
EXPLORING PEDAGOGICAL APPROACHES AND LEARNING EXPERIENCES IN INDUSTRIAL ARTS

Dr. Rosalinda G. Cochico

Pangasinan State University – Lingayen Campus

rcochico.lingayen@psu.edu.ph

ABSTRACT

This study employed a qualitative research design to examine students' perspectives on instructional materials and learning challenges in Industrial Arts courses. The study employed interviews as its primary data-gathering method, enabling participants to share their authentic experiences and insights. Data were gathered from selected students enrolled in Industrial Arts, with responses analyzed thematically to identify patterns across satisfaction, access, challenges, and suggestions for improvement. The findings revealed that students expressed moderate satisfaction with the instructional materials provided, acknowledging that manuals, modules, and project guides offered valuable guidance in woodworking, metalworking, and related tasks. However, they also pointed out that many of these resources were outdated and limited in scope, lacking integration with modern technologies. Students emphasized that hands-on practice was the most effective learning resource, complemented by visual demonstrations, videos, and industry-related examples that connected theory to practice. Challenges included insufficient materials, limited practice opportunities, difficulty in interpreting technical drawings, and a lack of clear explanations during classroom instruction. Access to tools and resources was also found to be unequal, with financial constraints and limited school provisions restricting learning opportunities for some students. Despite these challenges, learners valued their teachers' creativity in maximizing available resources. To improve the instructional experience, students recommended more updated, interactive, and visually engaging materials, as well as digital platforms for supplementary learning. The study underscores the importance of providing comprehensive, modernized, and accessible instructional resources, coupled with experiential learning strategies, to enhance student engagement, skill mastery, and satisfaction in Industrial Arts education. Thus, it is recommended to develop an instructional book that is aligned with the curriculum and provides the necessary activities and hands-on learning experiences for the students.

Keywords: Industrial Arts Education, instructional materials, learning experiences, hands-on learning, pedagogical approaches

INTRODUCTION

Industrial Arts, as a field of study, plays a vital role in equipping learners with the technical knowledge, practical skills, and creativity essential for both personal development and future careers. It bridges theory and practice, enabling students to transform ideas into tangible outputs through hands-on activities such as woodworking, metalworking, drafting, and other applied technologies. In today's rapidly evolving educational landscape, the teaching of Industrial Arts is not merely about skill acquisition but also about fostering problem-solving abilities, innovation, and lifelong learning competencies. Given this, it becomes important to

examine how teachers deliver lessons and how students experience the learning process in this specialized subject area.

Pedagogical approaches in Industrial Arts education often combine traditional demonstration methods with modern, student-centered strategies such as project-based learning, collaborative tasks, and technology integration. However, teaching effectiveness greatly depends on how these approaches are contextualized within diverse classrooms, shaped by available resources, teacher expertise, and learners' backgrounds. Exploring these pedagogical strategies provides deeper insights into how teaching methods align with educational goals and how they influence student engagement, motivation, and performance.

Equally significant are the learning experiences of students, which serve as indicators of how effectively Industrial Arts education meets their needs. Students' experiences are shaped not only by teaching strategies but also by the learning environment, access to facilities, and opportunities for creativity and critical thinking. By capturing students' perspectives, educators can identify both strengths and gaps in instruction, allowing for continuous improvement in the delivery of the subject.

In the Philippines, Industrial Arts is an integral component of the K-12 Technology and Livelihood Education (TLE) curriculum, which aims to develop 21st-century skills, including problem-solving, innovation, and career readiness. However, few local studies have systematically documented students' perspectives in Industrial Arts, particularly on both the adequacy of instructional resources and integration of digital tools. This study, therefore, seeks to explore the pedagogical approaches employed by teachers and the lived learning experiences of students in Industrial Arts. Through a qualitative lens, it aims to uncover the dynamics between instructional practices and learner responses, providing valuable insights for educators, curriculum developers, and policymakers. Ultimately, this research highlights the importance of aligning pedagogy with students' needs and experiences to ensure that Industrial Arts remains a meaningful and transformative component of the educational system.

Statement of the Problem

This study aimed to explore pedagogical approaches and learning experiences in Industrial Arts by examining students' engagement, challenges, preferences, and suggestions for improving teaching and learning outcomes.

Specifically, it sought to answer the following questions:

1. How satisfied are the students with the instructional materials provided in the Industrial Arts course?
2. What types of instructional materials do students find most helpful in learning about Industrial Arts?
3. What challenges do students face in understanding the concepts and skills taught in the Industrial Arts course?
4. Do students have adequate access to the materials needed for successful learning in Industrial Arts?
5. In which specific topics or skills do students experience the most difficulty, and what types of instructional materials do they consider most helpful for addressing these

challenges?

