The Construction and Practice on the Curriculum of Processing Technology of Paper Box and Carton for Printing Engineering

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\textbf{Abstract.} The curriculum of \textit{Processing Technology of Paper Box and Carton} was an important elective course, and it was helpful for improving the major training program and expanding students' knowledge. In this paper, four themes were mainly stated such as the systematic and key construction on course content, the matching development for curriculum teaching resources, the innovation teaching methods and examination mechanisms, the evaluation on teaching effects and ways. Among them, it was introduced involving the course construction ideas, implementation steps, construction effects and application feedback at the aspect of \textit{Processing Technology of Paper Box and Carton}.

\textbf{Introduction}

In order to help student know the structure, the raw materials and processing technology of packing box and corrugated carton, the course of \textit{Processing Technology of Paper Box and Carton} was set up for the project of printing engineering at Beijing Institute of Graphic Communication in 2009, which would extend the students’ professional knowledge, and broaden their employment channels. After seven years of course construction and development, the number of class hours has been increased from 24 hours to 32 hours, and the number of elective students has been steady. A series of unique teaching resources, including text book, reference book, teaching courseware, training aids and so on, have been gradually built up, which have played their respective role and laid a solid foundation for ensuring the good teaching orders and effects. Besides, some beneficial explorations on the teaching mode reform, the teaching method innovation were carried out [1]. Now, the main ideas on the curriculum construction and practical results will be introduced briefly.

\textbf{Paying Attention to the Systematization and Emphases of Course Content}

This course content, from the 2007 version teaching syllabus, only involved the processing technology of corrugated board and carton rather than paper box. It didn’t accord with the course name, and was bad for the printing engineering students to understand some processing technology and raw materials on packaging carton. Therefore, the new 2011 version syllabus for \textit{Processing Technology of Paper Box and Carton} added the teaching content on the processing technology of paper box, and deleted the last chapter content on the disposal and reclaim of paper box and carton, which balanced each chapter content and made teaching structure more reasonable. In addition, the number of class hours was increased to 32 hours.

\textit{Processing Technology of Paper Box and Carton} has been a very meaningful course. Its class content could be adjusted according to the emphasis on the class hours’ number, practical application of materials and social demand for products [2]. For example, the course content should
involve all of the knowledge of *Processing Technology of Paper Box and Carton* such as the raw material, the structure and strength design, processing and manufacturing technology, printing technology and post-press processing technology. However, it has been only a summary course because of the limited class hour number. Certain contents presented in detail in other courses (such as printing process) need only be studied on one’s own, and then students has generally consolidated previous knowledge by means of listing the main principle and concept. So the focus of this course was the performances and applications of raw materials used to make paper box and carton, the manufacturing process and quality inspection for them [3]. The students who were interested in conducting insight into the course content should been encourage to consult relevant literature or write a technical report by combining with other courses (such as the packaging structure design and post-press processing technology). The report score would be included into the daily grades in order to reward students. It could not only stress the main points, but also make students master comprehensively all content of this course under the fixed period of 32 hours. Thus it could provide an opportunity for students to learn the technical literature and information retrieval, which could impel students to access to new technology, new equipments and new materials. This way has enhanced students' subjective initiative and aroused their study enthusiasm.

**Strengthening the Matching Construction for Curriculum Teaching Resources**

Under the guidance of the syllabus, the course framework and basic teaching content has been established followed by a series of teaching resources construction. So far, the curriculum of *Processing Technology of Paper Box and Carton* was firstly opened in Beijing Institute of Graphic Communication among the similar institutions, so the teaching resources construction could just carry out independently without any reference and lessons.

After the curriculum accumulation and the literature collecting, the basic structure of teaching resources was completed in 2012. The new lecture notes and matched technical questions were used for the 2010th class students on the first time. After two years' teaching practice, on the basis of notes, a professional publication named *Processing Technology of Paper Box and Carton* was officially published on August, 2014, and was used as a reference.

