

THE IMPACT OF IMAGE-BASED LEARNING ON PROFESSIONAL SKILL DEVELOPMENT IN BEAUTY AND HAIRDRESSING EDUCATION AS PART OF FASHION EDUCATION

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Abstract:

This study investigates the impact of image-based learning (IBL) on professional skill development in beauty and hairdressing education as part of fashion education. Employing a quasi-experimental design with 120 practitioners in Taiwan, participants were divided into experimental (IBL) and control (traditional) groups. Key competencies—including technical skills, creativity, emotional regulation, and stress management—were assessed pre- and post-intervention. Results revealed significant improvements in the experimental group across all domains, with large effect sizes (Cohen's $d = 1.12-1.57$). These findings highlight IBL as an effective pedagogical tool for enhancing both technical expertise and emotional resilience in vocational fashion training programs.

Keywords: *Image-based learning, Beauty and hairdressing education, Fashion education, Emotional regulation, Stress management*

1. INTRODUCTION

The beauty and hairdressing industry is an ever-evolving and highly competitive field, influenced by shifting consumer preferences, technological advancements, and a growing demand for high-quality service [1,2]. As part of the broader fashion education ecosystem, beauty and hairdressing professionals are required to stay up-to-date with the latest trends, techniques, and innovations, while continually developing both technical skills and emotional resilience to meet the demands of client-facing roles. The beauty and hairdressing sector is defined by its rapid pace, and professionals must adapt quickly in order to maintain their competitive edge. The beauty industry is characterised by its fast-paced nature, where practitioners must adapt quickly to maintain competitiveness. Traditional training works well, but it might not suit everyone's way of learning or meet all their changing needs. [3] This indicates the importance of exploring alternative training methods that can enhance skill acquisition and emotional adaptation. Image-based learning (IBL), which uses visual stimuli such as images and videos, has emerged as a promising approach to support professional development and help practitioners meet these demands.

IBL is based on the cognitive theory of multimedia learning, which posits that learning is more effective when information is presented through both verbal and visual formats. By engaging multiple cognitive channels, IBL can enhance understanding, retention, and the ability to apply complex concepts [4]. In the context of fashion education, research has shown that multimedia and visual learning tools are effective in improving practical skills and increasing engagement among students [5,6]. Existing research has predominantly targeted students, leaving a gap in the literature regarding how IBL can be used for continuous education and skill enhancement for professionals in the field. Previous studies have

primarily targeted student populations, with limited exploration of how IBL can be used to support the continuous education and skill enhancement of professionals established in their careers.

This research gap is particularly relevant within Taiwan's beauty and hairdressing sector, which forms a vital component of the broader fashion education framework. The sector is marked by intense competition and a rapid pace of change, meaning that professionals must regularly update their skill sets to remain competitive. Traditional training may no longer be sufficient to address the diverse needs of the workforce. As such, this study seeks to investigate the impact of IBL on the professional skill development of beauty and hairdressing practitioners in Taiwan, a sector that would greatly benefit from flexible, innovative approaches to training.

The aim of this study is to bridge the gap by evaluating the effectiveness of IBL in improving essential areas such as technical skills, creativity, emotional regulation, and stress management. These areas are vital for learners to excel in their careers and to manage the emotional and physical demands of their work. By integrating IBL into vocational training and professional development programmes, this research will provide valuable insights into how visual and interactive learning can enhance skill acquisition, emotional resilience, and stress management within Taiwan's beauty and hairdressing sector as part of fashion education. The findings from this study are expected to inform future training practices, offering a more flexible and effective approach to continuous learning for professionals in this ever-evolving field.

2. METHODOLOGY

This study examines the impact of Image-Based Learning (IBL) on the professional development of beauty and hairdressing practitioners in Taiwan, specifically within the context of beauty and hairdressing education as a part of fashion education. A quasi-experimental design was employed to assess the effectiveness of IBL in improving key areas such as technical skills, creativity, emotional regulation, and stress management. The following section outlines the participants, the intervention, the data collection methods, and the analytical techniques used in this research.

2.1 Participants

The study included 120 participants, equally divided between the experimental group (60 participants) and the control group (60 participants), to ensure sufficient statistical power for detecting medium to large effects. The experimental group participated in a 6-week IBL programme, while the control group received traditional, non-IBL training methods. Participants were recruited from two vocational beauty and hairdressing institutions in Taiwan, which are integral parts of the broader fashion education system, and the sample size was determined through a power analysis, which indicated that 120 participants would provide 80% power.

