

# Teaching Reform Practice of Software Testing Course Based on Classroom Presentation

Mengdie Wu<sup>1,a,\*</sup>

<sup>1</sup>*School of Data Science and Engineering, Xi'an Innovation College of Yan'an University, Xi'an, China*

<sup>a</sup>*Wumd\_yanda@163.com*

<sup>\*</sup>*Corresponding author*

**Abstract:** *This research takes the Software Testing course for computer-related majors in undergraduate independent colleges under the background of Emerging Engineering Education as the research object. Aiming at the problems in traditional teaching such as teacher-centeredness, passive student learning, weak curriculum connection and imperfect assessment and evaluation, it integrates classroom presentation into course teaching and carries out the reform and practice of heuristic, interactive and application-oriented teaching mode. Based on the pre-course foundation and the accumulation of existing teaching practice, the research constructs a student-centered flipped classroom teaching mode by designing two types of presentation themes (free choice and designated), adopting a mixed online and offline presentation form, improving the evaluation mechanism with modern teaching tools, establishing a professional teaching team, and integrating ideological and political elements of the curriculum into teaching. Meanwhile, a diversified quantitative evaluation system emphasizing process assessment has been established, and systematic teaching resources such as teaching videos, demonstration courses, optimized teaching documents, typical cases and implementation manuals have been formed. This reform has effectively realized the transformation from "teaching-centered" to "learning-centered", improved students' professional application, communication and cooperation, innovation and practical abilities, and also provided a replicable and promotable reference scheme for other courses to carry out presentation teaching, thus achieving the expected research objectives of the project.*

**Keywords:** *Software testing, Classroom presentation, Teaching reform, Blended teaching, Learning-centered teaching*

## 1. Introduction

In traditional classroom teaching, teachers are often the "masters" of the classroom. As the leading role, teachers design all teaching links and control the teaching rhythm, while students act as audiences and passive recipients. Classroom presentation<sup>[1]</sup> fully reflects students' dominant position in classroom teaching, shifting the focus from teachers' "teaching" to students' "learning" and changing the traditional indoctrination teaching method.

Classroom presentation is a method for students to present their learning achievements to others through certain ways on the basis of fully learning, understanding, digesting and discussing knowledge. Originating from commercial activities in Western countries (e.g., new product promotion, the introduction of new businesses, or negotiation meetings), classroom presentation is no longer confined to business scenarios and has been widely adopted in other fields. Due to its good communication and exchange effects, presentation has been popularized as a teaching method and strategy.

Under the background of Emerging Engineering Education<sup>[2,3]</sup>, computer-related majors in undergraduate independent colleges have carried out the research and practice of heuristic, interactive and application-oriented teaching modes based on the teaching reform of professional courses that strengthen practical application abilities and highlight disciplinary characteristics, such as the final project of Software Testing, professional expansion, and the production and presentation of discipline competition works. From the current teaching experience, classroom presentation is one of the effective means to improve students' ability to solve practical problems and cooperate with others.

At the same time, modern multimedia teaching methods have provided convenient material conditions for students' classroom presentation, making it more and more widely used in teaching. The above factors have laid a good foundation for the implementation of classroom presentation in the

Software Testing course.

## **2. Research Content and Objectives**

To advance the teaching reform of the Software Testing course and achieve the expected talent cultivation effect, this research defines the specific research content and sets clear overall and specific objectives, with classroom presentation as the core teaching method and combined with the characteristics of computer-related majors in independent colleges.

### **2.1. Research Content**

Based on the Software Testing course for students majoring in computer-related fields in undergraduate independent colleges, this research studies the application and effect of classroom presentation in the course. As a professional course offered to students who have completed relevant foundational courses (e.g., Database Principles and Applications, Advanced Programming Languages, and Software Engineering) and acquired basic professional knowledge, it has strong professional pertinence and close connection with practice. It helps students integrate the knowledge from previous professional courses into this course and practical applications, and facilitates their digestion, understanding, application and presentation of professional knowledge.

Based on the teaching reform of Software Testing that focuses on strengthening practical application abilities and highlighting disciplinary characteristics, this research carries out the study and practice of heuristic, interactive and application-oriented teaching modes. Classroom presentation is adopted to fully reflect students' dominant position in classroom teaching, shifting the focus from teachers' "teaching" to students' "learning". This research integrates the classroom presentation method into the Software Testing course and implements flipped classrooms by means of blended teaching.

