Vol. 7, No. 1, 2026, pp. 714-722
DOI: https://doi.org/10.29210/08jces696500

Contents lists available at Journal ELORA

Journal of Counseling, Education and Society
ISSN: 2716-4896 (Print) , ISSN 2716-4888 (Electronic)

Journal homepage: https://jces.eloracenter.org/jces



Ibis paint to improve digital design skills, creativity, and visual communication in vocational fashion education: a systematic review

Emha Basma Lazuwara Hasbi Nabila, Ratna Suhartini*), Deny Arifiana
Master's Program in Vocational and Technical Education, Graduate School, State University of Surabaya, Indonesia

Article Info

Article history:

Received Sept 06th, 2026
Revised Oct 08th, 2026
Accepted Nov 04th, 2026

Keyword:

Ibis paint X,
Fashion design skills,
Creativity,
Visual communication,
Vocational education,
Systematic literature review

ABSTRACT

Digital tools are increasingly used in vocational fashion education to support technical design skills, creative exploration, and the communication of design concepts. This systematic literature review synthesizes 25 studies mapped in the submitted manuscript and reported through a PRISMA 2020 flow diagram. The review examines digital fashion-design practices, creativity, and visual communication, with Ibis Paint X treated as one application-specific case rather than the sole theoretical focus. The synthesis indicates three connected processes: application skills support the production and refinement of digital illustrations; creative thinking supports originality, flexibility, and elaboration; and visual communication depends on how clearly the resulting illustration conveys design concepts. Evidence directly concerning Ibis Paint is concentrated in a small group of studies, while other publications address broader digital design, artificial intelligence, and vocational learning. One reported one-group study involving nine students showed an increase in mean scores from 51.1 to 91.1, but its design and small sample do not establish a causal effect. The review therefore proposes a conceptual pathway linking technical execution, creative development, and visual message clarity. The findings support teaching that combines guided application practice, iterative design exploration, and assessment of both process and visual outcomes.

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Corresponding Author:

Ratna Suhartini,
Master's Program in Vocational and Technical Education, Graduate School, Universitas Negeri Surabaya
Email: ratnasuhartini@unesa.ac.id

Introduction

Digital technologies have expanded the ways fashion-design concepts are developed, represented, revised, and shared in vocational education. Alongside conventional manual drawing techniques, learners increasingly encounter digital tools that enable them to explore visual elements, experiment with different design possibilities, revise illustrations, and produce design outputs in editable formats. These technologies provide greater flexibility during the design process because students can modify shapes, colors, textures, and other visual components without having to reproduce the entire illustration from the beginning. In vocational learning, the educational value of these tools should not be reduced to the ability to operate an application or recognize its technical features. More importantly, students need to understand how digital functions can be applied to develop design ideas, solve visual problems, and communicate design concepts effectively. Therefore, digital competence

involves not only technical proficiency but also the ability to integrate technological knowledge with creative thinking and practical design activities. Research on digital fashion-design competence in vocational schools highlights the need to strengthen both teacher and student readiness to adopt digital design practices as part of the learning process (Ruhidawati et al., 2025).

Digital illustration applications such as Ibis Paint X provide various functions—including canvas configuration, brushes, layers, color selection, and image editing—that can support the production and refinement of fashion illustrations. These features allow students to develop initial sketches, improve line quality, apply color combinations, and make adjustments to visual details more efficiently. The use of digital illustration applications may also encourage students to become more independent in exploring design alternatives because changes can be made repeatedly throughout the production process. Prior work has examined the development of digital fashion-illustration media using Ibis Paint X and reported high feasibility assessments from media and subject-matter experts (Sholikhah et al., 2023). Sudiarsana et al. (2023) also described stages of digital painting instruction that include familiarization with application features, sketching, line refinement, and coloring. These stages illustrate that digital illustration requires a gradual learning process, beginning with an understanding of technical functions and progressing toward the production of more complete visual works. Although these studies are relevant to the technical dimension of digital design, their focus on application use or instructional-media feasibility does not by itself explain how technical proficiency connects with creativity, the development of design ideas, and visual communication.

