

## Development of a fashion-design curriculum in South Korea based on artificial intelligence

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### Introduction

With the demands of the Fourth Industrial Revolution (Industry 4.0), designers are seeking new capabilities to collaborate with artificial intelligence (AI) in order to demonstrate creativity and lead design innovation (Jeong & Kim, 2018). In the fashion industry, advanced AI technology has reached the level where it can produce automatically all-in-one design planning, personalized design, and low-involvement clothing in the design sector, which has to now been considered a creative area of human nature. As this paradigm shift from traditional fashion-design processes takes place, it is important to consider AI-based fashion-design education that can combine with existing fashion-design tools and lead to design innovation. However, research on the utilization of AI in fashion education has been lacking; there is little practical use of technology by students in fashion education (Merryman & Lu, 2021). AI technology in the fashion field is difficult to research independently. It requires high-level technology utilization through industry-academic cooperation, most of which has focused on the development or evaluation of services. Therefore, industrial-linked project-based learning (PBL) curriculum design is essential. PBL can cover preparation, topic selection, project planning, information exploration, task resolution, development, presentation, and evaluation (Krajcik & Blumenfeld, 2006; Larmer & Mergendoller, 2010). This study aims to develop a curriculum that applies AI technology to fashion-design education based on a cooperative system with industry.

### Methods

We considered prior research and theory on education and PBL teaching methods that have incorporated AI in domestic and foreign design majors over the past five years using academic journals, and internet data. This review of existent research and related literature helped refine this study's needs and research questions. Next, a Focus Group Interview (FGI) was conducted. Five experts in the field of fashion-design education met with companies to discern problems at the company sites and to discuss solving those problems using AI. Finally, an industry-linked PBL curriculum was derived that reflected the expert FGI opinions and that corresponded to the university's educational environment, IT business conditions, and the needs of students majoring in fashion design.

### Findings and discussion

FGIs were conducted with the Samsung C&T Fashion Group in South Korea. The company shared the concern that their current AI fashion recommendation service may not be satisfactory for young consumers and new fashion trends. This real-world fashion-industry issue presented an opportunity for academic research, student learning, and industry improvement. The company agreed to provide their current fashion product database and convolutional neural network (CNN) model for machine learning. AI fashion recommendation prototypes for the designer have also been developed through collaboration with the company. When designers search for desired styles and design attributes, it extracts and provides similar images corresponding to the information entered from the fashion product database. Next, experts in the field of fashion-design education explained the benefits of PBL that included improved skills such as increased understanding of fashion trends and concepts, creative thinking, problem-solving, and communication. Finally, a special-topic course was designed for fashion-design students, focusing on a particular target market, the Samsung C&T Fashion Group's fashion brands. The 15 weeks of PBL curriculum was developed as follows. The students were instructed to research trend forecasts and suggest new style trends (Weeks 1–3). The students' next step was to collect image data of the new style from the company fashion products. The CNN model's learning process was carried out through cooperation with the company (Weeks 4–7). Students were instructed to sketch and re-design based on their own concepts and combining AI fashion recommended results (Weeks 8–12). Finally, students presented results to the company and supplemented those results with additional feedback (Weeks 13-15).

### Conclusions and further research

This study investigated fashion-design education using AI based on the academic theory and current technology of fashion design. The study designed an AI-based fashion-design education curriculum through FGI with fashion companies and fashion experts. For future research, we would like to apply this curriculum to fashion design courses and analyze learning performance in fashion design education in cooperation with AI.

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