### **2.2. Research Objectives**

Overall Objective: On the basis of students' mastery of certain professional knowledge, classroom presentation is carried out to enable students to digest, understand, apply and then present the learned knowledge. The traditional indoctrination teaching method is changed, and the "independent-cooperative-inquiry" learning method is advocated. Students are guided to establish a connection between disciplinary essence and their own cognitive experience through active participation, willing inquiry and diligent thinking in practical experience. Furthermore, on the basis of acquiring knowledge, students' critical thinking and innovative practical abilities are improved, their sense of problem and ability of communication and cooperation are enhanced, and their holistic development of character and abilities is achieved.

Specific Objectives:

- Establish a research and practice teaching team for presentation represented by the Software Testing course, improve teachers' understanding of the student-centered educational philosophy, explore curriculum design and teaching methods, and form a set of practical and effective classroom presentation teaching schemes.
- Utilize online teaching platforms, big data statistics, teacher-student mutual evaluation and other tools to facilitate students' classroom presentation, and improve the monitoring, assessment and feedback mechanism of students' learning process.
- Through the implementation of classroom presentation in the Software Testing course, develop teaching resources for the course, including a classroom presentation implementation plan, exemplary presentation cases, and optimized teaching designs, providing a reference for the development of presentation teaching in other courses.

### **2.3. Teaching Problems to be solved**

1) Some teachers have an insufficient understanding of the "learning-centered" teaching philosophy. As the leading role in the classroom, teachers design all teaching links and control the rhythm, while students only act as audiences and passive recipients, failing to reflect students' dominant position<sup>[4,5]</sup>.

2) The teaching effect is unsatisfactory. The connection and integration between different courses are

inadequate, and students lack the process of digesting, absorbing and applying knowledge. Classroom presentation provides a platform for students to integrate knowledge and present it to others<sup>[6]</sup>.

3) The assessment and evaluation system is imperfect, which is mainly reflected in two aspects: first, teachers are insufficient in grasping students' ability to master basic knowledge and apply professional knowledge; second, there is a lack of an evaluation system for college students' practical problem-solving ability, and no assessment is conducted on students' application of professional knowledge to solve practical problems in the course teaching process<sup>[7,8]</sup>.

### 3. Innovation Points of the Project

1) Based on the teaching reform of Software Testing that strengthens practical application abilities and highlights disciplinary characteristics, the research and practice of heuristic, interactive and application-oriented teaching modes are carried out and applied in the teaching of Software Testing.

2) The "independent-cooperative-inquiry" learning method is advocated, guiding students to establish a connection between the essence of the discipline and their cognitive experience through active participation, voluntary exploration, and diligent reflection in practical learning. Furthermore, on the basis of acquiring knowledge, students' critical thinking and innovative practical abilities are improved, their sense of problem and ability of communication and cooperation are enhanced, and their holistic development of character and abilities is achieved.

3) Modern teaching methods are adopted to keep pace with the times. Online teaching platforms, big data and other tools are used to gather student feedback and construct a scientific assessment and evaluation mechanism, providing conditions for students to carry out classroom presentation. Teachers can timely understand students' learning situation through the platform, which provides a reference for the implementation of course presentation.

4) Taking this research as an opportunity, a teaching team with a reasonable structure, solid theoretical foundation and advanced educational philosophy is established. The team conducts theoretical and practical research on classroom presentation of the course, continuously improves teachers' awareness of student-oriented education, and enhances the quality of talent training.

Through the implementation of this research, valuable teaching resources such as course presentation implementation plans, syllabi, electronic lesson plans, curriculum designs, PPTs, online and offline teaching videos, and demonstration courses are formed, providing a reference for other courses to carry out classroom presentation.

### 4. Course Overview

The Software Testing course is a compulsory course for majors in Computer Science and Technology and Software Engineering, with a total of 48 class hours (32 theoretical hours and 16 experimental hours) and 3 credits. It is offered in the second semester of the junior year, with a total of 380 students having taken the course over the past two academic years. The prerequisite courses include Advanced Programming Language, Database Principles and Applications, Software Engineering, etc., which lay a solid foundation for students' subsequent graduation design and employment.

