Chemistry Laboratory Equipment as Authentic Materials in Assisting Tenth Graders of Vocational School in Writing Procedure Text

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Abstract: *This study explores the use of chemistry laboratory equipment as authentic materials to support tenth-grade vocational students in writing procedural texts. Conducted at a vocational school in Surabaya, 36 students from the Chemical Engineering Department participated in learning activities, observations, interviews, and writing tasks. Results showed that integrating real tools enhanced students' understanding of text structure, vocabulary, and sequencing. Most students produced well-organized texts and expressed higher motivation and confidence. Despite some challenges in transferring practical experience into written form, the findings affirm the value of authentic materials in genre-based ESP writing instruction for vocational contexts.*

INTRODUCTION

English is a core subject in Indonesia's national curriculum, aimed at developing students' skills in listening, speaking, reading, and writing. Among these, writing is considered the most challenging due to the need to organize ideas coherently and express them clearly (Alharbi, 2021; Zhang & Wang, 2020). This challenge becomes more pronounced in vocational schools, where students are required to write technical documents such as procedure texts—an essential form of communication in future workplaces.

Vocational students often struggle with low motivation, limited technical vocabulary, and weak organizational skills, resulting in unclear or incomplete writing. These issues call for innovative teaching approaches that simultaneously support language development and technical content mastery.

One promising approach is the use of authentic materials, defined as real-world objects or tools not initially designed for educational use. These materials help learners bridge the gap between academic tasks and real-life applications by increasing engagement and contextual relevance (Gilakjani, 2020; Widodo, 2019). While videos or images can illustrate procedures, they do not offer the same level of cognitive engagement or tactile experience as physical interaction with real objects. In particular, laboratory equipment allows students to physically handle, observe, and perform each step, reinforcing their understanding and memory of the procedure.

In technical fields like chemical engineering, such hands-on experience plays a vital role in strengthening procedural thinking. Writing about actions they have actually performed helps students describe steps more accurately, use technical terms appropriately, and reflect real-world task flow in their writing.

Although previous studies have explored the general use of authentic materials in writing instruction (Widodo, 2019; Fitria, 2021), limited research has focused on how direct interaction with lab equipment can enhance vocational students' ability to compose structured and accurate procedure texts.

To address this gap, the present study investigates the integration of chemistry laboratory equipment as authentic materials to assist tenth-grade vocational students in writing procedure texts. It seeks to demonstrate how physical, real-world tools can transform abstract writing tasks into meaningful, experience-based learning aligned with the students' future professional needs.

METHOD

Research Design

This study uses a qualitative descriptive method aimed at analyzing HiMall's marketing strategy in depth. Data were collected through interviews with prospective users, tenants, and mall management, as well as literature studies and secondary data such as APPBI reports and mall visitor data. Analysis was conducted using the STP approach (Segmenting, Targeting, Positioning) and the marketing mix combined with the NICE concept (Networking, Interaction, Common Interest, Experience). The results of the analysis are expected to provide an overview of the appropriate marketing strategies to increase awareness and attract HiMall users.

Research Subjects

Research involves a structured process of observation, analysis, and data interpretation to answer specific questions (Schoonenboom, 2020). This study uses a qualitative approach to investigate how vocational students use chemistry laboratory equipment as authentic materials in writing procedure texts. The study involved 36 tenth-grade students from the Chemical Engineering Department of a vocational school in Surabaya. These students participated in learning activities using chemistry laboratory equipment as authentic materials to support writing procedure texts. From this group, 10 students were purposively selected for semi-structured interviews, representing varied writing proficiency and engagement levels. Their input provided reflective insights into their learning experiences and challenges. This number aligns with Hennink and Kaiser (2022), who state that 6–12 participants are usually sufficient to reach thematic saturation in focused qualitative studies. All students were observed, engaged in classroom tasks, and produced written texts evaluated using a rubric adapted from Brown (2007), as cited in Isnaini et al. (2019). Using multiple data sources supported triangulated analysis of writing development and the effectiveness of authentic materials in vocational ESP instruction.

Research Setting

This study was conducted at a vocational school in Surabaya specializing in chemical engineering. The classroom is equipped with laboratory tools such as beakers, test tubes, and pipettes, providing an authentic environment for writing instruction. This setting was chosen to connect students' academic writing with real-world practice, ensuring relevance to their vocational training and supporting the contextual development of procedural text writing skills.

Data and Sources of Data

Data refers to information collected to answer research questions and support findings (Kitchin, 2021). In this study, data include written texts, interview responses, and observational notes obtained from three main sources:

1. Observation Checklists, Field Notes, and Field Records
   These capture students' interactions with chemistry lab equipment during writing activities. The checklist records behaviors such as material identification, application in writing, and use

of appropriate language structures.

