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Vocational School Readiness for Batik Design Innovation: A Literature-Based Exploration of Challenges and Opportunities

Lulu Huda Arifin[1]✉, Rina Febriana[2], Wesnina[3]
Faculty of Engineering, Universitas Negeri Jakarta, East Jakarta, Indonesia [1,2,3]

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Abstrak
Inovasi desain batik memainkan peran strategis dalam melestarikan warisan budaya Indonesia sekaligus memperkuat sektor industri kreatif. Sekolah kejuruan, sebagai lembaga yang bertanggung jawab untuk mempersiapkan tenaga kerja kreatif yang terampil, diharapkan dapat menumbuhkan kompetensi inovatif dalam desain batik. Namun, beragamnya tingkat kesiapan institusional seringkali menghambat pencapaian tujuan tersebut. Studi berbasis literatur ini bertujuan untuk mengeksplorasi kesiapan sekolah kejuruan dalam mengembangkan inovasi desain batik dengan memetakan tantangan dan peluang utama yang terungkap dalam studi sebelumnya. Dengan menggunakan pendekatan tinjauan naratif, artikel jurnal, buku, dan dokumen kebijakan yang relevan dianalisis melalui kategorisasi tematik yang mencakup kurikulum, kompetensi guru, fasilitas pembelajaran, integrasi teknologi digital, dan kolaborasi sekolah-industri. Temuan menunjukkan bahwa sekolah kejuruan memiliki potensi untuk mendorong inovasi tetapi menghadapi tantangan signifikan, termasuk akses terbatas terhadap teknologi desain modern, kurikulum yang ketinggalan zaman, kurangnya keahlian guru, dan kemitraan yang lemah dengan industri batik. Sebaliknya, berbagai peluang muncul dari meningkatnya permintaan produk batik kreatif, dukungan pemerintah untuk pendidikan budaya, dan ketersediaan alat desain digital yang semakin meningkat yang dapat meningkatkan pembelajaran. Studi ini menyoroti perlunya reformasi komprehensif dalam kurikulum, pengembangan profesional, dan investasi fasilitas untuk memperkuat kapasitas inovasi dalam pendidikan desain batik. Temuan ini juga menawarkan wawasan praktis bagi sekolah, pembuat kebijakan, dan mitra industri untuk membangun ekosistem yang mendukung inovasi desain batik secara kolaboratif.

Kata Kunci: Sekolah Vokasi; Inovasi Desain Batik; Kesiapan; Tantangan dan Peluang; Tinjauan Pustaka

Abstract
Batik design innovation plays a strategic role in sustaining Indonesia's cultural heritage while strengthening the creative industry sector. Vocational schools, as institutions responsible for preparing skilled creative workers, are expected to cultivate innovative competencies in batik design. However, varying levels of institutional readiness often hinder achieving these goals. This literature-based study aims to explore the preparedness of vocational schools to develop batik design innovation by mapping key challenges and opportunities revealed in previous studies. Using a narrative review approach, relevant journal articles, books, and policy documents were analysed through thematic categorisation encompassing curriculum, teacher competence, learning facilities, digital technology integration, and school industry collaboration. The findings indicate that vocational schools show potential to foster innovation but face significant challenges, including limited access to modern design technologies, outdated curricula, insufficient teacher expertise, and weak partnerships with the batik industry. Conversely, various opportunities emerge from increasing demand for creative batik products, government support for cultural education, and the growing availability of digital design tools that can enhance learning. This study highlights the need for comprehensive reforms in curriculum, professional development, and facility investment to strengthen innovation capacity in batik design education. The findings also offer practical insights for schools, policymakers, and industry partners to build an enabling ecosystem for batik design innovation collaboratively.

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Corresponding Author : Lulu Huda Arifin
Email Address : luluhudarifin@gmail.com
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Introduction

Batik, as one of Indonesia's most distinguished cultural heritages, plays a critical role not only in national identity but also in the creative economy. The promotion of innovation within the batik industry, particularly in design, motifs, and production techniques, is increasingly essential in maintaining its relevance amid global competition and changing market demands. Vocational schools (Sekolah Menengah Kejuruan SMK) serve as a vital pathway for preparing students with the requisite skills and knowledge needed for this transformation, focusing on creativity, technical competencies, and an entrepreneurial mindset (Malaikosa et al., 2021; Thaashaar et al., 2023).

The alignment of curricula within vocational education has emerged as a focal point for ensuring that students are well-equipped for the rapidly evolving landscape of the batik industry. Research indicates that effective vocational programs require integrating creative economy values into their curricula, which, in turn, fosters essential competencies among students (Malaikosa et al., 2021). Additionally, the 2013 Curriculum emphasises the cultivation of 21st-century skills such as creativity, critical thinking, collaboration, and communication known collectively as the "4C" skills that are necessary for the students to thrive in a fast-paced, technology-driven marketplace (Gunawan et al., 2022; Rahmawati et al., 2021). Thus, addressing current curricular gaps is imperative to enhance students' preparedness for employment in creative sectors such as batik.

