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Research on the Cultivation of Learning Motivation for Industrial Robot Professional Courses in Secondary Vocational Schools

Que Lanxin[1,a,*], Cao Zhaojie[1,a]

[1]*School of Education and Psychological Science, Sichuan University of Light Chemical Technology, Zigong, 643000, China*
[a]*lanxin09092021@163.com*
[*]*Corresponding author*

Abstract: *According to the actual situation of secondary vocational students, taking industrial robot major students of secondary vocational school as the research object, this paper deeply analyzes the root cause of the general lack of learning motivation of students of this major in the learning process of professional courses and explores the countermeasures to improve the learning motivation of industrial robot students of secondary vocational school. In order to train more high-quality technical skills to adapt to the development of the industry, to provide help for the development of the industrial robot industry, and to promote the development of China's intelligent manufacturing machinery industry.*

Keywords: *Secondary Vocational Students, Industrial Robotics Major, Learning Motivation, Motivation Strategy*

1. Introduction

In recent years, the state has proposed that vocational education is an education type with the same important status as general education. With the proposal of Intelligent Manufacturing China, many secondary vocational schools have set up industrial robot majors to train more skilled professionals to provide strong talent support for the development of Intelligent Manufacturing China. Learning motivation affects the learning quality and effect of students, and learning motivation is the internal driving force to promote the active learning of students majoring in industrial robotics in secondary vocational schools. For secondary vocational schools, in order to cultivate high-quality technical talents, they must first mobilize the enthusiasm of students and strengthen their learning motivation for professional courses.

2. Related Concepts

2.1. Industrial Robot Major

China's industrial robot industry has been in a period of rapid development, and there are more and more new industries and application scenarios. The current robot market industry demand is continuing to grow steadily. Artificial intelligence and robot technology are national strategic emerging industries that are encouraged and supported by the state, so the industrial robot industry will develop better and better. The application of industrial robots has improved the industrial production mode but also spawned a large number of new positions. From the domestic talent market demand, industrial robot talent demand is mainly concentrated in robot manufacturers, robot system integrators, and robot application enterprises. These three types of enterprises need a large number of industrial robots for development and manufacturing, installation and commissioning, and maintenance and repair technicians. The career development direction of industrial robots is very clear, focusing on the training of composite technical skills and talents, which have an irreplaceable and important position in enterprises.

In 2019, the Ministry of Education organized the revision of the Catalogue of Majors of Secondary Vocational Schools (2010), adding 46 new majors [1]. Among them, the application of industrial robot technology is on the list of this addition, which proves that the application of industrial robot technology is more and more valued by the country. In order to cater to the national strategic policy of 2025

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intelligent manufacturing, many colleges and universities across the country have opened industrial robot majors, aiming to train professionals to master the core technology of industrial robots that are urgently needed to adapt to the era of "machine replacement" [2]. Through school study, students can master the basic knowledge of general industrial robots, such as structure and movement principles, learn the skills of robot installation and debugging, programming and operation, maintenance and repair, and have good solidarity and cooperation, practical and hard-working professionalism, and professional quality.

2.2. The Relationship between Learning Motivation and Learning

Learning motivation is a kind of motivation; that is, it causes the individual's learning behavior, maintains the learning behavior, and makes the learning behavior move towards a certain learning goal. Learning motivation not only provides motivation for students' learning behavior but also guides their learning direction so as to achieve the completion of a certain learning goal. The learning motivation of industrial robots is the internal driving force for secondary vocational students to learn professional courses of industrial robots, which can be a strong driving force for students to successfully achieve their learning goals.

Taking motivation sources as references, learning motivation can be divided into internal motivation and external motivation [3]. Internal motivation refers to the learning motivation generated by students out of their own interests. In the study of industrial robot-specialized courses, it refers to the interest and love degree of secondary vocational students in industrial robots and the psychological experience of operating industrial robots. If students like industrial robots, they will enjoy learning more in class and will continue to study hard after class to improve their learning efficiency. External motivation refers to the motivation for learning caused by external factors that have no intrinsic connection with the learning activity itself. In the study of industrial robot specialized courses, external factors mainly include family, school, society, teachers, and so on. For example, students study industrial robots seriously, not because they are interested in them or love them, but in order to get praise or rewards from parents and teachers.