To be eligible for participation, individuals were required to have at least one year of professional experience in beauty or hairdressing, with no history of severe mental health conditions (such as depression or anxiety), and a willingness to participate in the training programme. Participants were randomly assigned to either the experimental or control group, ensuring an even distribution of age, gender, and years of professional experience across both groups to minimise demographic biases. Furthermore, job roles (e.g., hairstylist versus beautician) were balanced between the groups to facilitate fair comparisons.

2.2 Image-Based Learning Program

The image-based learning programme for the experimental group was designed to enhance technical proficiency, creativity, and emotional regulation. It consisted of three key components: (1) Digital tutorials and video demonstrations, which included high-quality, step-by-step instructional videos showcasing various beauty and hairdressing techniques (such as cutting, colouring, and styling). These

videos acted as visual guides, aimed at improving participants' skills; (2) Virtual simulations, which featured interactive 3D simulations of client interactions and salon scenarios, enabling practitioners to practise techniques in a controlled, simulated environment while also engaging in problem-solving tasks; and (3) Hands-on practice with feedback, where participants applied the techniques demonstrated in the videos and simulations. During these practice sessions, instructors provided real-time feedback, which helped participants refine their technical skills and improve their emotional regulation.

The control group, by contrast, continued with traditional training methods. This involved face-to-face instruction, instructor-led demonstrations, and practicing on mannequins, with no multimedia content incorporated. The traditional methods included practical demonstrations, manual exercises, and basic role-playing activities designed to simulate client interactions, but they lacked the visual and interactive elements available to the experimental group.

2.3 Data Collection

Data were collected at two points in time: before the training programme (pre-test) and immediately after the completion of the 6-week programme (post-test). The following methods and tools were employed to gather the data:

Technical skill assessment

To assess participants' technical proficiency in beauty and hairdressing tasks (such as cutting, styling, and colouring), a practical exam was conducted both before (pre-test) and after (post-test) the 6-week programme. The exam focused on key skills including precision, creativity, and problem-solving. Scoring was based on a detailed rubric, which included categories like precision, creativity, and problem-solving, developed by industry professionals and trained assessors. Multiple assessors participated in the grading process to minimise bias and ensure consistency in the evaluation.

Emotional regulation and stress management

Participants' ability to manage and regulate emotions in high-pressure scenarios was assessed using the Emotional Regulation Questionnaire (ERQ). This tool measures two key dimensions: emotional reactivity and the ability to control emotions. In addition, the K10 Mental Health Scale was employed to assess general psychological distress, including symptoms of anxiety and depression. The K10 scale consists of 10 questions regarding symptoms experienced in the past 30 days, with higher scores indicating greater distress. These assessments were crucial in evaluating participants' emotional resilience and their ability to manage stress.

Attention and focus

Participants' attention was assessed in three categories: visual attention (e.g., focusing on client details), auditory attention (e.g., listening to instructions and client requests), and kinesthetic attention (e.g., performing tasks with physical precision). Instructors rated attention using a Likert scale (1 = not focused, 5 = highly focused) during each session. Objective data collection was also employed using eye-tracking and EEG (electroencephalography) devices to monitor attention levels during task performance. These devices ensured that attention was measured accurately, not solely relying on self-reports, providing a more objective assessment of participants' focus.

Participant self-report

At the conclusion of the 6-week programme, participants completed a survey to assess their satisfaction with the image-based learning programme. This survey measured perceived improvements in technical skills, emotional regulation, and overall engagement with the learning method. Additionally, participants provided qualitative feedback through open-ended questions, sharing challenges or positive experiences they encountered during the learning process. This qualitative data provided valuable insights that were not fully captured by the structured assessments, offering a deeper understanding of participants' experiences with the programme.

Sub-subsection

To assess participants' technical proficiency in beauty and hairdressing tasks (such as cutting, styling, and colouring), a practical exam was conducted both before (pre-test) and after (post-test) the 6-week programme. The exam evaluated key skills such as precision, creativity, and problem-solving. The scoring was based on a detailed rubric developed by industry professionals and trained assessors, ensuring consistency and minimising bias. Multiple assessors were involved in the grading process to ensure fair and reliable evaluation.

2.4 Data Analysis**Descriptive statistics**

Descriptive statistics were calculated to summarise the data and provide a general overview of the results. For all variables, including technical skill scores and emotional regulation scores, mean scores, standard deviations, and ranges were computed. These statistics helped to describe the distribution of the data, offering a clear understanding of participants' performance and the variability in their scores.

