

Leadership Skills of Industrial Robot Specialization: Chinese Educators' Reference to Professional Training

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Abstract

Every teacher strives to exercise leadership and develop the skills of young students in order to succeed in school. An increasing number of frontline teachers say they must be more competent in teacher leadership. This descriptive study aims to investigate the leadership skills of Chinese educators handling students in Industrial Robotics. A total of 150 teachers specializing in industrial robots will participate in the study. Descriptive findings will be based on the findings that the views of industrial robotics professional teachers on faculty leadership which will be discussed.

Keywords

Teacher leadership, leadership skills, professional training, teacher leadership evaluation, industrial robot specialization.

1. Introduction

The industrial robot industry is one of the top ten key development areas in China listed in Made in China 2025. With the development of the digital and intelligent era, industrial robots can complete welding, assembly, spraying, handling and other types of work, promoting the development of the manufacturing field. A large number of jobs have undergone earth-shaking changes, and the demand for high-level technical skills in enterprises and society has increased, especially the urgent need for high-level technical skills talents for industrial robots.

Industrial robot major refers to the emerging major opened by vocational colleges to meet the talent needs of the industrial robot industry and according to the professional catalog, mainly cultivating high-level technical and skilled talents required for positions such as industrial robot equipment installation and testing, industrial robot programming, operation and maintenance, robot body and key components research and development and design.

The professional settings of the industrial robot major roughly include four aspects: talent training mode, curriculum system construction, industrial talent demand and internship training.

Since the United States proposed "teacher leadership" in the 80s of the 20th century, scholars from all over the world have paid great attention to the idea of "teacher leadership". At present, research related to teacher leadership includes teaching leadership, curriculum leadership, classroom leadership, and the construction of teacher leadership framework content. This research focuses on teacher leadership towards students.

Professional teachers play an important role in professional development. Teachers are not only "teaching craftsmen", but also developers, builders, and leaders of the curriculum. Vocational education teachers play an important role in curriculum development, curriculum implementation, curriculum evaluation and other activities, and every link requires the active participation of vocational education teachers, which is the core of vocational education

curriculum implementation or an important force to promote vocational education curriculum reform. The exertion of teachers' leadership has important theoretical research value and practical significance for the whole educational activity.

This study aims to investigate the leadership skills of Chinese educators handling students in Industrial Robotics.

2. Review of Related Literature and Studies

2.1. The concept and connotation of teacher leadership

Scholars have interpreted it from different angles, there are different opinions, there is no unified definition, and some representative definitions are listed below.

Katzenmeyer and Moller (2003) summarize teacher leadership in three areas: "the ability to lead students and other teachers, the ability to make school decisions and promote teamwork, and the ability to operate tasks."

Wu Jinyu and Dai Xuan (2008) propose to understand teacher leadership from two perspectives: "First, teacher leadership refers more to teachers' professional leadership than to job leadership; Secondly, teacher leadership should be more personality leadership, which is the ability of teachers to gain the respect of students and colleagues by virtue of their moral accomplishment and perfect personality, so as to influence them. "Teacher leaders are more likely to influence others with the power of their personality than administrators.

York-Barr (2004) likens teacher leadership to an "umbrella term" because the concept encompasses a range of multi-layered activities. Moreover, "teacher leadership is a competency that develops with life, is an ability that manifests itself in different ways in different groups, and is a ability that manifests itself in different connotations in different situations, and cannot be embraced by traditional concepts of competence."

There are many definitions of teacher leadership, and they are constantly evolving, and the definitions mentioned above all elaborate on the meaning of teacher leadership to some extent. But today, it has been difficult for scholars to arrive at a clear and consistent definition because the concept of teacher leadership is so broad. Still, there is a consensus among scholars that the boundaries of teacher leadership extend beyond the classroom. Based on the discussion of the connotation of teacher leadership by the above scholars, this paper defines teacher leadership as the ability of teachers to use their professional knowledge and subject professionalism to exert influence inside and outside the classroom, and ultimately improve teaching, improve students' academic performance, enhance teachers' professional level and promote school change by establishing a professional learning community and sharing leadership functions.