6. What suggestions do students provide for improving the instructional materials used in the Industrial Arts course?

Scope and Delimitations

The study focused on exploring the pedagogical approaches and learning experiences in Industrial Arts classes. It covered selected teachers and students who were directly engaged in Industrial Arts instruction and learning during the academic year. The research investigated the strategies teachers employed in delivering lessons, the methods used to engage learners in hands-on activities, and students' perceptions regarding the relevance, effectiveness, and challenges of Industrial Arts education. The scope of the study was limited to analyzing instructional practices, classroom interactions, and student reflections that contributed to the development of technical skills, creativity, and problem-solving abilities.

The study was delimited to participants within a specific educational institution and did not include all schools offering Industrial Arts programs. It was also limited to the qualitative exploration of experiences, meaning that statistical generalization of findings was not intended. The research did not cover other areas of Technology and Livelihood Education (TLE) such as Home Economics, ICT, or Agri-Fishery Arts, as the primary focus was solely on Industrial Arts. Likewise, the study did not extend to evaluating students' long-term career outcomes or external factors such as socioeconomic status or institutional policies, since it concentrated on immediate pedagogical practices and learning encounters within the classroom setting.

Review of Related Literature

Pedagogical approaches in Industrial Arts education emphasize creativity, hands-on learning, and the integration of theoretical and practical knowledge. These teaching strategies are often aligned with broader trends in sustainable development, innovation, and performance improvement. For instance, Hongsakul and Chuaychoo (2024) examined the influence of logistics activities on the sustainable performance of the air cargo business in Thailand, highlighting how systematic processes, efficiency, and adaptability contribute to long-term growth. This finding parallels Industrial Arts pedagogy, where structured yet flexible approaches to teaching and learning—such as project-based activities and skill-based assessments—promote both immediate mastery of competencies and sustained professional growth for learners.

Similarly, Artan, Leureta, Petrit, and Agron (2025) explored the role of digital marketing in promoting sustainable tourism development. Their study revealed how innovative strategies enhance visibility, engagement, and sustainability in the tourism sector. This principle is highly relevant to Industrial Arts education, as innovative teaching approaches, such as the integration of digital platforms, virtual demonstrations, and the creative promotion of student outputs, can significantly enhance student learning experiences. By connecting industrial skills training with modern tools and creative dissemination of knowledge, learners become better prepared for professional and entrepreneurial endeavors.

Furthermore, Jingwen, Azmawani, Tong, Kamarulzaman, and Shafie (2025) examined the business models of Chinese enterprises to understand how dynamic capabilities impact

innovation and performance. Their findings emphasized adaptability, creativity, and strategic resource use as key drivers of success. When applied to Industrial Arts pedagogy, this insight emphasizes the importance of creating adaptive learning environments that promote problem-solving, innovation, and reflective practice. By cultivating dynamic capabilities within students, educators can prepare them not only to master technical skills but also to apply these competencies flexibly in real-world contexts.

Industrial Arts (IA) education increasingly draws on value-centered thinking to design learning that is purposeful, iterative, and closely aligned with real-world contexts. A time-value orientation—prioritizing sequences of activities that compound value for end-users—offers a valuable lens for structuring IA projects, where learners plan, prototype, test, and refine tangible artifacts over time. In management scholarship, time-value-oriented business model innovation is associated with more straightforward value propositions and increased perceived value among customers (Liu et al., 2024). Transposed to IA pedagogy, this suggests that instructors can scaffold units so students experience the “arc” of value creation (from need-finding to fabrication to user feedback), thereby strengthening problem framing, craftsmanship, and reflection. Such sequencing can also inform assessment—evaluating not only end products but also the cumulative gains learners realize across phases of making.

A second strand relevant to IA is the integration of sustainability and responsible practice. While studied extensively in corporate contexts, environmental, social, and governance (ESG) logics naturally map onto IA decisions regarding material selection, process safety, waste minimization, and community impact. Evidence that ESG performance is strategically linked to firm value (Yildiz et al., 2024) underscores the importance of embedding sustainability criteria as learning outcomes. Students can be tasked with justifying design choices using lifecycle thinking, ethically sourcing inputs, and documenting the social utility of projects. Doing so aligns technical skills with responsible innovation, helping learners internalize how craftsmanship intersects with stewardship and stakeholder accountability.

