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Deep Learning Approach in Beauty Education: Strengthening Employability Skills for Sustainable Professional Development

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A B S T R A C T

This study aimed to examine the implementation of the Deep Learning approach in Beauty Education and its contribution to strengthening employability skills for sustainable professional development. A quantitative approach using a quasi-experimental pretest–posttest control group design was employed. The findings revealed that the experimental group showed a significant increase in employability skill scores from 68.42 to 86.31, while the control group improved from 67.95 to 74.28. Statistical analysis using paired sample and independent sample t-tests demonstrated significant differences between both groups ($p < 0.05$). The study found that the Deep Learning approach significantly improved students' communication, critical thinking, collaboration, adaptability, and professional responsibility through authentic and reflective learning experiences.

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INTRODUCTION

The transformation of the global beauty industry in the digital era has significantly changed the competency demands placed upon graduates of vocational and higher education institutions. The beauty sector is no longer limited to conventional cosmetic services but has evolved into a multidisciplinary industry integrating creativity, technology, entrepreneurship, digital communication, and customer-centered services. Consequently, higher education institutions in Beauty Education are expected to produce graduates who are not only technically competent in makeup artistry and beauty services, but also adaptive, innovative, collaborative, and professionally competitive within rapidly changing labor markets (UNESCO, 2024).

However, current realities indicate that a substantial gap still exists between the competencies developed in vocational education and the actual needs of the beauty industry. Recent studies reveal that many beauty education programs continue to emphasize procedural and technical learning while neglecting the development of employability skills such as communication, critical thinking, collaboration, adaptability, and professional problem-solving. This mismatch contributes to graduates' limited readiness to face increasingly competitive and technology-driven professional environments (Darmawang, 2022).

The issue becomes increasingly urgent as the beauty and wellness sector undergoes accelerated digital transformation. The integration of artificial intelligence, digital beauty marketing, online consultation platforms, and data-driven customer services has reshaped workforce expectations across the industry. Modern beauty professionals are now required to possess interdisciplinary competencies combining technical expertise with digital literacy, interpersonal communication, entrepreneurial capability, and reflective professional judgment. Yupelmi (2026) reported that beauty service industries increasingly prioritize graduates with multidisciplinary and adaptive competencies capable of responding to technological change and evolving consumer behavior.

At the same time, labor market trends demonstrate that employability skills have become central indicators of professional success in vocational careers. The World Economic Forum (2023) identified analytical thinking, resilience, creativity, communication, and lifelong learning as the most critical workforce competencies in the contemporary labor market. Similarly, Jackson (2022) emphasized that industries increasingly prioritize adaptive soft skills and transferable competencies over purely technical qualifications.

Within Beauty Education specifically, the challenge is more complex because the profession is fundamentally service-oriented and experience-based. Beauty professionals are expected to maintain professional communication with clients, interpret aesthetic preferences, manage workplace pressure, collaborate within multidisciplinary teams, and continuously adapt to emerging beauty trends and technologies. Nevertheless, conventional instructional approaches in many vocational institutions still rely heavily on demonstration-based and teacher-centered learning models that primarily focus on procedural repetition

and product outcomes rather than reflective understanding and authentic professional engagement (Darmawang, 2022).

Such learning practices tend to produce surface learning, where students focus on completing technical tasks without critically understanding the conceptual, ethical, and professional dimensions underlying their practices. As a result, graduates may demonstrate adequate technical abilities but struggle to apply reflective thinking, communication skills, and adaptive decision-making in real workplace contexts. This condition contributes to the persistent employability gap between vocational graduates and industry expectations.

In response to these challenges, educational transformation in vocational higher education increasingly emphasizes the implementation of innovative pedagogical approaches capable of fostering meaningful learning experiences and sustainable professional competence. One approach receiving growing scholarly attention is the Deep Learning approach. In educational contexts, Deep Learning refers to a learning process that encourages students to critically engage with knowledge, integrate theory with authentic practice, reflect upon learning experiences, and construct meaningful understanding through contextual problem-solving activities (Biggs & Tang, 2022).

Recent studies indicate that Deep Learning significantly contributes to the development of higher-order thinking skills, reflective learning behavior, professional autonomy, and collaborative competence in vocational education environments. Sudira (2026) found that Deep Learning implementation in vocational education enhances students' analytical capabilities, reflective understanding, and readiness for professional environments. Similarly, Turosidah et al. (2026) reported that integrating Deep Learning with project-oriented instruction significantly improved students' professional responsibility, collaboration skills, and critical thinking abilities.