2.2. Characteristics of teacher leadership

Zhou Xiaojing and Guo Ningsheng (2014) argue that teacher leadership is non-hierarchical. "In essence, 'leadership' in teacher leadership is non-hierarchical, neither position-based nor power-based. It is more based on professional knowledge and moral advice, and less attention is paid to formal roles and legitimate powers in the system. "The essence of teacher leadership is collective leadership, advocating the delegation of leadership authority to teachers, with principals and teachers jointly leading the school.

Zhou Xiaojing and Guo Ningsheng (2014) argue that teacher leadership is non-powering. "Teacher leadership is a comprehensive influence formed by teachers on the led through the interaction of their own non-power factors, including educational thought, educational professional knowledge, subject professional quality, educational practical ability, educational personality literacy and other elements, and its core is professional influence." Teacher leadership is not a power specific to a role or position, but a power that all teachers in a school have, and this power is more a strength of personality than a power and role power.

Wu Jinyu and Dai Xuan (2008) believe that teacher leadership is collaborative. Teacher leadership breaks through the limitations of heroic or monolithic leadership. The traditional heroic view of leadership emphasizes individual effort rather than group cooperation. Teacher leadership values the cooperation and interaction between teachers, and focuses on each teacher working together in group activities to jointly improve professional ability and promote school change more effectively.

3. Results and Discussion

This chapter presents the results and discussion of data to answer the problems raised in this study. It contains the data gathered using the survey questionnaires.

Problem 1. Profile of the Respondents

Table 1 Profile of the Respondents

Profile	Frequency	Percentage
Age		
Under 30 years old	31	20.67
31-40 years of age	57	38
41-50 years of age	47	31.33
Over 50 years old	15	10
Total	150	100
Gender		
Male	78	52
Female	72	48
Total	150	100
Highest Educational Attainment		
Bachelor's degree holder	33	22
Masteral degree with units earned	37	24.67
Master's degree holder	38	25.33
Doctorate Degree holder	42	28
Total	150	100
Years in Teaching Industrial Robotics		
Less than 2 years	21	14
2-3years	52	34.67
4years	47	31.33
More than 4years	30	20
Total	150	100
Number of Trainings Relative to Leadership		
1-3 times	32	21.33
4-6 times	47	31.33
7-9 times	59	39.33
More than 10 times	12	8
Total	150	100

The profile of the 150 teacher respondents shows the following:

a. When it comes to age, thirty-one (31) or about 21.67% of the teacher respondents are 21- 30 years old; fifty-seven (57) or about 38% of the participants are 31 -40 years old; forty-seven

(47) or about 31.33% of the participants are 41 -50 years old; and fifteen (15) or about 10% of the participants are Over 50 years old.

b. When it comes to gender, seventy-eight (78) or about 52% of the teacher participants are male, and seventy-two (72) or about 48% of the teacher participants are female.

c. When it comes to the highest educational attainment, thirty-three (33) or about 22% of the teacher participants are bachelor's degree holders; thirty-seven (37) or about 24.67% of them are earning units in master's degree; thirty-eight (38) or about 25.33% of the participants have a doctorate degree, and forty-two (42) or about 28% of the participant has a master's degree.

d. When it comes to the years in teaching industrial robotics, twenty-one (21) or about 14% of the teacher participants have been teaching for 2 years 以下; fifty-two (52) or about 34.67% of them have served for 2-3 years; forty-seven (47) or about 31.33% of them served for 4 years; thirty (30) or about 20% of them served for more than 4 years.

e. When it comes to the number of trainings relative to leadership, thirty-two (32) or about 21.33% of the teacher participants have trainings relative to leadership for 1-3 times; forty-seven (47) or about 31.33% of them have trainings relative to leadership for 4-6 times; fifty-nine (59) or about 39.33% of them have trainings relative to leadership for 7-9 times; twelve (12) or about 8% of them have trainings relative to leadership for more than 10 times.