A third complementary perspective comes from service and experience design. Qualitative analyses of innovative service practices in airlines reveal that a focus on user needs, timely support, and iterative feedback systems can lead to improved organizational performance (Bakir et al., 2024). For IA classrooms and laboratories, the parallel is a learning environment where “service moments” matter: tool checkouts, safety briefings, constructive critiques, and rapid instructor or peer support at points of confusion. Designing these touchpoints intentionally—clear rubrics, just-in-time demonstrations, visible progress boards, and structured critique protocols—can enhance students’ perceived support and deepen engagement with complex making tasks.

Recent work on sustainability capability-building highlights the importance of aligning digital infrastructures with green knowledge practices to enhance innovation and performance (Al-Husain et al., 2025). In an Industrial Arts setting, this suggests that workshop curricula can integrate “digital dynamic capabilities” (e.g., CAD/CAM platforms, IoT-enabled tools, and data dashboards) with explicit green knowledge management (materials life-cycle literacy, waste minimization logs, and energy-use audits) to cultivate learners’ sustainable design thinking. The implication for pedagogy is a shift from tool-centric instruction to systems-

oriented projects where students document process data, reflect on environmental impacts, and iterate designs that balance function, cost, and sustainability—an approach consistent with competency-based, project-driven Industrial Arts learning.

Parallel insights emerge from studies of digital transformation in training management. Metayer (2025) demonstrates how digitizing training records improves efficiency, safety, and regulatory compliance in a complex, hands-on domain. By analogy, Industrial Arts programs—often governed by safety protocols and equipment-use competencies—can benefit from digital portfolios and evidence-tracking systems that capture skills progression, safety certifications, and reflective artifacts tied to specific operations (e.g., joinery, metalwork, CNC machining). Qualitatively, such systems enable richer narratives of learning, support timely feedback, and make tacit craft knowledge more visible through annotated images, micro-videos, and rubric-aligned checklists—a concrete enhancement to experiential pedagogy and reflective practice.

Customer-experience research further underscores how perception, engagement, and service design mediate outcomes (Ali & Alfayez, 2024). When transposed to Industrial Arts classrooms, “learner experience” functions as the mediating mechanism between pedagogical inputs and achievement: studio layout and tool accessibility, clarity of task flows, immediacy of formative feedback, and supportive instructor presence can meaningfully shape motivation, persistence, and craftsmanship quality. Incorporating user-centered design principles—briefing students to prototype for real users, gather feedback, and iterate—aligns with the evidence that experience quality influences loyalty in services; in education, analogous outcomes include sustained engagement, elective enrollment in advanced modules, and positive peer mentoring cultures.

Optimization research using multi-criteria decision-making (MCDM) methods provides additional guidance on balancing safety, throughput, quality, and resource constraints (Kulakli & Şahin, 2023). Industrial Arts labs face similar trade-offs: scheduling limited machines, prioritizing safety checks, allocating materials, and evaluating project quality. Employing MCDM-inspired rubrics—weighting criteria such as precision, finish, structural integrity, sustainability, and documentation—can make assessment more transparent and defensible while teaching students to reason about engineering trade-offs. Qualitative data (think-alouds, reflective journals, and group critiques) can reveal how learners internalize these criteria, negotiate choices under constraints, and develop professional judgment.

