

Practice and Thinking on the Micro-Course Design of Green Packaging Curriculum

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Abstract—As a new education form based on new information technology and internet, micro-course teaching system provides more efficient teaching methods for modern education with characteristics of clear targeted, single knowledge-oriented, capable, vigorous and easy for students to learn and interactive. It is now receiving more and more attention from education administration and public people. In this paper, it showed some experiences on micro-course construction and curriculum design and teaching practice on traditional green packaging course education, and put forward some thoughts and useful suggestions on the application of micro-course at Beijing Institute of Graphic Communication.

Keywords—green packaging; micro-course; packaging professional education; education reform

I. INTRODUCTION

With the rapid improvement of industrial and social change, traditional education are forced to reform and fit the new situation caused by leaping technological development. The previous classroom teaching model was unable to meet the requirements of the current education. Micro-course is a new form of "short but integrated" trend applied to online education after micro-blog, micro film, WeChat and so on. It is widely used by educators as well as "Excellent Courses" and "Online Courses" in previous years [1,2].

"Micro-course", also known as "micro video course", is a new born online video course designed for a certain knowledge point of view, which is contextualized and supports a variety of learning methods [3]. In short, the micro-course is short micro-video course, which displays each points of the curriculum with the forming of animation, video or virtual simulation about 5-12 minutes through multimedia technology to achieve the purpose of teaching [4]. Due to the characteristics of clear targeted, single knowledge-oriented, capable, vigorous and easy for students to learn and interactive, micro-course is very important for the current higher

vocational education and will become a popular teaching method.

The "Green Packaging" course contains many chapters and fragmented points, and there are many new contents to be joined. Traditional classroom teaching focused mode was unable to adapt to the current situation. In this paper, we applied the new micro-course teaching model to the "Green Packaging" course at Beijing Institute of Graphic Communication(BIGC), and expounds the application of micro-course in curriculum design and teaching practice.

II. MICRO-COURSE CONTENT

The micro-course mainly shows the knowledge points through pictures, texts, videos, virtual simulations and PPT courseware. The well prepared knowledge points mainly consider two factors: one is those contents of abstract or need video display; the second is the difficulty and key in this course. The primary knowledge points determined by the syllabus of "Green Packaging" are mainly: green packaging overview, packaging environmental resource effects, green packaging evaluation theory & labels, green packaging materials, packaging waste recycling & recycling technology, green packaging case study. The corresponding secondary knowledge points and the third knowledge points are shown in Table I .

TABLE I. "GREEN PACKAGING" COURSE KNOWLEDGE POINTS

Primary knowledge points	Secondary knowledge points	Third knowledge points	
Green packaging overview	Definition of green packaging	Definition of green packaging	
	Meaning of green packaging	Meaning of green packaging	
Packaging environmental resource effects	The positive role of the packaging industry	The positive role of the packaging industry	
	Environmental impact of packaging industry	Negative effects on the environment of packaging industry	
	Green packaging standards and regulations	VOCs emission reduction and regulation	Restrictions on excessive packaging
		LCA evaluation theory	3R1D principle
Green packaging evaluation theory & labels	Green packaging evaluation theory	Carbon footprint evaluation theory	
		Green packaging logo	Green packaging logo
Green packaging materials	Green packaging raw materials	Paper packaging materials	
		Biodegradable plastic packaging materials	
	Green packaging auxiliary material	Adhesive Ink	
Packaging waste recycling & recycling technology	Recycle and reuse of paper aluminum plastic composite packaging	Recycling technology of Tetra Pak	
	Recycling and reuse of disposable plastic packaging	Recycling technology of plastic pallet	
	Recycling classification of packaging waste	Recycling classification of packaging waste	
Green packaging case	Application examples of 3R1D principle	Case of packaging reduction	
		Case of repeated use of packaging	
		Case of packaging recycling	
	Solvent-free laminating technology	Solvent-free laminating technology	
Pulp molded packaging technology	Pulp molded packaging technology		

III. MICRO-COURSE DESIGN



Fig. 1. Positive and negative film solvent-free laminating technology video

To achieve a better self-study effect of micro-class teaching, it depends largely on teaching resource construction [5]. It is difficult for students to achieve in-depth understanding through the traditional way, because the knowledge of the "Green Packaging" course is quite complicated. The author combines the picture, video, virtual simulation, PPT courseware and other resources to explain the knowledge points.

