

# Practice and Discussion of Wechat Public Platform to Assist Basic Chemical Experiment Teaching

Xiaoguang Wang<sup>1</sup>, Fengfeng Song<sup>1</sup>, Jiajun Sui<sup>1</sup>, Chenyang Ren<sup>1</sup>, Jiashu Pan<sup>1</sup> and Yueyun Yang<sup>1</sup>

<sup>1</sup>School of Chemistry and Chemical Engineering, Zhoukou Normal University, Zhoukou Henan, 466001, China.

## Abstract

WeChat is a mobile network quickly send voice messages, video, pictures and text, support multi-group chat mobile phone chat software. This paper analyzes the advantages and characteristics of using WeChat public account to assist basic experimental teaching of chemical engineering, and finds through practice that it can improve the efficiency of experimental management and teaching, stimulate students' enthusiasm and initiative in learning, and make full use of fragmented time. This paper also studies and pondered how to realize "flipped classroom" by using the public platform of WeChat.

## Keywords

WeChat public platform, basic experiment of chemical industry, flipped classroom.

## 1. Introduction

Basic experiment of chemical engineering is an independent compulsory basic course aimed at the basic scientific training of chemical and chemical students in colleges and universities. Therefore, the teaching and research of chemical basic experiment has been highly concerned by the schools and teachers and students. In the era of the rapid development of "Internet plus" technology, the reform of university teaching keeps innovating and developing, adding more scientific and technological elements. WeChat platform is an important entrance of the current mobile Internet and a new functional module on the basis of WeChat. The learning function is very powerful. It is widely used in all walks of life and has a great impact on people's work, study and life. WeChat public platform is set up to provide a new way for basic experimental teaching of chemical engineering, increase the scene and way of mobile learning, and provide a new idea for promoting the mutual integration of mobile Internet technology and higher education, which is conducive to inspiring students' enthusiasm for independent learning and improving their ability of independent learning and innovation. [1]

## 2. Problems Existing In Traditional Experimental Teaching

### 2.1. Limited Experimental Equipment

Due to the large number of college students and limited laboratory resources, a set of experimental equipment is often used by 5 to 6 people, so it is difficult to ensure that every student can repeat the experiment. As a result, some students in the group do not need to carry out experimental operation in the experimental class, but only need to copy the data at the end, which is not conducive to the use of instruments for students to master, nor to the cultivation of students' experimental operation ability.

## 2.2. Page Numbers Experimental Course Is Out of Step with the Theoretical Course

Basic chemical experiment and theory course arrangement in the same semester, time is very tight, in order to satisfy the experiment class and theory course teaching tasks, chemical experiment can't every time after the arrangement in the theoretical study, tend to be preferred in theory, this makes the students to do experiments on the experiment principle, it is hard to understand, and as the pace of the teacher learning in a passive way. This greatly reduced students' interest in learning this course, suppressed their enthusiasm for innovation, and was not conducive to normal and effective experimental teaching, let alone theoretical teaching.

## 2.3. Students Lack the Ability of Independent Innovation

At present, university teachers have heavy tasks of teaching and scientific research, so they have little time and energy, and no right channels to pay attention to students' independent innovation ability. At present, the experimental projects open in the laboratory are generally fixed. First, the teacher explains the experimental principle, demonstrates the experimental steps and operates the experimental instruments. Then, students do experiments and complete experimental reports according to the experimental steps step by step. In the experimental course, there is little time for interaction and communication between teachers and students, and there is no convenient channel for discussion after class, which cannot effectively guide students to cultivate their independent innovation ability. As a result, most students just mechanically accept knowledge and lack independent innovation ability.