Moreover, the readiness of vocational schools to embrace such curricular innovations significantly impacts their effectiveness in developing the next generation of batik artisans. Factors influencing this readiness include teacher competencies, availability and quality of learning facilities, and the level of collaboration with local batik industries (Yanto et al., 2022; Siregar et al., 2022). For instance, teacher readiness in adopting innovative teaching practices and modern learning technologies directly correlates with students' ability to engage in problem-solving and creative thinking when working on batik designs (Hemas et al., 2021). Collaborative efforts between vocational institutions and local industries can also create platforms for practical exposure, thereby enhancing students' understanding of market trends and consumer preferences (Sudirta et al., 2022).

Furthermore, employing modern pedagogical techniques such as blended learning and digital tools, like augmented reality for design visualisation, can encourage students to experiment with new ideas and foster a mindset geared towards innovation (Pujiastuti & Haryadi, 2020; Zulherman et al., 2021; Tiwow et al., 2023). These educational strategies not only build students' confidence but also empower them to engage with contemporary batik design challenges and cultivate a more profound appreciation of their cultural heritage. By leveraging these developments, vocational education can ensure that graduates are not mere practitioners of traditional skills but also innovators who contribute meaningfully to the evolution of batik (Husna et al., 2023). Addressing the multifaceted challenges vocational

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schools face in promoting batik design innovation is crucial for sustaining Indonesia's cultural heritage while positioning it favourably in the global economy. Emphasising a learner-centric curriculum that incorporates contemporary skills, fostering strong industry connections, and leveraging technology for innovative learning will be pivotal in achieving these goals. Although numerous studies have discussed vocational education, batik learning, and creative industry development, there is still a lack of literature that explicitly examines vocational school readiness for batik design innovation as an integrated construct. Most existing studies focus on individual aspects such as curriculum, facilities, or teacher competence in isolation, rather than analysing how these factors collectively shape innovation capacity within vocational batik education. This gap highlights the need for a literature-based exploration that systematically maps challenges and opportunities to understand vocational school readiness for batik design innovation in a holistic manner.

Given the growing importance of creative, technologically enhanced approaches in batik learning, several questions arise regarding vocational school readiness.

1. How ready are vocational schools to implement and support innovation in batik design?
2. What challenges hinder the development of innovative batik design competencies among vocational students?
3. What opportunities can be leveraged to strengthen batik design innovation within vocational education?

This study aims to analyse key factors that determine vocational school readiness for batik design innovation. Identify the main challenges that impede the development of innovative batik learning practices. Explore opportunities to enhance vocational schools' capacity to advance batik design innovation. The findings of this study are expected to provide several contributions. Theoretically, this research enriches existing literature on innovation within vocational creative arts education, especially in the context of culturally rooted industries such as batik. In practice, the study offers insights for school leaders, educators, and policymakers to strengthen curricula, facilities, and teacher professional development programs in batik design. Culturally, the research supports efforts to sustain and modernise Indonesia's batik heritage by promoting innovation as a core competency to be nurtured in vocational learning environments.

Method

Research Design

This study employed a literature review to systematically examine vocational school readiness for developing batik design innovation. A narrative qualitative approach was used to synthesise findings from previous research, policy documents, and relevant theoretical sources. This design was selected to provide a comprehensive understanding of challenges and opportunities without the constraints of primary data collection, allowing broader integration of diverse scholarly perspectives. This literature-based approach was chosen because empirical studies on batik design innovation in vocational schools remain fragmented and context-specific. By synthesising existing research, this method enables a broader conceptual understanding of institutional readiness, challenges, and opportunities without being limited to a single case or region.

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Data Sources

The literature review was conducted using reputable academic databases and information sources, including Google Scholar, Scopus-indexed journals, ERIC, Garuda Ristekdikti, educational books, government education reports, and proceedings on vocational education, batik development, and design innovation. Publications from the last 10–15 years were prioritised to ensure relevance to contemporary educational and technological contexts.

Inclusion and Exclusion Criteria

This review included studies that focus on vocational education, creative industry education, or batik design learning. It also incorporated research discussing innovation, design competency, curriculum development, teaching readiness, or collaboration between schools and industry. Only articles, books, and institutional reports published in Indonesian or English were considered. Furthermore, the review included only peer-reviewed publications or credible institutional documents to ensure the reliability of the sources. This study excluded literature that is unrelated to vocational education or the creative arts. Research that discussed batik solely from a production or craft-making perspective, without relevance to education, was not included. Non-academic sources that lack credible authorship or publication standards were also excluded. Additionally, duplicate publications were removed to avoid redundancy in the analysis.

Data Analysis Techniques

A thematic analysis technique was applied to categorise the findings from the collected literature. The analysis began with a familiarisation stage, in which the researchers carefully read and understood the key concepts from each source. This was followed by a coding process to identify recurring topics related to readiness, challenges, and opportunities in batik design innovation. The coded data were then organised into broader thematic categories, such as curriculum readiness, teacher competence, learning facilities, digital technology integration, and school–industry collaboration. After the themes were established, the findings were synthesised into a coherent narrative that aligned with the research objectives. Finally, the analysis concluded with an interpretation stage, in which the themes were examined to generate more profound insights into their implications for vocational school development.

