Development of Apparel CAD Education System

Graduate School of Integrated Sciences, Takami Yamamoto

Abstract

CAD/CAM systems have been introduced into clothing production processes employed in the apparel industry accompanying the development of information and communication technologies. This has enabled the establishment of more efficient production systems that allow the production of numerous products in varying amounts capable of accommodating user needs. As a result, it has become necessary for the apparel education provided by universities to not incorporate only conventional individual production methods, but also apparel production methods and CAD education in the form of specialized vocational education. The use of CAD has also been indicated as being essential in apparel construction education even for advance research relating to CAD education. However, due to the high cost of CAD systems, there are considerable differences in the equipment conditions among universities, and a curriculum and achievement goals have not been established.

Therefore, in this study, we have developed an apparel CAD education system to accommodate the utilization of information technology and to implement specialized vocational education in the apparel construction education offered by universities. The contributions are composed of a CAD education curriculum for developing practical skills; class textbooks, automatic drafting functions for teaching, and a CAD e-learning system.

The following provides a summary of the contributions along with its characteristics.

1. Apparel CAD Education Curriculum

A curriculum for CAD education was constructed in line with the educational objective of developing skilled individuals in the apparel industry in the form of specialized vocational education in apparel construction based on a fact-finding survey of CAD education at university and junior college instructors. The curriculum is composed of two basic courses and four applied courses, and makes it possible to provide guidance for knowledge and skills that enable the practical use of CAD systems.

2. Class Textbooks

Class textbooks used for "CAD Pattern Making 1 and II", which were set as basic courses for CAD education based on the above curriculum, were compiled with the aim of containing contents for one semester of classes each (about 30 hours). The first textbook used for "CAD Pattern Making I" enables students to learn the pattern making functions of CAD as well as to learn the basics of two-dimensional drafting. The second textbook used for "CAD Pattern Making II" emphasizes industrial pattern making and is compiled to enable instruction in actual input functions, grading functions and marking functions. These two textbooks make it possible to provide CAD education ranging from fundamentals to practical skills.

3. Automatic Drafting Functions for Apparel CAD Education

Automatic drafting functions for women's pants and men's pants were developed that add new teaching functions as educational tools for use in CAD education. These automatic drafting functions enable patterns to be drafted in various sizes and in a short period of time, and can be used as patterns for design development. The characteristics of these automatic drafting functions for education consist of: (1) a step mode function that displays the drafting procedure in individual steps, (2) an outsizing function that automatically changes the number of darts and other parameters according to body size, and (3) a display function that displays the procedures for using each function and class reference materials that can be referenced as necessary such as drafting serving as the basis of automatic drafting. In addition, the blouse automatic drafting functions are composed of three types of body sections, nine types of collars and four types of sleeves that comprehensively cover the contents of blouse drafting education. These automatic drafting functions allow the implementation of various teaching methods for beginning (students who have never studied CAD), intermediate (students who have learned the basic aspects of CAD Pattern Making I), and advanced CAD students (students who have completed CAD Pattern Making I) according to their level, and provide a wide range of usage procedures.

4. Apparel CAD e-Learning System

We also developed an e-learning system based on our previously developed CAD education curriculum, class textbooks and automatic drafting functions for apparel CAD education for the purpose of further promoting the use of information technology in CAD education. In addition, the e-learning system provides specific materials for teaching the space composition ability. This has enabled students to develop the ability to faithfully reproduce design images in patterns and the ability to create industrial patterns using CAD, both of which are necessary skills for pattern makers.

Surveys and interviews regarding the curriculum for CAD education, confirmation tests and surveys for the class textbooks, surveys regarding the automatic drafting functions for apparel CAD education, and confirmation tests before and after using the e-learning system along with surveys following its use were conducted in the form of user evaluations. The evaluations of five specialists (instructors) were also able to be obtained for the curriculum and e-learning system. The numerous evaluations from these users confirmed the validity and efficacy of this education system.

Practical training using this curriculum and its educational tools can serve as a guideline for CAD education in apparel construction education at universities where the introduction of CAD education is not proceeding as would be desired. In addition, the use of the e-learning system enables students to acquire CAD theory and skills at universities where CAD systems are available. Even in cases in which CAD systems are not available or are only available in small numbers, the system allows guidance to be provided relating to an overview of CAD in fulfilling the role of expanding the scope of CAD education.