Paired samples t-test

A paired samples t-test was conducted to compare pre-test and post-test scores within each group (experimental and control). This analysis aimed to determine whether there were significant changes in technical skills, emotional regulation, and stress management following the intervention. For example, a paired t-test was performed to assess the technical proficiency scores of the experimental group, comparing the pre-test score ($M = 72.3$, $SD = 5.1$) with the post-test score ($M = 81.2$, $SD = 4.4$). The result showed a significant difference, $t(59) = -8.35$, $p < 0.01$.

Independent samples t-test

An independent samples t-test was used to compare post-test scores between the experimental and control groups. This analysis examined whether the experimental group demonstrated significantly greater improvements in technical skills, emotional regulation, and attention compared to the control group. For instance, the independent samples t-test revealed that the experimental group ($M = 81.2$, $SD = 4.4$) scored significantly higher than the control group ($M = 75.4$, $SD = 5.3$) on the technical proficiency post-test, $t(118) = -3.71$, $p < 0.01$.

Effect size

Effect size was calculated to assess the magnitude of the differences between the experimental and control groups, providing insight into the practical significance of the findings. Cohen's d values were used to classify the effect sizes as small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$), which helped to interpret the meaningfulness of the differences observed in the results.

Qualitative analysis of participant feedback

Thematic analysis was performed on the open-ended responses from the survey to identify recurring themes and insights regarding participants' experiences with the image-based learning programme. This qualitative data helped to complement and explain the quantitative findings, offering a deeper understanding of how IBL impacted participants' emotional regulation and skill development within the context of beauty and hairdressing education as part of fashion education. By examining participants' personal feedback, the analysis enriched the study's findings, revealing nuanced aspects of the intervention's effectiveness.

3. RESULTS AND ANALYSIS

This section presents the results of the study, integrating both quantitative assessments and qualitative feedback to evaluate the impact of IBL on the professional development of beauty and hairdressing practitioners in Taiwan. The analysis focuses on four key areas: technical skills, creativity, emotional regulation, and stress management. Additionally, subgroup analyses are conducted to determine whether variables such as gender, professional experience, and job role moderated the effectiveness of the intervention.

Quantitative Results

Improvement in technical skills

The primary objective of the intervention was to enhance participants' technical proficiency in beauty and hairdressing tasks. The results clearly show a substantial improvement among those in the IBL group.

Group	Pre-test mean (SD)	Post-test mean (SD)	Mean difference	t-value	p-value	Cohen's d
Experimental (n=60)	72.3 (5.1)	81.2 (4.4)	+8.9	-8.35	< 0.01	1.12 (large)
Control (n=60)	70.2 (5.7)	74.8 (5.9)	+4.6	-5.10	< 0.01	0.61 (moderate)

The experimental group demonstrated a statistically significant increase in technical skill scores ($p < 0.01$), with a large effect size, indicating that the practical improvements were not only measurable but also meaningful. Although the control group also showed improvement, the gains were considerably smaller. This enhancement suggests that the visual and interactive elements of IBL fostered a more profound understanding of complex techniques, such as colour blending, sectioning precision, and tool handling—skills that traditional methods may not have fully captured or conveyed.

Moderating variables

To determine whether the impact of IBL varied across different practitioner characteristics, we analysed the effects by gender, years of experience, and job role.

Moderator	Subgroup	Pre-test mean	Post-test mean	Difference	p-value	Cohen's d
Gender	Male (n=28)	72.8	81.5	+8.7	<0.01	1.08
	Female (n=32)	71.9	81.0	+9.1	<0.01	1.15
Experience	1–3 years (n=33)	71.2	80.3	+9.1	<0.01	1.21
	>3 years (n=27)	73.5	82.1	+8.6	<0.01	1.05
Job Role	Hairdresser (n=30)	72.6	81.8	+9.2	<0.01	1.17
	Beautician (n=30)	72.0	80.7	+8.7	<0.01	1.09

The findings suggest that IBL was effective across all subgroups, with relatively consistent improvements observed. However, slightly greater benefits were noted among female participants, those with less experience, and those working as hairdressers. This could reflect a higher level of adaptability to new methods among less experienced practitioners, as well as a closer alignment between the content of the IBL programme and the highly visual, sequence-driven nature of hairdressing procedures.

