Teaching Research on Packaging Management and Evaluation Methods

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Keywords: Packaging Management, Comprehensive Evaluation, Teaching Method.

Abstract. In the process of teaching, packaging has relationships with economics, designing, materials and management methods. The contents of most packaging courses were focused on particular technology, for example, how to choosing materials, designing the box structure, decorating layout. In packaging management course, the students were asked to take the packaging technology, manufacturing knowledge and environmental influence together. The comprehensive evaluation methods were used to choose the final packaging solution. The design analysis, quality control, production management and life cycle assessment were presented in the course. In a limited time, it was difficult to acquire knowledge in different fields. In this paper, the teaching content of the course were confirmed. Case-teaching method and subject discussion method were used in teaching process. The teaching quality and effects were improved extremely.

Introduction

Packaging need to meet the needs of different productions or industries and has relationships with all kinds of knowledge. It is very complicated to manage the packaging process. What kind of management talent is needed and how to cultivate the student in teaching process are key questions in the changing process from a big packaging country to a powerful packaging country.

Production package is developed with the prosperity of the market economy. The package purpose is to meet the production natural and social functions [1]. Protection, storage, transportation, introducing using method and providing convenience to use, are summarized as natural functions. Meeting summer psychological needs, promoting the sales and protecting the environment are summarized as social functions [2]. Social function can improve the business, create brand premium price and impulse buys. Social function is also an important factor affecting product sales. To create value is the ultimate purpose.

An excellent package solution should meet the two functions at the same time. Natural function is a basic step for production and can be measured through performance testing. Social function is difficult to be measured.

It is a major undertaking in packaging management curriculum activity, to combine both functions. This course helps students to have the capability of comprehensive design and evaluation. Holistic package solution plan is also the necessity of global competition of market economy.

Package management position requirements in the enterprise have become more sophisticated and professional. The students should master the production package standard, ideas, methods. The management talents for packaging industry should have forward-looking vision, comprehensive knowledge, international perspective and social responsibility.

Course Knowledge Structure

Decision methods, analytic hierarchy process, system fuzzy decision and life cycle assessment are used to evaluate packaging solution. The course concerns the issues of packaging strategy selection.
in different marketing strategies. The production management characteristics of packaging enterprise are analyzed in detail.

**Decision Methods**

Decision methods include quantitative and qualitative analysis. Brainstorming, Gordon method and Delphi method are commonly used in qualitative decision, which has been widely used in the packaging design companies. The color and the structure of production packaging, artistic and symbolic font, upholstery design in packaging have been categorized qualitative decision. Quantitative decision methods include certainty decision, risk type decision and uncertainty decision. Quantity-cost-profit model and linear programming have to be used to solve certainty decision, such as arranging internal production schedule or output.

Decision making under risk applies to non-programmed decisions involving many random factors, for example, packing companies can use income statement method and decision tree method for technical transformation and development of new packing, etc. Decision making under certainty is mainly determined by decision-maker's attitude and experience, which will be optimized according to minimum regret criterion.

**Analytic Hierarchy Process**

For the characteristics of fast-moving consumer goods packaging diversification, packaging program evaluation models can be established based on analytic hierarchy process.

The comparison matrix is used to determine the weight of each evaluation index. The data is obtained through qualitative evaluation questionnaires [3]. Utilizing the principles of probability and statistics for data processing, the square root of the maximum characteristic root and feature vectors are calculated. The overall efficiency of a typical packaging solution is analyzed. The analytic hierarchy process is very suitable for application in the packaging comprehensive evaluation.

**Life Cycle Assessment**

The purpose of analyzing the life cycle of package is to compare and evaluate packaging products’ environmental performance within the whole life cycle of packaging, to minimize negative influences of packaging products, materials and technology on the environment, or to maximize rate of resource utilization [4]. Product packaging of internationally renowned companies, such as Coco Cola’s packaging and Tetra Pak, use the life cycle analysis to evaluate eco-packaging system.