2. Interview Responses
   Semi-structured interviews with students and teachers provide insights into their experiences, perceptions, and challenges related to using lab tools in writing instruction.
3. Student-Written Procedure Texts Analyzed Using Rubrics
   Texts produced by students before and after using authentic materials were analyzed with rubrics assessing clarity, structure, and accuracy in procedural writing.
   Together, these data sources provide a comprehensive understanding of how authentic materials, specifically chemistry laboratory equipment, shape students' writing skills and the challenges faced during the process.

Data Collection Techniques and Research Instruments

This study applied three main techniques to collect data related to the use of chemistry laboratory equipment as authentic materials in writing procedure texts: observation, interviews, and evaluation of student-written texts. These techniques were chosen to explore both the learning process and written outcomes in a vocational classroom context.

1. Observation
   Observation was conducted during class activities to document students' interactions with laboratory tools and their engagement in writing. Three instruments were used:
   a. Observation Checklist (adapted from Ngoc Tuan et al., 2018) to record structured behavior
   b. Field Notes and Field Records (adapted from Creswell & Poth, 2018) to document descriptive events and researcher reflections. All observation instruments are available in the Appendix.
2. Semi-Structured Interviews
   Semi-structured interviews were conducted with 10 students to explore their personal experiences, perceptions, and challenges during the learning process. The open-ended format allowed for in-depth responses while guiding the discussion across key themes (Nowell et al., 2017).
   The full interview guide is available in the Appendix.
3. Student-Written Procedure Texts Analyzed Using Rubrics
   Students' final writing products were evaluated using a rubric adapted from Brown (2007), as cited in Isnaini et al. (2019), which includes six components: Title, Materials & Tools, Steps & Clarity, Grammar & Vocabulary, Coherence & Flow, and Mechanics. This rubric supports both formative and summative assessments and helps identify strengths and areas for improvement in students' writing. The complete rubric and scoring guide are available in the Appendix.
   These three data collection techniques enable triangulation, strengthening the validity of findings by comparing behavioral evidence, personal narratives, and writing performance.

RESULT AND DISCUSSION

Research Findings

How Tenth Graders of Vocational School Utilize Chemistry Laboratory Equipment as Authentic Materials to Support Their Understanding and Organization of Procedural Steps in Writing Procedure Texts

The integration of real laboratory equipment significantly supported students in five key areas: recalling procedural steps, understanding text structure, increasing motivation, improving vocabulary use, and shifting writing behavior.

1. Recall and Sequencing of Steps
   Most students demonstrated improved ability to recall procedural steps due to direct interaction with the laboratory tools. Based on classroom observations and field notes, students frequently touched, mimicked, or pointed at tools like pipettes and conical flasks as they wrote, aiding memory and sequencing.
   a. Field Notes (April 2025):
      "Students mimicked actions while writing, indicating that they used motor memory to recall the sequence of steps." (Source: Descriptive Note)
   b. Interview Question 2:
      "Do you find it easier or harder to write procedure texts with real lab materials?"
      "It was definitely easier… when I had the equipment in front of me, it helped me organize my thoughts and describe things more accurately." (Student 1)
2. Awareness of Text Structure
   Students reported clearer understanding of procedural text structure—particularly the boundary between the 'Materials' and 'Steps' sections.
   a. Interview Question 6:
      "Did using real equipment help you understand the structure of a procedure text better? How?"
      "Yes… it helped me organize the sections clearly." (Student 4)
      "I understood better where the 'materials' part ends and where the 'steps' begin." (Student 1)
3. Vocabulary Use and Accuracy
   Observation and rubric analysis show that students more confidently used technical terms such as "pipette," "beaker," and "phenolphthalein."
   a. Observation Checklist:
      33 out of 36 students demonstrated correct vocabulary usage when handling and writing about the lab tools.
   b. Field Note (April 2025):
      "Students like Jelita and Bressies used transition words like 'first', 'then', and 'finally' correctly."
4. Increased Motivation and Engagement
   Students expressed increased enthusiasm and interest during the learning process when lab tools were involved.
   a. Interview Question 1:
      "I enjoyed the experience… I wasn't just imagining the tools I had used them." (Student 1)
      "I felt excited, it was new for me." (Student 6)
5. Behavioral Shift in Writing Process
   A shift from spontaneous writing to structured planning was observed.
   a. Interview Question 7:
      "How did your writing process change after using lab equipment?"
      "I planned my text better, thought about the order of the steps, and checked that the instructions were clear." (Student 1)
      "I started writing in a more logical order." (Student 2).

What Tenth Graders of Vocational School Encounter as Challenges in Writing Procedure Texts through Using Laboratory Equipment as Authentic Materials

While laboratory tools supported learning, students still faced challenges converting practical observations into structured writing. These difficulties stemmed more from cognitive and language limitations than from the tools themselves. The following findings explain these challenges in detail.

