Summary of Bilingual Teaching Construction in Digital Signal Processing Course—Take the Communication Engineering Major of Anhui Xinhua University as an Example

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Abstract. In this paper, based on the curriculum implementation of Digital Signal Processing in the early period of the bilingual teaching work in Anhui Xinhua University, curriculum system and feasibility analysis, the construction plan of bilingual teaching of curriculum implementation, curriculum effectiveness checking of bilingual teaching, the project team has carried out the preliminary exploration and tentative practice. And the bilingual teaching system were researched, analyzed and summarized systematically. Through the concrete effectiveness testing, it has achieved a good effectiveness with helpful reproducibility.

Introduction

After years of hardworking construction, communication engineering major of Anhui Xinhua University has been a characteristic major of Anhui province, with two experiment center at the provincial level, which was approved by the provincial outstanding engineers plan, provincial professional comprehensive reform pilot, and the national college students' education off-campus practice base. And it won the first prize of 2018 "Teaching Connotation Construction Competition of Applied Type Private Colleges in Yangtze River Delta", initially formed the course system which has its own characteristics.

Digital Signal Processing is the main course of communication engineering major. Under the circumstance that international talent cultivation becomes the mainstream, bilingual teaching is very necessary. At present, communication engineering majors of Electronic Communication Engineering School of Anhui Xinhua University has set up bilingual teaching courses corresponding to Digital Signal Processing. Because the teaching language had always been Chinese before, it was quite difficult to implement the teaching course.

In this paper, the project team studied and summarized systematically the construction process of bilingual teaching firstly in Digital Signal Processing course of Anhui Xinhua University, hoping to achieve the effectiveness of popularizing experience.

Curriculum System and Feasibility Analysis

Curriculum System

Digital Signal Processing was an important part of electronic information science, and it was one of the required professional technical basic courses for undergraduates majoring in communication engineering. The basic concepts and basic technologies of Digital Signal Processing was introduced mainly by the course curriculum system.

Through the studying of this course corresponding to bilingual courses, students would be encouraged to develop the habit of combining theory with practice, cultivate the ability of analyzing
and solving problems, and constantly apply the professional theoretical knowledge what they have learned to practice, so as to improve their ability of analyzing and solving problems effectively.

**The Feasibility Analysis of Adopting Bilingual Teaching**

In terms of teaching methods and means, it was necessary to stimulate the enthusiasm and initiative of all students in learning this course. At the same time, we have tried to establish a bilingual teaching program and system that was consistent with the academic level of students in our school.

From previous experience, the teaching system of *Digital Signal Processing* in our school was complete and the supporting experimental system was completed relatively, so it was highly possible to establish the bilingual teaching system. At the same time, as the carrier of teaching content, teaching materials must play a vital role in ensuring the teaching effect. After investigation, we have planned to adopt the English version of the classic textbook of Electronic Industry Press (edited by Kun-bao CAI), which would be of great benefit to our bilingual teaching of *Digital Signal Processing* course.

**The Construction Plan of Bilingual Teaching in Curriculum**

According to the specific conditions of teachers and students, the project team would formulate teaching methods, summarize teaching evaluation, improve assessment methods, build bilingual websites, write academic papers, and conduct investigation and implementation. The details are demonstrated as follows.

**Syllabus Development**

Since it was the first time for us to apply for bilingual teaching of *Digital Signal Processing*, the textbooks in both Chinese and English versions were readily available. According to the basic teaching requirements of *Digital Signal Processing* formulated by the Ministry of Education, we must revise the teaching syllabus of normal and experimental courses accordingly. In view of bilingual teaching, the project team explored and revised the teaching syllabus of normal and experimental courses before implementing the teaching process. The content of Table 1 is the relating details.

| Table 1. Syllabus for Regular and Laboratory Courses. |
|---------------------------------|---------------------------------|
| ![Table](image) |

**Teaching Method Formulation**

*Digital Signal Processing* is the main course of communication engineering major, and there is no bilingual teaching practice before. So it was a new attempt to establish a complete bilingual teaching system.