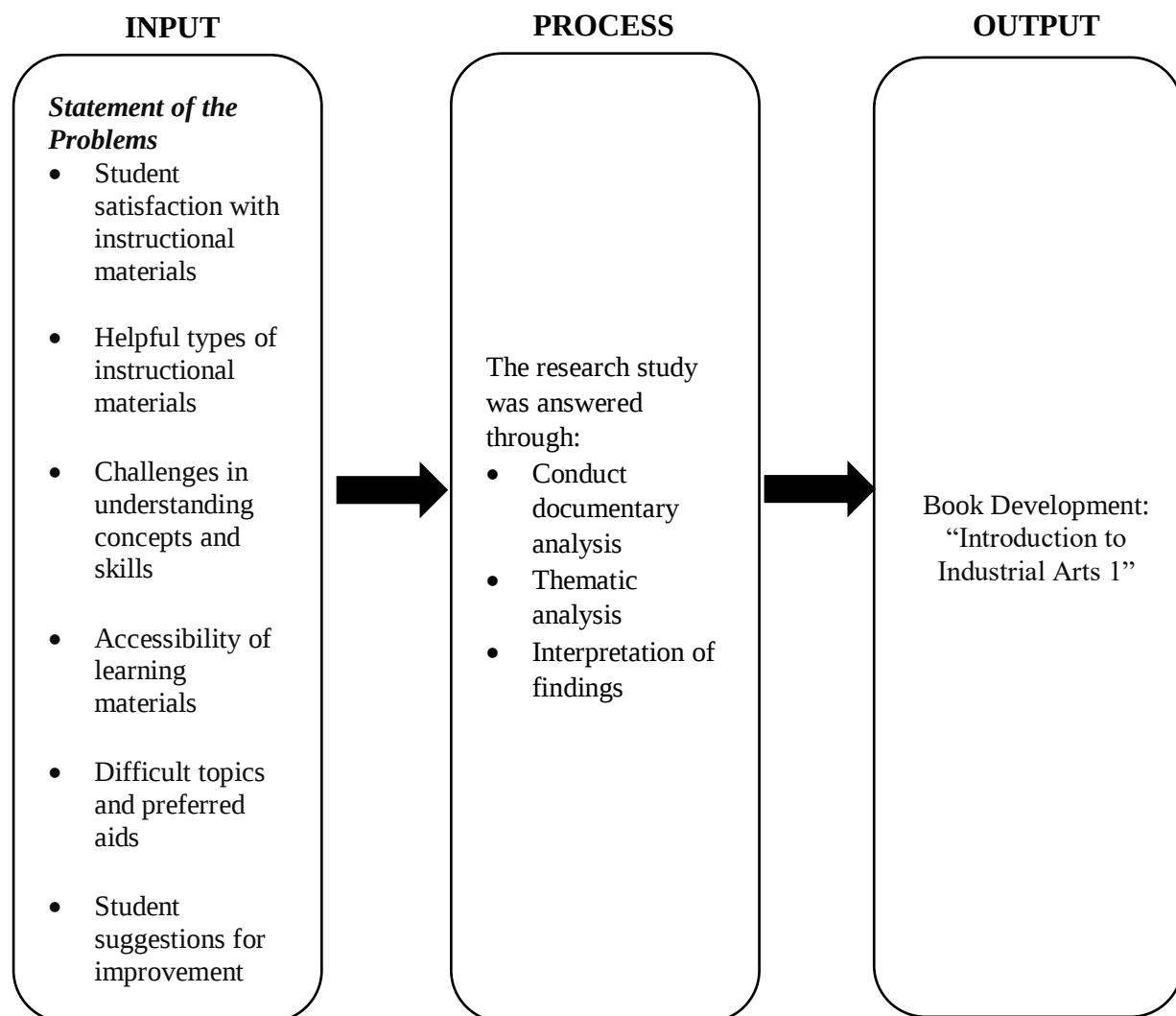
Theoretical Framework

Experiential Learning Theory (Kolb, 1984) posits that learning is a cyclic process in which concrete experience, reflective observation, abstract conceptualization, and active experimentation form an integrated whole. Applied to industrial arts, this framework foregrounds hands-on project work, iterative reflection on craft or design processes, and the testing of improvements as central to students’ development of practical skills and problem-solving abilities. In the context of the study, Kolb’s model helps explain how learners translate workshop activities and construction tasks into durable competencies: students gain knowledge through doing (concrete experience), pause to evaluate outcomes (reflective observation), form general principles about techniques or materials (abstract conceptualization), and then try refinements in new projects (active experimentation). Thus, the theory aligns closely with

research concerns about pedagogical approaches that emphasize practice-based learning, apprenticeship models, and the role of reflection in shaping industrial arts learning experiences.

Moreover, Social Constructivism (commonly associated with Vygotsky, 1978) emphasizes that cognitive development is fundamentally mediated by social interaction, language, and culturally situated tools. For industrial arts education, this framework highlights the importance of collaborative projects, instructor scaffolding, peer critique, and the use of technical artifacts and tools as mediators of learning. Within the study, Vygotskian ideas explain how novices move through a Zone of Proximal Development when more knowledgeable others (teachers, skilled peers, industry mentors) support students in tasks slightly beyond their unaided ability—whether learning safe tool use, interpreting technical drawings, or mastering complex fabrication sequences. Social constructivism therefore aligns with investigations into classroom organization, mentorship patterns, and collaborative pedagogies that shape students' lived learning experiences in industrial arts settings.

Conceptual Framework



The **study's input** focuses on the key areas explored through the research questions. These include student satisfaction with instructional materials, the types of materials students find most helpful, the challenges they encounter in understanding Industrial Arts concepts and skills, their accessibility to the needed resources, the specific topics or skills where they experience the most difficulty, and the suggestions they provide for improving instructional materials.

The **Process** involves the qualitative methods employed to analyze these inputs. Data will be gathered through interviews, focus group discussions, or documentary analysis to capture student experiences. The collected information will then undergo thematic analysis, allowing for the identification of effective instructional materials, recognition of common challenges and needs, and integration of student-driven recommendations. These steps ensure a systematic interpretation of the learning experiences within the Industrial Arts course.