## 3. WeChat Public Platform Assisting Experimental Teaching

### 3.1 Make Micro Lesson Video, Assist Pre-Class Preview

Micro-lesson learning before class is the basis of basic experimental teaching of chemical engineering, and micro-lesson video is the main content of micro-lesson. The quality of micro-lesson video directly affects the teaching effect, so the setting of micro-lesson video is particularly important. Micro-class video is simple, short and refined, with a length of about 5 to 10 minutes. A micro-class corresponds to a knowledge point, and students can selectively repeat the content they need to learn. [2,3] microlecture video of basic chemical experiment mainly includes the following contents: (1) experimental purpose and experimental principle. Principles are the basis of experiments. Normally, experimental principles are learned in advance in theory classes. (2) instrument introduction. Instrument introduction is mainly to guide students to understand the experimental setup, should explain to students the successful point and clever point of the experimental setup, let students experience this kind of innovative thinking in the experimental process, cultivate their innovative consciousness. (3) important and difficult points of experimental operation and matters needing attention. This part mainly reminds students of the most important points in the operation, but avoids the whole demonstration as far as possible. Students should be given enough space to think and need to move their brains to complete the experiment. (4) experimental application and experimental expansion. Experimental application and expansion are used to improve students' experimental interest and cultivate their experimental innovation spirit. In addition to reasonable Settings in the knowledge structure, when recording video, animation, experimental renderings and schematic diagrams will be added to improve the effect of video. Micro lesson video recording after upload WeChat public platform, students may at any time to watch the video lesson, lesson micro video learning, small class has set some simple quizzes, students need to participate in problem solving, and time to fulfill the requirements of qualified, can enter the classroom experiment operation, so that can guarantee a good preview effect.

### 3.2 Publish Experimental Class Information

Timely push the relevant information of the experimental course, such as the experimental course schedule before the start of the course, laboratory safety information, the display of laboratory instruments and equipment, the introduction of laboratory environment, courseware of experimental projects, etc. Students through WeChat platform, before entering the lab environment of the laboratory, experimental instruments and equipment, and the teacher is going to explain the content of experiment item have a comprehensive understanding, carrying, prepared to learn, to a greater extent to improve the students' interest in study, fully mobilize students' learning enthusiasm and interest in learning, stimulate students' innovation spirit, so that the students can quickly enter the experiment in lab [4, 5].

### 3.3 Set Preview and Test Functions

WeChat platform entry program, card small program, provide each experimental project preview and test questions, for students to learn to create challenges and tasks. Through the design of a series of difficult and appropriate questions, students can only continue to challenge themselves if they get the previous questions right, which can effectively stimulate students' desire to challenge, and at the same time enable students to effectively preview and review the learning content and test the learning effect, so as to improve their autonomous learning ability.

### 3.4 Classroom Practice

Practical operation is the core of the experimental course. With pre-class micro-class learning, a lot of explanation time can be saved in class, leaving time for students to practice. The teacher only needs to emphasize some important and difficult points before class. Students operate experiments, observe experimental phenomena and measure experimental data in class. In addition, they also need to complete the discussion questions in the micro-class through practice, observation and discussion in class. At the end of the course, students complete the discussion questions online, and the system will grade them according to the accuracy rate.

### 3.5 Create An Innovation Section

In the section of cultivating students' independent innovation ability on WeChat platform, students can submit some independently designed and innovative experiment contents through the platform, pass the real-time inspection and approval of teachers, and guide students to enter the laboratory to operate. In this way, students can not only avoid entering the laboratory aimlessly, but also cultivate their independent innovation ability.

### 3.6 Knowledge Consolidation and Application Promotion

The teaching mode based on WeChat public platform is mainly composed of two parts: (1) experimental report. All students are required to complete the experiment report after the experiment. By writing the experimental report, the correctness of the measurement data and the size of the error are analyzed. For the experimental data with large errors and errors, they are required to re-operate the experiment and the measurement data. (2) design experiments, innovation and promotion. There are special innovation laboratories and open laboratories where students can design experiments and innovate experiments independently. Students can carry out research experiments, extracurricular science and technology production and invention, and various competition activities. After application, students are provided with corresponding experimental equipment, and special teachers provide consultation and guidance. This level is mainly for students with good grades, strong practical ability and strong interest in learning. Focus on training and training outstanding students' entrepreneurial spirit and innovation ability, develop students' personality specialty.

## 4. Application Prospect of Wechat Platform in Basic Experimental Teaching of Chemical Engineering

### 4.1 Development Needs of The Times

According to tencent's WeChat influence report 2018, WeChat accounts for 34 percent of all users' data traffic. WeChat data consumption accounts for 30% of the data consumption of half of the young users aged 18 to 35. The penetration rate of WeChat payment rocketed, especially among users under the age of 18, reaching 97.3% in 2017[6]. The basic experimental course of chemical engineering is mainly aimed at the post-90s students, who are accustomed to using mobile phones to check information and learn in real time. WeChat platform just caters to the students' extensive needs and becomes a tool to maximize their learning interest and efficiency. [7]

