore, it is necessary to control the degree of difficulty, only by appropriately increasing the difficulty to the level that can be achieved after hard work, the range of activity can be extended to the edge of the comfort zone and enter the stretching zone, at this time, the learning difficulty is just right, and it is easier for people to enter the state of concentration.

The traditional class mode has the situation of "difficult principle and difficult output", and the relay protection training project is a comprehensive application of professional theory<sup>[5-6]</sup>, which often needs better theory as support in the debugging steps and debugging methods, and the students choose rote memorization because they can't remember and understand the knowledge points, which reduces the quality of teaching and affects the development of professional and technical skills. Therefore, when it is difficult to achieve a goal, you can disassemble a goal into multiple small goals, refine the task, reduce the difficulty of completion, and make it easier to achieve the goal when the task will flow from the difficult area to the stretch area (see Fig. 2).

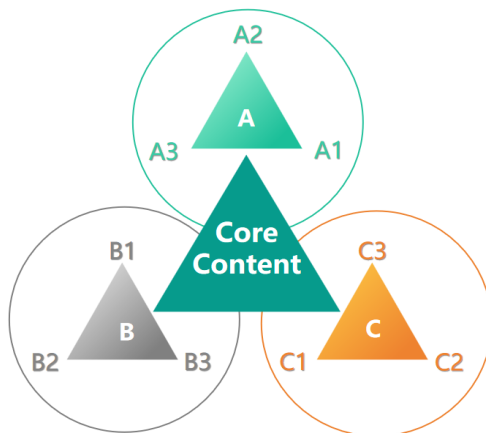


Fig. 2. Target Splitting Model

The advantage of this kind of dismantling task is that one focus is broken down into multiple concerns, and the more and more detailed the focus, the more focused the attention, and the more obvious the efficiency and effect. The "three horizontals" of the "line protection inspection" are element A, element B, and element C, and the "three verticals" are element A1 (or B1 or C1), element A2 (or B2 or C2), and element A3 (or B3 or C3) (see Fig. 3).

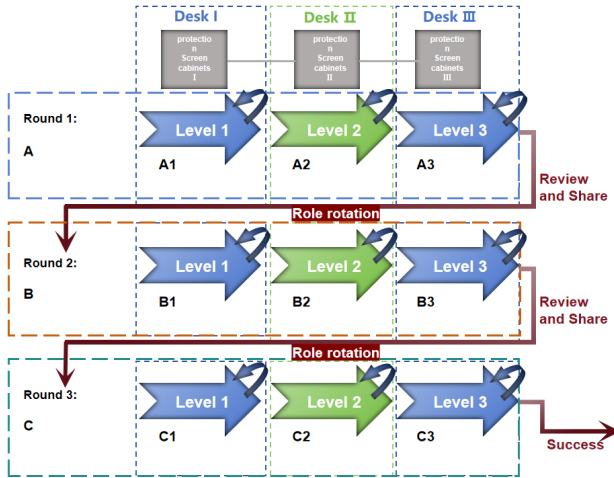


Fig. 3. Key Elements of the Content

### 3.3 Increase Urgency and Focus

The training adopts a time-limited mechanism, and the students need to complete the level within the specified time and finally clear the level. This is conducive to the overall progress of the class control, guide the students to combine work and rest, during the breakthrough period, due to the time-limited requirements of the students to trigger their sense of urgency, the attention of the training operation will be more concentrated, and the training efficiency is improved.

### 3.4 Make Good Use of Teaching Skills to Guide Independent Exploration

The interest and excitement of the students is always the best internal driving force in the class. Trainers should continue to cultivate insight, understand what students are interested in, guide reasonably, make full use of GRIP game experience method, visual experience method and other promotion technologies, enrich the guidance and use of teaching aids throughout the process, simulate the real production site, according to the teaching content and the actual learning situation of students, make good use of case analysis, seminars, demonstrations, games, action learning methods and other teaching methods, with the help of loose-leaf teaching materials, video, audio, courseware, online question bank and other teaching resources and auxiliary teaching

design, through visual, auditory, sensory, The sense of touch mobilizes the cognitive potential of the students, so that they are happy to learn, good at learning, able to learn, voluntarily immersive, independent learning and thinking, give full play to the effect of "students promote the development of the class", feel the pleasure in exploring and enterprising, enhance the students' sense of achievement and self-confidence, constantly consolidate the understanding of professional content, improve the problem of "difficult and difficult to understand" in the relay protection profession, solve the wrong mentality of "emphasizing theory and ignoring practice" of students, and create an interesting, independent and efficient dynamic class form.