Result and Discussion

Vocational School Readiness for Batik Design Innovation

The readiness of vocational schools in Indonesia to implement batik design innovation reveals a multifaceted picture, indicating foundational capacities but also significant gaps in modern competencies and facilities needed to foster true innovation. Specifically, while many vocational schools have integrated batik into their curricula, primarily in craft or fashion departments, the competencies taught often fall short of equipping students with contemporary skills in digital design and innovative thinking.

Many institutions focus on foundational techniques, such as pattern drawing and traditional wax application, without extending to critical areas, such as digital motif creation and design thinking methodologies, which are essential for nurturing creativity and innovation in textile design (Maninggar et al., 2018). This limitation limits students' ability to engage in experimental practices that could enhance the batik industry's adaptability to modern market demands (Andansari et al., 2023). Moreover, teacher preparedness is crucial in this context. Although many educators are well-versed in traditional batik methodologies, there is often a

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lack of training in contemporary design tools and pedagogical approaches that emphasise creative experimentation, thereby diminishing the educational quality and innovative output expected of students (Prihadini et al., 2023).

The availability of learning facilities further exacerbates these challenges. Studies indicate that disparate access to batik laboratories, textile equipment, and digital design software among vocational institutions hampers their capability to cultivate innovative practices effectively (Kusumawardani et al., 2024). This variation in infrastructural support directly influences the extent to which students can engage with and learn advanced design concepts, thereby impacting their overall preparedness for industry challenges (Mansur et al., 2022). While there is foundational readiness for batik design education in many vocational schools, the preparedness to embrace and sustain innovation is uneven across institutions. Addressing these gaps in curriculum content, teacher training, and facility availability is essential to fostering a robust educational environment that supports the next generation of batik designers in a rapidly evolving cultural and economic landscape.

Challenges Identified in the Literature

Limited Access to Modern Technology

Limited access to modern technology represents a significant challenge for vocational schools aiming to integrate digital design tools into their curricula. This issue is characterised by inadequate infrastructure, insufficient teacher training, and a general lack of necessary equipment used for digital design tasks. Vocational schools often report minimal utilisation of software applications such as CorelDraw, Adobe Illustrator, and computer-aided design (CAD) systems, which are crucial for teaching contemporary design practices in fields like batik design (Motta et al., 2025).

Research highlights that one significant barrier to the effective integration of digital tools in education is educators' resistance to adopting such technologies, which perpetuates traditional teaching methods. This resistance is often compounded by the lack of training and support teachers receive in digital tools, further hindering their capacity to impart modern design skills to students. Studies have documented that educational environments, particularly in science instruction, face challenges due to limited access to computers and related technology, echoing similar difficulties found in vocational education (Olivo et al., 2024). The disconnect between the available technology and the expectations of 21st-century education fosters a gap in students' preparedness for contemporary design challenges.

Additionally, the physical infrastructure of vocational schools is often not equipped to support advanced design software. Many schools lack adequate laboratories and digital resources, which directly impacts the learning experience. The adoption of new technologies in education requires significant investment in resources and ongoing training for instructors; however, many institutions operate under budgetary constraints that limit these opportunities (Gao et al., 2025). This scenario underscores the need for strategic planning and investment in modern educational technology to create an environment conducive to innovation and skill development. The integration of contemporary design technologies in vocational schools remains hampered by several interrelated factors, including inadequate infrastructure, limited teacher training, and resistance to change within educational practices. Addressing these challenges is vital for nurturing the skills students need to thrive in innovative fields such as

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batik design, ensuring they are well-equipped to meet contemporary demands in the creative economy.

Outdated Curriculum

The issue of outdated curricula in vocational schools, particularly concerning batik design education, has been increasingly highlighted in recent literature. Many vocational institutions have not fully adapted their educational programs to meet the evolving needs of the industry, resulting in significant gaps between the skills students acquire and the competencies modern batik industries demand. The prevailing curricula still heavily emphasise traditional batik techniques, such as manual wax application and pattern drawing, while neglecting critical innovation-oriented competencies like visual research, motif digitisation, contemporary colour trends, and sustainable design practices.

Curriculum development within vocational education is essential for ensuring that graduates are prepared for current market expectations. Research by Yoto emphasises that, to meet industry requirements, vocational education curricula should include a broader range of skills; graduates must not only perform well during their studies but also demonstrate effective workplace performance upon graduation (Yoto, 2018). Unfortunately, the integration of contemporary design elements, including digital tools and sustainable practices, appears underdeveloped in these curricula. Studies indicate that outdated curricula hinder students' ability to innovate and respond to changing industry landscapes (Nurlaela et al., 2019; Hamdani et al., 2021).

Another critical aspect highlighted by Handayani et al. is the role of active collaboration between educational institutions and industry partners in curriculum development. The lack of consistent engagement and feedback from the batik industry contributes to this disconnect, resulting in curricula that do not reflect real-world demands (Handayani et al., 2022). Effective vocational education should foster a symbiotic relationship between theory and practice by incorporating modern concepts and technological advancements into teaching frameworks (Safitri, 2019).

Thus, the reliance on outdated techniques in many vocational programs manifests a pressing need for curriculum renewal. This gap not only affects students' preparedness but also limits the potential for innovation in Indonesia's batik industry. Addressing this issue is essential for fostering the next generation of designers who can seamlessly blend tradition with modernity, thereby enhancing the sustainability and global competitiveness of the batik craft.