The **Output** of the study is the development of a specialized instructional material in the form of a book titled "Introduction to Industrial Arts 1." This book will incorporate the findings of the research, addressing identified gaps, challenges, and student needs, while also integrating suggested improvements. Ultimately, the output aims to enhance teaching and learning in Industrial Arts by providing a more effective and student-centered resource.

METHODOLOGY

Research Design

The study employed a qualitative research design to explore the pedagogical approaches and learning experiences in Industrial Arts. A qualitative design was appropriate because it provided an avenue to capture authentic voices, perceptions, and experiences rather than relying solely on numerical data. The main focus was on understanding how teachers delivered instruction, how learners engaged in practical activities, and what challenges and opportunities emerged in Industrial Arts classes.

Population and Sampling Technique

The study population consisted of Industrial Arts teachers and selected students enrolled in secondary education, where Industrial Arts was offered as part of the Technology and Livelihood Education (TLE) program. The study employed purposive sampling, as participants were selected based on their relevance to the topic and their ability to provide meaningful insights. A total of six teachers with at least two years of experience in teaching Industrial Arts and 80 students who had completed at least one semester of Industrial Arts under the TLE program participated in the study.

Data Gathering Procedure

The data gathering procedure involved semi-structured interviews. An interview guide with open-ended questions was prepared to elicit detailed responses from participants. Individual interviews were conducted with teachers to document their instructional strategies, teaching approaches, and the challenges they faced. With their consent, all sessions were audio-recorded and later transcribed verbatim for analysis.

Data Analysis

The study employed thematic analysis in interpreting the data. The transcribed interviews were carefully reviewed multiple times to identify recurring ideas, patterns, and themes. Codes were assigned to significant responses, which were then grouped into categories and synthesized into broader themes. This process helped in organizing the findings into coherent insights about pedagogical practices and students' experiences in Industrial Arts.

Limitations and Ethical Considerations

The study recognized certain limitations. The findings were limited to the group of teachers and students who participated, which meant they might not be generalizable to other schools or contexts. In addition, as the data were self-reported, there was a possibility of responses being influenced by social desirability.

In terms of ethical considerations, the researcher ensured that participants gave informed consent before participating. Pseudonyms were used to protect their identities, and confidentiality was strictly observed. Participants were informed of their right to withdraw at any time without penalty. The researcher also upheld academic integrity by reporting the findings honestly and accurately.

RESULTS AND DISCUSSION

Based on the findings, here is how the research questions were answered:

SOP 1. How satisfied are the students with the instructional materials provided in the Industrial Arts course?

In the Industrial Arts course, the students generally expressed a moderate level of satisfaction with the instructional materials provided. Many acknowledged that the materials, such as manuals, activity sheets, and project guides, served as useful references that helped them understand the step-by-step processes in woodworking, metalworking, and other practical tasks. These resources were particularly valued for their clarity and alignment with the competencies expected in the subject. However, some students noted that the materials were often outdated and lacked integration with modern tools and technologies commonly used in the field, which limited their relevance to real-world applications.

Several students emphasized the importance of visual aids, illustrations, and hands-on demonstrations as complementary to the written instructional materials. They shared that while the handouts and printed modules explained the concepts, learning was more meaningful when the materials were paired with demonstrations by the teacher and opportunities to apply the instructions directly in practical tasks. This highlighted their preference for a combination of text-based and experiential learning resources.

On the other hand, a number of students voiced dissatisfaction with the limited availability of materials, particularly when several learners had to share a single resource during workshops. This scarcity sometimes caused delays in completing projects and created challenges in independent learning. Despite these constraints, the majority recognized the efforts of the instructors in maximizing the available resources to make learning more engaging and effective. Overall, the findings suggest that while the instructional materials are beneficial and

appreciated, there is a need for more updated, comprehensive, and accessible resources to fully meet students' expectations and enhance their satisfaction.

SOP 2. What types of instructional materials do students find most helpful in learning about Industrial Arts?

In this study, students consistently highlighted that hands-on activities were the most helpful instructional materials in their learning process. They emphasized that Industrial Arts as a discipline is skill-oriented and requires practical engagement with tools, equipment, and materials. By directly participating in projects such as woodworking, metalworking, or drafting, students reported that they not only developed technical skills but also enhanced their problem-solving abilities, creativity, and confidence. This experiential learning allowed them to connect theoretical knowledge with real-world applications, making the lessons more meaningful and memorable.

Aside from hands-on activities, many students also found videos and online resources valuable, particularly in reinforcing concepts outside the classroom. Demonstration videos provided step-by-step guidance on specific techniques, which they could revisit at their own pace. Online resources such as tutorials and forums offered broader perspectives and innovative project ideas, allowing them to expand their knowledge beyond what was covered in formal lessons. These materials were especially useful in bridging learning gaps, as students could review them anytime to clarify doubts.