A. Picture Design

Picture is a simple part of micro-course production, it can intuitively show the general impression of knowledge points. Various types of pictures, such as physical maps, cartoons, flow charts, structure maps, etc., can be used to explain the knowledge points. Compared to the traditional teaching model, the pictures at micro-course teaching system make it easier for students to understand what they have learned.

B. Video Design

Short time based micro-video is the king resource in micro-course teaching, which is easier to understand than pictures and texts. For example, when teach students the solvent-free laminating process of positive and negative film, the process needs to be completed using a large solvent-free laminating machine. For the film route, adhesive coating method, precision control, temperature control and other operational processes can be displayed through the video in many steps. Each process has corresponding text to explain, as shown in Fig.1.

C. Virtual Simulation Design

Virtual simulation resources are characterized by immersion, interactivity and conception. They are widely used in the field of information education and experimental teaching demonstration center in universities[6]. Pulp molding is an important part of green packaging technology, with the advantages of environmental protection and resource recycling [7]. We made it as a 3D paper product that uses plant fiber pulp or waste paper as raw materials, using unique technology and special additives to suppress the formation in special mold

[8]. There are many processes, and can be simulated by virtual simulation technology. As shown in Fig.2 (a) (b) (c) (d), respectively, represents the crushing beating, vibrating screen filtration, assembly feeding and abrasive dehydration molding process in the pulp molding. Learners can watch the animation process and text interpretation of each step.

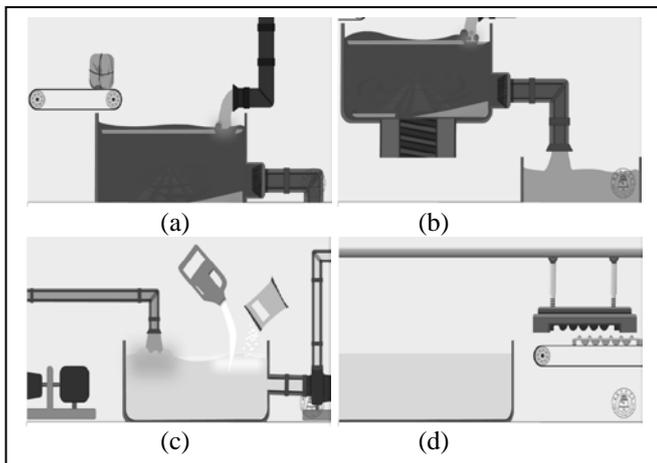


Fig. 2. Virtual simulation of pulp molding process

D. PPT Design

PPT is the most commonly used tool in micro-course teaching, and also the core content of micro-course production. There are several requirements of PPT design, which are as follows:

- Neatly and congruously structure. A good PPT file can intrigue people's interest from the first sight in the structure design. First of all, the whole structure, including the size of the page, font selection, title arrangement, picture typesetting and so on, should be well designed and prepared. In addition, the overall need to achieve the throughout and united typesetting.
- Integrally and concisely content preparation. The content section is the core of the PPT. Micro-course PPT not only has a neat structure, but also to achieve the full coverage of knowledge content. Content generally have a title, introduction, main text, summary and other parts. Also, some space for remarks and students notes should be designed on the PPT interface.