Ausubel believes that learning motivation and learning are mutually reinforcing. Learning motivation is an important factor that affects students' learning behavior and improves their learning effect. Students' sense of achievement after learning knowledge can, in turn, strengthen the relationship between learning motivation and learning [4].

3. Study the Status of Industrial Robot Major Students in Secondary Vocational Schools

3.1. Teaching Methods are not Innovative

As an emerging major, industrial robotics has strong particularity and is significantly different from traditional majors. In terms of professional theoretical knowledge learning, it is inevitably related to many disciplines, including kinematics, robot programming, etc. However, the advantages of modern information technology are not fully utilized in the teaching process, and reasonable teaching methods are not selected according to the characteristics of industrial robots. The traditional teaching method cannot guarantee teaching quality and efficiency and cannot improve talent training quality, so it is necessary to innovate teaching methods.

There are also unreasonable places in the curriculum. In order to improve the teaching quality and promote the development of students, it is necessary to arrange the teaching content reasonably. The current teaching materials cannot keep up with the pace of social development; there is a disconnection phenomenon; the teaching content is relatively old in general; and some of the learning content has no practical value. For example, mobile robots currently play a large role in robotics competitions, but they are only slightly mentioned in textbooks.

3.2. Students are not Motivated to Learn

Under the background of the new curriculum reform, industrial robot majors in secondary vocational schools should consider cultivating students' abilities and improving their professional quality as fundamental tasks in the teaching process, but there are many problems exposed in the current teaching practice. Through investigation, it was found that teachers do not attach importance to cultivating students' subjectivity in the teaching of professional courses, and the traditional teaching methods are applied in the classroom at a relatively high rate. Knowledge and skill teaching occupy the core position, but motivation and interest cultivation are neglected, which seriously restricts the improvement of

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students' levels and abilities.

For students, at the beginning, they are full of expectations for the study of this course, but as long as the learning difficulty is increased and the tasks to be completed are relatively heavy, some students will retreat, forming a fear of difficulties, and their learning enthusiasm will decrease significantly, and their learning cannot meet their expectations.

4. Analysis of the Reasons for Insufficient Learning Motivation in the Industrial Robot Specialized Course for Secondary Vocational Students

Based on the study status quo and existing problems of industrial robot students in secondary vocational schools, according to the interview results of some industrial robot students and teachers in secondary vocational schools, it is concluded that the reasons for the lack of learning motivation of industrial robot students in secondary vocational schools are mainly divided into their own factors, family factors, and class atmosphere.

4.1. Secondary Vocational Students' Own Factors

According to the survey, some secondary vocational students said that they have rarely been praised and affirmed by parents and teachers from primary school to now and lack a correct understanding of themselves, resulting in feelings of inferiority and underestimation of their learning ability, resulting in some students having rebellious emotions and a more negative attitude toward learning. There are also some students who do not enter ordinary high school because of the failure of the high school entrance examination and do not get self-affirmation, thinking that they will not make any academic achievements in the future, so they do not want to forge ahead and give up [5]. Among them, some students who learn professional courses on industrial robots said that the content of professional courses is a little boring, it is difficult to concentrate on understanding knowledge points, and it is easy to have a fear of difficulty when they encounter the content that needs thinking. According to the above survey, secondary vocational students lack a correct understanding of themselves, do not realize the importance of learning professional courses, do not have a clear plan for future study and career, and lack long-term and short-term specific goals.