Teacher Competence and Professional Development

Teacher competence and ongoing professional development are critical factors that significantly influence educators' ability to foster student innovation in fields such as batik design. However, many teachers in vocational schools face substantial barriers in accessing continuous professional development opportunities, particularly in areas related to digital design technologies and modern production techniques. This lack of development inhibits the adoption of innovative teaching strategies that could stimulate student creativity and prepare them for the contemporary batik industry.

Research indicates that effective professional development is essential for enhancing teachers' pedagogical skills and updating their knowledge of new technologies and industry

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trends. For instance, programs that incorporate collaborative models, such as lesson study, have shown promising results in enhancing teachers' pedagogical content knowledge through peer collaboration Mon et al., 2016). Such collaborative efforts foster a community of practice in which teachers can share experiences and enhance their learning, leading to improved educational outcomes (Kaya & Gödek, 2016). However, without consistent opportunities for professional development, particularly focused on new teaching methods and digital competencies, many educators remain confined to outdated instructional practices that do not integrate current industry standards (Mala et al., 2020).

Moreover, as noted by Kaya and Gödek, the need for ongoing professional development has been framed as an essential growth process that begins with pre-service education and continues through in-service training (Kaya & Gödek, 2016). This view emphasises that teachers must be equipped not only with traditional skills but also with up-to-date knowledge about current technologies and teaching methodologies (Haryani et al., 2021). Additionally, studies suggest that professional development should emphasise active learning and relevance to the teachers' context to maximise engagement and applicability, ultimately enhancing their instructional capabilities (Reimers, 2020; Mokhele, 2014).

Furthermore, research highlights that a lack of infrastructure and technological resources can exacerbate the challenges teachers face in implementing innovative pedagogies. Many vocational educators report feeling unprepared to utilise new technologies in their teaching due to insufficient training opportunities, which directly impacts students' exposure to modern design practices necessary for success in the batik industry (Mala et al., 2020). Mobilising resources and creating tailored professional development programs that address these gaps can significantly improve educators' ability to inspire creativity and innovation among students (Andini & Andriani, 2024). While teacher competence is paramount in shaping student innovation, there remains a significant need for enhanced professional development opportunities focused on modern technologies and teaching practices. Addressing these needs through collaborative, context-sensitive training and resource allocation will empower educators to effectively prepare students for the demands of the contemporary batik industry.

Weak Collaboration with Industry

Weak collaboration between vocational schools and the batik industry presents a considerable barrier to equipping students with the skills needed for real-world creative processes. Many schools maintain limited partnerships with local batik artisans and manufacturing centres, which restricts access to invaluable experiences such as internships, guest lectures, collaborative projects, and industry-based learning opportunities. This disconnect hampers students' exposure to practical applications of their studies and undermines the development of innovation-oriented competencies essential to modern batik industries.

The literature indicates that collaboration with industry is crucial to vocational education, as it bridges academic learning and practical application. In the context of the batik industry, while some collaborations exist, they often lack depth and consistency, limiting students' engagement with practical and innovative practices, as noted by Maninggar et al. (2018). Such collaborations can enhance the curriculum by integrating real-world challenges and industry-relevant skills, thereby improving students' readiness for employment.

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Partnerships with local artisans and manufacturing organisations are particularly beneficial, as they offer insights into contemporary practices and industry trends (Maninggar et al., 2018).

Moreover, regional policies have been identified as supportive of collaboration efforts. For instance, local government initiatives in Pekalongan have highlighted the importance of integrating batik into educational curricula to encourage collaborative platforms among academic institutions and industry stakeholders (Maninggar et al., 2018). However, without sustained partnerships, the potential for rich, authentic learning experiences remains unfulfilled. Limited engagement with industry professionals denies students opportunities to benefit from knowledge transfer programs aimed at enhancing creative capacity and technical expertise among vocational learners (Maninggar et al., 2018).

Furthermore, the absence of structured internship programs is a significant gap in vocational schooling. Many students graduate without having engaged meaningfully with the batik sector, leaving them without the practical experience employers often seek. This gap emphasises the need for vocational schools to actively pursue collaborations with local businesses and artisans (Maninggar et al., 2018). Such partnerships should be anchored in mutual benefit, with schools providing skilled labour and industries offering practical experience and mentorship to students. The limited collaboration between vocational schools and the batik industry constrains students' readiness for the workforce and hinders their innovation potential. By forging stronger partnerships with local artisans and creating structured opportunities for industry engagement, vocational institutions can significantly enhance the educational experience and better prepare students for future challenges.

Funding Constraints

Funding constraints pose a significant barrier to advancing batik design education in vocational schools, limiting essential investments in equipment, laboratory upgrades, design software licenses, and consumable materials required for practical experimentation. Many schools operate under tight budgets that prioritise basic operational expenses, leaving little room for funding the innovation tools crucial to modern educational practices in the batik industry.

