Higher Education Study by Teaching Course of Digital Signal Processing

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Abstract. Bilingual teaching is generally used in higher education. English is used as the second language to learn and acquire the interdisciplinary knowledge except the mother tongue. Some higher education philosophies are introduced in this paper. The teaching quality control and assessment are introduced. The teaching methods used in Digital Signal Processing course are discussed. Through the bilingual teaching methods, students could broaden their international view.

Introduction

In an increasingly competitive global educational market, universities are forced to compete with each other for the limited resources. One of the most significant developments in higher education in modern times has been the rise of English as a medium of instruction (EMI)[1]. As a result of the globalization of higher education, EMI has become a fast-growing trend around the world. Bilingual teaching is generally used in higher education. English is used as the second language to learn and acquire the interdisciplinary knowledge except the mother tongue.

In Sweden, an EMI course in technical communication was jointly supervised by both language and engineering teachers, who provided support to students’ project execution and reporting needs [2].

Many Asia Pacific countries were former British colonies, from countries of large territories such as India, Malaysia, to smaller countries or regions such as Brunei, Singapore, Samoa, and Hong Kong; thus, bilingual education has been popular [3].

Students are strongly in favor of using English as a medium of instruction. Some reasons behind this preference include the need to read and cite indexed journal articles in their dissertations, their intention to pursue postgraduate studies abroad, and the desire to have an edge in the job market [4].

We teach the course of digital signal processing by Bilingual teaching. Bilingual teaching should be with two basic conditions. One is that the teaching material is in English or bilingual type; another one is that teaching language is Chinese and English.

In the second session, we will introduce our teaching philosophy. In the third session, the teaching quality control and assessment are introduced. Then we discuss our course of digital signal processing. Finally, the summary is given.

Teaching Philosophy

In order to teach our courses better, we have spent a large amount of time on thinking about the philosophy in teaching. Our personal philosophy of teaching is divided into four parts.

Maintaining Enthusiasm for Teaching

We believe that maintaining enthusiasm for teaching is the most important thing for being a good teacher.

The more enthusiasm a person has for the job, the more effort he or she will make. In fact our enthusiasm for teaching has really stimulated us a lot in the past ten years in pursuing the goal of being a good teacher. It makes us set a series of goals to achieve. While we fulfill these goals, we make progress gradually.
Continuously Improving our Academic Ability

Besides enthusiasm, another important aspect of being a good teacher is to continuously improve one’s academic ability. Since the technologies develop quickly each year, a teacher should keep up with the new technologies so that he or she can direct the students efficiently and introduce up-to-date technologies and theories to the students.

We have achieved our personal development plan in the past fifteen years. For instance, we got our PH.D degree and the Certificate of multimedia technology skills in teaching in past fifteen years. These do help us to give colorful and useful lectures to our students.

Adapting Appropriate Methods to Better Teaching

While we give the lectures in our university, NEU, we always consider adapting appropriate methods to improve our teaching.

We have been paying more attention to some aspects, such as choosing proper content, utilizing visual or audio aids, and keep a friendly and useful interaction during a lecture.

Sometimes we give the students a task and make the students work as a group to solve it. We choose different methods according to the content in each lecture. In a word, we try our best to make use of appropriate methods to make our lecture effective.

Be a Good Friend to the Students

In China there is an idiom, ‘good teacher and helpful friend’, which means that a successful teacher could be a good friend to the students. In other words, the teacher not only gives the students high quality lectures, but also takes care of them and gives them help when they encounter problems.

For example, we give some advice to our students when they ask us. We keep in touch with some students after they graduated from our university. It is a good way for us to get feedback to adjust our lectures.

In conclusion, our philosophy in teaching helps us better our teaching effectively.

Teaching Quality Control and Assessment

In fact, there are two aspects of the teaching quality control and assessment system.

On the one hand, there is a teaching quality control and course evaluation system for lecturers. The main reasons why the university does this are to promote teaching innovation and increasing the teaching quality.

