



A Practical Exploration of the “Infiltrating” Intelligent Teaching

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Abstract. Under the background of modern education informatization, the intelligent teaching is constructed to establish a new teaching organization, “the infiltrating intelligent teaching”, in which the diversified “hybrid” “infiltration” teaching strategy can take advantage of innovative “Internet+” in the course to improve the teaching effect. At the end of the semester, with the SPSS paired sample T test of the students’ achievements, it is found that this teaching method plays a significant role in the teaching of students’ learning attitude, learning method and learning ability. This is to take the initiative to give full play to the advantages of modern information technology, mobilize the enthusiasm of both teachers and students, and form a good teaching reform and innovation between teacher-student interaction and student-student interaction.

Keywords: Infiltration teaching · Intelligent teaching · Teaching strategy · Trinity

1 Introduction

In recent years, a lot of references and learning experiences have been made on the comprehensive research of teaching reform, such as online and offline cooperation of MOOCs, micro lessons, flipped classroom and other modern forms of teaching reform and innovation based on digital technology. However, with the improvement of social demands, the reform of teaching system and the progress of modern teaching technology, the teaching reform still needs to be perfected and supplemented continuously. With the use of intelligent teaching tools, a diversified “hybrid” “infiltration” teaching method is one of the new paradigms for universities to use “Internet+ education” to improve the teaching dimension.

2 The Intelligent Teaching Class

The all-round and multi-dimensional intelligent class is a teaching environment that provides teachers professional characteristics for different courses [1]. In a visual intelligent teaching class, the design of teaching space, intelligent management and control, intelligent linkage, the integrated software and hardware and data support can be all provided, where teachers, students and administrators participate jointly, which can not only

meet the needs of teachers and students’ preview before class (data sharing), learning in class (teaching interaction) and evaluation after class (teaching reflection), also help the administrators conduct teaching analysis, teaching evaluation and optimization suggestions with shared data [2]. In this way, a comprehensive three-dimensional integrated intelligent teaching environment including intelligent teaching environment, intelligent teaching model and intelligent teaching evaluation can be constructed.

In the modern virtual system, such as VR or AR, teachers and students can make virtual three-dimensional presentation, where they can obtain knowledge anytime and anywhere regardless of the order. Learners can acquire knowledge in virtual environment, which is a co-participating platform in teaching and learning for teacher-student interaction, student-student interaction.

3 The “Infiltrating” Teaching Model

The “Infiltration” teaching originated from European and American countries, as its unique teaching form and good teaching effect has been spread rapidly. It uses modern information technology to construct an immersive teaching environment in knowledge imparting and practical innovation, so as to improve learners’ knowledge construction experience and practical innovation ability. It is critical to create a context about the course, which innovates a practical exploration of the traditional teaching. Compared with the traditional, the design of “infiltrating” teaching should take students as the main players and teachers as guides and assistants. In class, students are the initiators of learning, however, teachers only need to flexibly create some corresponding teaching situations according to pre-designed themes in the teaching process and guide students to construct meaning. The teacher guides them to immerse themselves in the created learning situation and atmosphere with the “immersed” idea, and mobilize the students to participate in thinking and learning independently. The four stages of learning are realized: focusing on the topic, leading out the problem → awakening the learning, participating in the debate → rational thinking, scientific judgment → carrying out practice and absorbing innovation. Centering on the professional theme of the course, teachers will analyze and extract the problems according to the teaching objectives of the course with high quality, and stimulate students’ thought from “What? to “What is it?” or “Why?”, and transform the class from “passive learning” to “active thinking”.

4 Comparison Between “Infiltrating” Teaching and Traditional Teaching

The “infiltrating” intelligent teaching mode is no longer a single form, but an innovation based on “Internet + education”. It differs greatly from the traditional teaching mode in teaching concept, teaching idea, teacher and student’s status, path, methods, communication between teachers and students, evaluation methods and other aspects, as shown in Table 1.

Additionally, in the overall design of a course, the “infiltrating” teaching mode constructs the concept of integration from multiple perspectives, such as teaching objectives,