As a compulsory professional course for computer-related majors, combined with the school's talent training orientation, the course adheres to the principles of student-centeredness and outcome-based education, as well as the educational philosophy of continuous improvement. Through learning this course, students can understand the importance and testing process of software testing including core basic concepts such as software defects, software testing process models, the characteristics of black-box and white-box testing methods, and software testing processes; the concepts and characteristics of defect pattern-based software testing; the methods and evaluation indicators of system testing (e.g., performance testing, stress testing, and security testing); the characteristics and application of automated testing tools; and the application of artificial intelligence in software testing. Students can also understand the development trend of software testing technology to guide future application. Constructing this course well under the background of Emerging Engineering Education is of great significance for establishing scientific development and testing thinking and cultivating students' ability to solve complex engineering problems.

Relying on the construction of provincial first-class majors, the course is continuously improved and

upgraded. The curriculum resources are constantly perfected, and the compilation of supporting exercises and experimental guidance materials matching the textbook has been completed.

## 5. Teaching Methods and Means

In the traditional teaching practice of the Software Testing course, several prominent problems have emerged that restrict the improvement of teaching quality and the cultivation of students' comprehensive abilities, which are also the core pain points to be addressed in this teaching reform research. The following is a detailed analysis of these existing teaching problems.

### 5.1. Carrying out Student-Centered Classroom Presentation

On the basis of students' basic mastery of professional knowledge such as programming and software engineering, flipped classrooms are implemented in the Software Testing course through pre-class preview, in-class explanation combined with online and offline Q&A, classroom presentations, unit tests, course experiments, group tasks, and teacher-student peer evaluation. The design of teaching links for the Software Testing course is shown in Figure 1.

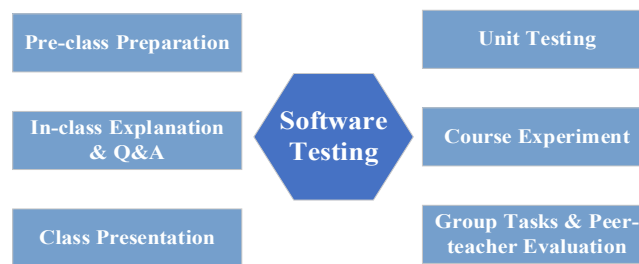


Figure 1: Teaching link setting of software testing.

Students' presentation themes are divided into two types:

1) Free-choice themes: Including the development history of software testing, professional knowledge points, industry frontiers, etc., which are selected by students themselves according to their strengths and wishes. This can deepen students' understanding of the major and industry development, and enhance their comprehension of professional knowledge by explaining the content and ensuring that other students understand the key points.

2) Designated themes: Mainly involving professional knowledge, especially comprehensive knowledge such as the application of software automated testing tools. Carefully selected by teachers, these themes can improve students' ability to solve complex professional problems through the presentation process.

In the project implementation, free-choice themes are presented in offline classrooms, while designated themes are presented online. The theme design of classroom presentations for the Software Testing course is shown in Figure 2.

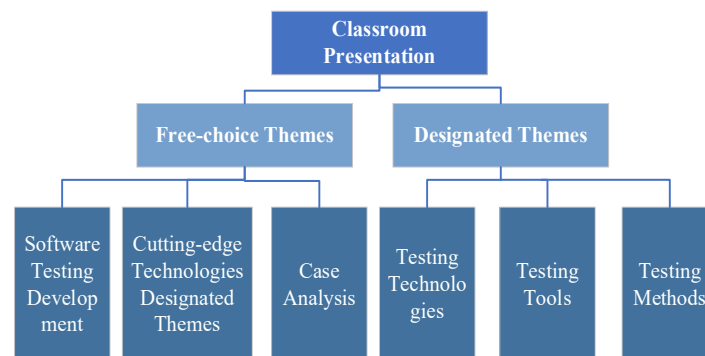


Figure 2: Theme design of classroom presentation for software testing.

### ***5.2. Improving the Evaluation Mechanism with Modern Teaching Tools***

The assessment and evaluation mechanism is improved through classroom communication, online teaching platforms, teacher-student mutual evaluation platforms, big data statistics and other tools. Students' learning progress and performance can be tracked and obtained in a timely manner, which provides a prerequisite and reference for the implementation of course presentation.