In Beauty Education, the implementation of Deep Learning is highly relevant because beauty practice inherently requires contextual understanding, aesthetic reasoning, interpersonal sensitivity, and reflective professional judgment. Through Deep Learning, students can engage in authentic projects, reflective practice, collaborative learning, and client-centered problem-solving activities that closely mirror professional realities within the beauty industry. Furthermore, Pritasari et al. (2026) emphasized that integrating technology-oriented learning and soft skill development in vocational beauty education can strengthen students' work competence and professional adaptability.

Furthermore, integrating Deep Learning into Beauty Education aligns closely with the global agenda of the Sustainable Development Goals (SDGs), particularly SDG 4 concerning Quality Education and SDG 8 concerning Decent Work and Economic Growth. Higher education institutions are increasingly expected to prepare graduates who are capable of lifelong learning, professional adaptability, and sustainable career development within evolving industrial ecosystems (UNESCO, 2024).

Despite the growing discourse surrounding innovative vocational pedagogy, empirical studies specifically examining the relationship between Deep Learning and employability skills within Beauty Education remain limited,

particularly in the context of vocational higher education in developing countries. Existing research predominantly focuses on technical competency development, entrepreneurship, or industry collaboration, while the pedagogical role of Deep Learning in strengthening employability skills among beauty education students has not been sufficiently explored (Yupelmi, 2026).

Therefore, this study seeks to examine the implementation of the Deep Learning approach in Beauty Education and its contribution to strengthening employability skills for sustainable professional development. This research is expected to contribute both theoretically and practically to the development of innovative vocational learning models capable of preparing adaptive, reflective, and professionally competitive graduates in the contemporary beauty industry.

THEORETICAL REVIEW

Deep Learning Approach in Vocational Education

The transformation of vocational higher education in the digital and industrial era has shifted the educational paradigm from content transmission toward meaningful, reflective, and competency-oriented learning. Within this context, the *Deep Learning* approach has gained increasing scholarly attention because it encourages students to develop conceptual understanding, critical reflection, contextual reasoning, and authentic problem-solving abilities rather than merely memorizing procedural knowledge.

In educational discourse, *Deep Learning* refers to a learning approach that emphasizes understanding, interpretation, integration of knowledge, and reflective thinking. Students engaged in deep learning tend to connect theoretical concepts with practical experiences, critically analyze problems, and construct meaning from learning activities. This approach contrasts with *surface learning*, which focuses primarily on rote memorization and task completion without conceptual comprehension. Recent educational reforms increasingly advocate deep learning as an essential pedagogical strategy for preparing students to face complex professional and societal challenges in the twenty-first century

In vocational education, the implementation of Deep Learning is particularly relevant because vocational institutions are expected to produce graduates who possess not only technical expertise but also adaptive, analytical, and professional competencies. Vocational learning environments require students to integrate cognitive, psychomotor, and affective dimensions simultaneously. Therefore, learning approaches that promote reflective practice and authentic experiences become essential in strengthening professional readiness. Recent studies demonstrate that Deep Learning significantly contributes to the improvement of vocational competencies and professional adaptability. Research conducted by Turosidah et al. (2026) revealed that the integration of Deep Learning and project-oriented instruction in vocational education improved students' professional responsibility, collaborative skills, and critical thinking abilities. Students became more engaged in reflective learning processes and demonstrated stronger connections between theoretical understanding and practical implementation in professional contexts.

Similarly, Sudira (2026) emphasized that Deep Learning in vocational education fosters meaningful learning experiences through authentic activities,

reflective analysis, and contextual problem-solving. The study highlighted that students who experienced deep learning environments showed greater learning autonomy, stronger analytical capabilities, and better preparedness for workplace challenges.

These findings indicate that Deep Learning has strong potential for implementation in Beauty Education, where professional practice requires not only technical mastery but also creativity, communication, ethical awareness, and service-oriented competencies.

Employability Skills in Beauty Education

The rapid growth of the global beauty and creative industries has transformed the competency demands placed upon graduates of beauty education programs. Modern beauty industries no longer prioritize technical expertise alone; instead, they increasingly value graduates who possess strong *employability skills*, including communication, teamwork, adaptability, creativity, and professional ethics. Employability skills refer to transferable competencies that enable individuals to obtain employment, sustain professional careers, and adapt to evolving workplace demands. These skills encompass communication abilities, collaboration, critical thinking, problem-solving, leadership, self-management, and lifelong learning capacities. In vocational higher education, employability skills are considered strategic competencies because professional success depends not only on technical proficiency but also on interpersonal and adaptive abilities.

The Organisation for Economic Co-operation and Development (OECD) emphasized that twenty-first-century vocational education must integrate technical competencies with social, cognitive, and digital skills to meet the changing needs of industries and labor markets.