4.2. Family Factor

Students' independence and confidence mostly come from the support and encouragement of their families. The best education is reasonable guidance rather than blindly beating, criticizing, passively indoctrinating, and comparing with other children. By sorting out the interview records, the question "Do your parents pay attention to your studies? Do you hope to get help from your parents in studying?" When asked about this question, more than half of the students said that they do not want their parents to pay too much attention to their studies. Some students who live in school think that their home is far away from the school, and they spend most of their time in school. They only have brief communication with their parents on the phone during the weekdays, and their parents devote all their energy to work and only care about their studies. Not a lot of attention." Through interviews with several teachers, it is known that teachers believe that "compared with ordinary high schools, parents of secondary vocational students do not pay much attention to their children's academic performance. Due to their poor cultural quality, parents cannot provide good learning guidance for their children, and parents can do little for their children in terms of learning. Secondary vocational students are in a relaxed learning and living atmosphere. They learn entirely on their own initiative." Contemporary secondary vocational students are different from previous students. There are more students living in school, and they basically have mobile phones to communicate with their parents, but they generally do not report their learning to their parents. Parents do not have a comprehensive understanding of their children's learning, so they can provide them with less help.

4.3. The Class Atmosphere

In the survey, we learned that the current communication between secondary vocational students and full-time teachers is not ideal, and more than half of the students think that "there is not much contact between themselves and full-time teachers, and the class teacher prefers some" and "most full-time teachers just to complete the teaching task, except for lectures and examinations, basically do not communicate with us". "Our professional courses are usually only once or twice a week, although

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sometimes I feel that I have a common topic with the teacher, but because the number of meetings is not much, I communicate with the teacher less", "A considerable number of professional courses teachers cannot even call our names; most of the students remain silent in the class, hoping that they will not be named by the teacher to answer questions." Through the introduction of students, I learned that teachers do not have much contact with students and have not formed a good relationship between teachers and students. After interviews with some teachers, some teachers believe that "teachers in secondary vocational schools are engaged in professional teaching activities, and due to the shortage of teachers, the school hires some teachers from outside to give lectures to students." It can be seen that the stability of the current secondary vocational school teachers cannot meet the requirements; the relationship between teachers and students is not ideal, not intimate, and not harmonious; teachers do not understand the students they teach.

5. Strategies to Stimulate the Learning Motivation of Industrial Robot Professional Courses for Secondary Vocational Students

5.1. Combine the Interests of Secondary Vocational Students and Enhance their Interest in Teaching Content

Interest is the best teacher, and the interest of secondary vocational students in industrial robots has a huge impact on the learning effect of their professional courses. From the perspective of motivation classification, the motivation triggered by learning interest belongs to internal motivation, which does not need external temptation and punishment to make action target because action itself is a kind of motivation [6]. Therefore, in the process of industrial robot teaching, guide secondary vocational students to correctly understand different levels of learning interests, take the initiative to link their learning interests with future career planning, and form a stable interest. Students with sustained and stable learning interests will have a more serious attitude towards learning and will consciously summarize and reflect on learning efficiency.

In actual teaching, most secondary vocational students have a weak sense of discipline in the classroom, and whether they can listen attentively depends on their interests, hobbies, and mood. Therefore, teachers should follow the principle of teaching students according to their aptitude and choose the corresponding teaching methods according to the demands of the students. At the same time, focusing on the job needs, connecting the teaching content with the job content, and helping students understand that the study of professional courses is the future career ability needs, so that the teaching of professional courses can attract students, so that students can focus on learning, learning efficiency, and learning quality will be guaranteed. For example, an industrial robot Operation and programming is a professional course that integrates science and practice and is highly operational. Secondary vocational students prefer practical training to learning theoretical knowledge. Teachers can start with this feature by taking students to the industrial robot training room for a visit and demonstration, so as to arouse students' interest in this course. Demonstrating to students how to use industrial robots to write their names and install mobile phone parts and other basic operations not only reflects the fun of teaching but also allows students to feel that their major has strong practicability in real society and attaches importance to the study of industrial robot professional courses.