Using the data obtained from the sample survey, the researchers used the analysis of variance method to conduct an in-depth examination and analysis of the impact of teacher leadership on student learning from the perspective and dimension of teachers. The test results of the homogeneity of variance of the constituent elements of the relevant variables of teacher leadership in different dimensions show that the homogeneity of variance of the analyzable variables is the same.

Problem 2. Respondents' Assessment on the Leadership Skills of the Teachers of Industrial Robot Specialization

Table 2 Analysis of the Assessment of Personality Charm of Teachers on Students' Learning in the Questionnaire

Personality Charm of Teachers	Mean	Standard Deviation	Verbal Interpretation
2.1.1 Self-expectations	2.86	.825	Agree
2.1.2 Personal efficacy	1.52	.752	Disagree
2.1.3 Love of education	3.25	.826	Agree
2.1.4 Teachers' ethics	3.05	.846	Agree
2.1.5 Learn and innovate	1.73	.847	Disagree
Overall	2.48	.770	Disagree

Legend: 3.25–4.00 Strongly Agree; 2.50–3.24 Agree; 1.75–2.49 Disagree; 1.00–1.74 Strongly Disagree

Table 2 shows respondents' assessment of the multidimensional factors of teachers' influence on charisma. All in all, respondents disagreed that teachers had exerted teacher leadership in terms of charisma, with an overall mean of 2.48 and a standard deviation of 0.770.

To be clear, the indicator "The impact of a teacher's love for educational work on student learning" received a top mean of 3.25 with a standard deviation of 0.826 and was verbally interpreted as agreement. At the same time, the mean of the indicator of "the impact of teachers' personal efficacy on student learning" was the lowest, at 1.52, and the standard deviation was 0.752, which was verbally interpreted as disagreement.

The elements that make up personality charm of teachers: self-expectation, personal efficacy, love of educational work, teacher ethics, learning and innovation.

Table 3 Analysis of the Assessment of Teaching Leadership of Teachers on Students 'Learning in the Questionnaire

Teaching Leadership of Teachers	Mean	Standard Deviation	Verbal Interpretation
2.2.1 Organization and implementation of teaching plans	1.81	.648	Disagree
2.2.2 Organization of classroom learning activities	2.62	.630	Agree
2.2.3 Establishment of student learning teams	2.52	.728	Agree
Overall	2.32	.685	Disagree

Legend: 3.25–4.00 Strongly Agree; 2.50–3.24 Agree; 1.75–2.49 Disagree; 1.00–1.74 Strongly Disagree

Table 3 shows respondents' assessment of the multidimensional factors of teachers' influence in teaching leadership. All in all, respondents disagreed that teachers had exerted teacher leadership in teaching leadership, with an overall mean of 2.32 and a standard deviation of 0.685. To be clear, the indicator "The impact of the teacher's organization of classroom learning activities on student learning" received the highest mean of 2.62 with a standard deviation of 0.630 and was verbally interpreted as consent. At the same time, the mean value of the indicator "the impact of the organization and implementation of the teacher's teaching plan on student learning" was the lowest, at 1.81, and the standard deviation was 0.648, which was verbally interpreted as disagreement.

According to the statistical results of Table 6, the factors of teachers' teaching organization ability, including the organization and implementation of teaching plans, the organization of classroom learning activities and the establishment of student learning teams, have different impacts on students' learning, among which the Mean value of the organization of classroom learning activities is 2.62, and the Mean value of the establishment of student learning teams is 2.52, both of which are greater than 2.50, indicating that teachers pay attention to the organization of classroom learning activities, enrich the content of classroom teaching activities, or pay attention to the establishment of student learning teams. Therefore, teachers pay attention to the organization of classroom learning activities and the establishment of student learning teams, which is conducive to the improvement of leadership in teaching organization and can have a more obvious impact on student learning. The Mean value of the organization and implementation of the teaching plan is 1.81, which indicates that the ability of teachers to organize and implement the teaching plan is not enough, which is a link that needs to be paid attention to in the ability improvement. This may have something to do with the fact that robotics is an emerging discipline and that teachers have insufficient teaching experience and technological development. Formulating a scientific teaching plan and effectively implementing their own teaching plan so that it can promote students' learning are the links that need to be paid attention to in the improvement of teachers' leadership ability. It is hoped that when the organization and implementation of the teaching plan and the establishment of the student learning team are used in the classroom learning activities, the learning effect of students can be effectively improved.