In Beauty Education, employability skills are particularly significant because the profession is highly service-oriented and client-centered. Beauty professionals are expected to communicate effectively with clients, demonstrate emotional intelligence, manage professional relationships, maintain ethical conduct, and adapt to rapidly changing beauty trends and technologies.

Recent research by Rusmiyati et al. (2026) demonstrated that employability skill development in vocational education is strongly influenced by authentic learning experiences, industry-based projects, collaborative learning, and innovative pedagogical practices. The study concluded that learning environments emphasizing reflective engagement and contextual practice significantly improve students' workplace readiness.

Furthermore, the digitalization of beauty services and the expansion of the creative economy have increased the need for graduates who are capable of integrating technological literacy, entrepreneurial thinking, and professional adaptability into their practice. Consequently, Beauty Education institutions are required to redesign learning systems that not only develop practical competencies but also strengthen holistic professional capabilities.

Relationship Between Deep Learning and Employability Skills

Theoretically, Deep Learning is closely associated with the development of employability skills because both emphasize active engagement, reflective thinking, contextual understanding, and authentic problem-solving. Through Deep Learning, students are encouraged to critically analyze professional situations, develop innovative solutions, reflect upon their experiences, and communicate ideas effectively within collaborative environments.

Deep Learning environments facilitate the development of higher-order thinking skills, including analytical reasoning, creativity, adaptability, and professional judgment. These competencies directly support employability skills required in contemporary workplaces.

Recent educational studies have shown that reflective and authentic learning experiences contribute significantly to the strengthening of students' employability competencies. Students engaged in Deep Learning approaches tend to demonstrate stronger communication abilities, collaborative attitudes, self-management skills, and professional confidence compared to those experiencing traditional teacher-centered instruction.

Additionally, the World Economic Forum (2023) identified analytical thinking, creativity, resilience, leadership, and lifelong learning as the most essential future workforce competencies. These findings reinforce the importance of integrating Deep Learning approaches into vocational education systems to prepare students for dynamic and uncertain professional environments. Within Beauty Education, Deep Learning can strengthen employability skills through reflective practice, client-based simulations, collaborative projects, and contextual case analyses. Such learning experiences allow students to develop professional identities, ethical awareness, interpersonal competencies, and adaptive capacities essential for sustainable career development in the beauty industry.

Deep Learning, Sustainable Education, and SDGs

The implementation of Deep Learning in vocational education also aligns strongly with the global agenda of the *Sustainable Development Goals* (SDGs), particularly SDG 4 concerning *Quality Education* and SDG 8 concerning *Decent Work and Economic Growth*.

SDG 4 emphasizes the importance of inclusive, equitable, and quality education that promotes lifelong learning opportunities. Deep Learning supports this objective by encouraging meaningful learning, critical reflection, creativity, and learner-centered pedagogical practices. Rather than focusing solely on academic achievement, Deep Learning promotes holistic competency development that prepares students for continuous professional growth.

Meanwhile, SDG 8 highlights the importance of productive employment, professional competence, and sustainable economic participation. In vocational higher education, strengthening employability skills through innovative pedagogical approaches contributes directly to improving graduates' career readiness and adaptability within evolving labor markets.

Recent educational reforms increasingly recognize that sustainable professional development requires graduates who are not only technically

competent but also reflective, adaptive, collaborative, and capable of lifelong learning. Therefore, integrating Deep Learning into Beauty Education represents a strategic effort to support sustainable education and workforce development in the beauty and creative industries.

METHODOLOGY

This study employed a quantitative approach using a quasi-experimental design with a *pretest–posttest control group design*. The study aimed to examine the effectiveness of the Deep Learning approach in strengthening employability skills among students in Beauty Education programs. The quasi-experimental design was selected because the research was conducted in an authentic educational setting where random assignment of participants was not fully possible (Creswell & Creswell, 2023). The research involved two groups: an experimental group that received learning through the Deep Learning approach and a control group that received conventional instructional methods commonly implemented in beauty practice courses. Both groups completed pretest and posttest assessments to measure changes in employability skills after the learning intervention.

Research Participants

The participants of this study were undergraduate students enrolled in the Beauty Education Study Program at a public university in Indonesia. The participants were selected purposively from students taking the Traditional Bridal Makeup course because the course integrates practical competencies, communication, collaboration, and professional service skills that are closely related to employability competencies in the beauty industry.

A total of 60 students participated in the study, consisting of 30 students in the experimental group, and 30 students in the control group. The participants had relatively similar academic backgrounds and practical learning experiences before the implementation of the study.

