Teaching Reform and Exploration of Analog Electronic Technology

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Abstract: Analog Electronic Technology course is a core basic curriculum of electronic information profession, in order to adapt to curriculum teaching reform of Analog Electronic Technology, the paper has summarized the main results of the reform and construction of Analog Electronic Technology from teaching content and teaching methods and teaching practice to modern education means, and put forward a series of effective measures and methods to improve the education quality and strengthen innovation education, and progressively realized an open teaching model, and achieved the certain results.

Keywords: analog electronic technology, curriculum teaching, teaching reform, practice teaching

1 Introduction

Analog electronic technology is the basic curriculum of electronic information specialty, teaching task enables the students to obtain basic knowledge and basic theory and basic skills of analog electronics technology, and cultivates the abilities of analysis problems and solving problems to lay a good foundation of following professional curriculums, and it has strong practice and practicality. With the rapid development of semiconductor technology in last two decades, new concepts and new analytical methods have also been emerging, the curriculum content has also increased, and changed a lot, these have raised new challenges of the implementation teaching and teaching objectives, it is urgent for the curriculum to reform education, teaching methods provide the basis, and implement guarantee for the optimization and reorganization of the content. In teaching process, teachers should actively explore and improve teaching methods, and cultivate the main body awareness and learning interest and motivation of the students, and inspire creative thinking. We have combined the teaching practice and experience to reform teaching methods and teaching practice and other aspects, and heightened the students’ abilities of acquiring knowledge and applying knowledge and innovation

2 The Main Measures of Deepening Teaching Reform

2.1 To reform teaching methods and improve teaching quality

In the teaching process, we change education thinking, and strengthen quality education, and train innovation ability, and adopt a variety of teaching methods and flexible teaching forms, and make students from passive acceptance to initiative exploration. In the classroom, teachers speak emphases and difficulty and outline of the content, and organize self-learning and flexible classroom question and discussion, and analyze the problems of typical questions, and introduce solving skills, these have greatly mobilized the active participation awareness of the students, and made them from passive listening to active learning, and stimulated learning interest of the students. The applications of multimedia courseware make the explanation of curriculum outlines and difficult issues more vivid and visualization, and heighten consecution and clarity and the informative, these multi-media affect different senses of the students, and form the stimulating process of multi-sensory to activate learning thinking, teaching results have greatly improved. Computer’ dynamic imitation software (such as electronic circuit simulation software EWB) demonstrates the working process of electronic circuits, this method is intuitive, it is easy for the students to understand the teaching content, the effect cannot be compared by other instructional media presentation. The teachers ask students to learn the content of common and description according to self-study outline and write reading reports, and check their discussion and reports to appraise learning effect. Teachers take variety flexible questioning approach to
flourish class atmosphere according to the teaching content and situation, and strengthen communication between teachers and students, and apply heuristic teaching methods.

2.2 To apply modern education means and build new classroom teaching mode
Curriculum team takes full advantage of computers and campus network to develop series courseware of Analog Electronic Technology, it includes teaching plan of "Analog Electronic Technology Courseware" and network courseware of "Analog Electronic Technology Student Network" and "Analog Electronic Technology network teaching system" and “Analog Electronics Technology Experiment Learning Network”, all the teaching resources are promulgated on campus network. The "Analog Electronic Technology Student Network" highlights the tutorship characteristics, its backbone contents are basic requirements and content summary and difficult keystone and example analysis and unit testing, and provide rich animation resources, "the discussion message" and "you ask me" enhance its interactivity, "special dissertation" provides a number of academic activities and the typical circuits to expand the students’ knowledge. Network teaching system of analog electronic technology covers the entire curriculum teaching content, its arrangement is clear and reasonable; network learning system of “Analog Electronics Technology Experiment” organizes the open experiment content according to curriculum experiment outline, and increases electronic circuit design and simulation content, each experiment includes the experimental purposes and theory content and virtual experiment environment. These series of courseware have rehearsal and study and practice and test and experiment, they possess the characteristic of sharing and open and interactive, and make students acquire multi- system learning and training to cultivate their abilities of analysis issues and solving problems, and provide the students with wide learning choice, and solve the students’ problems of preparation after-school review and self-study and other issues [3].