Creativity is a further component of fashion design because students are expected to generate original ideas, consider alternative solutions, and elaborate visual details in accordance with a particular design concept. In this context, creativity is reflected not only in the uniqueness of the final illustration but also in the process through which students explore colors, shapes, patterns, proportions, and other visual elements. Digital applications can provide opportunities for such exploration because students can experiment with different combinations and revise their work during the design process. Indriati et al. (2025) discussed the use of Ibis Paint in supporting students' creativity, including originality, flexibility, color exploration, and elaboration. These dimensions indicate that digital illustration activities may provide opportunities for students to express ideas and develop visual alternatives rather than merely reproduce predetermined examples. A separate study by Jannah et al. (2025) reported an increase in mean learning scores from 51.1 to 91.1 among nine students following an Ibis Paint-based learning activity. This finding provides an indication of the potential contribution of application-supported learning to students' learning outcomes. However, because the study used a one-group pretest–posttest design without a comparison group, the score change cannot be attributed exclusively to the application. Testing effects, maturation, instructional support, and other contextual factors remain possible explanations. Consequently, the findings need to be interpreted cautiously and considered alongside evidence from studies examining other dimensions of digital fashion-design learning.

Fashion illustration also functions as a means of visual communication through which design ideas are transformed into visual representations that can be understood by others. A fashion design is not successful only because it is technically polished or aesthetically attractive; it must also convey the intended concept through recognizable forms, proportions, colors, textures, and details. The arrangement of these visual elements helps communicate the characteristics, purpose, and overall identity of a design. In vocational education, students therefore need to develop the ability to make visual decisions that are consistent with the concepts they intend to communicate. The literature cited in the submitted manuscript positions fashion illustration as a communicative medium through which design concepts can be represented (Ademtsu et al., 2024). This perspective emphasizes that illustration involves more than the production of images because it also requires students to organize visual information and translate abstract ideas into recognizable forms. Accordingly, digital design skills, creativity, and visual communication can be understood as interconnected dimensions: digital skills enable visual production, creative processes shape and enrich the content of the design, while visual communication concerns the clarity and effectiveness with which the final work conveys the intended message.

Unlike previous studies that primarily examined Ibis Paint-based instructional media, application implementation, or students' creativity as separate topics, this review synthesizes digital design skills, creative processes, and visual communication as related dimensions of vocational fashion-design learning. This integrated perspective is important because the development of fashion-design competence requires students to move beyond the operational use of digital applications toward the production of meaningful, original, and communicative visual works. Examining these dimensions together also provides an opportunity to identify how technical capabilities and creative activities contribute to the quality of students' fashion illustrations. The application name is therefore retained as an example within the wider field of digital design tools, not as a claim that one proprietary application is inherently superior to other platforms. The review aims to (1) map how digital tools are used to develop fashion-design skills in vocational education; (2) synthesize how digital design practices

relate to creativity; and (3) formulate a conceptual explanation of how technical and creative processes may support visual communication in fashion illustration. Through these objectives, the review is expected to provide a broader understanding of the relationship between digital technology, creativity, and visual communication in vocational fashion-design learning.

Method

Research Design

This study uses a systematic literature review (SLR) approach and reports the study-selection process with reference to the PRISMA 2020 statement (Page et al., 2021). The purpose is to identify and synthesize research relevant to digital fashion-design skills, creativity, and visual communication in vocational or related design-education contexts. The synthesis is thematic and follows the stages of familiarization with the studies, coding relevant findings, grouping codes into descriptive themes, and developing analytical relationships among themes (Thomas & Harden, 2008).

Research Questions

The research questions were developed based on three main constructs: Ibis Paint-based fashion design ability, creativity, and visual communication. Formulating research questions is essential to ensure consistency among the review objectives, search strategy, article selection, and synthesis process. Page et al. (2021) emphasized the importance of establishing clear objectives and eligibility criteria when conducting a systematic review.

Table 1. Research Questions

Code	Research question
RQ1	How are digital design tools used to develop fashion-design skills in vocational education?
RQ2	How are digital design practices associated with creativity in the fashion-design process?
RQ3	Through what processes may technical design skills and creativity contribute to visual communication in fashion illustration?

Search Strategy and Study Selection

The manuscript reports a final corpus of 25 articles and includes a PRISMA flow diagram. As represented in the diagram, 165 records were identified, 28 duplicates were removed, 137 records were screened, 92 were excluded at title/abstract screening, 45 full-text reports were sought, five reports were not retrieved, 40 full-text reports were assessed, 15 were excluded with reasons, and 25 studies were included. These counts are transcribed from the flow diagram supplied in the original manuscript.

