

# *Application of Various Teaching Strategies in the Course of Introduction to Urban Rail Transit*

Hong Zhang\*

*Department of New Energy Vehicle Technology Beijing Polytechnic, Beijing, China  
chipzhang@126.com*

*\*Corresponding author*

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**Abstract:** In view of the problems existing in the traditional teaching process of Introduction to Urban Rail transit, this paper discusses the establishment of Growth mindset, the application and implementation of case teaching method in the teaching of this course. It turned out that the application of a variety of teaching strategies stimulates students' internal driving force, improved students' learning efficiency and comprehensive ability, and also improved the teaching quality of the course.

## **1. Introduction**

Introduction to urban rail transit is a vocational and technical skill course for mechanical and electrical technology major of Urban rail transit. Through the study of this course, students can comprehensively learn the main contents of urban rail transit equipment system and the basic contents of urban rail transit operation organization, so that they can master the knowledge and skills related to the major and occupation, enhance the students' learning purpose of professional courses, and mobilize the students' learning initiative and enthusiasm[1].

## **2. The Existing Problems in the Teaching Course**

The students are not confident when facing the learning task. As higher vocational school students, they have been experiencing more setbacks and less sense of achievement on the road of learning. Many students have been used to this helpless state when facing learning tasks. Due to the students' insufficient attention to the course, the students' initiative in learning the course is not strong, and then the students' attention to the course is also lacking, and the final learning effect is difficult to guarantee[2]. The teaching content of the course covers a wide range of knowledge in various main fields of rail transit. The teaching content tends to be theoretical, so students feel boring in the process of learning the course, and it is also difficult to understand and memorize the knowledge points.

## **3. Teaching Strategies Applied in the Course**

In order to solve these problems, I applied the following teaching strategies in the teaching process of this course and achieved certain teaching effect.

### 3.1 The Establishment of Students' Growth Mindset

The establishment of students' Growth mindset ran through the whole course. In view of the problem of students' lack of confidence in the face of learning tasks, it was an effective solution for teachers to help students establish growth mindset in the course. "Growth mindset" is a belief system that one's intelligence will grow or develop through persistence, hard work and dedicated learning. "(Mary Cay Ricci,2021) The specific implementation method was as follows: we reviewed the brain partition map together , so that students could strengthen the understanding of the relationship between brain and facial features, physical activity and daily behavior. For example,the frontal lobe is in charge of people's speech, emotion, thought and plan, and controlling of the body's skilled movement. The parietal lobe is responsible for sensation and is also related to body movement[3]. The occipital lobe is in charge of vision. The temporal lobe is in charge of memory and emotion. It enables people to identify others or objects, communicate and act.

Teachers told students "when we learn new things, neurons will establish new connections that become more stable as we work harder. The more connected, the smarter the brain will be, so the brain is like a muscle, the wiser it uses."(Mary Cay Ricci,2021)The establishment of Growth mindset had broken through the original cognition of students . Students believed that intelligence could be shaped. Students would become enough confident when they were facing learning tasks[4].

### 3.2 The Case Teaching Method

Case teaching method originated in 1920s. It was advocated by Harvard Business School in the United States. At that time, it adopted a unique case type of teaching. These cases were all from the real situations or events of business management. By using this method, it helped students to participate in classroom discussion actively, and it had great performance after implementation. To solve the problem that students' motivation was not strong, teachers tried to start from the perspective of safety awareness in professional quality, and told students that no matter what work we do in this field in the future, our work would have a direct relationship with the safety of passengers' lives. The students' safety awareness was instilled by the study and analysis of typical cases. It was proved that this was an effective solution through practice: All the typical cases had touched or even impacted the students and enhanced the students' sense of professional mission and responsibility, and then students were willing to pay more attention in the course, as shown in Figure 1.

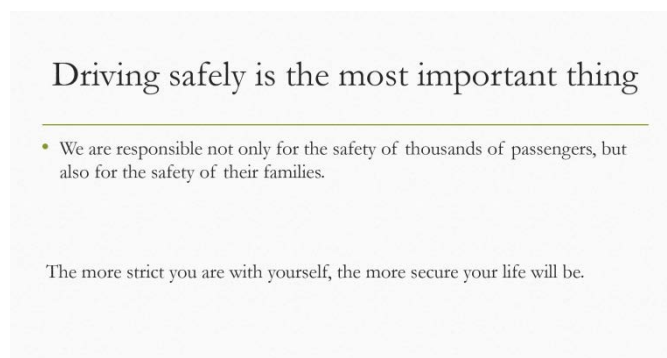


Figure 1: Slides of Vocational literacy education

For example, a major driving accident was one of the cases of this course. The accident not only caused great economic losses and some passengers injured, but also affected the normal travel of the general public, and caused great social impact. After investigation, it was found that the major

driving accident was due to the lack of parts in the fifth carriage and sixth carriage when the faulty vehicle was assembled in the factory. The subway vehicle factory that produced the vehicle was responsible for the accident[5]. The indirect reason is that the vehicle maintenance personnel and crew are not thorough in the daily maintenance and inspection of the vehicle, failing to check the key parts of the vehicle in accordance with the relevant maintenance procedures.