Learning Intervention

The experimental group participated in learning activities designed using the Deep Learning approach for one academic semester. The learning process emphasized:

1. reflective learning activities;
2. authentic beauty practice projects;
3. collaborative learning;
4. client-based problem-solving;
5. critical discussion and feedback;
6. integration of theoretical understanding with professional practice.

Students were encouraged to analyze beauty cases, reflect on practical experiences, discuss professional challenges, and develop contextual solutions related to beauty services and client needs. Meanwhile, the control group received conventional instruction dominated by demonstration-based learning,

procedural practice, and lecturer-centered explanations without structured reflective activities.

Research Variables

Independent Variable: Deep Learning Approach

Dependent Variable: Employability Skills

The employability skills examined in this study included:

a) communication skills;
b) teamwork and collaboration;
c) critical thinking;
d) problem-solving ability;
e) self-management;
f) professional responsibility;
g) adaptability.

Instruments

Data were collected using several instruments to obtain comprehensive information regarding students' employability skills.

1. Employability Skills Questionnaire

Structured questionnaire was developed based on employability skill indicators adapted from Jackson (2022) and the World Economic Forum (2023). The questionnaire used a five-point Likert scale ranging from strongly disagree to strongly agree.

2. Observation Sheet

Observation sheets were used to assess students' professional behavior, communication, collaboration, and participation during beauty practice activities.

3. Reflective Learning Journa

Students in the experimental group completed reflective journals to document learning experiences, professional insights, challenges encountered, and problem-solving strategies throughout the learning process.

4. Project Assessment Rubric

A project rubric was used to evaluate students' performance in authentic beauty projects, including technical execution, teamwork, creativity, communication, and professionalism.

Before implementation, all instruments were validated by experts in vocational education and beauty education to ensure content validity and clarity.

Data Collection Procedure

The study was conducted through the following stages:

1. Pretest Stage

At the beginning of the semester, both groups completed the employability skills questionnaire to identify students' initial competency levels.

2. Learning Implementation Stage

The experimental group received learning through the Deep Learning approach, while the control group received conventional learning instruction over approximately 14 weeks.

3. Observation and Documentation

During the intervention, researchers conducted classroom observations and collected reflective journals and project documentation.

4. Posttest Stage

At the end of the learning period, both groups completed the posttest questionnaire to measure changes in employability skills after the intervention.

Data Analysis

The collected quantitative data were analyzed using descriptive and inferential statistical techniques with the assistance of SPSS software.

The analysis procedures included:

1. descriptive statistics to determine the mean and standard deviation of employability skill scores;
2. normality and homogeneity tests to ensure statistical assumptions;
3. paired sample *t-test* to analyze differences between pretest and posttest scores within groups;
4. independent sample *t-test* to compare employability skill improvements between the experimental and control groups.

Meanwhile, qualitative data from reflective journals and observations were analyzed descriptively to support the interpretation of quantitative findings.

Ethical Considerations.

This study followed academic ethical principles throughout the research process. All participants voluntarily agreed to participate and were informed about the objectives of the study. Confidentiality and anonymity of participants' data were maintained, and the research was conducted solely for academic purposes.

RESULTS

Improvement of Employability Skills

The findings of this study indicate that the implementation of the Deep Learning approach in Beauty Education contributed positively to the improvement of students' employability skills. Based on the pretest and posttest results, students in the experimental group demonstrated a significantly higher increase in employability skill scores compared to students in the control group. Before the intervention, both groups showed relatively similar levels of employability skills. The average pretest score of the experimental group was 68.42, while the control group obtained an average score of 67.95. After the implementation of the Deep Learning approach for one semester, the average posttest score of the experimental group increased to 86.31, whereas the control group showed a smaller increase with an average score of 74.28.

Statistical analysis using the paired sample *t-test* revealed a significant improvement in employability skills within the experimental group ($p < 0.05$). Furthermore, the independent sample *t-test* showed significant differences between the experimental and control groups after the intervention, indicating

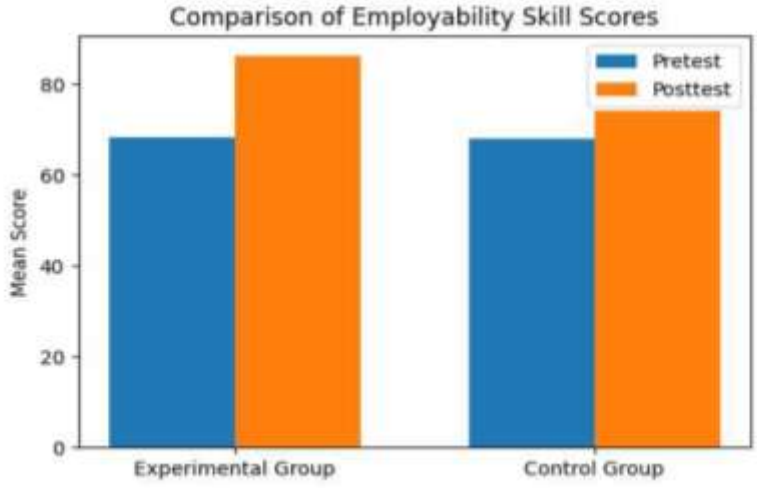
that the Deep Learning approach had a measurable effect on strengthening students' employability competencies.

