

## **Strengthen Practice Process Management and Improve the Quality of Practice**

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**Abstract.** The construction site practice of civil engineering major plays a significant role in the teaching process. Each year in the college of civil engineering of Yangzhou University, a large number of students participate in various construction sites. The management of the practice, however, is quite challenging as the practice is scattered in different construction sites and the construction progress varies accordingly. We have been exploring different ways to make the practice more manageable, i.e., to strengthen the practice process management, and to improve the quality of practice. In recent years, the paper authors have developed a practice management platform called “Zanxue.com” based on Internet, and have established the institutionalization of site practice management. Several years’ practice demonstrates the effectiveness of the platform in both improving the quality of the practice and in achieving good teaching effect.

### **Foreword**

Site practice unites the teaching process for civil engineering major and the practice on a cultivation viewpoint [1][2][3]. Through site practice, students are able to connect theory with practice, an achievement that deepens their understanding of theoretical knowledge, enables them to apply learnt theories to new applications such as experience construction organization design, construction management, and construction technology in practical construction. It further fosters students’ abilities to analyze problems and settle practical engineering problems. Additionally, it helps them to understand the society, to widen their horizon of knowledge, and to strengthen practical skills through exchanging learning with technicians and workers on the sites.

### **General Requirements of Production Practice**

The production practice of civil engineering specialty hardly differs among colleges and universities. According to its talent cultivation plan, Yangzhou University arranges this practice during the “practice week” of the sixth semester. The practice teaching activities are performed after the completion of civil construction courses and other related fundamental professional courses.

Based on current engineering construction conditions, the production practice is implemented by the combination of concentrative practice and decentralized practice. The preparatory work prior to the practice is the premise of normal implementation of practice work. All students are required to contact sites for practice based on their own situations after familiarizing themselves with practice assignment books, guidebooks, and other related documents. In case that some of the students fail to find appropriate sites for practice due to special circumstances, the instructors should help them contact suitable sites and make uniform arrangements.

In general, the class president is responsible for collecting students’ progress in contacting sites for practice one week before the practice. Before the practice, all students should participate in a practice mobilization meeting so that they can communicate with practice instructors, get familiar with basic requirements of practice, learn safety instructions, and sign on it for confirmation before

submission. Students who participate in practice should also register on “Zanxue.com,” the practice management platform [4] [5].

After entering the site, students first receive a safety education, delivered by engineering technicians on the site; they must get familiar with design drawings, systematically learn construction status, familiarize themselves with the site layout and project organization, and absorb site management experience from engineering technicians with an open mind. A production practice is implemented mainly to assist students to further learn about the effect of professional knowledge on engineering projects, to experience a diversity of construction sites, and to cultivate their application abilities through project construction management activities.

During the practice, all the students are required to write practice diaries in the required form on “Zanxue.com” on a daily basis. They should also analyze and summarize daily work conditions, and download and learn standards and related technical documents in the database of “Zanxue.com.” Additionally, they should upload constructions pictures and videos, and record all the knowledge points. During the later period of the practice, students should further select a subject and formulate a practice report based on it.

The engineering technicians of construction units who guide students’ practice on the site play a significant role in helping the university offer supervision to students. The engineering technicians assist students to complete production practice satisfying the required quantity and quality. They help students formulate a practice plan, determine the content and location of the production practice, arrange implementation of the practice plan, and answer various questions in engineering technology and organization management that students encounter in practice. They should also help examine students’ performance in practice and work such as their practice diaries, arrange and adjust practice content, guarantee the completion of the practice outline, review their practice reports, and give comments on students at the end of the practice. Last but not least, they should organize and submit practice documents for students via “Zanxue.com.” The practice adopts a problem-based learning method.

### **Status Analysis of Production Practice**

General production practice has such difficulties as large number of students, short practice period, and decentralized practice sites. We should solve these problems to strengthen practice organization form and management, to guarantee the quality of production practice, to enhance practice effect, to help students grasp and apply their knowledge about construction technology and construction organization management, and to cultivate students’ abilities to analyze and solve problems during construction[6] [7].

Every year, a large number of students in Yangzhou University participate in production practice, causing a heavy task. Take a look at the past four years (2011-2014). Nearly 500 students have participated in production practice, and more than 120 students have received guidance. If 3-4 students are to be accepted by one project, the number of participants in the projects will reach 30-40. All the teachers of construction teaching offer guidance. An average of 6 teachers are available annually, and they each guide about 20 students to participate in a 3-week production practice. Taking charge of 6-7 sites that are scattered in different areas, instructors have a quite heavy workload.

Currently, constructions in most central urban areas have been largely completed and the number of construction sites near the university has been decreasing. Meanwhile, to ensure safety production, various construction companies only accept a relatively limited number of students. The practice sites contacted only by the university cannot meet the needs for practice anymore. Through continuous exploration for nearly a decade, Yangzhou University has formed two relatively mature practice forms, namely, the “uniform arrangement” and the “orderly decentralization.” The “uniform arrangement” means that the university contacts practice sites and instructors guide

production practice. The “orderly decentralization” means that the students contact practice sites and participate in production practice upon approval of the university and construction instructors. The two practice forms realize process management through “Zanxue.com,” a practice management platform. In recent years, the number of “orderly decentralization” has been gradually increasing, taking 70% of the total number (average number of four years).