### ***5.3. Establishing a Well-Structured and Dynamic Teaching Team for Course Presentation***

Students need professional knowledge beyond a single course to carry out classroom presentation. To implement student-centered classroom presentation, a well-structured, dynamic teaching team with advanced teaching philosophy and strong awareness of teaching reform has been established in this research. Among the team members, One team member (17%) holds a senior professional title, and four members (67%) hold intermediate professional titles, and all are young and middle-aged teachers. At the same time, exchange and learning activities are carried out for the teaching team to continuously update their teaching level and educational philosophy.

### ***5.4. Integrating Curriculum Ideological and Political Education into Teaching***

Combined with the characteristics of the Software Testing course, the ideological and political elements of the curriculum are thoroughly explored, and such elements are organically integrated with professional education, achieving the imperceptible and seamless integration of ideological and political education into professional teaching.

### ***5.5. Perfecting Relevant Materials and Forming a Reference Scheme***

Through the specific implementation of classroom presentation in the Software Testing course, a valuable presentation implementation plan is formed. The plan, together with the syllabus, teaching design and other resources, is continuously improved in practice, forming a valuable reference scheme for this teaching mode.

## **6. Achievements**

With classroom presentation as the core, the teaching reform of the Software Testing course has formed systematic, replicable and promotable teaching achievements via blended teaching, diversified evaluation and team building. The specific outcomes are as follows:

Video-based teaching resource library established.

A series of teaching videos covering core knowledge points, presentation skills, and typical case analyses have been developed, which integrate theory with practice and are suitable for blended teaching scenarios. High-quality demonstration courses have been developed, presenting the full process of classroom presentation and providing intuitive references for similar course reforms.

Core course documents optimized and updated.

The course syllabus has been revised to clarify the position, hour allocation and assessment requirements of classroom presentation. The detailed teaching design has been improved with differentiated processes and guidance schemes for free-choice and designated presentation themes, refining key implementation steps.

Standardized teaching supporting materials polished.

Electronic lesson plans have been updated by integrating presentation teaching ideas, theme design and evaluation criteria. Courseware has been optimized with cutting-edge industry cases, presentation templates and expanded knowledge points, adapting to students' whole learning cycle of preview, presentation and review.

Typical teaching practice cases compiled.

5 representative excellent cases have been selected and polished, covering software testing development history, automated tool application, performance testing practice and industry frontier analysis. Each case includes complete content such as theme, discussion process, results, teacher

comments and improvement suggestions, forming a directly referable case library.

Standardized implementation manual formulated.

The Implementation Manual for Classroom Presentation of Software Testing Course has been developed, defining theme design principles, group cooperation requirements, presentation specifications, evaluation criteria and assessment rules, ensuring the replicability of the teaching mode.

Diversified assessment and evaluation scheme formed.

A quantitative assessment scheme adapted to the presentation teaching mode has been built based on process assessment, clarifying the content, source, weight and marking standards of each module. Supporting forms such as assessment records and student self- and mutual-evaluation sheets have been created, enhancing the operability and scientificity of evaluation.

## 7. Course Evaluation and Effectiveness

As a core compulsory course for computer-related majors, the Software Testing course bears the important responsibility of cultivating students' practical application ability and engineering thinking, and its course design and teaching implementation are closely linked to the talent training goals of independent colleges. The following is a detailed introduction to the basic setup, teaching objectives and construction foundation of the course.

### 7.1. Course Evaluation

According to the characteristics of classroom presentation, online and offline tasks are designed, and the course assessment and evaluation method has been revised and improved for many times. A diversified, multi-level and fully quantitative performance evaluation system oriented to achievements and emphasizing process assessment has been established, as shown in Table 1.

Table 1: Quantitative assessment table of software testing.