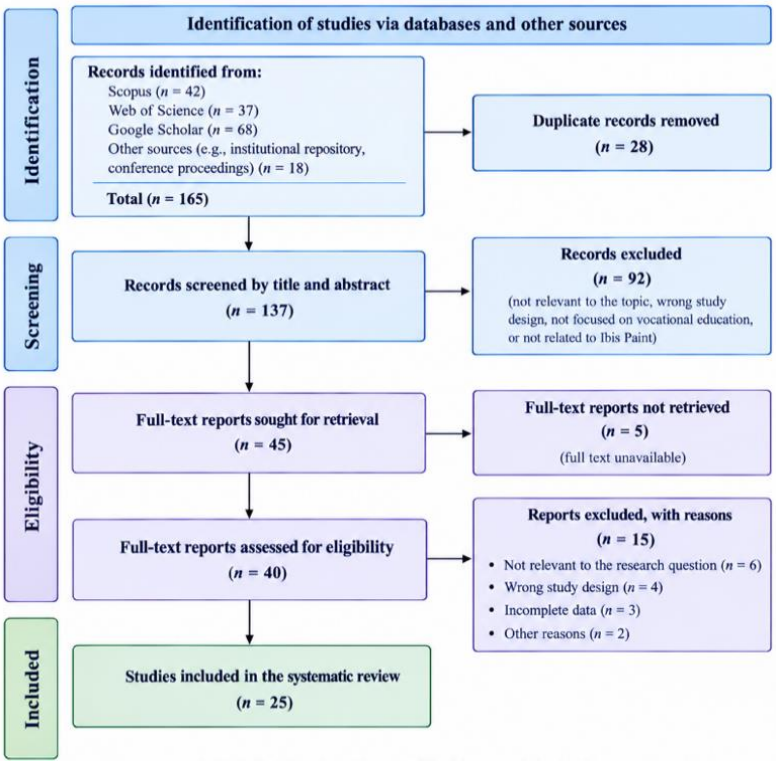


Figure 1. PRISMA 2020 Flow Diagram of the Literature Selection Process.

The search concepts represented in the original manuscript cover Ibis Paint, digital fashion design, creativity, visual communication, digital drawing, and vocational education. The Boolean combinations are presented in Table 2. They should be reported as the actual strings used in each database, with syntax adjusted to the database interface.

Search Strings

Table 2. Literature Search Strings

Search focus	Boolean search string
Ibis Paint and fashion design	"Ibis Paint" AND "Fashion Design"
Digital design and creativity	"Digital Fashion Design" AND "Creativity"
Fashion design and visual communication	"Fashion Design" AND "Visual Communication"
Digital drawing and vocational education	"Digital Drawing" AND "Vocational Education"
Integrated constructs	("Ibis Paint" OR "Digital Fashion Illustration") AND ("Creativity" OR "Creative Skills") AND ("Visual Communication" OR "Fashion Design")

Eligibility Criteria

The eligibility criteria were intended to retain publications that directly addressed at least one of the review constructs and provided sufficient information for thematic extraction. Table 3 clarifies the criteria stated in the original manuscript.

Table 3. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Studies addressing Ibis Paint, digital fashion design, creativity in design, or visual communication.	Studies with no substantive relationship to the review questions.
Scientific publications from identifiable and verifiable sources.	Publications with unverifiable bibliographic identities or sources.
Full-text publications with information sufficient for data extraction.	Reports without sufficient methodological or findings information for analysis.
Publications in Indonesian or English.	Duplicate records.
Studies relevant to design education or vocational education.	Studies addressing technology outside the fashion/design-education context.

Data Extraction, Quality Appraisal, and Synthesis

For each included study, the extraction framework should record author and year, publication source, research purpose, design, participants or sample size, intervention or digital tool, outcome measures, principal findings, limitations, and relevance to the review questions. The thematic synthesis groups the extracted evidence into four themes: (1) use of digital tools in fashion-design education; (2) technical digital-design competence; (3) creativity in design development; and (4) visual communication through fashion illustration. The analytical step then examines how these themes may connect, rather than treating each publication as an isolated summary.

Results and Discussions

The Utilization of Ibis Paint in Fashion Design Education

The original manuscript maps 25 publications covering several levels of relevance to the review questions. A small group directly addresses Ibis Paint in fashion illustration, instructional materials, or creativity. Other studies concern digital design competence, vocational learning, digital fashion technologies, artificial intelligence, and visual communication. This variation broadens the conceptual context but also means that the 25 studies should not be treated as equally direct evidence for the specific relationship among Ibis Paint proficiency, creativity, and visual communication.