Creativity and problem-solving

The capacity to generate creative solutions and adapt styling approaches is fundamental in beauty-related professions. Participants' creativity was assessed through structured tasks requiring personalised styling responses and problem-solving in simulated client scenarios.

Creativity scores (Pre- and Post-Test)

Group	Pre-Test Mean	Post-Test Mean	Mean Difference	t-value	p-value	Cohen's d
Experimental	65.5	76.4	+10.9	-9.42	< 0.01	1.31 (large)
Control	63.1	68.5	+5.4	-6.21	< 0.01	0.84 (moderate)

Participants in the IBL group showed a marked improvement in creativity, suggesting that visual exemplars and scenario-based learning stimulated more innovative and personalised approaches to service delivery. These gains were more pronounced than those seen in the control group, further supporting the role of IBL in fostering non-linear, adaptive thinking.

Emotional regulation and stress management

Given the emotionally demanding nature of beauty work, improvements in emotional regulation were a major focus of this study. The Emotional Regulation Questionnaire (ERQ) and Kessler Psychological Distress Scale (K10) were employed to measure changes.

Emotional regulation and stress levels

Group	ERQ Pre	ERQ Post	K10 Pre	K10 Post	ERQ Δ	K10 Δ	t-value	p-value	d
Experimental	24.8	34.6	27.1	18.5	+9.8	-8.6	-10.13	< 0.01	1.57 (ERQ)
Control	23.7	27.3	26.3	23.5	+3.6	-2.8	-3.29	< 0.01	0.45 (ERQ)

The data suggests that IBL contributed significantly to emotional resilience, enabling practitioners to manage workplace stress and challenging client interactions more effectively. This is a particularly relevant finding, as burnout remains a persistent issue in customer-facing professions.

3.2 Qualitative Findings

To further support the quantitative findings, participants in the experimental group were invited to provide feedback through open-ended questions, revealing several key themes that highlighted the effectiveness of the IBL programme. A prominent theme was engagement through interactivity—many participants found the visual simulations and video-based scenarios far more immersive and practical than traditional instructional methods. One beautician remarked, “Seeing real situations unfold helped me prepare for things we don’t always get to practise in class,” reflecting the heightened relevance and applicability of the content. Increased confidence also emerged as a significant benefit, with several participants noting how the IBL-based emotional training made them feel more composed and capable when interacting with clients, especially in stressful or high-pressure situations. Furthermore, the reflection and feedback component of the programme was highlighted as particularly valuable. Participants appreciated the opportunity to review their performance through video playback, which allowed them to identify areas for improvement and receive targeted feedback. This process, they noted, contributed significantly to reinforcing their skills and enhancing their confidence in real-world applications. These qualitative responses align closely with the statistical data, underscoring the importance of IBL not only in advancing technical skills but also in fostering emotional growth, thereby making practitioners more adaptable, confident, and resilient in their professional roles.

3.3 Practical Significance

The improvements observed in this study go far beyond just numerical gains; they carry significant real-world implications for beauty and hairdressing professionals. The 8.9-point increase in technical proficiency suggests that practitioners are now more skilled in executing complex tasks with greater precision, which is likely to enhance client satisfaction, reduce complaints, and foster stronger brand loyalty. Additionally, the gains in creativity enable practitioners to offer more personalised and trend-sensitive services, which is crucial for retaining clients in a highly competitive, style-driven market. The improved emotional regulation observed in participants also indicates a reduction in workplace conflicts, less stress-related absenteeism, and greater career sustainability, all of which are essential for long-term success in the profession. Furthermore, the reductions in psychological distress, as indicated by the K10 scale, suggest that IBL may contribute to better mental health outcomes, which are vital in an industry known for its high levels of stress and fatigue. In sum, image-based learning demonstrates clear advantages not only in educational metrics but also in the day-to-day experiences and long-term career prospects of beauty and hairdressing professionals.

3.4 Discussion

The results of this study clearly demonstrate that Image-Based Learning (IBL) has a significant impact on the professional development of beauty and hairdressing practitioners, particularly within the context of fashion education. The improvements observed in technical skills, creativity, emotional regulation, and stress management align with previous research on multimedia learning in vocational education (Lin et al., 2018; Chen & Lee, 2019). These findings suggest that IBL is a more effective approach compared to traditional methods, especially for skills that require practical application, creative thinking, and the ability to respond dynamically to the needs of clients, all of which are critical in fashion-related professions.