Furthermore, textbooks and printed manuals were recognized for their role in providing foundational knowledge and technical references. Students noted that while these resources were not as engaging as practical work, they served as essential guides for understanding standards, safety protocols, and design principles. Meanwhile, guest speakers and industry practitioners were also appreciated because they shared real-world experiences and professional insights that inspired students to pursue excellence in their craft. Their presence created a connection between classroom learning and industry practices, motivating students to take their work more seriously.

The findings suggest that students prefer a blended use of instructional materials—with a strong emphasis on hands-on learning, supported by multimedia resources, textual references, and industry exposure. This combination not only catered to different learning styles but also enriched their overall educational experience in Industrial Arts.

SOP 3. What challenges do students face in understanding the concepts and skills taught in the Industrial Arts course?

Students in Industrial Arts often encounter challenges in fully grasping the concepts and skills taught in the course. One major difficulty stems from the lack of clear explanations during classroom instruction. When teachers are unable to simplify technical terms or demonstrate procedures step by step, learners struggle to connect theory with actual application. This lack of clarity creates confusion and slows down their ability to develop the required competencies.

Another challenge is the insufficient opportunities for practice. Industrial Arts is a hands-on subject where mastery relies heavily on repeated performance of tasks such as measuring, cutting, assembling, or operating tools. However, limited time in class and inadequate facilities often prevent students from engaging in consistent practice. As a result, learners fail to refine their skills and gain the confidence needed to carry out projects independently.

Students also experience difficulty in finding relevant materials and resources that can supplement their learning. Industrial Arts often requires specific tools, equipment, and raw materials, but these are not always readily accessible in schools or at home. The lack of affordable and available resources hinders students from practicing outside the classroom, further restricting their learning opportunities.

Additionally, the limited use of visual aids poses another obstacle. Many students find it easier to understand abstract concepts or technical procedures when they are illustrated through diagrams, models, videos, or demonstrations. Without such support, learners are left to rely solely on verbal instruction or written notes, which may not fully capture the practical aspects of the subject.

Lastly, other challenges such as time constraints, overcrowded classes, and varying levels of prior knowledge among students also contribute to their difficulties in Industrial Arts. These factors collectively limit students' ability to grasp concepts, develop practical skills, and sustain their motivation in the course.

SOP 4. Do students have adequate access to the materials needed for successful learning in Industrial Arts?

The findings revealed that access to materials varied significantly depending on the availability of school resources and the socio-economic background of students. Many participants noted that while the institution provided basic tools and equipment, the quantity was often insufficient to accommodate the number of learners, resulting in shared usage and limited hands-on practice. This lack of adequate access occasionally hindered the learning process, as students were unable to engage in activities that required individual practice and mastery entirely.

Furthermore, some students expressed that although their teachers improvised and maximized available resources, the quality of learning was still affected by the absence of specific, specialized tools and materials essential for Industrial Arts projects. The situation was more challenging for students who could not afford to purchase supplementary materials independently, highlighting the role of financial constraints in shaping access. However, participants acknowledged that the resourcefulness of teachers and peer collaboration often compensated for these shortcomings, allowing them to develop fundamental skills despite limitations.

Overall, the study indicated that while students do have some level of access to Industrial Arts materials, it is not always sufficient to ensure equal and successful learning opportunities. Adequate provision of materials and institutional support remains a critical factor in enhancing students' practical experiences and learning outcomes in Industrial Arts.

SOP 5. In which specific topics or skills do students experience the most difficulty, and what types of instructional materials do they consider most helpful for addressing these challenges?

The findings revealed that students often experienced the most difficulty with topics that required a combination of technical precision and practical application. Skills such as accurate measurement, proper use of hand and power tools, and interpreting technical drawings posed significant challenges. Many students shared that while they understood the theoretical aspects of these skills, applying them in real-life tasks demanded greater mastery and confidence. Safety protocols and the integration of design concepts into functional projects also emerged as areas where learners encountered consistent struggles, mainly due to the need for both cognitive understanding and practical execution.

To address these challenges, students highlighted several types of instructional materials they found most helpful. Hands-on practice projects were consistently regarded as the most effective, as they allowed learners to directly apply their knowledge, correct mistakes, and gain confidence through repetition and experience. Step-by-step video tutorials were also considered highly valuable, particularly for complex tasks such as tool handling or furniture assembly, as students could pause, replay, and follow instructions at their own pace. Real-world examples and case studies were noted as helpful in bridging the gap between theory and practice, enabling students to see how concepts are applied in professional settings.