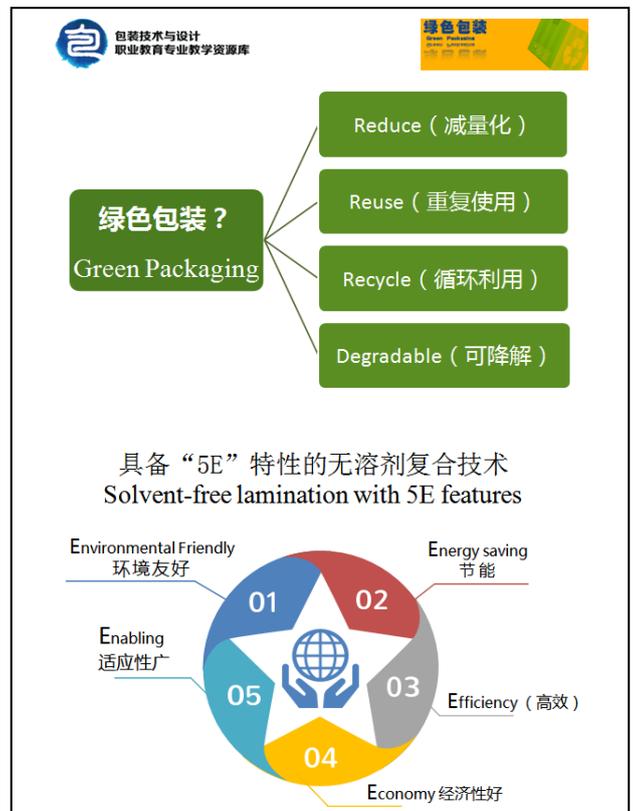


Fig. 3. "Green Packaging" micro-course PPT design.

- Rich materials and students-friendly interface. In addition to the structure and content, existing materials should be making full use to enrich the PPT file. For example, media resources such as pictures, videos, or virtual emulation can be inserted into the PPT to make it more vivid. It is worth noting that the material should be placed in a reasonable position so that it can be easy to read and have a clear hierarchical relationship
- Finally, PPT should be able to interact with learners to increase the interests of learning. Fig.3 is a glance display of "Green Packaging" micro-course PPT file. Students or industry learners can self-study through the internet based cloud platform and learn the uploaded PPT document.

E. Micro-course Recording and Editing

After the completion of the resource preparation, the micro-course video needs to be recorded and edited, which is the last and the most important step in the production of the micro-course. At present, there are a variety of ways to produce micro-course, including teaching video type, multimedia explanation type, animation explanation type, screen recording type and video clip type[9]. Among them, the video clip type micro-course method combines the advantages of the above several methods, and achieves the best effect. So we chose this method to record the teacher's video and use video processing software *premiere* to cut, separate or integrate the production resources into the video. With the

corresponding subtitles, the production of micro-course is completed.

Clip is the sublimation processes of micro-course production, including correct the inappropriate local or minor problems in the video by editing and revising. It could greatly improve the total learning effect of micro-course teaching. The characteristic video is placed in the lower right corner in a small window when playing and editing the PPT, as well as showing the PPT with time-logic centered, meanwhile inserts some pictures, videos and others resources, which could effectively demonstrate the actual effect of micro-course teaching and learning..

IV. CONCLUSIONS

Through the “Green Packaging” micro-course construction and practice in BIGC, several micro-course production and education experience could be summarized as follows:

- Due to its characteristics of clear target, single knowledge-oriented, capable, vigorous and easy to learn, micro-course is now emerging more and more advantages as a supplement to the current higher vocational education and gradually become a popular teaching method.
- The construction of micro-course should give the knowledge points of the course clearly, and then use multimedia technology to combine with pictures, videos, virtual simulation, PPT and other materials.
- The application of micro-course in “Green Packaging” course has achieved good teaching results, and other similar courses can also improve the teaching effect by making micro-course.
- Micro-course puts forward higher requirements for the level of teachers and school teachers training. The traditional educational thoughts, educational concepts and educational models need to be updated and

developed to further enhance the teachers' ability in micro-course teaching age.

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