2.3 Optimizing Teaching Content and Improving Teaching Effectiveness
The curriculum has formed relatively complete system, However, the current teaching content of the curriculum can’t absolutely meet the requirements of the modern economic development and business, In order to reasonably resolve conflicts and establish the society needs as the goal, the paper has promoted the modular professional curriculum system based on the project as the main body, which emphasizes the amalgamation training of skill and theory, and develops students’ comprehensive abilities. Teaching content substantially integrates the sutra chapters, and concentrates the working principle of the physical mechanism related to the basic components, and deletes the content which doesn’t adapt the development of electronic technology, and highlights the basic circuit theory and basic analysis methods, and increases the educational content of electronic circuit simulation software, the background of all sections teaching is integrated circuits according to training goals, this course will be divided into seven modules: semiconductor parts and low frequency small signal amplifiers and feedback amplifiers and operational amplifiers, power amplifiers and series regulated power supply and switching power supply. We focus on the discussion of the basic amplifier circuit and its analysis and the feedback amplifier circuits and analog integrated circuits and its applications and so on, and detailedly explain basic concepts and methods, and pay attention to the composition structure of electronic circuit, and emphasize the element’s characteristics and applications, and minimize the complexity mathematical derivation, and strengthen quantitative analysis, and supplement quantitative calculation.

3 To Strengthen Practice Teaching and Enhance Practice Ability
3.1 Delaminating teaching
The experiment of Analog Electronics Technology is important base lesson of an electrical professional student, and is an important part of curriculum teaching; experiment curriculums can’t only train basic laboratory skills of the students, and foster students’ abilities of comprehensive work and rigorous scientific attitude, and but also lay a good foundation for the learning following courses. In order to make the curriculum experiments really get rid of the traditional teaching mode of demonstration and
verification, we carried out experimental teaching reforms to train and exercise students’ engineering practice abilities, we reduced validation proportion, and improved the ratio of integrated design experiments, and implemented hierarchical experiment teaching, the focus of the reform strengthens the student's comprehensive ability. the students firstly complete the basic experiment content, and accomplish the experiments of design and synthesis, and apply aided computer to design and simulate the circuits in the experiment, the teachers provide guidance, and improve the students’ comprehensive analysis and design level, the students solve main problems themselves, the arrangement of experiment content is progressively divided into the following three levels:

The first level is confirmatory experiment, teachers give the experiment contents and needful equipments and operation methods and steps, experiment aim enables students to master the use of basic electronic devices and the basic skills and methods of electronic technology experiment and understand the basic functions and applications of electronic devices and basic measurement skills and measurement methods. Students mainly learn the parameters and characteristics of electronic components and the basic principle of the unit circuits, and verify the relevant theory of the electronic technology according to experiment purposes and circuits and equipments and more detailed experimental procedures, and further consolidate the basic knowledge and basic theory.

The second level is design experiment. Teachers only give the experiment purpose and basic requirements, the students design scheme by themselves, and select the test equipments, and implement the experiment process under the instructor’s agreement. the main purpose trains students to apply the basic knowledge and theory, and achieves the scientific and rational design to improve students’ capability of integrating theory with practice, and exercises the students abilities of independent work, and develops the firm will and the realistic quality of scientific spirit.

The third level is the integrated experiment, these experiments involve electronics and physics science and computer science and other multidisciplinary knowledge, the students integrate their used knowledge to design experiment project according to teachers’ basic requirements, and devise experiment circuitry, and complete EDA simulation, and select the testing equipments, and assemble experiment circuits, and draw out the adjustment and testing programs, and write out experiment reports. These experiments play a crucial role to improve the student's comprehensive abilities of analysis problems and innovation. At the same time, literature consultation and project analysis and comparison improve students’ the economic awareness and collaboration awareness and team work and collective spirit.

The fourth level is the curriculum design link of strengthening and improving, it trains the capabilities of circuit design and circuit assembly and circuit debugging and fault clearance, Teachers guide students to complete some designs of the larger circuits (temperature alarm, voltage controlled step wave generator, digital stopwatch, etc.) and analysis and debugging, the teaching teams explain the nature of curriculum design and tasks and methods and steps and time arrangement and specific requirements, and put forward the subject design task and technique indicators, guidance teachers organize students to demonstrate and compare and determine the final project, the students apply EWB and Multisim and other simulation software to make curriculum design more reasonable and easier operation, and complete the actual circuit installation debugging, the teachers check and accept curriculum design report, and question the rationality of the entire design process, the students’ harvest is very large, the students really understand the role of learning analog electronics, these enhance their learning interest and practice abilities, and are verification and deepening of theoretic teaching, and enrich the theoretical teaching content, and cultivate the students’ innovative consciousness and rigorous scientific work style.