## **4 Stretching Exercises, Repeating Learning**

Psychologist Mihaly·Chiksenmihalai proposed a model in "Flow": when people are tired of their current activity, the difficulty should be increased; When people are anxious about their current activity, it means that they should maintain this level of concentration and practice, so that they can enter the flow channel and immerse themselves in it. As shown in the figure, the flow curve is maintained for a long time, which is often accompanied by a happy mood and high efficiency.

The training mode of *Line Protection and Inspection* adopts the principle of gradually increasing difficulty as a whole, from shallow to deep horizontally, and from easy to difficult vertically, and students need to complete the pass in a serpentine shape. From a longitudinal point of view, the first two levels are similar in content, aiming to repeat the practice, deepen understanding and proficiency, set up additional challenge options in level 3, increase the difficulty with the number of rounds, students can choose whether to accept the challenge, and if the challenge is successful, they can get additional incentives, otherwise it will be counted as a failure to break through and re-pass. The significance of repeated breakthrough lies in repeating the practice of mistakes after the problem, consolidating the weak links in time, making up for the shortcomings, until the success of the pass again, entering the next level, repeated and repeated is conducive to learning and mastering all the skills of line protection.

## **5 Effective Feedback to Motivate Learning**

### **5.1 Review and Summarize in a Timely Manner to Consolidate Professional Improvement**

Review is a very important learning process. At the appropriate nodes of the practical training, by setting up large and small reviews, focusing on the course objectives, reviewing and summarizing, emphasizing, and reviewing problems for process steps, key knowledge points, key operation essentials and key risk points, etc., strengthen the students' knowledge understanding and memory, help students find problems, identify deficiencies, improve learning methods, enhance learning willingness, and achieve good learning, so as to enhance students' self-confidence and sense of gain.

## 5.2 Make Good Use of the List to Motivate and Create an Atmosphere of Catching up With and Surpassing Learning

The dynamic layout of "progress chess game" and "score list" reflects the level of each group in which level (where), what is the content (what), and how each group is effective, forming a 3W effect, so that the breakthrough has results, teaching is effective, creating a good learning atmosphere of catching up with learning, and further stimulating the students' awareness of independent exploration.

## 5.3 Establish an Effective Evaluation Mechanism to Provide Feedback on Class Effectiveness

From the dimensions of course content, form, teachers, and effects, students are organized to carry out evaluation activities in stages, analyze evaluation data, grasp the rationality and attractiveness of teacher allocation and organizational form at the first time, obtain training and teaching results, find problems in time, make up for shortcomings, give full play to advantages, and make the class more autonomous, interesting and efficient.

# 6 Conclusions

Based on the principle of "student-centered", driven by typical tasks, driven by interactive methods, with skill advancement as the goal, and guaranteed by the integrated evaluation mechanism, this paper grasps the psychological characteristics and cognitive laws of students, designs the "information" that students like, highlights the main position of students, stimulates the initiative and creativity of students, and creates an atmosphere of catching up with learning. Improve the cultivation of professional skills, deepen the construction of training and teaching evaluation system, comprehensively analyze the effectiveness of education, better meet the requirements of talent training and the needs of enterprises, and provide reference ideas for the promotion and application of the teaching mode of professional training courses.

## References

1. Jones D J, Madison K W, Wieman C E. Transforming a 4th year Modern Optics Course Using a Deliberate Practice Framework[J].Physical Review Physics Education Research, 2015, 11(2).DOI:10.1103/PhysRevSTPER.11.020108.
2. Hopson L R, Branzetti J, Regan G L. What the experts see: A qualitative analysis of the behaviors of master adaptive learners in emergency medicine[J].AEM Education and Training. 2024, 8(1):e10943-e10943.
3. Wiltrakis S, Hwu R, Holmes S, et al. Debriefing cognitive load during Traditional Reflective Debriefing vs. Rapid Cycle Deliberate Practice interdisciplinary team training[J].Advances in Simulation, 2024, 9(1).DOI:10.1186/s41077-024-00296-1.



4. Driver M K, Zimmer K E, Khan O, et al. Preparing General Education Teachers for Inclusive Settings: Integrating High-Leverage Practices and Mixed-Reality Simulation in Pre-Service Coursework[J]. 2024.
5. Nurse K, Ling M, Castle N, et al. The influence of deliberate practice on skill performance in therapeutic practice: A systematic review of early studies[J]. 2024.
6. Mcgaghie W C, Barsuk J H, Wayne D B I S B. Powerful medical education improves health care quality and return on investment[J]. *Medical teacher*, 2024, 46(1):46-58. DOI:10.1080/0142159X.2023.2276038.

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