# Reform of Teaching Mode of Soil Mechanics and Fundamentals Based on Superstar Learning

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## ABSTRACT

This paper addresses the shortcomings of the conventional pedagogical approach to soil mechanics and basic engineering. It proposes a novel reformulation of the teaching mode based on the Superstar learning methodology. By analysing the teaching characteristics of Super Star Learning Pass, and combining the course content and teaching objectives, the reform practice is carried out in terms of the following aspects: teaching content, teaching methods, teaching resources and assessment methods. The results demonstrate that this pedagogical approach can foster students' intrinsic motivation and autonomy in learning, enhance the quality of instruction, and provide a valuable model for the reform of soil mechanics and basic engineering courses and other related disciplines.

**Keywords:** Superstar learning master; Soil Mechanics and Foundation Engineering; Teaching mode reform; Teaching quality; Teaching effect

## I. INTRODUCTION

Soil Mechanics and Foundation Engineering is a pivotal professional course for civil engineering majors, distinguished by a robust theoretical foundation and extensive practical applications[1]. The conventional pedagogical approach relies predominantly on didactic lectures, wherein students are passive recipients of knowledge, exhibiting a dearth of practicality and innovation. The rapid development of modern information technology has significantly promoted and influenced the reform of university teaching modes, thereby posing new challenges to the traditional teaching mode[3-4]. Presently, as a consequence of the accelerated expansion of mobile communication networks and the pervasive adoption of smartphones among university students, a novel pedagogical approach, exemplified by the smartphone application Chaoxing Learning Through, has emerged as a prominent phenomenon within the academic milieu, signifying a noteworthy shift in educational practice[5-6]. This has resulted in a transformation of the traditional classroom teaching mode, which is centred on the teacher's role as a source of knowledge, into a learning mode centred on the student's independent acquisition of knowledge[7-10]. In comparison to the conventional classroom teaching model, the utilisation of the smartphone app Chaoxing Learning Through as a conduit for mobile learning has the

potential to transcend the constraints of temporal and spatial boundaries, allowing students to engage in learning at their own discretion and convenience. This approach can serve as an efficacious complement to the traditional classroom setting. The objective of this article is to reform the teaching mode of Soil Mechanics and Foundation Engineering based on the Chaoxing Learning Through platform, with the aim of improving the quality and effectiveness of the teaching process.

## II. THE TEACHING CHARACTERISTICS OF SUPER STAR LEARNING

Chaoxing Learning Through is an online learning platform designed for use on mobile devices, including smartphones and tablets. It offers a range of features, including:

The platform offers a diverse range of teaching resources. The Chaoxing Learning Through platform incorporates a multitude of pedagogical resources, including videos, audio, images, and texts, thereby facilitating students' engagement in self-directed and personalised learning.

The platform offers a multitude of interactive teaching activities. The Chaoxing Learning Through platform offers a comprehensive range of teaching activities, including discussions, questions, quizzes, and more. These activities facilitate interactive communication between teachers and students, and enhance students' participation and enthusiasm in learning.

The platform facilitates real-time monitoring of students' learning progress. The Chaoxing Learning Through platform is equipped with the capacity to record students' learning progress and achievements in real-time. This functionality enables teachers to monitor students' learning status in a timely manner, thereby facilitating the provision of targeted guidance.

## III. PRACTICE OF TEACHING MODE REFORM FOR SOIL MECHANICS AND FOUNDATION ENGINEERING BASED ON CHAOXING LEARNING THROUGH

### *A. Reform of teaching content*

On the Super Star Learning platform, we redesigned and integrated the teaching content of the course Soil Mechanics and Basic Engineering. The details include:

1) Streamlining and integrating teaching materials: In light of the ongoing development of disciplines and the evolving needs of students, it is imperative that the content of teaching materials be streamlined and integrated, with a clear focus on key points and difficulties.

2) Increase the practical and innovative content: It is recommended that the boundaries between disciplines and engineering practice be transcended, and that practical and innovative content be augmented, including case analysis and research experiments.