Tabel 1. Table and Visual Representation of Employability Skill Results

Table and Visual Representation of Employability Skill Results

Group	Pretest Mean	Posttest Mean	Improvement
Experimental Group	68.42	86.31	17.89
Control Group	67.95	74.28	6.33

Figure 1. Comparison of Pretest and Posttest Employability Skill Scores between Experimental and Control Groups.



The improvement occurred across several employability skill indicators, particularly:

1. communication skills;
2. teamwork and collaboration;
3. critical thinking;
4. problem-solving ability;
5. professional responsibility;
6. adaptability and self-management.

Among these indicators, communication and critical thinking showed the highest level of improvement during the learning process.

Communication Skills

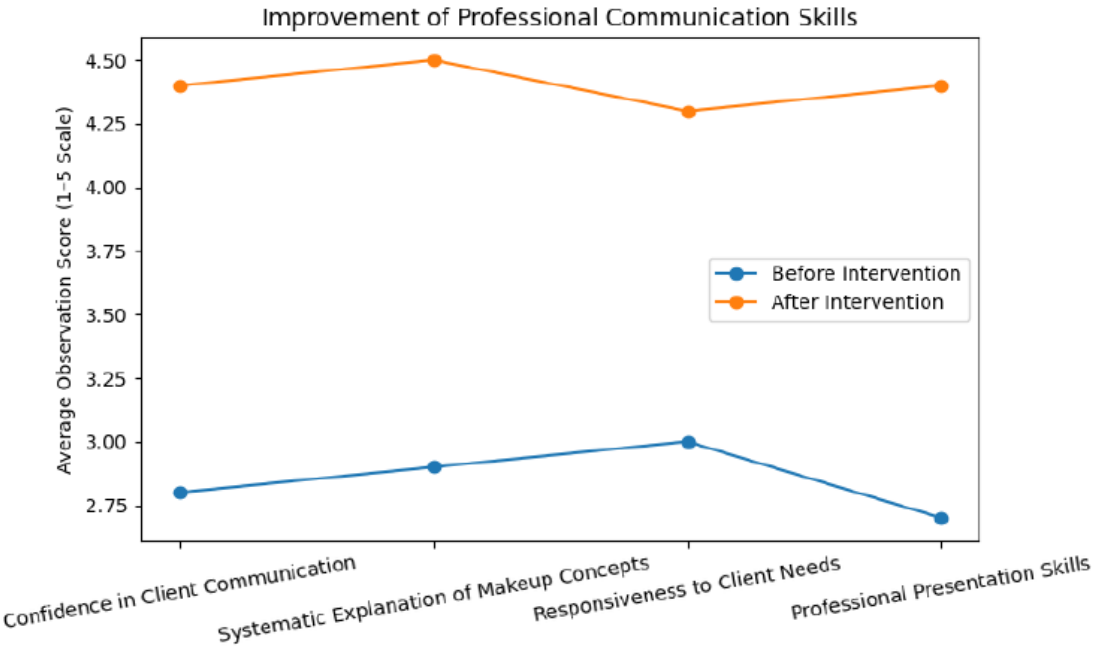
Observation results showed that students in the experimental group became more confident and professional in communicating during beauty practice sessions. Students were able to explain makeup concepts more systematically, respond to client needs more appropriately, and present project results using professional language.

Tabel 2. Visual Table of Communication Skill Improvements in Beauty Practice Sessions

Visual Table of Communication Skill Improvements in Beauty Practice Sessions

Communication Indicators	Before Intervention	After Intervention
Confidence in Client Communication	2.8	4.4
Systematic Explanation of Makeup Concepts	2.9	4.5
Responsiveness to Client Needs	3.0	4.3
Professional Presentation Skills	2.7	4.4

Figure 1. Observation results demonstrating improvements in students' professional communication competencies during beauty practice sessions after the implementation of the Deep Learning approach.