The PRISMA diagram indicates that 25 studies remained after full-text eligibility assessment. The number of included studies is therefore a description of the final corpus, not by itself proof of comprehensiveness or methodological sufficiency. The strength of the synthesis depends on the relevance, transparency, and quality of the included evidence, as well as the completeness of the search protocol.

Table 4. Mapping of the 25 Articles Reviewed in the Systematic Literature Review

Authors (Year)	Article Title	Research Focus
(Fauziyyah et al., 2026)	Development of an E-Jobsheet for Using Ibis Paint X Without a Stylus as Fashion Design Teaching Material at MAN 1 Bukittinggi	Ibis Paint instructional materials
(Jannah et al., 2025)	Implementation of Ibis Paint X Application in Fashion Design Learning Based on Students' Learning Interests	Ibis Paint and fashion learning
(Ruhidawati et al., 2025)	Developing Teachers' and Students' Competencies in Digital Fashion Design Using Ibis Paint X at SMK Sukapura Tasikmalaya	Digital design competencies
(Indriati et al., 2025)	Implementation of Change Management in the Use of Ibis Paint Application to Improve the Creativity of Grade XI Students of Fashion Design and Production at SMKN 2 Magetan	Ibis Paint and creativity
(Cao, 2025)	Constructing a Future-Skills Talent Training Mechanism for Vocational Undergraduate Fashion Design in the Age of Digital Intelligence	Future vocational skills
(Shi et al., 2023)	Understanding Design Collaboration Between Designers and Artificial Intelligence: A Systematic Literature Review	Human–AI design collaboration
(Fadhilah et al., 2023)	Vocational School Students' Perceptions Toward Science Learning Activities in the Context of Fashion Design	Vocational student perceptions
(Ernawati et al., 2023)	Improving Fashion Design Learning Outcomes by Problem-Based Learning Model in Vocational High School	Fashion learning outcomes
(Wati et al., 2024)	Advancing Fashion Design Education: Evaluating the Eligibility of Video Tutorial Media for Basic Pattern Content in Vocational High School	Digital teaching media
(Kholifah et al., 2025)	Unlocking Workforce Readiness Through Digital Employability Skills in Vocational Education Graduates: A PLS-SEM Analysis Based on Human Capital Theory	Digital employability
(Weems, 2026)	Productive Negative Emotions in Creative Studio-Practice in Higher Education Fashion Design Programmes	Creative studio practice
(Cong & Zhang, 2024)	The Application of Hierarchical Perception Technology Based on Deep Learning in 3D Fashion Design	3D digital fashion design
(Pan et al., 2025)	The Application and Optimization of Style Transfer Neural Network Based on Deep Learning in Fashion Design	AI fashion style transfer
(Yang & Jin, 2026)	The Adoption Behavior of Fashion Designers Toward AIGC: The Interaction of Psychological Motivation and Perceived Risk	Fashion AI adoption
(Sun et al., 2026)	A Data-Driven Study of Cultural Radiation and Transformation in Fashion Design Through Artificial Intelligence	AI and fashion culture
(Held & Mejeh, 2024)	Students' Motivational Trajectories in Vocational Education: Effects of a Self-Regulated Learning Environment	Vocational motivation
(Balloni et al., 2025)	A Neural Rendering System for Fashion Design Process	Fashion visualization
(Yu et al., 2024)	Solar Space Thermal Energy Utilization and AI Navigation Based on Light Sensors in Museum Visual Communication Design	Museum visual communication
(Wu et al., 2025)	Reform Path and Empirical Exploration of Visual Communication Design Education Based on Graph Neural Network	Visual communication education
(Xie et al., 2025)	Transforming Intangible Cultural Heritage in Destinations: A Fashion Communication Perspective	Fashion communication
(Ki et al., 2025)	How Is NFT Fashion Distinct from Digital Fashion? Insights from Mixed-Methods Research Combining Social Listening and Consumer Surveys	Digital fashion and NFTs
(Abrusci et al., 2025)	AI4Design: A Generative AI-Based System to Improve Creativity in Design—A Field Evaluation	Design creativity and AI
(Li et al., 2025)	FS-Control: Artistic Fashion Design with Discriminated and Conditional Diffusion Model	AI-assisted fashion design
(Farkhatun et al., 2021)	Increasing Fashion Design Creativity by Using the Ibis Paint X Application Module	Ibis Paint and creativity
(Soomro et al., 2025)	Fostering Technical Skills and Creativity in Digital Fabrication Spaces: An Open-Ended Prototyping Approach	Technical skills and creativity