Through the study and analysis of the accident case, the students realized that even a trivial negligence would cause serious consequences in the field of urban rail transit. Students should be in awe of their future career and learn professional knowledge from now on.

## **4. Reflection on Practice**

### **4.1 The Establishment of "Growth Mindset" will Take a Long Time**

Teachers need to help students to establish "Growth mindset" throughout the course. Teachers and students can learn all kinds of materials about Growth mindset together; When students made progress, teachers can tell them clearly: This is the result of your efforts. When students encounter setbacks in the learning process, teachers can guide students to face with a more positive attitude. Cognitive psychologist Roma Bruner defines failure as "not to experience success or failure as reward or punishment, but as information." The reason for failure is not that we are terrible, but that we need to adjust(Mary Cay Ricci,2021) For example, when explaining the composition of urban rail transit system power supply and traction, students had difficulties in the concept. To solve this problem, teacher suggested that students watch the movie "Subway" after class and teacher had set the question in advance: which part of the movie is related to the learning content of this class? After watching, the students could conclude that the flood in the tunnel was electrified due to the electrified track related to the content of the course. The reason why the track was electrified could just be explained by the concept of train contact rail in this lesson. The adjustment of learning strategies helped students solve difficulties in learning, completed the establishment of knowledge concepts and further generation and had a positive attitude in the face of learning difficulties.

### **4.2 Some dos and don'ts of Teaching Method**

The establishment of "growth thinking" is not an overnight thing. Teachers need to help students establish it throughout the curriculum. Teachers can learn all kinds of learning materials about growth mindset together with students; When students make progress, they should clearly tell them that this is the result of your efforts. When students encounter setbacks in the learning process, teachers should guide students to face with a more positive attitude. Bruner who is a cognitive psychologist, defined failure in this way: "Do not experience success or failure as a reward or punishment, but as information." The reason for failure is not that we are poor, but that we need to adjust. For example, when explaining the composition of urban rail transit system - power supply and traction, students have difficulty in mastering the concept. In the face of this situation, the teacher suggested that students watch the film "Deadly Metro" after class and set the question in advance: Which part of the film is related to the learning content of this lesson? After watching, students can conclude that the part of the story in the film where the flood in the tunnel is electrified due to the electrification of the track is related to the course content. The reason for electrification of the track can be explained by the concept of train contact rail in this lesson. Through the adjustment of learning strategies, it helps students solve learning difficulties, complete the establishment and further generation of knowledge concepts, and more importantly, establish a positive attitude when facing learning difficulties.

The use of case teaching method in the course also needs to pay attention to several points: the selection of cases must be appropriate, close to the teaching content of the course, and serve the teaching content well. In the process of case study, we should reasonably set up problems, which can immediately lead students to discuss and analyze the problems that need to be solved. In particular, we should timely correct inappropriate points in students' self summary and discussion, so that students will not remember wrong knowledge points.

Another effective way to retrieve knowledge is to "promote learning by writing". After class, students can be asked to write a short composition related to knowledge points. Students can write a written summary of their core ideas. They can use their own words to reshape the concept and refine the concept by giving examples. The following is a summary written by students themselves for several important concepts that are particularly easy to confuse when explaining the composition of urban rail transit - signal and communication system. "ATO system is aimed at a specific train: like the driver, it adjusts the train speed by controlling the train's traction and braking; ATP system is aimed at two trains: like the signalman, it ensures the safe distance between two trains by displaying signals to the driver to prevent collisions; ATS system is aimed at all trains running on the line: like the dispatcher, it controls the dwell time of each train at the station and The running speed of the section enables all online trains to maintain a balanced spacing. " Through such summary, it can be judged that students really understand and distinguish these concepts.

## References

- [1] Zhang Hui, Zhang Xingang. *Introduction to OCS of Urban Rail Transit [J]. Wireless Internet Technology, 2013 (10): 1*
- [2] Zhang Y Z, Yun-Feng L I, Liu G. *Antidepressant effect of oligosaccharides extracted from Morinda Officinalis on the learned helplessness rat model[J]. Chinese Journal of Behavioral Medical Science, 2005.*
- [3] Mary Cay Ricci (2021) *Mindsets in the Classroom. Routledge, 25-89.*
- [4] Torres B . *Mindset: The New Psychology of Success[J]. Springs, 2016(4):55.*
- [5] Dweck, Gavin C, Marguerite (Narrator). *Mindset: The New Psychology of Success, How We Can Learn to Fulfill Our Potential[J]. Gildan Audio, 2015.*