Meanwhile, interactive online exercises were appreciated by some learners for reinforcing technical knowledge, although they were seen as supplementary rather than primary tools. Overall, students expressed that a blended approach—combining detailed textbooks for theoretical grounding, visual demonstrations through videos, and authentic practice through projects—was most effective in overcoming their learning difficulties in Industrial Arts.

SOP 6. What suggestions do students provide for improving the instructional materials used in the Industrial Arts course?

Students provided several constructive suggestions for enhancing the instructional materials used in the Industrial Arts course. Many of them emphasized the need for more visually engaging and interactive materials, such as step-by-step illustrated guides, diagrams, and videos that clearly demonstrate processes and techniques. They explained that while textual explanations were helpful, visual aids made it easier for them to understand complex tasks and retain the information. In addition, students recommended integrating digital platforms where resources, such as tutorials, practice exercises, and reference materials, could be accessed at any time, providing them with flexibility in reviewing lessons beyond the classroom.

Another common suggestion centered on contextualizing the instructional materials to real-life applications. Students expressed that incorporating examples from actual industrial practices or showcasing finished products from professionals would make the learning experience more meaningful and motivating. They also proposed updating the materials to include modern tools, equipment, and techniques that reflect current industry standards. According to them, this would not only improve their learning but also enhance their readiness for real-world applications.

Finally, students suggested that instructional materials should be more learner-centered, offering opportunities for self-assessment, reflection, and peer feedback. They recommended incorporating activity sheets, project-based tasks, and problem-solving exercises that encourage creativity and critical thinking. By combining traditional printed resources with digital, visual, and hands-on components, students believed that the instructional materials would be more effective in supporting diverse learning styles and fostering deeper engagement in the Industrial Arts course.

Table 1. Summary of challenges encountered and corresponding suggested solutions

THEME	DESCRIPTION OF FINDING	STUDENT-DRIVEN SUGGESTION
Outdated instructional materials	Existing manuals and guides were useful tools, but often lacked alignment with current tools and industry standards.	Updated materials with modern technologies and contextualized examples
Limited Practice Opportunities	Overcrowded classes and insufficient workshop hours reduced hands-on engagement.	Allocate extended workshop sessions and provide more facilities.
Technical skill difficulties	Students struggled with measurement accuracy, tool handling, and interpreting technical drawings.	Incorporate step-by-step illustrated guides and video tutorials.
Inequitable Resource Access	Financial constraints limited some learners' ability to secure tools or practice independently.	Schools to partner with industries for equipment support or donations

SUMMARY

In exploring students' satisfaction with the instructional materials in the Industrial Arts course, the findings revealed a moderate level of satisfaction. Students appreciated the manuals, activity sheets, and project guides for their clarity and alignment with competencies. However, they pointed out that many were outdated and lacked relevance to modern tools and technologies. Visual aids and demonstrations were seen as vital complements, while the limited availability of materials sometimes caused delays and hindered independent learning. Overall, students valued the usefulness of the resources but stressed the need for more updated, comprehensive, and accessible materials.

When asked about the types of instructional materials they found most helpful, students strongly emphasized the importance of hands-on activities. Practical engagement with tools and projects enhanced not only technical skills but also creativity and problem-solving abilities. They also valued demonstration videos and online tutorials for flexible, self-paced learning, while textbooks and manuals served as essential technical references. Guest speakers and industry practitioners were likewise appreciated for connecting classroom learning to real-

world applications. Collectively, students preferred a blended approach to learning, with hands-on activities at the core.

The challenges faced by students centered on the lack of clear explanations during instruction, insufficient opportunities for practice, and the unavailability of resources. Time constraints, overcrowded classes, and varying levels of prior knowledge further compounded these difficulties. Students particularly struggled with technical skills, including measurement, proper tool use, interpreting drawings, and applying safety protocols. These challenges highlighted the need for more structured, accessible, and practice-oriented learning supports.

Access to instructional materials was also a significant concern. Although schools provided basic tools and equipment, these were often insufficient for the number of students, leading to shared use and reduced individual practice. Financial constraints also limited some learners' ability to supplement their resources, although teacher resourcefulness and peer collaboration often helped address these gaps. Despite these efforts, the study highlighted the crucial importance of adequate institutional support and the provision of resources for equitable learning opportunities.

In terms of instructional materials most helpful in addressing specific difficulties, students emphasized the effectiveness of hands-on projects, step-by-step video tutorials, and real-world case studies. These helped bridge the gap between theory and practice, while interactive exercises and textbooks provided supplementary reinforcement. The preferred approach was a blended mix of text-based, visual, and experiential resources.