On the other hand, there is an assessment system for students. The main reasons why the university does this are to encourage students studying courses, collect the feedback on the courses, and classify students into different levels to show how good or bad the students are.

Therefore, we need the teaching quality control and assessment system.

For lecturers the teaching quality control and assessment is organized by the Office of Educational Administration in our university. The teaching observation and student assessment are part of the teaching quality control and assessment system.

On the one hand, there is a Teaching Assessment Council which takes charge of teaching observation. The Council members consist of retired lecturers who usually had the high reputation in teaching before they retired. The work done by this Council is involved from arranging the teaching observation timetable to giving the comments to each lecturer.

During the whole semester, the Council members go to the classroom, observe the lecturers’ teaching, they mark their teaching sessions according to the assessment standards as well as. The lecturer may not know when and who will observe his or her teaching session. Sometimes the lecturer is informed that he or she will be observed in a particular teaching session.

On the other hand, the students will be given the chance to assess and mark the lecturer’s work by the end of a course. This sort of assessment is usually carried out by anonymous questionnaires.
At the end of each year, the administrative office will publish the lecturers’ marks. If a lecturer’s marks keep in the lower level for three continuous years, his or her positional level will be decreased. When students attend a course, they are assessed according to the assessment standard published by the Department of Teaching in the university. The final mark of each course for a student is generally composed of laboratory work, average work and final examination. The average work relates to attendance levels and the marks that the student has got on the course. The assessment may vary with different courses.

Teaching Methods in Course of Digital Signal Processing

Digital Signal Processing

Digital signal processing is a platform curriculum in the College of Information Science and Engineering, in Northeastern University. It is the required subject for undergraduate students of communication engineering, and other information or non-information specialties. It is with deep theories and high practices. Students who take it should be well prepared for math, circuit and electronics systems.

In this course, some basic concepts and techniques of DSP are provided. The discrete Fourier transform (DFT) and fast Fourier transform (FFT) will be studied. The structures and design methods of digital filters will be discussed in detail and digital signal processors are also introduced to develop the ability of application. The period is 40 hours, and the credits are 2.5 Credits. The lab work of this course is shown in Table 1.

Table 1. Lab work in this course of digital signal processing.

<table>
<thead>
<tr>
<th>Order</th>
<th>Name of lab work</th>
<th>Hours</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discrete convolution of C language programming experiment</td>
<td>4</td>
<td>Design</td>
</tr>
<tr>
<td>2</td>
<td>C language programming experiment of DFT and FFT</td>
<td>4</td>
<td>Design</td>
</tr>
</tbody>
</table>

Experiment Result Evaluation Methods

Experimental grades are consisted by two parts, including general grades (up to 70%), the experimental evaluation result grades (up to 30%). Experimental results are in accordance with the below assessment evaluation.

a. Preview the experiment content, write the review report;

b. Understand the correct way of using the experimental device.

c. Carefully record the experiment data and the experimental results;

d. Experimental data is correct, the principle and the analysis are accurate.

Teaching Methods Used in Digital Signal Processing Course

In order to improve the teaching effect, we release the lecture notes, homework, practice and reference materials to BlackBoard platform in the website. It is convenient for students to download and study. Students could complete the homework and submit them online, and students also could view related assignments and answer online. Sending notice to the students by email improves the learning efficiency.

By integrating the lecture notes and course syllabus, reference materials, test operations, and expand module into an online system, provide a dynamic and convenient online study system to student. Through the mail, students could be timely get feedback and communication with teachers. Each exam could be recorded.

The book named Discrete-time Signal Processing written by Alan V. Oppenheim was chosen as the text book. Through the bilingual teaching methods, students could broaden their international view.
Conclusions
As a result of the globalization of higher education, EMI has become a fast-growing trend around the world. Bilingual teaching is generally used in higher education.

English is used as the second language to learn and acquire the interdisciplinary knowledge except the mother tongue. Some high education philosophies are introduced in this paper. The teaching quality control and assessment are introduced. The teaching methods used in Digital Signal Processing course are discussed.

Through the bilingual teaching methods, students could broaden their international view.

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References