Digital Tools and Fashion-Design Skills

The studies by Sudiarsana et al. (2023), Sholikhah et al. (2023), and Ruhidawati et al. (2025) collectively indicate that digital fashion-design competence involves more than opening or navigating an application. It includes familiarity with tool functions and the ability to apply them through a sequence of design actions, such as preparing a canvas, sketching, refining lines, selecting colors, and completing an illustration. Sholikhah et al. (2023) focused on the development and feasibility of digital fashion-illustration media, whereas Sudiarsana et

al. (2023) described the learning stages involved in digital painting. Ruhidawati et al. (2025) extended the discussion to the competence of teachers and students in digital fashion design.

These findings are complementary but address different outcomes. Feasibility ratings for instructional media indicate expert judgments about the product, not necessarily measured improvement in students' design performance. Descriptions of learning stages clarify what learners do but do not establish the magnitude of learning gains. Consequently, technical competence should be assessed through observable performance indicators: appropriate use of application features, accuracy of sketch construction, control of line and color, organization of visual elements, and completion of a coherent fashion illustration.

Creativity in Digital Fashion Design

Creativity is reflected in the generation and refinement of design ideas, the production of alternatives, and the elaboration of visual details. Indriati et al. (2025) associated the use of Ibis Paint with creative dimensions such as originality, flexibility, color exploration, and elaboration. These dimensions suggest that digital tools may provide an environment for trying alternatives and revising a design, but the presence of digital features alone does not guarantee creative outcomes. Instructional prompts, opportunities for experimentation, feedback, and the learner's ability to justify design decisions remain important.

The AI4Design study by Abrusci et al. (2025), involving 31 design students, offers a broader comparison concerning technology-supported creative work. Because the technology and design context differ from Ibis Paint-based fashion illustration, its findings should be used as contextual evidence rather than direct evidence of Ibis Paint effectiveness. Across these studies, the defensible synthesis is that digital tools can provide resources for exploration, while creativity depends on how learners use those resources to generate, compare, and elaborate ideas.

Visual Communication Through Fashion Illustration

Visual communication concerns the extent to which an illustration makes a design concept understandable to another person. In fashion education, the illustration communicates choices about silhouette, proportion, garment details, color, and intended style. The communicative function of fashion illustration discussed by Ademtsu et al. (2024) complements studies focused on technical drawing because it shifts attention from the production process to the message conveyed by the final work.

Accordingly, the quality of visual communication should not be inferred solely from technical accuracy or aesthetic appeal. A technically competent illustration may still communicate poorly if its form, details, or colors do not support the intended concept. A useful assessment framework therefore includes conceptual clarity, readability of the illustration, appropriateness of shapes and colors, accuracy of relevant details, and consistency between the stated design intention and the final visual output. These indicators are a conceptual operationalization derived from the reviewed themes and require validation before use as a standardized instrument.

Critical Comparison of Empirical Evidence

The available evidence varies substantially in design and outcome. Jannah et al. (2025) reported a mean-score increase from 51.1 to 91.1 in a one-group pretest–posttest study involving nine students. This result is encouraging as a local learning-outcome observation, but it does not establish a causal effect because there was no control group and the sample was small. The manuscript does not provide a standardized effect size, confidence interval, or sufficient information for an independent power assessment; these values should not be calculated or inferred from the reported means alone.

Sholikhah et al. (2023) reported feasibility scores of 91.6% from media experts and 97.5% from subject-matter experts. These are validation results for instructional media and should not be compared numerically with Jannah et al.'s student learning scores because the constructs and measurement scales differ. Fauziyyah et al. (2026) reported media validation of 95% and subject-matter validation of 88.40%, with practicality ratings of 90.51% from teachers and 94.51% from students; these likewise represent feasibility/practicality rather than an effect on design performance. Indriati et al. (2025) used a descriptive qualitative approach and provides process-oriented evidence about creativity, not a standardized effect estimate.

Table 5. Summary of Empirical Findings and Methodological Limitations in Previous Studies on Ibis Paint-Based Fashion Design Learning

Study	Design / participants reported in manuscript	Reported result	Interpretive limitation
Jannah et al. (2025)	One-group pretest–posttest; n = 9	Mean 51.1 to 91.1; p reported as 0.000	No control group; small sample; no standardized effect size or confidence interval reported.