5.2. Refine Learning Objectives and Cultivate a Sense of Achievement in Learning Specialized Courses

According to the ability of secondary vocational students combined with the characteristics of industrial robot specialized courses, assign moderate-difficulty tasks, refine learning objectives, students can achieve small goals as long as they can complete the task, resulting in a strong sense of accomplishment. Over time, students' interest in professional courses will become more and more intense, forming a continuous and stable interest that will strengthen their motivation to learn industrial robot specialized courses.

Compared with the professional theoretical knowledge of industrial robots, secondary vocational students are more likely to be interested in the practical training operation of industrial robots. They can start with interesting and easy-to-operate tasks before starting this professional course. After a successful operation, students will feel a sense of satisfaction and achievement, which will encourage them to love this major more. In teaching, if we can set phased learning goals that are easy to achieve, such as dividing "robot program writing and debugging" into "basic programs that can create robots", "new robot program

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modules" and "new routine programs", students will complete several learning goals in the order from easy to difficult in the process of completing small unit learning tasks. After each completion of the learning goal, students will have a sense of accomplishment, feel the happiness of success, and learn more and more. Their' interest in learning industrial robot professional courses will be intangibly stimulated and maintained for a long time.

5.3. Make Full Use of Information Teaching and Create a Good Classroom Atmosphere

Digitalization has become the mainstream development trend in contemporary education. Teachers should enhance their teaching ability with the assistance of information technology, adjust the teaching mode by using multimedia, keep in mind the main identity of students, and continuously improve the learning atmosphere.

When teaching professional courses of industrial robot operation and programming, teachers should establish a correct cognition of the attributes of the course, focus on cultivating students' operation and programming abilities, and send micro-videos to students before class so that students can preliminarily understand the teaching content by watching the micro-videos. The content of micro-video is relatively rich, which can be a video of operating industrial robots or a video of enterprise personnel using robots in specific positions to improve work efficiency. In the process of watching the micro-video, students can intuitively understand the content to be learned and also feel the practical value of this course. They can also recommend the content of the popular science website to students in the form of links, help students expand their frontier knowledge related to industrial robots, and increase the intuitiveness of professional course teaching.

In addition, the role of multimedia technology should be played in the teaching process of professional courses on industrial robots to introduce students to different situations and stimulate their good emotions, such as in the teaching of programming and the operation of detection and arrangement tasks. Professional teachers can go deep into the enterprise to shoot a video of the programming and operation of industrial robot technicians for detection and arrangement tasks and play expert programming videos for students before the practical training project. Students try to operate under the guidance of experts, and teachers ask enlightening questions, "In the teaching device configuration window, how do the staff reasonably assign I/O signal addresses?" "Why are program data and routine stored in the same program module when the program is written?" In this way, students are guided step by step to standardize the programming and operation of detection and arrangement tasks, and through students' observation, thinking, and actual operation, they will not only experience the work situation but also learn to be happy.

5.4. According to the Professional Characteristics of Industrial Robots, Scientific Adjustment of Evaluation Methods

In the process of organizing skills competitions, the performance of all participants can be quantitatively evaluated [7]. In the daily teaching process, it is necessary to transform the standards set by the skills competition into requirements for students. According to the current evaluation concept of the skills competition, reasonable indicators are set for teaching evaluation according to the ability requirements put forward by each position to the practitioners. This challenges students' learning, stimulates their enthusiasm for learning and participation, and enhances their learning motivation.

In terms of teaching evaluation of industrial robots, teachers should provide effective guidance and evaluation, not only distinguishing between "good" and "bad" in a qualitative way, but also paying attention to whether students' skill level has improved and whether their learning status is maintained. Videos, photos, and other methods should be used to evaluate each student's specific performance in completing the same task. The teacher presented a series of videos in front of the students and let the students watch the videos and make comments by themselves. The difference between "good" and "bad" is very obvious. The students can also master the skills of objective evaluation, become more familiar with the operation process, and pay more attention to details in the evaluation. Combined with the students' evaluation of themselves, the teacher makes timely comments on whether the students have mastered good industrial robot skills. In this way, the evaluation of both teachers and students can be linked together, and the intrinsic learning motivation of students can be stimulated, thus achieving innovative education.