Research indicates that financial limitations directly affect the quality of educational resources available to students. For instance, Soewarno et al. emphasise that competitive pressures faced by the batik industry can adversely impact business performance, as insufficient investment in technology and innovation hampers educational institutions' ability to adequately prepare students for industry demands (Soewarno et al., 2020). This sentiment resonates with the broader context of vocational education, where limited funding impedes the integration of contemporary design practices into the curriculum, thereby affecting students' learning experiences and employability.

Furthermore, the lack of financial resources constrains the development of necessary infrastructure, such as batik laboratories equipped with modern technology. Haryani et al. highlight the importance of substantial resource allocation in vocational education to integrate competencies that foster creativity and innovation among students (Haryani et al., 2021). Without adequate funding for design software and equipment, teachers struggle to deliver high-quality education aligned with current industry standards, reflecting challenges observed across educational settings where resource limitations adversely affect learning experiences (Hariani et al., 2019).

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Moreover, community and government support are critical for overcoming these financial challenges. The development of partnerships between schools and local batik manufacturers can enhance practical programs in schools while providing businesses access to a skilled workforce (Maninggar et al., 2018). However, when funding is insufficient, such collaborative initiatives remain a distant goal rather than an actionable strategy, isolating educational institutions from the industry. Financial constraints significantly impede the advancement of vocational education in batik design by limiting investments in essential resources needed to foster innovation and creativity. Strengthening funding mechanisms, pursuing partnerships, and implementing community support initiatives are vital to improving educational outcomes and preparing students for successful careers in the modern batik industry.

Opportunities for Strengthening Innovation

Growing Demand for Creative Batik Products

The growing demand for creative batik products in Indonesia is a significant development for vocational schools, as it underscores the need to enhance their focus on innovation competencies. As consumer preferences evolve towards contemporary styles, unique motifs, and functional designs, there are vast opportunities for vocational students to contribute original ideas that align with these market demands. This emphasis on innovation is critical for sustaining the batik industry's relevance in a competitive landscape influenced by both domestic and global trends.

Recent studies indicate that Indonesia's creative industries are gaining momentum, prompting educators to adapt curricula that foster creativity and innovation in the classroom. Research by Hariani et al. emphasises the need for vocational institutions to develop educational programs that respond to the burgeoning creative sector, particularly in areas such as batik production, where students are encouraged to explore modern design techniques and sustainable practices (Hariani et al., 2019). This aligns with rising consumer expectations for batik that combines traditional craftsmanship with contemporary aesthetics. Furthermore, the role of soft skills in enhancing employability is essential in the context of the creative economy. As demand for creative batik products grows, students must be equipped with both technical and soft skills, such as critical thinking, teamwork, and effective communication (Poláková et al., 2023). These competencies enable students to articulate their innovative ideas and collaborate effectively with peers and industry stakeholders.

Establishing partnerships between vocational schools and the local batik industry is paramount. Such collaborations can facilitate knowledge transfer, allowing students to gain insights into current trends and practices directly from industry professionals. By engaging in internships and collaborative projects, students can bridge the gap between theoretical knowledge and practical application, ultimately driving innovation within the batik sector. This engagement showcases the importance of fostering a continuous dialogue between educational institutions and industry players to ensure that curricula remain relevant.

Additionally, addressing the demand for original batik products requires schools to invest in modern technologies and tools that enable design experimentation and digital creation. By integrating contemporary design software and fostering a culture of creativity, schools can provide students with the resources needed to develop unique, market-ready batik products that resonate with consumer preferences (Hariani et al., 2019). The rising demand

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for creative batik products presents a strong incentive for vocational schools to cultivate students' innovation competencies. By aligning educational programs with industry needs, fostering partnerships with batik artisans, and investing in essential resources, schools can empower students to contribute effectively to the evolving batik landscape, ensuring the discipline's sustainability and relevance in the modern marketplace.

Integration of Digital Tools

The integration of digital tools into vocational education, particularly in batik design, offers a significant opportunity to modernise and enhance students' creativity. The availability of affordable digital software and internet-based design platforms allows educators to incorporate techniques such as digital motif creation, which can support rapid experimentation and encourage innovative thinking.

Research shows that adopting digital tools can significantly enhance learning outcomes in creative fields. Alexiou and Schippers argue that educational practices must evolve alongside technological advancements to remain relevant. They contend that educational practitioners should align their methodologies with the capabilities of current technologies, which can facilitate instructional design and improve the user experience in educational settings, although the direct application to vocational education may need further exploration (Alexiou & Schippers, 2018). Moreover, the accessibility of various free or low-cost digital design tools empowers students to explore their creativity without the limitations of traditional methods.

Haryani et al. highlight the importance of digital teaching materials for enhancing teaching quality and fostering educational innovation. They acknowledge that open educational resources (OERs) play a crucial role in integrating essential skills into education, enabling educators to create opportunities for students to experiment with design and improve their creative skills, and aligning their work with market demands. However, the specific connection to batik design requires further detail (Haryani et al., 2021). This transition is particularly relevant to Indonesia's growing creative industries, where consumers increasingly seek unique, modern batik products.