Study	Design / participants reported in manuscript	Reported result	Interpretive limitation
Sholikhah et al. (2023)	Media development; sample/design details not stated in manuscript	Media expert 91.6%; subject expert 97.5%	Feasibility ratings are not direct evidence of student learning effects.
Fauziyyah et al. (2026)	4D development; participant details not stated in manuscript	Media 95%; material 88.40%; teacher practicality 90.51%; student practicality 94.51%	Validation/practicality outcomes do not establish improvement in student performance.
Indriati et al. (2025)	Descriptive qualitative; observations, interviews, documentation	Creativity themes: originality, flexibility, color exploration, elaboration	No standardized effect size reported; findings are context-specific and qualitative.

This comparison demonstrates why the evidence should be interpreted according to study design and outcome type. Feasibility, practicality, learning scores, and qualitative accounts of creativity answer different questions and should not be pooled or ranked as if they measured the same construct. In particular, the increase reported by Jannah et al. (2025) may reflect the combined influence of instruction, practice, feedback, and repeated testing, rather than the application alone. The current evidence therefore supports a cautious account of potential contribution, not a definitive causal claim.

Integrated Conceptual Synthesis and Research Gap

The synthesis supports a process-oriented conceptual pathway. First, technical digital-design skills provide the means to translate an initial idea into a manipulable visual representation. Second, creative thinking shapes that representation through idea generation, comparison of alternatives, originality, flexibility, and elaboration. Third, visual communication concerns whether the selected visual elements convey the intended fashion concept clearly. The relationship is therefore not simply that application proficiency automatically produces creativity or communication competence; rather, technical skills enable execution, creative processes guide the development of the design, and communicative criteria guide the refinement of the final illustration.

The three constructs can be operationalized for future empirical testing as follows: digital design skills through feature use, sketch accuracy, line and color control, and completion of the illustration; creativity through originality, flexibility, fluency of alternatives, and elaboration; and visual communication through conceptual clarity, readability, visual appropriateness, detail accuracy, and alignment between intention and output. These indicators are a proposed synthesis for research design and should be reviewed by subject-matter experts before being used as validated measures.

The research gap is not the absence of studies on Ibis Paint or digital fashion illustration. Rather, the gap identified in this review is the limited integration of technical performance, creative process, and communicative quality within one explanatory framework. Unlike application-specific development studies that primarily evaluate media feasibility or learning outcomes, this review connects the stages through which students may transform a design idea into a technically executed, creatively elaborated, and communicatively clear fashion illustration. This framework is a conceptual proposition derived from the mapped literature; it does not establish causal relationships.

Implications for Vocational Fashion Education

Instruction should combine explicit teaching of digital application features with authentic fashion-illustration tasks. Students need guided practice in sketching, line refinement, color selection, layer management, and finalization, followed by opportunities to explain the design decisions represented in their work. Such an approach connects technical proficiency with the purpose of the design task.

Teachers should also structure iterative creative exploration. Learners can be asked to produce more than one design alternative, compare color and form choices, receive feedback, and revise their illustrations. Assessment should separately evaluate technical execution, creative development, and visual communication so that strengths and weaknesses in one dimension are not obscured by a single overall score.

Conclusions

Based on the preliminary literature mapping, the use of Ibis Paint in fashion design education is relevant to the development of digital competencies, learning outcomes, and students' creativity. The studies conducted by Ruhidawati et al. (2024), Jannah et al. (2025), Indriati et al. (2025), and Fauziyyah et al. (2026) provide empirical foundations for understanding the utilization of this application across various fashion design learning contexts. The conceptual synthesis indicates that Ibis Paint-based fashion design ability and creativity can be positioned as two potentially complementary aspects in the development of visual communication skills. Technical skills

support the process of representing ideas visually, whereas creativity is associated with the exploration and development of design concepts. Visual communication represents an aspect that requires further investigation to understand how design outcomes can clearly convey messages and communicate the characteristics of a design (Indriati et al., 2025; Ademtsu et al., 2024). The contribution of this article lies in proposing an integrative conceptual framework that connects digital design skills, creativity, and visual communication in vocational education. Future research should empirically examine the relationships among these three constructs and expand the synthesis based on studies that meet systematically established selection criteria (Page et al., 2021; Thomas & Harden, 2008).

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