Reflective journals also revealed that students became more aware of the importance of interpersonal communication in beauty services. Several students stated that collaborative discussions and client-based simulations helped them improve their confidence when interacting with others. Meanwhile, students in the control group tended to focus primarily on technical practice and demonstrated less active communication during learning activities.

Critical Thinking and Problem-Solving Ability

The Deep Learning approach encouraged students to analyze beauty cases critically and make contextual decisions during practical activities. Students in the experimental group demonstrated better abilities in selecting makeup techniques, adapting beauty concepts to client characteristics, and solving technical challenges during projects.

In this case, students were able to modify bridal makeup designs according to skin conditions, cultural themes, and client preferences rather than merely replicating examples demonstrated by lecturers.

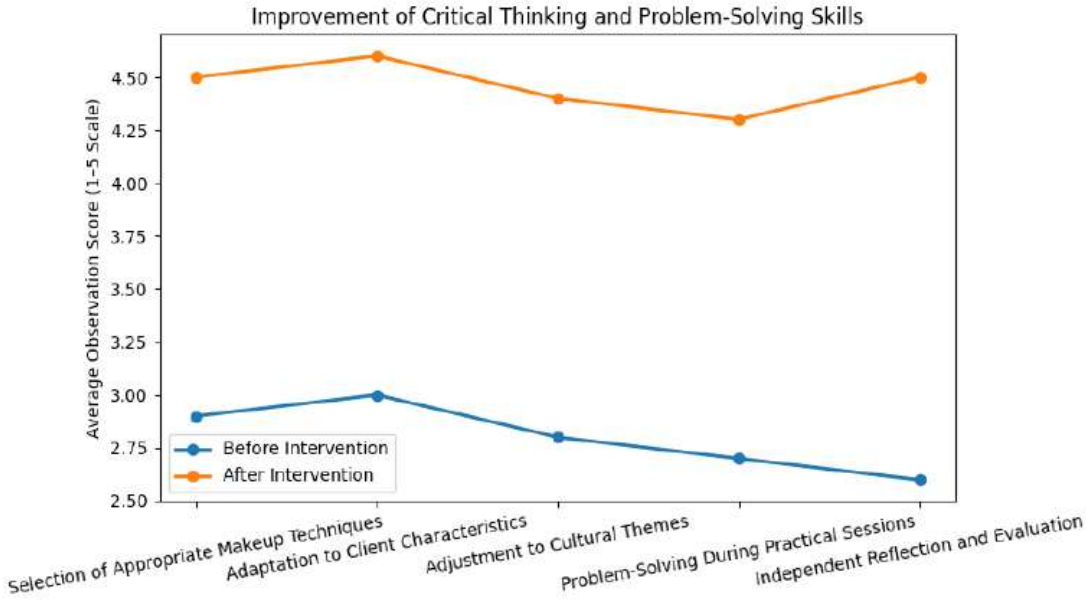
The reflective learning process also enabled students to evaluate mistakes, identify weaknesses, and develop alternative solutions independently.

Tabel 3. Visual Representation of Critical Thinking and Problem-Solving Improvements

Visual Representation of Critical Thinking and Problem-Solving Improvements

Indicators	Before Deep Learning	After Deep Learning
Selection of Appropriate Makeup Techniques	2.9	4.5
Adaptation to Client Characteristics	3.0	4.6
Adjustment to Cultural Themes	2.8	4.4
Problem-Solving During Practical Sessions	2.7	4.3
Independent Reflection and Evaluation	2.6	4.5

Figure 1. Observation results demonstrating improvements in students' critical thinking and contextual problem-solving abilities after the implementation of the Deep Learning approach in Beauty Education.



Teamwork and Collaboration

Students participating in Deep Learning activities showed stronger collaborative behavior during project implementation. Group discussions, peer feedback sessions, and collaborative beauty projects encouraged students to negotiate ideas, divide responsibilities, and coordinate tasks more effectively. Observation findings indicated that students became more respectful of different opinions and more capable of managing teamwork challenges professionally.