Finally, students suggested several ways to improve instructional materials. They recommended incorporating more visual and interactive resources, such as illustrated guides, diagrams, and videos, as well as integrating digital platforms for flexible access. Updating materials to align with modern tools and industry standards was strongly emphasized. They also advocated for learner-centered designs that included self-assessment, reflection, and project-based tasks to foster creativity and critical thinking. Collectively, these suggestions underscore the students' desire for instructional materials that are engaging, relevant, updated, and adaptable to diverse learning styles.

CONCLUSIONS

- The study revealed that students were moderately satisfied with the instructional materials in Industrial Arts, recognizing their usefulness in guiding step-by-step processes in various tasks. However, limitations such as outdated content, scarcity of resources, and lack of integration with modern tools and technologies reduced their overall effectiveness. Despite these challenges, students appreciated the clarity of the materials and the teachers' efforts to maximize available resources.
- Students found hands-on activities to be the most effective instructional materials, as these directly developed their technical skills, creativity, and problem-solving abilities. Multimedia resources such as videos and online tutorials enhanced their learning by providing flexible, self-paced support, while textbooks and guest lectures offered foundational knowledge and real-world insights.

- Students struggled with limited clarity of technical explanations, insufficient practice opportunities, and a lack of accessible resources. The absence of adequate visual aids, overcrowded classes, and varying levels of prior knowledge further complicated their ability to grasp complex concepts and master practical skills.
- The findings indicated unequal access to Industrial Arts materials, as tools and equipment were often insufficient for the number of students. While teachers improvised with available resources, financial constraints limited some learners' ability to acquire their own materials, thereby restricting practice opportunities and hindering skill mastery.
- Students encountered the most difficulty in technical skills requiring precision, such as accurate measurements, tool handling, and interpreting technical drawings. Safety protocols and integrating design concepts into projects also posed consistent challenges. They considered hands-on practice, step-by-step video tutorials, and real-world examples as the most effective instructional materials for overcoming these difficulties.
- Finally, students suggested the use of more visually engaging and interactive materials, integration of digital resources, and contextualization of learning to real-life industrial practices. They emphasized the need for updated content that aligns with modern tools and techniques, as well as learner-centered materials that encourage creativity, reflection, and critical thinking.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are suggested:

1. Firstly, it is recommended that instructional materials be updated and diversified to incorporate modern tools, digital references, and industry-aligned content. Schools should invest in ensuring wider accessibility of these resources and integrate visual aids, demonstrations, and practical applications to create a more engaging and relevant learning experience.
2. Educators should adopt a blended approach to instructional materials, emphasizing practical, hands-on projects while supplementing them with multimedia and textual resources. Collaborating with industry professionals to provide workshops and guest lectures can also enrich student learning and better prepare them for real-world applications.
3. It is recommended that teachers employ clearer explanations supported by visual aids, models, and demonstrations to enhance student comprehension. Schools should provide additional practice opportunities through extended workshop sessions, adequate facilities, and supplemental resources to help learners refine their skills and build confidence.
4. Schools should prioritize investing in sufficient tools and materials to ensure equitable learning opportunities for all students. Partnerships with local industries and community stakeholders may also be explored to secure sponsorships or donations of modern equipment, thus improving resource availability and enhancing the learning environment.

5. It is recommended that Industrial Arts instruction focus on providing repetitive, guided practice sessions supported by video tutorials and case-based examples. Teachers should integrate real-world projects that highlight accuracy, safety, and design application to help learners connect theory with practice and build greater confidence in their technical skills.
6. It is recommended that instructional materials be redesigned to include visual and digital components such as illustrated guides, videos, and online modules. Schools should also update content to reflect current industry standards while fostering student-centered learning through project-based tasks, peer collaboration, and opportunities for self-assessment and reflection.
7. Lastly, based on the findings of this study, it is strongly recommended to develop a comprehensive book titled “Introduction to Industrial Arts 1.” This book should serve as a standardized and updated instructional resource that addresses the gaps identified in existing materials. It must integrate clear explanations, step-by-step illustrated guides, and contextual examples to support both theoretical understanding and practical application. Additionally, the book should incorporate modern tools, techniques, and industry-based practices to ensure its relevance to current standards. To cater to diverse learning styles, it is advisable to complement text-based content with visual aids, diagrams, and suggested digital resources, as well as reflective activities and project-based tasks to promote creativity and critical thinking. By providing an accessible, learner-centered, and industry-aligned reference, this book can enhance student satisfaction, improve comprehension, and foster mastery of essential Industrial Arts skills, ultimately strengthening the teaching and learning experience in the subject.

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