Table 1. The comparison between “infiltrating” teaching and traditional teaching

	The traditional teaching mode	The “infiltrating” intelligent teaching mode
Concept	Inculcating teaching	Infiltrating teaching
Idea	The Emphasis on teacher-centered could neglect students’ dominant status, resulting their inactive, uncreative and passive study.	Taking students as the main players and teachers as guides and assistants, it could mobilize the students to participate in thinking and learning independently.
Teacher	The leader of knowledge and skills-teaching.	The designer of teaching activities and the director of teaching process.
Student	An inculcated and passive learner	An immersive and active learner
Path	Preview before class → lecture in class → homework after class.	A thematic preparation before class → an infiltrating teaching in class → step-up after class
Methods	Presented mainly in the form of PPT	Various virtual three-dimensional presentation
Communication	less	more
Evaluation	less	A three-in-one multiple evaluation mode of teacher evaluation, student self-evaluation and student mutual evaluation

content, process and value, so as to achieve the deep integration of students’ online learning and offline teaching, rather than a simple addition design of the two, and realize an integration of students’ online pre-learning tasks before class and offline immersive experiential learning [3]. With the exploration of the combination of “classroom teaching+ information technology” as the main line, students’ principal position should be adhered to, and the combination of theory teaching and case practice should be lay more emphasis on. Through the construction of practical class, students’ knowledge internalization can be controlled and the learning effect can be strengthened, seen in Table 2.

5 The Curriculum Design of “Infiltrating” Intelligent Teaching

The curriculum design is divided into three parts: “thematic” panorama presentation (arousing interest), “infiltrating” speculative participation (rational analysis) and “advanced” thinking and practice (advancing sublimation), which is embodied in observation and implementation in class, participation and implementation in thinking, practice integration in practice. In the design of teaching plan, teachers practice the trinity teaching mode of “theme-based, infiltration-based and advance-based”.

First, a thematic preparation before class. In the beginning of a semester, according to the teaching objectives, the teacher gives students some assignments for reading in

Table 2. The structural differences between “infiltrating” teaching and traditional teaching

	The traditional teaching mode		The “infiltrating” intelligent teaching mode	
	Teaching	Activities	Teaching	Activities
Before class	Preview	Do some readings or exercises on their own.	Transformation of knowledge	Self-directedly learn some materials pre-designed by teachers, communicate and give feedback on issues.
In class	Transformation of knowledge	All lectures, simple questions and interaction are given by the teacher.	Internalization of knowledge	A all-round and multi-dimensional class including students’ thematic presentation and infiltrating participation, teacher’s evaluation and rational analysis.
After class	Internalization of knowledge	Homework.	Step-up practice	Advanced” thinking and practice.

advance, such as related books, platforms, websites, etc., so as to expand their horizons and stimulate their interests in learning. Considering the situation of students and the development status of the industry, he chooses some reasonable selection of teaching content, and then gives some “theme-based” teaching guidance, where students can make the individual self-study with team inquiry learning and active theme discussions. In the preview, students should be assigned to record the key points and difficulties in learning, and make PPT in group for the next formal lecture in turn.

Next, an infiltrating teaching in class. In the first fifteen minutes in class, students will be asked to make a presentation on the content of this teaching materials on stage and PPT prepared before class, and lead other students to make a reading of the knowledge in the textbook, so that they can enter an immersive professional learning with questions. It is essential to encourage students to study on their own and cultivate their ability to be careful, so as to improve their ability of deal with some social relations and teamwork. According to the teaching theme and the current situation of the industry, the teacher poses the questions, carries out the topic discussion, guides them to make some speech, to apply the theoretical knowledge to the practical analysis with the goal and direction, and tries to make some analysis and summary of the problems reflected in learning. The key points of the course that are thought and sorted out before class and the questions or

thoughts that are explored in class will be added to discussed, in which the theoretical knowledge of the course will be included and interacted to discuss those materials and problems described. After in-depth analysis, reasonable questioning, careful experience and in-depth understanding, the students' ability to interpret the course knowledge will be gradually improved and the interpretation of theory with practice will be promoted.

Finally, step - up after class. After students' self-evaluation, mutual evaluation in group and teacher's comments, their self-reflection ability could be greatly improved. In order to enable them to better participate in learning independently and realize the purpose of social education of the course, they are guided to use new media or field materials collected before class such as photos, text and videos. In views of the characteristics of professional courses, they are guided to think empathically and imitate some relative social practices, which can cultivate the ability to explain and display, and improve their cognition of social education. Here, they are added as the subject of assessment and evaluation, which fully reflects the subject status of students in curriculum evaluation, and the objectivity, authority and standardization of teacher's evaluation are organically combined with the pertinence and flexibility of student evaluation. The three-in-one multiple evaluation mode of teacher evaluation, student self-evaluation and student mutual evaluation is constructed, including preview pre-class, learning in-class and reflection after-class, where the performance of each student in learning is included in his ordinary grades and comprehensive evaluation.

6 Results and Analysis

After the implementation of the infiltrating teaching method for a period of time, it is obvious that the class has been greatly different from before. The atmosphere in class is more active and the class cohesion is more enhanced. At the end of the semester, the students were tested with the Comprehensive Assessment Scale of Learning Attitude and Learning Methods, and the assessment results were sorted out. With the support of SPSS software, paired sample T-test was conducted on the test data, and the output results are shown in Table 3.