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5.5. Enhance Self-Efficacy and Enhance Learning Confidence

Self-efficacy is one of the important factors that affect the enthusiasm and initiative of secondary vocational students. Bandura believes that when people are engaged in a certain job, if they can realize that their skills are fully capable of coping with the problems in the work and achieving good results, and if they are full of confidence in completing the task, a strong sense of self-efficacy will be formed [8]. The ability to generate self-efficacy will affect whether students work hard and persist in learning for a long time. If students have a high sense of self-efficacy, they can learn and achieve their goals for a long time, and they can control the idea of self-abandonment when confronted with slightly difficult challenges. Students with low self-efficacy think that they are not able to complete a task assigned by the teacher and are easily afraid to give up when they are under pressure.

The enhancement of self-efficacy enables students to face problems bravely and have the confidence to solve them. Having a good sense of self-efficacy in school can motivate students to put in more effort and stick to tasks, thus boosting their learning. If students clearly feel that they have made progress in their studies, their self-efficacy is enhanced, and the motivation to learn can be maintained for a long time. Therefore, teachers and parents of secondary vocational school students should guide secondary vocational school students to look at themselves dialectically, guide students to recall their successful experiences, make them realize that they are not useless, and enhance their sense of self-efficacy by increasing students' personal successful experiences so as to strengthen students' learning motivation. The experience of failure can be guided by reasonable external attribution to enhance students' self-confidence. For example, for students who are unsuccessful in a small test of industrial robot operation, they can be guided to attribute the reason for their failure to controllable external factors, that is, insufficient effort, so that they believe that as long as they are more serious in class and usually practice more, they will be able to operate successfully next time.

5.6. Flexible Use of Feedback Methods to Strengthen Students' Learning Motivation

During the teaching period, evaluations such as personal ranking and performance should be weakened, and effective feedback should be provided to give students positive expectations [9]. If the teacher's feedback is timely, objective, and sincere, students can take the initiative to accept it, fully recognize their good work and shortcomings, timely correct and focus on the weak areas of learning, enhance their learning motivation, and improve their learning efficiency. Through the teacher's timely feedback, students know their own progress and can enhance their self-confidence. If you know you are not studying well, you can reflect on yourself and study harder. Feedback information must be as comprehensive, clear, and specific as possible, so that students understand what is right or wrong and why it is right or wrong, so that feedback can play a greater role. For example, in the teaching of the track description task programming and debugging project in the practical training course of industrial robot operation, it is only necessary to see the display results of the students after completion, and it is also possible to record the operation process of the students, analyze whether the students operate standardized step by step, and carry out standard operations while explaining, so that the students will be impressed by the mistakes in their operation and correct them in time.

In addition, teachers should pay attention to the specific situation, according to the nature of the specialty and the characteristics of secondary vocational students, to grasp the feedback time point [10]. For students who are usually more confident and cheerful but a little careless, they should be reminded in time when they make mistakes, which will not only discourage their enthusiasm for learning but also make them more careful and serious. For students who are usually inferior and introverted, teachers should give timely praise and feedback when their performance is good and give students positive expectations, which is conducive to enhancing their self-confidence and enthusiasm.

6. Conclusions

Learning motivation is an important factor that affects students' learning behavior and learning effect, and the quality of students' learning is an important factor that affects the quality of the school's cultivation of talents in society. The best education is not the traditional knowledge infusion but the greatest stimulation of students' interest, to cultivate students from the aspect of interest and constantly enhance their learning motivation so that they can take the initiative to learn and improve their learning efficiency and quality. In the era of artificial intelligence and robots, secondary vocational industrial robot teachers should keep pace with The Times, adjust the motivation of secondary vocational students to

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stimulate the strategy of learning, and train more high-quality technical talents with strong comprehensive professional ability to promote the development of intelligent manufacturing.

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