Impact on technical skills

The substantial improvement in technical skills within the experimental group indicates that IBL provides a more immersive and engaging learning experience than traditional, face-to-face instruction. The integration of digital tutorials, video demonstrations, and virtual simulations allowed participants to interact with the learning material in ways that traditional methods cannot replicate. This aligns with Mayer's cognitive theory of multimedia learning, which suggests that learning is more effective when information is presented through both visual and verbal channels. The opportunity to practice skills in a virtual environment, receive immediate feedback, and make real-time adjustments likely contributed to the improvements in technical proficiency, particularly in tasks central to beauty and hairdressing, such as precision cutting, styling, and colouring. These skills are fundamental in fashion education, where the application of techniques must reflect current trends and client preferences.

Impact on creativity and problem-solving

IBL also had a significant impact on participants' creativity and problem-solving abilities. The use of multimedia content, particularly virtual simulations, allowed participants to experiment with different approaches to client interactions and service delivery, fostering innovation without the fear of making mistakes. This approach is grounded in constructivist learning theory, which values active learning and experimentation. By offering practitioners the freedom to explore new techniques, IBL enhanced their creativity and problem-solving skills, critical for adapting to the diverse demands of the fashion and beauty industries. In beauty and hairdressing education, where every client poses a unique challenge, this ability to innovate and resolve problems is invaluable for professionals seeking to offer personalised and trend-sensitive services.

Emotional regulation and stress management

One of the most significant improvements observed was in emotional regulation and stress management. These skills are essential in the beauty and hairdressing industry, where professionals frequently deal

with high-pressure client interactions and time-sensitive tasks. IBL provided practitioners with the opportunity to practice emotional regulation strategies in a controlled, virtual environment, helping to build psychological resilience. The ability to manage emotions and stress effectively is crucial for maintaining professionalism, job satisfaction, and overall well-being in the beauty and hairdressing profession, which is a vital component of fashion education. The improved emotional regulation observed in participants suggests that IBL can contribute to reducing burnout and enhancing long-term career sustainability in the fast-paced fashion industry.

Psychological resilience

The reduction in psychological distress observed in the experimental group suggests that IBL can positively influence the mental health of practitioners. The beauty and hairdressing profession is mentally demanding, with professionals often experiencing high levels of stress due to client-facing work and tight schedules. By incorporating emotional regulation and stress management training, IBL offers a holistic approach to professional development, addressing not only the technical skills required in beauty and hairdressing but also the mental well-being of practitioners. This approach has the potential to reduce absenteeism, improve job satisfaction, and contribute to longer career longevity in the beauty and hairdressing sector, which is deeply intertwined with fashion education. Enhancing psychological resilience is crucial for ensuring that practitioners remain adaptable and sustainable in their careers, especially in an industry characterised by rapid trends and constant innovation.

4. CONCLUSION

This study provides compelling evidence of the positive impact of Image-Based Learning (IBL) on the professional skill development of beauty and hairdressing practitioners in Taiwan, particularly within the context of beauty and hairdressing education as part of fashion education. The significant improvements observed in technical skills, creativity, emotional regulation, and stress management highlight IBL's potential as a valuable tool in vocational training for the beauty and hairdressing sector, which is closely integrated into the fashion education system. The findings suggest that IBL not only enhances technical proficiency but also strengthens emotional resilience, leading to improved job performance, higher client satisfaction, and greater career sustainability. Despite these promising results, several areas for future research remain. While the current sample size was sufficient, expanding it could improve the generalisability of the findings. Additionally, the long-term effects of IBL on skill retention, emotional resilience, and career longevity should be explored further in future studies. Longitudinal research would provide valuable insights into the sustained impact of IBL in vocational education within the beauty and hairdressing field, particularly as part of fashion education.

Future research should also aim to explore the broader applicability of IBL across different cultural and geographical contexts and assess its impact over extended periods. It will be crucial to identify specific factors that may moderate its effectiveness, such as technological access or learner characteristics. Furthermore, more detailed statistical analyses could reveal the interplay between various factors influencing professional development, such as gender, years of experience, and job roles. The integration of IBL into ongoing professional development programmes should also be examined in greater depth, as this approach shows promise not only in enhancing technical skills but also in promoting mental health, emotional resilience, and overall career satisfaction among practitioners. Ultimately, the findings from this study suggest that the adoption of IBL could contribute to more sustainable and fulfilling careers in the beauty and hairdressing industry, enabling practitioners to adapt to industry changes while maintaining their well-being and enhancing their professional growth within the framework of fashion education.

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