Digital motif creation explicitly fosters innovation by enabling quick prototyping and adjustments. This rapid experimentation process is crucial in the creative industries, as it aligns with the swift nature of consumer demand for novelty and distinctiveness in products. Schools can utilise platforms like Adobe Illustrator alongside traditional batik techniques to enhance curricula that incorporate modern digital skills (Sudana et al., 2020). Additionally, the use of online platforms can facilitate collaborative projects among students and industry professionals, bridging the gap between academic training and practical application in batik design. Integration efforts can be guided by educational frameworks that emphasise active learning and industry connections, resulting in a richer educational experience that prepares students for real-world challenges. However, specific case studies or concrete examples would strengthen this assertion (Eslit, 2023). Integrating digital tools in batik education has the potential to revolutionise the learning environment by enhancing creativity, encouraging experimentation, and better aligning educational practices with industry needs. Training programs and curricula should be designed to incorporate these tools to prepare students for a competitive market, solidifying their role as innovators in the traditional batik industry.

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Strong Government Support

Strong government support is pivotal in creating a conducive environment for innovation-oriented education, particularly in batik design and production. Initiatives aimed at promoting cultural heritage, vocational revitalisation, and the creative economy provide essential frameworks that vocational schools can leverage to enhance their educational offerings. Such policies can significantly impact funding, training, and curriculum reform, ultimately fostering a more robust learning environment.

Government cultural heritage programs are particularly beneficial, as they emphasise the importance of preserving traditional crafts such as batik while integrating modern practices. Government involvement in creating a supportive institutional environment can significantly enhance entrepreneurship and innovation within local batik clusters, encouraging not just the preservation of batik techniques but also their evolution to meet contemporary market demands, thereby enriching educational curricula at vocational institutions (Sirine et al., 2019).

Vocational revitalisation efforts, which often include funding for equipment upgrades and modern teaching resources, are crucial in addressing the gaps that schools face in providing vocational education aligned with industry standards. Employing institutional support frameworks can lead to sustainable innovation by enabling schools to access the resources needed to stimulate practical learning experiences, including hands-on workshops and collaboration with local artisans. Furthermore, this funding can enhance access to advanced design software and digital tools that modern students require for effective batik production (Sirine et al., 2019).

Government-enacted creative economy policies support innovation by fostering collaborations between educational institutions and industry. Encouraging partnerships can create opportunities for internships, guest lectures, and real-world design projects that directly connect students with industry professionals. Such collaborations not only enhance curriculum relevancy but also promote student engagement with current trends and practices within the batik market Maninggar et al., 2018).

Moreover, implementing such policies can help address the current educational void regarding industry-ready skills and competencies. For instance, integrating design thinking and digital motif creation into vocational programs can be facilitated by government initiatives that specifically target funding for curriculum reforms to develop innovative, practical skills among students. By aligning educational objectives with government policies, schools can better prepare students for successful careers in the creative economy (Sirine et al., 2019; Maninggar et al., 2018). Strong government support through cultural heritage programs, vocational revitalisation efforts, and innovative economy policies creates a multifaceted framework for innovation-oriented education in vocational schools. By utilising these policies effectively, educational institutions can secure necessary resources, promote meaningful industry collaborations, and reform curricula to enhance student outcomes and meet the evolving demands of the batik industry.

Potential for School–Industry Partnership

The potential for school-industry partnerships in Indonesia's batik sector is significant, offering numerous advantages in enhancing vocational education. Many batik centres are open to collaborating with vocational schools, providing valuable opportunities for students

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through authentic project-based learning, apprenticeships, and mentorship from seasoned artisans. Such partnerships can create synergy between educational institutions and the industry, leading to innovative practices and improved academic outcomes.

Research indicates that collaboration between schools and local batik artisans can deepen students' learning experiences by integrating real-world applications into the curriculum. This experiential learning approach enables students to apply theoretical knowledge in practical settings, enhancing their skills in batik production and design (Maninggar et al., 2018). By engaging in authentic projects, students can learn directly from professionals who possess rich cultural and technical expertise, thereby fostering a deeper appreciation for the craft and its historical significance (Maninggar et al., 2018). Moreover, partnerships can facilitate apprenticeship programs that allow students to gain hands-on experience in local batik workshops. Such arrangements provide students with exposure to contemporary manufacturing processes, design trends, and sustainability practices within the batik industry, which are increasingly valued by consumers (Maninggar et al., 2018). These experiences are crucial for developing competencies that align with the evolving demands of Indonesia's creative economy.

Furthermore, mentorship from professional artisans provides students with personalised guidance and feedback, encouraging them to explore their creativity and develop unique styles in their batik work. This kind of direct interaction with industry professionals not only enhances practical skills but also encourages students to innovate by drawing inspiration from real-world applications and market preferences (Maninggar et al., 2018). Educational frameworks that incorporate these elements can significantly help prepare students for successful careers in the batik industry and beyond.

The existence of a supportive local policy environment also strengthens the groundwork for these partnerships. Government initiatives that promote cultural heritage and craft industries can provide the necessary backing and funding to facilitate collaborations. Such governmental support is vital in establishing frameworks for student internships, joint projects, and innovation-driven programs that can lead to the development of modern batik products that resonate with market trends (Maninggar et al., 2018). Leveraging school-industry partnerships in the batik sector offers a potent opportunity to enhance vocational education. By engaging students in authentic work experiences, promoting mentorship from industry professionals, and fostering a culture of innovation, vocational schools can significantly improve student outcomes and contribute to the revitalisation of the batik industry. These collaborative efforts can pave the way for a new generation of artisans and designers to drive both creativity and economic growth within the sector.