In order to improve the teaching effect, the project team comprehensively used various teaching means in the teaching process, such as multimedia courseware, computer online simulation, etc. For example, MATLAB was used throughout the course learning. In class, the software was used to demonstrate the processing process of digital signals. And the students were required to complete and design experiments after class.
In addition, the project team used computer technology to make some images, animation, etc., which enriched the information of the class, made the teaching content more substantial and lively, and stimulated the initiative and enthusiasm of students effectively in learning.

**Teaching Evaluation Summary**

Since the participants of teaching activities included teachers and students, curriculum evaluation should also be composed of teacher evaluation and student evaluation respectively.

After the completion of the teaching, teachers should carry out the evaluation and summary of the teaching timely, summarize the methods, processes, practices, experience and other elements of bilingual teaching systematically. Finally, based on the previous working foundation, a written evaluation was formed.

Student evaluation should be based on the evaluation of teaching quality and their own harvest. The evaluation factors of teaching quality could be summarized as objectives, contents, methods and effectiveness, etc.

**Improvement of Assessment Method**

The purpose of curriculum assessment was not only the main means to promote teachers and students to realize their roles, but also an important tool to evaluate students' learning effect and teachers' teaching effect. We have adopted comprehensive measures such as attendance, papers, questions, homework, experiments and final exams to promote the assessment of bilingual teaching comprehensively. In this way, students were reported to gain great benefits generally.

**Bilingual Website Construction**

Teaching website has an advantage of vivid, intuitive and distinct, which was an important tool to promote students' in-depth study. The project team has tried to establish the website framework of bilingual teaching initially, and make and upload some testing questions to lay a technical foundation for the subsequent improvement and enrichment of teaching content.

**Academic Paper Writing**

The writing of academic papers was one of the important indicators to test and measure the performance of a project. The project team has published two academic papers on education, teaching and research in some journals in China, constantly enhancing the influence of bilingual teaching of our school. At the same time, the teacher asked the students to write an English essay about the bilingual teaching of *Digital Signal Processing*, which has no any constraint in genre.

**Paper Investigation and Implementation**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Necessary</th>
<th>Unnecessary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of People</td>
<td>39</td>
<td>2</td>
</tr>
<tr>
<td>Proportion</td>
<td>95.12%</td>
<td>4.88%</td>
</tr>
</tbody>
</table>

**Table 3. Bilingual Teaching Quality Satisfaction.**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Quite Satisfied</th>
<th>Basically Satisfied</th>
<th>Dissatisfied</th>
<th>Difficult to Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people</td>
<td>21</td>
<td>16</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Proportion</td>
<td>51.22%</td>
<td>39.02%</td>
<td>7.32%</td>
<td>4.88%</td>
</tr>
</tbody>
</table>
According to the requirements of course evaluation, before completing the teaching process, teachers should prepare materials such as questionnaire, solicit students' satisfaction with teaching, and propose suggestions for improvement. The two key indicators of the survey are the necessity of bilingual teaching and the satisfaction of bilingual teaching quality. The specific details are seen in Table 2 and Table 3, and the corresponding pie charts are shown in Fig. 1 and Fig. 2.

The Effectiveness Testing of Bilingual Teaching

After more than a year of efforts, the project team has basically improved the teaching materials, laying a solid foundation for the large-scale promotion of bilingual teaching in the future. And the construction target was very clear, which would promote the benefits in return.

Through systematic practice, students' English thinking habits has been changed fundamentally through various forms such as questionnaire, panel discussion and paper analysis. Due to the adoption of the all-English mode (homework, examination papers, and papers, etc.), students' acceptance of bilingual teaching has been improved greatly. At the same time, in the firm degree of grasping knowledge points, English understanding of professional literature, and other aspects, it has better distinctive results.

Conclusion

After groping and trying, the project team carried out the practice and exploration of bilingual teaching of Digital Signal Processing initially, and achieved good results with helpful reproducibility. In the future work, we plan to further apply for the compilation of English handouts, so as to lay a solid foundation for the subsequent compilation of English textbooks. At the same time, the project team will make and upload part of the test paper exercises, which will lay a technical foundation for the subsequent improvement and enrichment of teaching content.

It is worth noting that the teaching method of full teaching has still been adopted by some teachers mainly, which has a big gap between the teaching concept and method of research-based teaching. In a long time, the study on the orientation of English learning and curriculum learning in bilingual teaching mode is still the main problem that teachers need to face up to.

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References