3) Extend the scope of knowledge in related fields: It is recommended that knowledge and skill training in related fields, such as structural analysis and computer-aided design, be introduced into the curriculum in order to enhance students' comprehensive quality and application ability.

### *B. Reform of teaching methods*

The Super Star Learning platform employs a multifaceted approach to pedagogy, integrating a range of instructional techniques. The details are as follows:

1) A combination of online and offline methods is employed, comprising online preview materials, teaching videos and other teaching resources, as well as offline classroom-based explanation,

discussion and question-and-answer sessions.

2) Project-based teaching: The course content is integrated with students' interests through the introduction of project tasks with a realistic background, which are then completed independently by the students.

3) Case teaching: The introduction of typical cases for analysis and discussion serves to enhance students' understanding of theoretical knowledge and application ability.

*C. Reform of teaching resources*

The Super Star Learning platform is characterised by the active development and utilisation of a diverse array of pedagogical resources. The specifics of this undertaking include:

1) The production of high-quality teaching videos: It is our policy to engage the services of highly competent educators to create instructional videos which highlight key and challenging content.

The following flowchart illustrates the process of creating an effective instructional video.

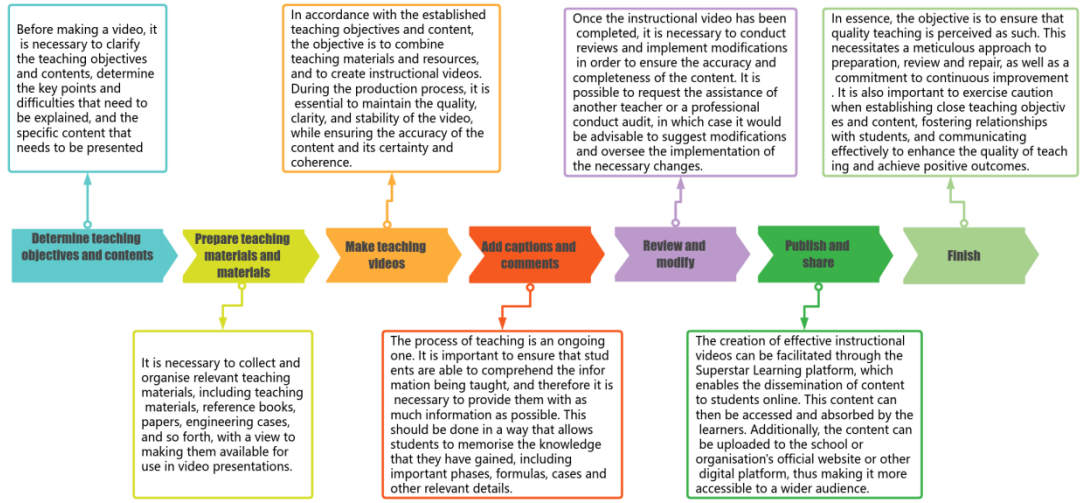


Figure 1 Video production process

2) Collect and sort out engineering cases: the cases should be sorted according to their practicality and analysed and explained in order to assist students in understanding and mastering theoretical knowledge.

3) Design a highly interactive question library: design a representative question library to facilitate students' self-testing and learning communication.

*D. Reform of assessment methods*

On the Super Star learning platform, we have reformed the assessment method of the course Soil Mechanics and Basic Engineering. The details include:

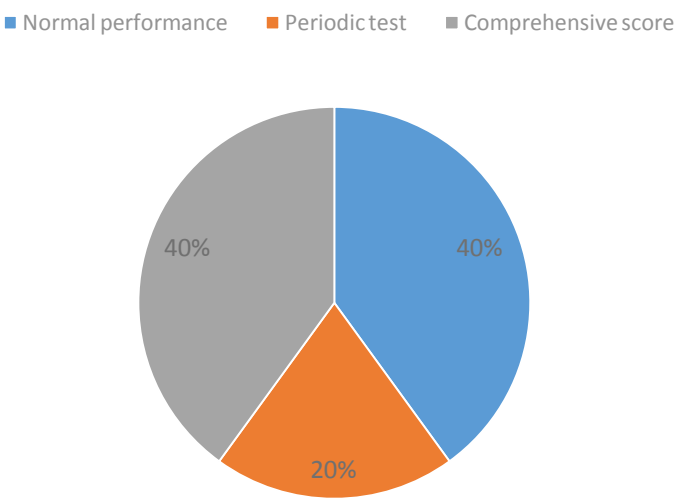


Figure 2. Assessment method

1) It is recommended that the proportion of students achieving normal grades be increased. The category of normal grades encompasses a range of academic achievements, including performance in online learning environments, classroom performance, and completion of homework assignments. These constitute 40% of the total grade.

2) The introduction of phased examinations: A series of phased tests will be employed to ascertain the extent of students' comprehension of the subject matter, with this component accounting for 20% of the total score.

3) Administer the final comprehensive examination. The final comprehensive examination is conducted in a closed-book format, accounting for 40% of the total score.

## IV. SOIL MECHANICS AND BASIC ENGINEERING COURSE REFORM EFFECT

The reform of the teaching mode of Soil Mechanics and Basic Engineering based on Superstar Learning has yielded certain results, which are reflected in the following aspects:

The reform of the teaching mode of Soil Mechanics and Basic Engineering based on Superstar Learning has resulted in an improvement in students' learning interest and initiative. The Super Star Learning platform affords students the opportunity to engage in independent learning at their convenience, selecting content aligned with their interests. This approach has been observed to enhance students' learning interest and initiative.

Enhance students' practical and innovative abilities. The incorporation of practical and innovative content, such as case analysis and research experiments, enables students to gain a more profound comprehension of theoretical knowledge and apply it to practical projects, thereby enhancing their practical abilities and innovation abilities.

The quality of teaching has been enhanced, as has the efficacy of the teaching process. The reform of teaching content, teaching methods, teaching resources, assessment methods and other aspects enables teachers to gain a more comprehensive and objective understanding of their students' learning situations. This allows them to provide targeted guidance and support, thereby enhancing the

quality and effectiveness of their teaching.

Facilitate interaction and communication between teachers and students. The interactive functions, such as discussion and questioning, facilitate communication and interaction between students and teachers, thereby promoting communication and cooperation between them. This has resulted in the formation of a dynamic and engaging classroom environment, which has subsequently led to an enhancement in the overall effectiveness of the teaching process.

The course construction and teaching reform were promoted. The reform of the teaching mode of Soil Mechanics and Basic Engineering based on Superstar Learning provides a useful reference for the reform of the teaching of other similar courses and promotes the process of course construction and teaching reform. The integration of online and offline teaching resources, the adoption of a variety of teaching methods, the enrichment of teaching resources, the reforming of assessment methods and other aspects collectively result in a teaching mode that is more suitable for the needs of students and practical engineering applications. This, in turn, leads to an improvement in the quality and effectiveness of teaching. Furthermore, the reform of this teaching mode provides a useful reference for other similar courses, thereby further promoting the process of curriculum construction and teaching reform.

In conclusion, the reform of the teaching mode of Soil Mechanics and Basic Engineering based on Superstar learning has yielded certain results. However, further exploration and improvement are necessary to ensure its continued suitability in the context of an ever-changing educational environment and evolving student needs.

## V. CONCLUSION

The reform of the teaching mode of Geotechnical and Foundation Engineering based on Super Star Learning Pass has been shown to improve students' interest and initiative in learning, enhance students' practical ability and innovation ability, improve the quality and effect of teaching, promote teacher-student interaction and communication, and promote the course construction and the teaching reform process. The reform of this teaching mode provides a useful reference for the teaching reform of other similar courses. It is evident that further exploration and improvement of the teaching mode is necessary in order to adapt to the ever-changing educational environment and the evolving needs of the students.

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