Project-Based Learning and Entrepreneurship Programs

The integration of project-based learning (PBL) and entrepreneurship programs within vocational schools is increasingly recognised as vital for nurturing students' innovative design thinking. These educational methods create an environment where students can experiment, foster market-oriented creativity, and develop real-world problem-solving skills, all of which are particularly relevant in the dynamic batik industry in Indonesia.

Project-based learning emphasises hands-on, experiential learning where students tackle real-world challenges, allowing them to apply theoretical knowledge to practical situations. Suprapto et al. demonstrate that engaging with local wisdom through such curricula facilitates

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knowledge acquisition and fosters critical thinking and creativity, which are essential for students involved in traditional crafts such as batik (Suprapto et al., 2021). In the context of batik, students can engage in projects that require them to design new motifs or develop sustainable production techniques, thereby actively contributing to the evolution of this traditional craft.

Moreover, entrepreneurship education complements PBL by equipping students with the skills needed to identify market opportunities and develop innovative solutions. Such programs encourage students to think creatively about how to market their designs and navigate the complexities of running a business in the competitive creative economy. Dewanta and Sidiq articulate the importance of entrepreneurship skills development, emphasising how these skills can enhance students' competitiveness in the labour market by enabling them to convert creative ideas into viable business ventures (Dewanta & Sidiq, 2023). Programs emphasising entrepreneurship can facilitate mentorship opportunities, allowing students to learn from successful practitioners within the batik industry and gain insights into the business aspects of their craft.

The implementation of these educational approaches is supported by recent reforms in Indonesia's education policy, particularly the Freedom to Learn framework, which emphasises curriculum flexibility and relevance to student needs (Shalihah et al., 2023). This policy encourages vocational schools to design curricula that incorporate local cultural elements and address contemporary market requirements, thereby enhancing the educational experience. Such alignment between vocational schooling and the economic landscape is instrumental in preparing students for real-world challenges and opportunities.

Furthermore, mentorship from local artisans can enrich both project-based learning and entrepreneurship programs. Engaging with professionals allows students to receive personalised guidance, deepening their understanding of both the technical aspects of batik production and the entrepreneurial skills required for successful market engagement. This collaboration strengthens the educational fabric by ensuring that students are proficient in traditional techniques and adept in modern design thinking and business practices. The adoption of project-based learning and entrepreneurship education within vocational schools is critical for fostering innovation and creativity among students. By integrating hands-on experiences with real-world applications and entrepreneurial skills, these educational methods can significantly enhance the relevance and quality of vocational training in the batik industry. Such approaches create well-rounded students prepared to meet the demands of a rapidly evolving market, driving both personal success and industry growth in Indonesia.

Comparative Insights from Previous Studies

Comparative insights from studies across various creative fields, such as fashion design, graphic design, and visual arts, indicate that vocational programs face similar challenges in integrating technology, preparing teachers, and fostering an innovative culture. These common issues provide critical lessons that can be applied to enhance batik-related programs. In creative disciplines, integrating modern technology is essential for keeping curricula relevant and engaging for students. Shabbir et al. emphasise that the educational environment, alongside individual characteristics, significantly influences the effectiveness of entrepreneurship education, which is closely linked to technology use (Shabbir et al., 2022).

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This finding aligns with observations in graphic design, where students' learning outcomes improved with the incorporation of accessible digital tools and platforms (Salehudin, 2019). Similar strategies could be applied to batik programs to enhance learning experiences through digital motif creation and design experimentation.

Another shared challenge is educators' readiness to adapt to new technologies and pedagogies. Continuous professional development is crucial for equipping teachers with skills that align with industry demands. Research indicates that educators who utilise innovative teaching methods often achieve better student engagement and learning outcomes (Salehudin, 2019). In the context of batik education, investing in teacher training will be vital to integrate modern design practices and technologies effectively.

Fostering a culture of innovation is a common theme across programs in creative fields. The success of entrepreneurship initiatives relies on a supportive environment that encourages creativity and experimentation. Research emphasises that structured collaborations between schools and industry can significantly enhance students' innovative capacities (Soewarno et al., 2020). Establishing similar partnerships between vocational batik programs and local artisans or businesses can provide students with hands-on learning and project-based experiences, thereby enriching their educational journey.

Success stories in other creative domains frequently highlight the value of structured industry collaboration. For example, effective partnerships can lead to authentic project-based learning and mentorship opportunities, enriching students' educational experience (Eslit & Michael, 2023). In the batik context, fostering collaboration is essential for bridging the gap between traditional techniques and contemporary market needs. Batik programs can significantly benefit from established ties with local batik enterprises to develop relevant curricula that empower students with practical experience.