By analyzing the results, we can see that the mean difference between the data of the early test and the late test of the experimental class is -21.9768 , the T-value is 8.910, the degree of freedom is 39, and the sig (dual) is 0.000 (no asterisk display), then 0.000 is less than 0.05, that is to say, there is a significant correlation at the 0.05 level. In other words,

Table 3. Output results

Paired sample statistics	Average	N	Standard deviation	Standard deviation				
Traditional teaching	68.96	40	8.212	1.473				
Infiltrating teaching	89.321	40	9.95324	1.8243				
Sample verification	Pair difference			T	df.	T		
	Average	Standard deviation	Standard deviation					
				T				
				Lower limit				
Traditional-Infiltrating	-21.9768	12.5534	2.3235	-34.6574	-16.3457	-8.910	39	.000

project teaching method plays a significant role in teaching students' learning attitude, learning method and learning ability. Based on the above experimental data, we can see that the implementation and application of the infiltration teaching method has achieved the expected effect. In the environment of learning in the smart classroom, this kind of learning method of the infiltration teaching is novel and acceptable to students. This teaching method has a positive impact on the improvement of students' comprehensive ability and professional quality as well as their learning attitude and methods. Compared with traditional teaching, immersive teaching is more suitable for professional courses, and the experimental data of students can provide reference for other front-line teachers.

7 Conclusion

With the rapid development of science and technology, the infiltration intelligent teaching has penetrated into every subject and scene of education and school. The development of educational informatization and continuous progress of information technology in colleges and universities can reform the teaching mode in class, improve the teaching quality, and promote the comprehensive upgrading of educational concepts and teaching modes [4], which is an effective means and an important way of the broad prospect of education today.

The “Infiltration” teaching is to follow the “students-oriented” education concept. In class, students are guided to immerse in a specific situation, where the teacher’s “immersion” as the leading and students “entry” as the main body can strive to create interactive and participatory teaching atmosphere between them, so as to accelerate students’ understanding and learning. First, it can create a good combination of theory and reality atmosphere, so that students quickly enter the role. Second, it can respect their subjectivity, and fully mobilize their enthusiasm. Third, it can pay more attention to the interpretation of problems and details, improve their ability of deep thinking. Fourthly, it can lay more emphasis to the joint cultivation of their knowledge and moral education to promote the improvement the quality in class. The biggest advantage of the modern technology-based invasive teaching is that it changes the traditional teaching concept, builds an immersive platform and atmosphere for them to learn, enriches the teaching situation better, provides them with immersive teaching experience, changes the status and relationship between teaching and learning, and stimulates them to actively explore the learning. Promoting their learning full of creativity and imagination is an innovative teaching path based on the concept of knowledge production and innovation [5].

By integrating learning in action and practice in learning, students’ knowledge has been “advanced”, which not only improves the learning of professional course, but also greatly improves the interest in social practice, enhances the adaptability of society, improves the cognition of social and class education. This kind of teaching innovation mode of “one core, two special and three promotion” of characteristic courses has been formed, which is guided by the teaching objective of strengthening the cultivation of practical skills and the principle of “infiltrating” teaching.

1) *“One core” -- strengthening practical skills training as the core.*

This course revolves around the core of “strengthening practical skills”, determines the teaching objectives, and is committed to training both a certain degree of theory and

strong practice of composite, applied professional talents. By an integrating learning in action and practice in learning, the core idea can be implemented through the whole curriculum teaching, where the students' "infiltrating" study can be emphasized, the ability to solve the dilemma of their weak transferability of theoretical knowledge in class and their practical skills to connect theory with practice can be all improved effectively.

2) "Two special Features" -- "discipline education" and "culture Education".

In the aspect of value shaping, it highlights the characteristics of "discipline education" and "culture education", integrates ideological and political education into professional teaching, pays attention to the teaching of knowledge generation process, enhances students' patriotic sentiment, carries forward and cultivates their national spirit, and cultivates their careful, thorough and enthusiastic service consciousness, as well as cooperation consciousness of unity, cooperation and tolerance, to be the applied professionals with some compound talents of flexible, restraint, integrity of professional awareness.

3) "Three elevations" -- improve the ability of self-learning, practical application, and curriculum cognition.

It can encourage students to take the initiative to study on their own, cultivate their ability to be cautious and independent, and develop their ability to explain and show and strain, so as to promote students' ability of social relations and teamwork.

It can cultivate students' ability to observe, discover and analyze problems, improve their ability to interpret curriculum knowledge, and promote their in-depth interpretation of theory with practice.

It can enhance the ability to adapt to the society, improve the cognition of education, their imperceptibles potential to love their work, and realize the talent training goal of "three-person education".

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