

In-depth Teacher-student Interaction Research in Polytechnic Smart Classroom based on the Perspective of "San Jiao" Reform

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Abstract. Classroom reform is an important step in the reform of "San Jiao". The polytechnic classroom urgently needs to be deeply restructured and upgraded. Smart classroom enabling deep interaction embodies the teaching structure elements, the deep learning in the environment of smart classroom, and the deep integration of information technology.

1.Introduction

"San Jiao" reform is the starting point to deepen the mode of talent training. It has become an unavoidable topic of modern vocational education to explore the in-depth classroom interaction of intelligent classroom in vocational colleges. Smart classrooms can empower in-depth classroom interaction in polytechnics.

2.Creation: Classroom construction of vocational education under the "San Jiao" reform

2.1.Intelligent classroom enabling in-depth classroom interaction in vocational colleges

Classroom is the main field of teaching activities. We should pay attention to teacher development and strengthen classroom vitality. Compared with general education, vocational education has more obvious professionalism, cross-border and integration, and it has a close connection with the development of economic society. Therefore, "colorful classroom" needs to focus on the compilation, selection and use of textbook resources, which cannot be separated from the guidance of relevant theoretical research.

2.2.Integrating multiple teaching methods to solve classroom problems

Teaching method is an important starting point of classroom reform in vocational colleges, and the most essential feature of the teaching method reform of "colorful classroom" is integration. That is to say, we should promote the "multi-dimensional" transformation of classroom teaching method based on the deep cooperation between schools and enterprises so that "colorful classroom" is more in line with the characteristics of the type of vocational education.

3.Countermeasures and suggestions for classroom reform in vocational colleges

Some countermeasures and suggestions can be put forward from three aspects: path innovation, resource development and factor reconstruction, so as to lay a solid foundation for innovative collaborative new-type classroom.

3.1.Path innovation to break the path dependence of traditional classroom teaching reform

The reform path of traditional classroom teaching is mostly top-down policy-driven reform, that is, experts are called together to put forward teaching reform suggestions based on research and experience, and then these suggestions are written into such documents as professional teaching standards, curriculum standards, talent training programs, and are widely disseminated and enter the classroom of front-line teachers.

3.2.Resource development and improving the multi-party collaborative classroom resource construction path

The scientific development and rational application of classroom resources become the representation form of "colorful classroom". Therefore, improving the multi-party collaborative mechanism of classroom resources development in vocational colleges is helpful to promote the standardized development of related markets. This requires relevant departments to conduct complete management and organization of teaching resources.

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4. The value and path of intelligent classroom enabling in-depth interaction in higher vocational classes

High quality classroom teaching is the core content of constructing high quality vocational education system. Many studies have shown that classroom discussion and innovation, peer interaction and cooperation, teacher-student interaction and communication and other interactive participation variables have an important impact on strengthening the role of classroom main position and effectively improving the quality of classroom teaching^[1].

4.1. Implications of in-depth classroom interaction

To grasp the meaning of deep classroom interaction is the epistemological premise for clarifying the practical path of deep classroom interaction in vocational colleges empowered by intelligent classroom. Classroom interaction has both situational and practical characteristics. It is not an abstract, isolated form of understanding that must be translated into action to demonstrate its true value. In the smart classroom environment, in-depth interaction of multiple elements, deep driving of multiple tasks and deep linkage of multiple platforms effectively enhance students' interactive participation, thus significantly improving the effect of in-depth classroom interaction in the smart classroom environment.

4.2. Smart classroom enabling the value of in-depth classroom interaction in vocational colleges

The in-depth classroom interaction in vocational colleges enabled by smart classroom is not to change the traditional classroom interaction, or completely deny the interaction concept in the traditional classroom, but to explore a more effectively interactive practical logic, so that every student in vocational colleges can participate in the in-depth exchange of ideas all the time. Its value is mainly reflected in the following three aspects.

4.2.1 Realizing multiple integration and interaction of teaching structure elements

The deep classroom interaction in vocational colleges enabled by smart classroom builds a deep classroom interaction form based on the reform of teaching structure. Interactive feedback is an important coupling variable. Meaning construction and behavior response regulate and control content processing through interactive feedback, so as to achieve multiple integration and interaction among elements of teaching structure.

4.2.2 Realizing deep learning in the smart classroom environment

The concept of in-depth classroom interaction centered on learning is emphasized. The in-depth classroom interaction in vocational colleges under the intelligent classroom environment places learning as the main focus and puts it in the center, so that learning integrates the four elements of teaching structure.

4.2.3 Technology becomes a subjective role in the in-depth classroom interaction of vocational colleges

In the smart classroom, technology is no longer an auxiliary and intermediary tool role in the in-depth classroom interaction of vocational colleges. Smart classroom environment becomes the medium and bridge connecting abstract interactive teaching theory and concrete interactive teaching practice, providing full support for the development of classroom interactive activities, interactive data collection, interactive behavior analysis, interactive feedback push, etc., to achieve the maximum effect of interaction.