1. Difficulty Differentiating Similar Tools
   Many students faced initial confusion distinguishing similar tools like burettes and measuring cylinders.
   a. Interview Question 3:
      "I mixed up the beaker and measuring cylinder the first time." (Student 1)
2. Grammar and Sentence Construction Issues
   Despite using authentic tools, grammar issues remained a persistent challenge—especially verb tenses and passive voice.
   a. Interview Question 3:
      "Grammar was still difficult for me." (Student 4)
      "I struggled with using passive voice." (Student 5)
   b. Rubric Analysis (Grammar Score):
      Several students scored below 16 in grammar, indicating minor to moderate issues even among top-performing students.
3. Limited Technical Vocabulary
   Students needed time and support to recall or spell the names of lab tools in English.
   a. Interview Question 3:
      "I had to double-check how to spell the names of some tools." (Student 1)
      "It was hard to describe the function in English." (Student 2)
4. Structural Incoherence in Early Drafts
   Some students initially produced texts with unclear boundaries between materials and steps.
   a. Observation Notes:
      "Certain students merged tools and procedures in a single paragraph, showing a lack of structural clarity."
5. Need for Additional Support and Modeling
   Students suggested improvements like vocabulary drills and example texts to aid their writing.
   a. Interview Question 10:
      "Provide example texts for comparison." (Student 4)
      "Add vocabulary drills before the writing session." (Student 5)

What Tenth Graders' Procedure Writing Text Results Reveal After Utilizing Chemistry Laboratory Equipment as Authentic Materials

This section analyzes students' final procedure texts after using chemistry lab tools in writing instruction. Using a rubric covering six components, their work was assessed for both content accuracy and language quality. Students were then grouped into five performance categories, with examples provided for each.

1. Excellent Category
   Students in this category produced clear, detailed, and well-structured procedure texts. Their writing reflected strong command of technical vocabulary and language accuracy.

a. Student 2
Total Score: 85

Table 1. Student 2's paper analysis

Title	
Content	How to Use Test Tube Oven
Analysis	Clear procedural form ("How to…"), specific tool mentioned, aligns with instructional purpose.
Rubric Score	5/5
Goal	
Content	To safely heat substances in test tubes using a test tube oven in the laboratory.
Analysis	Infinitive phrase with adverb of manner; clear, formal, and appropriate to ESP context.
Rubric Score	(Scored within Coherence/Grammar)
Materials	
Content	1. Test Tube Oven 2. Test Tubes 3. Test tube holder or rack 4. Substances to be heated 5. Safety goggles 6. Lab coat & heat-resistant gloves
Analysis	Uses parallel structure and technical terms. Complete, precise, and appropriate.
Rubric Score	15/15
Steps	
Content	1. Place the test tube oven on a flat, heat-resistant surface. 2. Ensure the oven is clean. 3. Put on safety equipment. 4. Insert the test tube into the oven rack. 5. Turn on the oven. 6. Set the desired temperature. 7. Monitor heating. 8. Wait for the heating to complete. 9. Turn off the oven. 10. Use the test tube holder to remove the test tube carefully.
Analysis	Steps follow logical lab procedure. Imperative verbs are correctly and consistently used. Slight lack of detail in timing or temperature.
Rubric Score	20/25
Grammar	
Analysis	Mostly accurate; appropriate tense, structure, and technical vocabulary.
Rubric Score	16/20
Coherence	
Analysis	Logical sequencing and paragraph unity are present. Some transitions could be more explicit.
Rubric Score	16/20
Mechanics	
Analysis	Consistent capitalization and punctuation; only minor issues.
Rubric Score	13/15

b. Student 5
Total Score: 86

Table 2. Student 5's paper analysis

Title	
Content	How to Use a pH Meter
Analysis	Title uses the imperative form ("How to…"), clearly names a specific lab tool, and aligns with the instructional genre.
Rubric Score	5/5
Goal	
Content	To accurately measure the pH level of a solution using a pH meter.
Analysis	Purpose is clearly stated using an infinitive phrase. Formal tone and adverb of manner ("accurately") reflect scientific precision.
Rubric Score	(Goal assessed under Grammar/ Coherence)
Materials	
Content	1. pH meter 2. Distilled water 3. Buffer solutions (pH 4.0, 7.0, 10.0) 4. Beaker or sample container 5. Tissue 6. Gloves and lab coat
Analysis	The list is well-organized, with technical terms ("buffer solution"), consistent parallel phrasing, and appropriate lab safety items.
Rubric Score	15/15
Steps	
Content	1. Turn on the pH meter. 2. Rinse the electrode with distilled water. 3. Calibrate the pH meter using buffer solution pH 7.0. 4. Rinse the electrode again and calibrate with pH 4.0 if measuring acidic solution or pH 10.0 for basic solution. 5. Rinse the electrode once more before inserting it into the sample solution. 6. Wait for the reading to stabilize and record the pH value. 7. After use, rinse and store the electrode properly.
Analysis	Uses consistent imperative verbs, Logical flow with sub-steps (e.g., calibration variants) showing deeper procedural understanding, Embedded conditionals enhance clarity and reflect real lab application.
Rubric Score	21/25
Grammar	
Analysis	Sentence structure is consistently accurate. Command forms are correctly used. Tense and subject-verb agreement are maintained.
Rubric Score	17/20
Coherence	
Analysis	Steps progress smoothly with well-structured logic. Embedded transitions (e.g., "after use," "before inserting") support cohesion.
Rubric Score	**15/20**
Mechanics	
Analysis	Punctuation and capitalization are accurate throughout. Minor lapses (e.g., article usage) do not interfere with readability.
Rubric Score	**13/15**