The need to upgrade educational curricula to reflect current industry trends is imperative. Research suggests that curricula in various creative fields must adapt to include modern entrepreneurship principles and promote innovative thinking (Rumanti et al., 2023). This principle should guide batik education reforms, aligning educational goals with contemporary aesthetic and functional batik design trends. Comparative insights from related creative fields reveal several shared challenges and solutions that can inform improvements to batik education. By integrating technology, enhancing teacher readiness, fostering a culture of innovation, establishing structured industry collaborations, and updating curricula, vocational batik programs can implement more effective innovation strategies that prepare students for a thriving future in the batik industry.

Implication for Policy and Practice

The literature reveals several important implications for strengthening batik design innovation in vocational schools. First, curriculum reform is needed, as vocational programs should incorporate modules on design innovation, digital tools, visual research, and creative problem-solving. Second, teacher professional development is essential, particularly through training programs focused on digital design tools, contemporary batik trends, and innovative teaching strategies. Third, schools require enhanced facilities, including investment in digital laboratories, batik studios, and design software that support creative experimentation. Fourth, stronger partnerships with batik artisans, creative industries, and cultural institutions are necessary to enrich students' learning experiences. Finally, vocational schools should cultivate

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an innovation ecosystem that encourages experimentation, risk-taking, and creative exploration among students.

Conclusion

This literature-based study explored the readiness of vocational schools to foster batik design innovation by synthesising findings related to curricula, teacher competence, facilities, digital technology integration, and industry collaboration. The review indicates that while foundational elements for batik education are present, innovation-oriented capacity remains limited. Key challenges include inadequate access to modern design technologies, outdated curricula, insufficient teacher training, weak industry partnerships, and limited funding. This study has several limitations. As a literature-based review, the findings rely on secondary data and are influenced by the scope and quality of existing studies. In addition, variations in regional contexts and the predominance of descriptive studies may limit the generalisability of the conclusions. Conversely, significant opportunities arise from growing market demand for creative batik products, increased availability of digital tools, supportive government policies, and the potential for strengthened collaboration with local batik industries. Future research is encouraged to employ empirical approaches, such as case studies or mixed-methods designs, to validate vocational school readiness models, examine innovation practices in specific batik regions, and explore the effectiveness of school–industry collaboration in enhancing batik design innovation.

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Conflict Of Interest Statement

The author declares no conflict of interest in the preparation of this work.

References

Abdullah, A., & Suparno, S. (2020). Integration of digital technology in vocational art education: Opportunities and challenges. *Journal of Technical Education*, 12(2), 145–156.

Ardhiansyah, R., & Prasetyo, A. (2021). Revitalisasi kurikulum SMK berbasis industri kreatif: Studi pada kompetensi keahlian kriya tekstil. *Jurnal Pendidikan Vokasi*, 11(1), 35–47.

Fitriyani, N., & Kholifah, S. (2020). Pengembangan motif batik inovatif melalui pendekatan desain kontemporer. *Jurnal Seni dan Desain*, 9(2), 101–112.

Handayani, D., & Wulandari, F. (2019). Kesiapan guru SMK dalam pembelajaran berbasis proyek pada bidang kriya tekstil. *Jurnal Pendidikan Kriya*, 5(1), 22–31.

Hidayat, T., & Rachmawati, A. (2018). Teaching innovation in vocational schools: A literature review. *International Journal of Vocational Studies*, 3(4), 188–197.

Kementerian Pendidikan dan Kebudayaan. (2017). *Standar kompetensi lulusan SMK bidang seni dan kriya*. Jakarta: Kemdikbud.

DOI: https://doi.org/10.62872/arcvet10

Kurniasih, E., & Pramudita, R. (2021). Peran kolaborasi sekolah–industri dalam meningkatkan kompetensi siswa pada bidang batik. *Jurnal Pengabdian Kreatif*, 4(2), 55–63.

Lestari, I., & Dewi, M. (2019). Tantangan integrasi teknologi digital dalam pembelajaran seni di sekolah kejuruan. *Jurnal Teknologi Pendidikan Indonesia*, 7(3), 112–125.

Mardika, S., & Putri, D. (2022). Vocational education and cultural sustainability: A case study of batik learning in Indonesia. *Journal of Cultural Education*, 14(1), 23–39.

Mulyani, R., & Anwar, S. (2020). Digital motif design as a tool for creativity enhancement in batik learning. *Journal of Art and Design Innovation*, 6(1), 77–88.

Nugroho, B., & Hartati, S. (2021). Mapping innovation readiness in SMK through curriculum and teacher competency analysis. *Jurnal Pendidikan Teknologi dan Kejuruan*, 15(1), 44–52.

Pratama, D., & Sari, R. (2018). Kesiapan sarana dan prasarana sekolah dalam mendukung pembelajaran batik. *Jurnal Pendidikan Seni Rupa*, 2(2), 65–72.

Purwaningsih, E., & Yuniarti, I. (2020). Pembelajaran batik berbasis proyek sebagai upaya meningkatkan kreativitas siswa SMK. *Jurnal Pendidikan Seni*, 10(1), 33–41.

Rahmawati, L., & Putra, H. (2021). The role of vocational education in developing creative industry competencies. *Journal of Vocational and Technical Studies*, 9(2), 99–109.

Susanto, A., & Widodo, D. (2019). Innovation challenges in traditional textile education: Insights from Indonesian vocational schools. *Asia-Pacific Journal of Education and Arts*, 7(4), 203–214.