Influenced by the ideology of “emphasizing theory and neglecting practice,” students attach insufficient attention to the purpose of the practice. They also believe that the practice on the site would be more about observation and less about practicing since the practice period is only three weeks, a misunderstanding that would bring limited improvement, especially for those preparing for the postgraduate entrance exam with weak practice awareness and lacking in enthusiasm and initiative during practice work.

According to outline requirements of practice teaching, there are relatively more practice contents for students on sites. Nevertheless, it was impossible to make the contents remain exactly the same with those of the university because of a short practice period and because that the concrete contents of the practice were arranged by instructors on the site. Furthermore, to settle insufficient technical guidance strength on the site, some practice sites arrange students to undertake certain specialized work, such as surveying and setting out, accepting steel bar, examining stubble of constructional column and bar connector, and acting as a data processor. In this case, within a limited time, students’ practice contents decrease accordingly and the practice effect is influenced.

### **Institutionalized Management to Be Implemented to Guarantee Practice Quality**

An improved management system is a crucial guarantee of efficient management. Yangzhou University has established and perfected production practice management system and production practice management methods in recent years. Existing series management documents include (1) Application Guide of Zanxue.com, (2) Safety Instruction of Production Practice, (3) Guide for Students on Production Practice Site, (4) Formulation Standard of Production Practice Achievement, (5) Basic Requirements of Guidance on Production Practice Site, (6) Management Methods for Instructors of Production Practice, (7) Administrative Regulations for Production Practice Assessment, and (8) Evaluation Criterion of Production Practice.

These documents systematize production practice guidance and management; they guarantee production practice quality and satisfy requirements of practical teaching.

### **Process Management Based on Zanxue.com, a Practice Management Platform**

**Computer and Mobile Phone Synchronization for Convenience of Registration.** Instructors and students can scan, download, and install mobile phone terminal of the real-time sharing platform; they can complete practice registration, which includes participation units of the practice project, engineering structures and forms, and other related information so that they can gather basic information of the practice project in a timely fashion.

**Registration by Mobile Phone Location, Offering Accurate Checking-in.** The platform is applicable for Apple (IOS system) and Android (Android system) smartphones. The login ID can bind the same mobile phone and SIM card to realize mobile phone location, to avoid checking-in allograph, and to guarantee data authenticity (see Figure 1). Attendance report is generated automatically in accordance with the checking-in record and is updated immediately if the record changes in order to ensure accuracy and authenticity of the checking-in record.

**Diary and Real-time Commenting.** Students are required to upload their practice diaries and pictures (see Figure 2) on a daily basis. After uploading diaries, the computer can realize synchronized uploading and real-time achievement sharing with other students on different practice sites. The platform enables students to carry out real-time communication and to propose unique opinions about construction technology and methods of different sites. Instructors can upload

pictures at any time and give targeted practice guidance via the platform, such as commenting on diaries. Real-time communication helps students get familiar with different construction processes and obtain knowledge during the practice.



Figure 1. Registration Information of Zanxue.com (In Chinese).



Figure 2. Students uploading practice diaries and pictures (In Chinese).

**Professional Resources for Studying at Any Time.** The platform offers various kinds of architecture industry related knowledge in “File Cabinet – Public File,” including laws and regulations, acceptance specifications, and other professional resources, for students to download and study, allowing them to grasp knowledge and obtain resources from projects on the sites besides from textbooks.

### Control of Key Nodes

The control of key nodes in management is especially important regarding both “uniform arrangement” and “orderly decentralization.” Preparatory work of practice by “uniform arrangement” is based on the practice; preparatory work of practice by “orderly decentralization” needs to be planned and arranged in advance due to its long time span. The practice mobilization meeting demands full attention, including safety reminder, practice outline, practice requirements, personnel grouping, meetings of teachers and students, and document distribution, especially links to register at “Zanxue.com.”

Instructors can provide direct and immediate guidance for students concerning both practice forms via “Zanxue.com;” instructors can also lead real-time discussions by proposing questions and encourage different opinions from students on the contents of each practice. Instructors can further examine and comment on practice diaries and pictures uploaded by students, and place excellent diaries on the top as examples for others. Years’ of practice has shown improvement among students.

Assessment of final score of students include dairy quantity, picture quantity, teacher's mark, number of thumbs up, description of knowledge points, downloading and learning of reading specifications, laws and regulations, safety knowledge, practice conclusion, and other practice contents. With respect to grading, score of practice diaries takes 30%, teachers' mark 30%, and defense performance 40%. The comprehensive statistics of the three scores should objectively represent evaluation of students' practice effect.

## Conclusion

The only way to strengthen practice process management is to enhance the quality of the practice. "Zanxue.com," a practice platform based on a mobile Internet model, brings all the students who participate in the practice into one platform via the Internet and makes communication between teachers and students convenient; it is a successful application that realizes real-time interaction between students and teachers through teachers' examination, guidance, and management during the practice. The platform not only records and reports students' practice achievements and teachers' examination and comments, but also collects teachers' commenting time. "Zanxue.com" makes it convenient for students to participate in practical activities and at the same strengthens process management, fundamentally improving practice education quality.

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