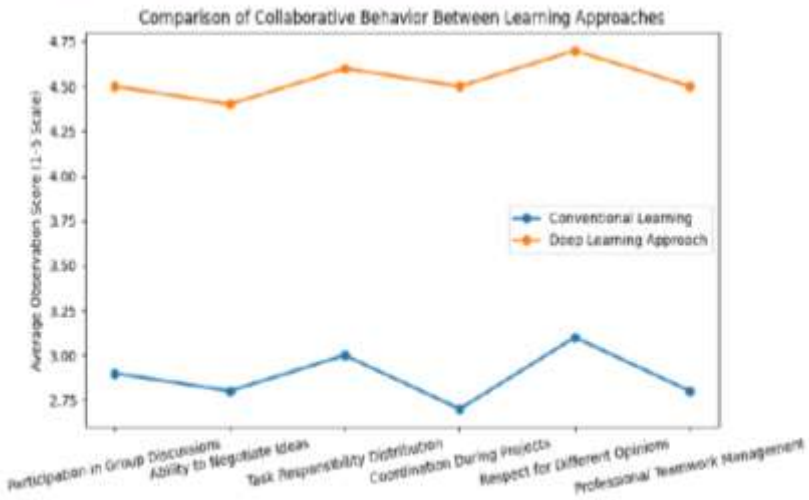
By contrast, students in the conventional learning environment tended to work individually and depended heavily on lecturer instructions.

Tabel 4. Visual Representation of Collaborative Behavior in Deep Learning Activities

Visual Representation of Collaborative Behavior in Deep Learning Activities

Collaboration Indicators	Conventional Learning	Deep Learning Approach
Participation in Group Discussions	2.9	4.5
Ability to Negotiate Ideas	2.8	4.4
Task Responsibility Distribution	3.0	4.6
Coordination During Projects	2.7	4.5
Respect for Different Opinions	3.1	4.7
Professional Teamwork Management	2.8	4.5

Figure 1. Comparison of students' collaborative behavior between the Deep Learning approach and conventional learning environments during beauty project implementation



Professional Responsibility and Adaptability

The findings also revealed improvements in students' professional attitudes, including punctuality, discipline, accountability, and adaptability. Students in the experimental group demonstrated greater responsibility in completing projects, preparing tools and materials, and maintaining professional standards during beauty practice sessions.

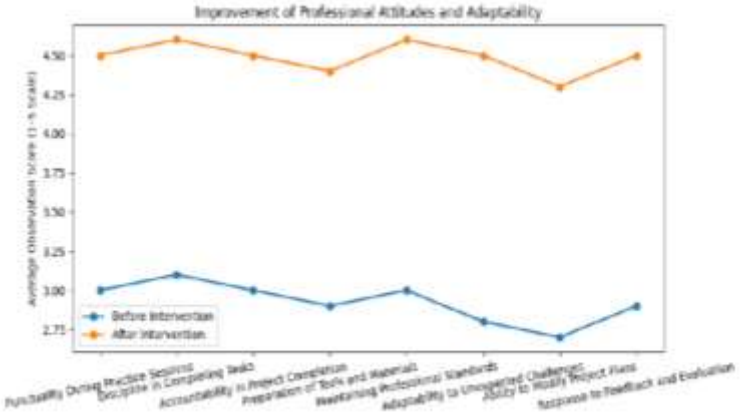
Additionally, students became more adaptive when facing unexpected challenges during practical activities. They were able to adjust techniques, modify project plans, and respond more calmly to feedback and evaluation.

Table. 5 Visual Representation of Professional Attitudes and Adaptabillity Improvements

Visual Representation of Professional Attitudes and Adaptability Improvements

Professional Attitude Indicators	Before Deep Learning	After Deep Learning
Punctuality During Practice Sessions	3.0	4.5
Discipline in Completing Tasks	3.1	4.6
Accountability in Project Completion	3.0	4.5
Preparation of Tools and Materials	2.9	4.4
Maintaining Professional Standards	3.0	4.6
Adaptability to Unexpected Challenges	2.8	4.5
Ability to Modify Project Plans	2.7	4.3
Response to Feedback and Evaluation	2.9	4.5

Figure 1. Observation results showing improvements in students' professional attitudes, responsibility, and adaptability after the implementation of the Deep Learning approach in Beauty Education.



DISCUSSION

The findings of this study confirm that the Deep Learning approach contributes significantly to strengthening employability skills among students in Beauty Education. The improvement observed in communication, critical thinking, collaboration, and professional responsibility indicates that meaningful and reflective learning experiences can support students' professional readiness more effectively than conventional procedural instruction.

These findings align with the theory proposed by Biggs and Tang (2022), who emphasized that Deep Learning promotes conceptual understanding, reflective thinking, and meaningful engagement with learning experiences. Students involved in Deep Learning environments tend to develop higher-order cognitive abilities because they actively construct knowledge rather than passively receive information.

In this study, students were not merely trained to imitate makeup procedures demonstrated by lecturers. Instead, they were encouraged to analyze beauty cases, reflect on client needs, evaluate practical decisions, and connect theoretical concepts with authentic professional situations. This learning process enabled students to develop a deeper understanding of beauty practice as a professional and service-oriented discipline.