3.2 To open laboratory

experiment teaching of open laboratory is new measure of enhancing students’ innovative awareness and abilities, and makes up for the lack of tradition experiment teaching, and exerts students’ initiative, and makes the students become into experiment main body, teachers face the operation shortage of students experiment, which blocks off electronic technology courses study, open experiment teaching strengthen these, teachers can utilize open laboratories to guide some amateur students to design electronics circuitry and take part in electronic design competition, the open laboratory provides basic
instrumentation and measuring tools for students, the students exercise the basic operation methods to
improve the basic operation skills under the guidance of instructors, the teachers ask the students to
accomplish validation experiments to enhance application abilities of the students knowledge and
practice ability in open laboratory by themselves, guide teachers are composed of theory and experiment
teachers, they supplement knowledge configuration each other, the students generally pay enough
attention to the practice teaching after curriculum reform, and make use of spare time to forwardly fulfill
experiment, we have carried through teaching reform and exploration of analog electronic technology
more than two years, and acquired some teaching experience, the students have benefited from these
teaching reform, these have received good results[5].

3.3 To set up individual classes and improve the examination system
In order to train students’ operation ability, we increase the proportion and intensity of practice teaching,
and enhance the level of traditional secondary experiment, and separate the experimental part from
curriculum teaching, and set up independent curricula. It slightly lags behind the theory teaching, its
hours are 32, experimental teaching has achieved good results, and the students’ abilities of applying
electronic technology have been greatly improved. The paper has established assessment methods of
combining theoretical examination with experiment operation and usual results, Practice has proved that
the separate experiment teaching promotes the theory teaching, assessment methods are fair and
objective and reasonable, operation is easy, it comes into being prominence effect of training students’
abilities of analysis and solving problems, and adequately makes use of the instruments and equipments,
we strengthen the building of experimental teaching staff, and truly make laboratories into the location
of improving the students overall quality.

3.4 To unfold the second classroom
The second classroom is important measures, and broadens the students’ knowledge, and trains students’
operation and innovation ability, and strengthens the students’ basic skills training, and deepens and
complements the first class knowledge. In recent years, we combine class teaching, and actively guide
students to participate in various competitions, these have achieved remarkable results. according to the
second class goal, we plan to recruit the group members from the second grade, and select the portion
students as the second class members after several steps of voluntary registration and interview and
observation and elimination, their academic performance is good, They observe discipline, the activities
of the second class are divided into four stages, the first phase makes students be proficient basic
operation, the second phase enables the students to improve themselves along a certain direction, The
third stage arranges the students to participate in the actual research work of "Student Research Training
Program". The fourth step is the harvest stage, the students have reached a considerable level of
integrated electronic design ability, and are generally able to independently accomplish specific tasks,
their skills can accomplish graduate design or thematic studies, and participate in various types of
electronic competitions, and they have achieved good results[6].

4 Conclusion

The practice has proved teaching reform of analog electronic technology improves the teaching quality
and benefits the majority of students nearly two years, with the scientific and technological development,
teaching reform will be mended continually to train high quality personnel. The reform results are more
obvious, the students’ abilities of self-learning and practice innovation have been enhanced, these
specific reform measures have greatly mobilized the enthusiasm of students and creativity, and these
vigorously promoted the improvement of teaching quality, and expanded the impact of the results. This
average grade of the students is 70 points to 78 points, our school has reformed teaching methods,
students’ achievement has certain increase, and the competition in the electronics has also made
impressive achievements. All these indicate that the curriculum reform and exploration are feasible and
effective. the reform and exploration improve the learning abilities of the students, and guide the
students to master the basics knowledge and methods of electricity technology, and boost up the abilities
of acquiring and analysis and processing information, and enhance curriculum teaching effect, and closely associate the theory with the engineering applications, curriculum reform is long term and arduous task, we will further update education idea and concept, and increase the importance awareness of personnel training quality, and strengthen the combinability of research and teaching to promote the level elevation of the teaching and academic, and provide good teaching resources for the students to improve education quality.

References