Life cycle analysis of packaging shows that, when calculating by energy consumption per liter of beverage, aluminum can is the most energy-consuming packaging container, combination board is the least, and glass and polyester have approximate energy consumption; when analyzing the energy consumption of each stage of life cycle of packaging, aluminum can, tin can and polyester can feature materials consumption, while glass bottle features transportation consumption and cap and label consumption.

**Marketing Strategies**

With the rapid popularity of e-commerce and online shopping, many products’ marketing strategy has online and physical stores, designing different packaging schemes for differentiating products, matching different types of customers and adapting to different logistics and transportation. It is necessary to change sales modes and marketing channels, and expand outlets for goods. Besides, timely using innovative packing material to pack, fresh care and quality insurance of packaging, and improved convenience of transportation provide products with new opportunities for market expansion [5].

**Production Management**

Packaging production process first needs to categorize products of the packaging industry, including raw material manufacturers, package printing companies and packaging machinery
manufacturers. Different types of companies have different forms of production organization. After a detailed analysis of characteristics of industry and companies, teachers make case analysis by combining time organization and spatial organization of production. Package printing companies can select serial movement mode of products during the production process; packaging companies using flow production line of can may choose parallel movement mode or parallel serial movement.

Subject Discussion Method

Decision methods include quantitative and qualitative analysis. Brainstorming, Gordon method and Delphi method are commonly used in qualitative decision, which has been widely used in the packaging design companies. The color and the structure of production packaging, artistic and symbolic font, upholster design in packaging have been categorized qualitative decision. Quantitative decision methods include certainty decision, risk type decision and uncertainty decision. Quantity-cost-profit model and linear programming have to be used to solve certainty decision, such as arranging internal production schedule or output.

Case-teaching method

The cases used by case-based teaching method are all from real-life situations or events in packaging companies, and this can help train students to actively participate in discussion in class. Moreover, cases should be typical and deeply investigated. They must be derived from the design and production practice of packaging, and mustn’t be conjecture nor fiction of teachers [6]. The cases must be attentive to real details and allow students to feel like they were in packaging company and personally on the scene.

In this way, students can take people and things in the cases seriously, carefully analyze various data and intricate cases, and are able to search for knowledge, enlighten wisdom, and exercise capabilities. Therefore, teachers must have hands-on experience, go deeply into the practices of packaging companies, and collect real cases. In packaging management course, case-based teaching runs through all chapters.

For example, teachers take business bid for case analysis when teaching decision making under risk of operating decision; teach the use of life cycle of packaging method with the case of life cycle assessment of logistics system of yogurt product packaging; teach production management with case of the application of control system in beer packaging production; teach equipment management with cases of part deformation and elimination of packaging machinery; analyze the cases of O.R.G. and Red Bull when teaching supplier selection of purchasing management; when explaining move mode of production management, make a contrastive analysis of auto-filling production and auto bottom-lock paper packing box; when explaining marketing strategy theories, teach about 4Cs marketing theory with customer-experience-centered case of Apple Inc.; Case-based teaching visualizes complicate analysis, which helps students classify, combine and analyze relevant information and find an effective way to solve the problems.

Summary

In the process of course teaching of packaging management, using different teaching methods to enrich classroom models can significantly increase students’ enthusiasm for leaning and class participation, and students can proactively connect miscellaneous knowledge, holistically contemplate on packaging scheme from planning to implementation, systematically decide on and evaluate issues in all aspects, and make a sound implementation plan for holistic packaging management [7].

Teaching process is a process where teaching benefits teachers as well as students, so only by constantly exploring knowledge hierarchy and teaching methods can we improve teaching efficiency,
achieve teaching objectives, and thus giving play to their role in training program. Due to comprehensiveness and modernity of packaging management course, knowledge hierarchy needs to be supplemented and updated continuously to meet new needs of the industry.

Acknowledgement

This work was financially supported by the course reform project of Beijing Institute of Graphic Communication (22150116008/028), the general education reform project of Beijing Institute of Graphic Communication (22150116007/031), packaging engineering teaching team (construction) of Beijing Institute of Graphic Communication (22150116006/017).

References