In order to help the students to have deeply master paper box design during the course study period, two extracurricular books were recommended, which were *The Carton Packaging Design* (Xie Qi, *Printing Industry Press*, 2008) and *The Carton Packaging Design Knife Territory* (Li Zongpeng, Zhou Shenghao, *Liaoning Art Publishing House*, 2009). According to the revision of the syllabus, the content of teaching course was perfected gradually, and many pictures and basic data were inserted, which could be more helpful to students about review and in-depth grasp of the curriculum structures and contents. In order to promote students had a more visual understanding of the material and structure of paper box and carton, course group collected a lot of cardboard cartons and corrugated carton as teaching aids, and they were used in intuitive material of classroom teaching so as to arouse the enthusiasm of the students' learning greatly. In this way, students could know and grasp the production processing technology and related content of paper box and carton in multi-channel and multi-form.

**Innovating Teaching Methods and Examination Mechanisms**

Although the course content of *Processing Technology of Paper Box and Carton* has not been abstruse, it would take a lot of time and energy to explain the course in detail for students. The so-called processing technology has been just a summarization including the contents such as raw materials, manufacturing processes, printing technology and quality detection and so on. It has demanded a teacher give priority to the important contents for students after being familiar to each section contents.

Lecturing style has been not only relatively stable, but need change and innovate in accordance with the course. A teacher should explain emphatically some principles covering material properties, classifications and specifications, etc [4]. However, when coming down to the things such as the use
of raw materials, the introduction to processing technology and equipment, the teacher would lead students to take part in some exhibitions of printing and packaging products and processes, or visit on-the-spot investigation to printers or packaging decoration factories if possible [5]. For instance, it should been taken full advantage of many industry exhibitions in Beijing. Students could have a better grasp of course content. Furthermore, the practical significance of the curriculum would be highlighted along with students’ personal involvement and up-close experience.

Although Processing Technology of Paper Box and Carton has been an elective course, it covers a lot of basic theoretical knowledge, so it has been necessary to master the knowledge as the printing engineering students. Previous syllabus provided that the final grade should be evaluated synthetically by regular scores (containing attendance performance, homework and experiment) and class-ending report. But not a few students nearly completed their reports by copying someone else’ papers word for word or completely copying and pasting certain paper on the Internet when they finished class-ending reports. Those reports lacked the organization of language and content. What’s more, because the reports always laid particular stress on a certain aspect to discuss deeply, it was hard to check students’ mastery toward the key knowledge of the whole course, so they had no effectiveness. After repeated research and argument, course group reformed the curriculum evaluation mode. The regular scores have accounted for 40%, which were composed of homework, short paper, classroom performance and attendance. If the latest carton processing technology or material appeared, while the applications have not been widespread, the students could write the short papers by collecting document literature in many ways. The short paper accounted for 30%. If there have no latest industry information, the teacher would give students two assignments which accounted for the same proportion. The classroom performance and attendance accounted for 10%, while the remaining 60% was used with an examination way. Teacher chose some flexible and subjective questions as short answers in the open book exam. The test paper score was 100 points before converted according to a given proportion.

Attaching Importance to Self-evaluation on Teaching Effects and Research on Teaching Reform

It was necessary for a course to carry out self-evaluation on teaching effects. The optional course Processing Technology of Paper Box and Carton had a better recognition among printing engineering students. In order to further boost the teaching and serve students, teacher has generally inspected the teaching effects by sending out questionnaires to students. The feedbacks from students were more real, and the results had a direct help to improve the teaching in the future. According to the investigation and analysis, most of the students thought the curriculum is useful for graduation and future career, and they suggested that the scale of two parts about paper box and carton could be adjusted on the basis of the condition of printing and packaging industry. At the same time, students also presented many proposals in teaching resources, teaching methods, the faculty and the class-ending mode.

In order to perfect the system of teaching resources, a university curriculum project was applied for the course to make the construction achievement applied in the actual teaching practice. In the meantime, two research papers were published about current situation of the curriculum construction, basic ideas, reform measures, feedback effect and the plan of teaching reform. A good effect of publicity was obtained through mutual exchanges and communication.

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References