Table 4 Analysis of Assessment of Educational Influence of Teachers on Students' Learning in the Questionnaire

Educational Influence of Teachers	Mean	Standard Deviation	Verbal Interpretation
2.3.1 Understand and grasp the needs of students	1.79	.741	Disagree
2.3.2 Guidance on students' learning and thinking	1.94	.767	Disagree

2.3.3 Teacher's expertise and skills	2.98	.806	Agree
2.3.4 Motivation for students' learning behavior	2.55	.677	Agree
Overall	2.31	.796	Disagree

Legend: 3.25–4.00 Strongly Agree; 2.50–3.24 Agree; 1.75–2.49 Disagree; 1.00–1.74 Strongly Disagree

Table 4 shows respondents' assessment of the multidimensional factors of educational influence of teachers. All in all, respondents disagreed that teachers played a role in teacher leadership in terms of educational influence, with an overall mean of 2.31 and a standard deviation of 0.796.

To be clear, the indicator "The impact of teachers' professional knowledge and skills on student learning" received the highest mean of 2.98 with a standard deviation of 0.806 and was verbally interpreted as consent. At the same time, the mean value of the indicator "the impact of teachers' understanding and grasp of students' needs on students' learning" was the lowest, at 1.79, and the standard deviation was 0.741, which was verbally interpreted as disagreement.

The constituent elements of teacher education influence: teachers' understanding and grasp of students' needs, guidance on students' learning and thinking, teachers' professional knowledge and skills, and motivation for students' learning behaviors. According to the relevant statistical results in Table 8, the Mean value of teachers' professional knowledge and skills is 2.98, and the Mean value of motivation for students' learning behavior is 2.55, indicating that these two factors have a significant impact on students' learning in the questionnaire. Among them, teachers' leadership in professional knowledge and skills has the most significant impact on students' learning, followed by the motivation of students' learning behavior. Teachers' understanding and grasp of students' needs and teachers' guidance on students' learning and thinking had little impact on students' learning, and their Mean values were 1.79 and 1.94, respectively, indicating that teachers believed that leadership in these aspects was insufficient and needed to be strengthened.

Zhou Xiaojing and Guo Ningsheng(2014) argue that teacher leadership is non-hierarchical. "leadership" in teacher leadership is non-hierarchical, neither position-based nor power-based. It is more based on professional knowledge and moral advice, and less attention is paid to formal roles and legitimate powers in the system. In the influence of teacher education, teachers' professional knowledge and skills, and the motivation of students' learning behaviors are the basis for the effective development of teacher education leadership. In addition, in order to maximize the effectiveness of teacher leadership in improving students' learning, it is necessary to give full play to the other two factors: the function of guiding students' learning and thinking, motivating students' learning behaviors, and understanding and grasping students' needs.

4. Conclusion

Based on the results of the survey, the following conclusions were drawn:

1. Regarding teacher charisma, teachers believe that the lack of personal efficacy, lack of learning and innovation, hinders the improvement of teachers' charisma and limits their educational leadership. Teacher leadership should be more about personality leadership, which is the ability of teachers to gain the respect of students and colleagues by virtue of their moral cultivation and perfect personality, so as to influence them. "Compared to administrators, teacher leaders use more strength of personality to influence others.
2. Regarding teachers' teaching leadership, teachers believe that the organization and implementation of teaching plans face the greatest challenges. The content and level of the

lesson plan need to be targeted to meet the needs of teachers and students. Teachers pay attention to the organization of classroom learning activities and the establishment of students' learning teams, which is conducive to the improvement of leadership in teaching organization and can have a more obvious impact on students' learning.

3. Regarding the influence of teacher education, teachers believe that they understand and grasp the needs of students, and guide students' learning and thinking. There are big challenges. Teachers' understanding and grasp of students' needs and teachers' guidance on students' learning and thinking have little impact on students' learning, and leadership in these aspects is lacking and needs to be strengthened.

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