### 4.2 State Encourages

Issued in 2018, the ministry of education of the ministry of education to accelerate the construction of high level of undergraduate course education comprehensively improve the ability of personnel training of opinions put forward: to promote the modern information technology and education teaching depth fusion, around stimulate students interest in learning and potential to deepen teaching reform, at the same time, reshape education teaching form, to speed up the formation of multiple cooperative, rich in content, applications and services in a timely manner of the higher education service system of cloud, make to adapt to the students' autonomous learning, autonomous management, independent service demand classroom, laboratory of wisdom, and wisdom of the campus. To adapt to the application of the new form of "Internet + higher education", the combination of WeChat platform and university physical and chemical experiment teaching is beneficial to stimulate students' interest in independent learning and combine boring theoretical knowledge with interesting experimental operation, in order to improve the learning effect. [1]

### 4.3 Colleges and Universities Actively Prom

In order to vigorously promote the teaching reform and network teaching, colleges and universities across the country have realized the full coverage of campus wireless network, which provides convenient conditions for the promotion and use of WeChat platform. The application of WeChat platform in teaching caters to the needs of students and enables them to make full use of some spare time to study. The WeChat platform of university physical and chemical experiment teaching USES a lot of simple and concise video, diagram courseware and daily push of cutting-edge knowledge summary and other contents, which can let students be clear at a glance, quickly get familiar with the content of complex experimental courses in a very short time, and understand the latest experimental information, so as to improve the experimental efficiency. [1]

## 5 Conclusion

In view of the problems existing in the current basic experimental teaching of chemical engineering, this paper proposes the flipped teaching model based on WeChat platform, which has the following advantages: (1) change the guiding ideology of experimental teaching to focus on students' learning, supplemented by teachers' guidance. (2) the modern micro-course teaching mode and traditional teaching combined, to achieve a better teaching effect. (3) this model can let students more into the classroom teaching, exercise and play a greater extent of personal comprehensive ability, scientific thinking and methods for students to master, cultivate the spirit of innovation and exploration, exercise modeling ability and other aspects have an important role. In a word, this kind of flipped teaching mode is a reform and attempt in

the teaching of basic experimental courses of chemical engineering, which is conducive to improving the teaching quality. How to better apply the flipped teaching model based on WeChat public platform in experimental teaching still needs to be explored, summarized and improved by educational researchers.

## Acknowledgements

The authors wish to thank the helpful comments and suggestions from my leaders and colleagues in college of chemistry and chemical engineering, zhoukou normal university. This work were supported by the Scientific Research Innovation Foundation for education teaching reform project of zhoukou normal university (Grant No. J2019029).

## References

- [1] S.F. Yang, Y.L. Sun, R. Shi. On the Application of WeChat Platform in University Physical Chemistry Experiment Teaching [J]. Science and Education BBS, No.9(2019) , p.60-62.
- [2] Z.J. Xu, G.Y. Wei, C.H. Sui. Reform college physics experiment teaching to cultivate independent experiment ability [J]. Laboratory Research and Exploration, Vol. 30(2011) No. 6, p.272-274.
- [3] S. Li, X.Q. Liu. Construction of "Internet +" university physics experiment teaching system [J]. Experimental Technology and Management, Vol.34(2017) No.1, p. 172-174.
- [4] J.J. Li, Z. Xu, Y.H. Bai, et al. Exploration and practice of micro-video chemistry experiment teaching model [J]. Laboratory Research and Exploration, Vol. 36(2017) No.1, p.189-191.
- [5] M.D. Wang, Y.J. Shi, D.P. Kong, et al. Design and practice of laboratory safety education teaching based on WeChat public platform [J]. Laboratory Research and Exploration, Vol. 36(2017) No.2, p. 289-292.
- [6] WeChat influence report in 2018. [https://xw.qq.com / cmsid /20180514A1TCXT00](https://xw.qq.com/cmsid/20180514A1TCXT00).
- [7] P. Xiao, J.Z. Lin, Y. Zhao, etc. WeChat public platform to assist university physics experiment teaching practice and thinking [J]. Physics Bulletin, No.3 (2018) , p.79-83.
- [8] Opinions of the Ministry of Education on accelerating the construction of high-level undergraduate education and comprehensively improving talent cultivation ability [Z]. Gao Jiao [2018] no. 2. [http: //www.moe.gov.cn /srcsite /A08 /s7056 /201810 /t20181017\\_351887.html](http://www.moe.gov.cn /srcsite /A08 /s7056 /201810 /t20181017_351887.html).