The improvement in communication skills observed in this study also supports the findings of Jackson (2022), who argued that employability development in higher education depends strongly on authentic learning

experiences and interpersonal engagement. Beauty services fundamentally require effective communication because beauty professionals interact directly with clients, interpret aesthetic expectations, and provide personalized services.

The findings further demonstrate that collaborative and reflective learning activities contribute significantly to students' confidence and interpersonal competence. Students became more capable of presenting ideas, discussing professional issues, and responding constructively to feedback during project activities. These outcomes indicate that Deep Learning can facilitate the development of professional communication competencies that are highly relevant to workplace environments.

The enhancement of critical thinking and problem-solving abilities is also consistent with previous vocational education studies. Sudira (2026) reported that Deep Learning encourages students to engage in reflective analysis and contextual reasoning when solving authentic professional problems. Similarly, Turosidah et al. (2026) found that integrating reflective and project-oriented learning activities significantly improves vocational students' analytical and professional competencies. In the context of Beauty Education, critical thinking is particularly important because beauty professionals frequently encounter diverse client characteristics, aesthetic preferences, and situational challenges. The ability to adapt makeup techniques, evaluate beauty concepts critically, and solve practical problems creatively represents an essential component of professional competence in the beauty industry.

Another important finding of this study concerns the improvement of teamwork and collaboration. The collaborative learning process embedded within the Deep Learning approach allowed students to experience authentic social interaction similar to professional workplace settings. This finding supports OECD (2023), which emphasized that modern vocational education should integrate collaborative competence and social interaction as fundamental employability skills required in contemporary industries. Furthermore, the improvement in professional responsibility and adaptability demonstrates that Deep Learning not only influences cognitive competencies but also contributes to the development of professional attitudes and self-management abilities. Reflective learning activities encouraged students to become more aware of discipline, accountability, and professional ethics during practical activities.

From the perspective of sustainable professional development, the findings of this study also demonstrate strong relevance to the Sustainable Development Goals (SDGs), particularly SDG 4 concerning Quality Education and SDG 8 concerning Decent Work and Economic Growth. The Deep Learning approach supports the creation of meaningful and student-centered learning experiences capable of preparing graduates for sustainable career development within evolving professional environments. Despite these positive findings, several challenges were identified during the implementation process. Some students initially experienced difficulties adapting to reflective learning activities because they were more familiar with teacher-centered instructional approaches. Additionally, the implementation of Deep Learning required longer instructional

time, intensive feedback, and active lecturer facilitation to ensure meaningful engagement throughout the learning process.

Nevertheless, the overall findings indicate that the Deep Learning approach represents a highly relevant pedagogical strategy for Beauty Education in the contemporary era. By integrating reflective learning, authentic practice, collaboration, and contextual problem-solving, Beauty Education programs can better prepare graduates who are adaptive, reflective, and professionally competitive within the rapidly evolving beauty industry.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that the implementation of the Deep Learning approach in Beauty Education significantly strengthens students' employability skills and supports sustainable professional development in the contemporary beauty industry. Students who participated in Deep Learning-based activities demonstrated greater improvement in communication, critical thinking, collaboration, adaptability, professional responsibility, and self-management compared to those experiencing conventional learning approaches. The integration of reflective learning, authentic beauty projects, collaborative discussion, and contextual problem-solving created meaningful learning experiences that connected theoretical understanding with professional practice. Through these activities, students developed not only technical competencies in beauty services but also interpersonal communication, analytical reasoning, and professional decision-making skills required in service-oriented professions. Students became more capable of responding to client needs, adapting beauty concepts to various contexts, collaborating effectively with peers, and solving practical challenges independently.

The findings also indicate that Deep Learning encourages reflective awareness and professional maturity among students. Reflective journals and project-based activities enabled students to evaluate their own performance, identify weaknesses, and develop alternative solutions during practice sessions.

Overall, this study confirms that employability skills are more effectively developed through authentic, student-centered, and reflective learning approaches. Therefore, integrating Deep Learning into Beauty Education can serve as an innovative pedagogical strategy for preparing adaptive, reflective, and professionally competitive graduates while supporting Sustainable Development Goals related to Quality Education and Decent Work**.**

FURTHER STUDY

Further research is recommended to expand the scope of this study by involving larger and more diverse samples from different educational institutions and regions. Future studies may also examine the long-term effectiveness of deep learning approaches in enhancing employability skills and professional competencies among beauty education students. In addition, researchers are encouraged to explore the integration of emerging technologies, such as artificial intelligence and digital learning platforms, to support sustainable professional development and career readiness in the beauty industry. Comparative studies across vocational disciplines may also provide

broader insights into the applicability and effectiveness of deep learning-based educational strategies.

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