5. Smart classroom enabling the path of in-depth classroom interaction in vocational colleges

Although the media in the environment of smart classroom extends to virtual reality, the in-depth classroom interaction in vocational schools cannot be examined solely from the perspective of technology, which will only fall into the pattern of instrumental thinking, but should be under the care of teaching structure, social interaction theory and scientific theory of learning. On the basis of following the law of education science, the in-depth classroom interaction in vocational colleges under the intelligent classroom environment is considered comprehensively.

5.1. Relying on data thinking to realize scientific interactive decision-making

Interactive decision making refers to the process in which teachers, under the guidance of educational theories and with the help of certain technical means, implement a number of satisfactory schemes to achieve teaching objectives^[2]. It can be said that interactive decision-making is the normal behavior which determines the quality of classroom interaction.

5.2. Relying on smart environment to enhance interaction participation

The level of interaction is the primary condition that affects the depth of interaction. The stimulation of intrinsic participation motivation is the most fundamental way to enhance the interactive participation of vocational college students.

Smart classroom environment can make vocational

college students get a more vivid sense of presence and improve the immersion of students' experience, so as to achieve the purpose of enhancing the interactive participation of vocational college students with deep situational experience. In addition, it is possible to

quantitatively evaluate the interaction participation in the smart classroom environment, so that the frequency and quality of each student's interaction can be clearly recorded.

For example, please refer to

Table 1: Real willingness of different types of students to invest time in teacher development activities every week.

	case number	mean	mode	median	maximum	minimum
high participation	100	1.70	1	1	6	0.5
moderate participation	135	1.87	1	1.5	5	0.2
low participation	82	1.65	1	1.5	4	0.5

The table shows 317 students from different classes of the same department I taught last semester. In terms of the average time invested, students with moderate participation have the highest willingness to invest, with an average value of 1.87, followed by students with high participation, with an average value of 1.70, and students with low participation have the lowest willingness, with an average value of 1.65. In addition, since $\text{sig}=0.20>0.05$, there was no significant difference in the real willingness of different types of students to invest time in weekly teacher development activities.

5.3.Relying on high-quality interaction to improve the effectiveness of interaction

Interactive effectiveness is the core of in-depth classroom interaction in vocational colleges. High quality interactive feedback is an important way to achieve high quality interaction. Students' right of discourse refers to students' right to express their thoughts, emotions and opinions in educational activities, especially in the classroom^[3]. Each student not only gets the opportunity to answer freely, but also gets the right to question and speak freely. Only in this way can a polytechnic classroom truly become an ecological field of thought collision, emotional resonance and wisdom creation. Quality interaction is an interactive process aimed at deep learning.

5.4.Improving interaction accuracy relying on learning analysis

Interactive precision is a necessary way to achieve in-depth classroom interaction. The learning analysis technology integrated with smart classroom is just in line with it. Smart classroom can collect data of teacher-student interaction behavior throughout the class.

Smart classroom can be used to collect data on teacher-student interactions throughout the class. Learning analysis technology is a technology used to measure, collect, analyze and report data related to students' learning behavior and their learning environment, so as to better understand and optimize students' learning status and their learning environment. The use of learning analysis techniques aims to understand deep learning from the perspective of big data.

6.Conclusion

According to the above analysis, most of the students in the sample accept to invest 1 hour in teacher development activities every week. However, in the actual participation process, on average, each student only participated in teacher development activities for 1.3 times in the last semester. What are the reasons that affect the further exploration of the value of different types of higher vocational students' participation in teacher development activities?

On the basis of previous studies, the author focuses on "time", "credits", "hours", "remuneration", "communication", "interest", "skills" and other eight factors influencing participation.

The author adopted 5-point Likert scale to investigate 7 factors including "time", "credits", "volunteer hours", "remuneration", "teacher-student communication", "interest" and "skills". In the process of data processing, the author first assigns a "1" to "very unimportant", a "2" to "not important", a "3" to "average", a "4" to "important" and a "5" to "very important", and then discusses it. In other dimensions, the survey was carried out in the form of fill-in-the-blank, which was filled in by the surveyed students according to their personal situation.

Table 2. Descriptive statistics of factors affecting different types of students' participation in teacher development

type of students	statistic	time	credit	volunteer hours	reward	teacher-student communication	interest	skill
highly involved type	average value	4.19	4.12	3.88	3.07	4.36	4.51	4.30
	standard deviation	0.82	0.76	0.91	1.12	0.60	0.63	0.72
	average value	3.88	3.81	3.56	3.06	4.02	4.18	4.21

moderate participation type	standard deviation	0.93	0.95	1.01	1.10	0.81	0.86	0.80
low participation type	average value	3.80	3.78	3.40	2.86	3.76	4.15	4.12
	standard deviation	1.12	1.13	1.12	1.15	1.03	0.91	0.89

As an inclusive teaching environment, smart classroom provides a unique natural condition for the realization of in-depth classroom interaction in vocational colleges. However, the fundamental appeal of smart classroom is to deepen the profound understanding of classroom interaction in practice, rather than simple technology superposition. Reason and sensibility are neither mutually exclusive nor opposite poles. Just as Dewey said, “Any theory that considers objective conditions to be important is only at the cost of exerting external control and restricting individual freedom”^[4].

References

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