Performance Category		Items Score	Weight
Attendance	Online check-in	Learning Platform	5%
	Offline roll call	Classroom	5%
Usual Performance	Chapter learning	Learning Platform	5%
	Homework	Learning Platform + Offline	5%
	Classroom presentation & group tasks	Learning Platform + Offline	15%
	Course experiments	Teachers	10%
	Student self-evaluation & mutual evaluation	Students	3%
	Classroom questions & discussions	Teachers	2%
Final Performance		Final exam	50%

Each item in the performance assessment is scored separately on a 100-point scale. This evaluation system adds items such as classroom presentation, group tasks, and student self-evaluation and mutual evaluation. The design of the assessment model changes the traditional static evaluation method that emphasizes theory and neglects ability, making the course assessment fully based on data and avoiding formalism.

### 7.2. Effectiveness

With the goal of strengthening practical application abilities and highlighting disciplinary characteristics, heuristic, interactive and application-oriented teaching mode research and practice have been carried out for classroom presentation in the Software Testing course. Based on classroom presentation, this research fully reflects students' dominant position in classroom teaching, shifting the focus from teachers' "teaching" to students' "learning". The classroom presentation method is integrated into the Software Testing course, and flipped classrooms are implemented by means of blended teaching.

## 8. Project Evaluation and Construction Plan

To effectively integrate classroom presentation into the Software Testing course and achieve the teaching reform objectives, a diverse set of targeted teaching methods and means are adopted, covering student-centered teaching practice, scientific evaluation mechanism, professional team building and ideological and political education integration. The specific implementation measures are elaborated as follows.

### 8.1. Overall Project Evaluation

With the focus on strengthening practical application abilities and highlighting disciplinary characteristics, heuristic, interactive and application-oriented teaching mode research and practice have been carried out for classroom presentation in the Software Testing course. Based on classroom presentation, this research fully reflects students' dominant position in classroom teaching, shifting the focus from teachers' "teaching" to students' "learning". The classroom presentation method is integrated into the Software Testing course, and flipped classrooms are implemented by means of blended teaching, which has achieved the expected objectives of the project.

### 8.2. Construction Plan

In the later stage, the classroom presentation teaching mode will be continuously improved to make the classroom more interactive and engaging, and to improve the quality and efficiency of teaching. At the same time, the course content will be constantly updated to ensure its cutting-edge, advanced and practical nature.

Firstly, continuously enrich and optimize the library of classroom presentation cases; Secondly, further improve the construction of relevant teaching materials for Software Testing; Finally, strengthen academic exchange and professional development among the teaching staff, enable them to learn advanced teaching concepts, and broaden their educational perspectives.

## Acknowledgements

This project is supported by the University-level Teaching Reform Project of Xi'an Innovation College of Yan'an University (2025XYLKC05).

## References

- [1] Felder R M, Brent R, Prince M J. *Designing and Implementing Effective Classroom Presentations to Enhance Student Engagement and Learning Outcomes*[J]. *Journal of Engineering Education*, 2022, 111(4): 897-914.
- [2] Li Y, Zhang W. *Promoting Engineering Curriculum Reform with "Six-Dimensional Orientation" Under the Background of Emerging Engineering Education*[J]. *China Education News*, 2024, 4(A06).
- [3] Wang H, Chen J. *Exploration on the Transformation of Teaching Modes in Computer Professional Courses Driven by Emerging Engineering Education*[J]. *Journal of Higher Engineering Education*, 2023, 2: 76-81.
- [4] Zhang L, Wang Q. *Flipped Classroom Teaching Practice of Software Testing Course Based on Classroom Presentation*[J]. *Computer Education*, 2023, 8: 124-128.
- [5] Li M, Chen H. *Research on the Application of Blended Teaching in Software Testing Course under the Background of Emerging Engineering Education*[J]. *Research in Higher Education of Engineering*, 2022, S1: 189-191.
- [6] Wang Y, Liu J. *Construction of Teaching Mode Integrating Classroom Presentation into Computer Professional Courses*[J]. *Computer Engineering & Science*, 2024, 46(S2): 305-310.
- [7] Chen L, Zhang H. *Application of Blended Teaching Based on Classroom Presentation in Software Testing Course*[J]. *Journal of Educational Technology Research*, 2022, 15(3): 78-92.
- [8] Liu M, Zhang W. *Research on the Integration of Curriculum Ideological and Political Education and Classroom Presentation in Computer Professional Courses under the Guidance of Emerging Engineering Education—Taking Software Testing as an Example*[J]. *China Educational Technology*, 2023, 7: 98-103.