Student 2, Student 5, and other students in the Excellent category demonstrated strong mastery of procedural writing. Their texts reflected clear structure, appropriate use of lab terminology, and accurate imperative forms. They were able to transfer hands-on lab experiences into coherent, detailed, and academically appropriate procedure texts.

2. Good Category

These students showed a good understanding of procedure writing, though with less elaboration or occasional gaps in detail, coherence, or grammar.

a. Student 9

Total Score: 80

Table 3. Student 9's paper analysis

Title	
Content	HOW TO USE: TERMOMETER
Analysis	Uses imperative style and specific tool mention, but full capitalization and missing article ("a thermometer") reduce formality and accuracy.
Rubric Score	4/5
Goal	
Content	Knowing someone's body temperature accurately by using a thermometer.
Analysis	Begins with a gerund rather than the expected infinitive. Informal register; lacks precision expected in academic writing.
Rubric Score	(Scored under Grammar/Coherence)
Materials	
Content	1. Thermometer (digital or mercury) 2. Alcohol wipes or cotton 3. Clock or stopwatch (if needed)
Analysis	Basic and relevant, though list structure is inconsistent and lacks measurement detail.
Rubric Score	13/15
Steps	
Content	1. TOOL PREPARATION: Clean the tip of the thermometer with a tissue moistened with alcohol. 2. TURNING ON THE THERMOMETER: Press power button if using digital. 3. THERMOMETER PLACEMENT: • Oral: under tongue, close mouth. • Axillary: under armpit, close arms. • Rectal: lubricate, insert slowly (1–2 cm). 4. WAIT: Beep (digital) or 3–5 min (mercury). 5. READING: View result, record if needed. 6. CLEANING: Wipe with alcohol again.
Analysis	Procedural steps are present and mostly accurate. Subheadings help structure, but sometimes disrupt cohesion. Verb use is mostly imperative.
Rubric Score	19/25
Grammar	
Analysis	Generally accurate, with some awkward phrasings and missing articles.
Rubric Score	15/20
Coherence	
Analysis	Steps are logically ordered but flow is sometimes choppy due to section headers.

Rubric Score	14/20
Mechanics	
Analysis	Capitalization overused in title; punctuation mostly correct.
Rubric Score	10/15

b. Student 16
Total Score: 82

Table 4. Student 16's paper analysis

Title	
Content	How to Use a Hot Plate
Analysis	Procedural, accurate, includes article and tool name. Original was in all caps, which reduced formality slightly.
Rubric Score	4/5
Goal	
Content	To Be Able To Use Hot Plate Properly And Safely In The Laboratory.
Analysis	Clear intention, but awkward phrasing and capitalization errors lower precision.
Rubric Score	(Scored under Grammar/Coherence)
Materials	
Content	1. Hot plate 2. Vessel 3. Magnetic stirrer 4. Power cable
Analysis	Functional items are listed, but lack detail and safety items. Simple vocabulary.
Rubric Score	13/15
Steps	
Content	1. Place hot plate on a flat surface. 2. Plug in the hot plate. 3. Turn on the device. 4. Set the temperature. 5. Place container with substances on top. 6. Add magnetic stirrer if available. 7. Set the speed of the confuse. 8. Wait for boiling and stirring. 9. Turn off and unplug. 10. Clean the late plate.
Analysis	Step structure is solid, with correct sequencing. Errors in vocabulary ("confuse" for "stirrer"; "late plate" instead of "hot plate") reduce clarity.
Rubric Score	20/25
Grammar	
Analysis	Verb forms are mostly correct; a few tense and article issues appear.
Rubric Score	16/20
Coherence	
Analysis	The flow is present but slightly interrupted by language errors.
Rubric	15/20

Score	
Mechanics	
Analysis	Several spelling mistakes and inconsistencies noted.
Rubric Score	9/15

Student 9 and Student 16, along with others in the Good category, demonstrated a solid understanding of procedural writing, though their texts contained minor lapses in vocabulary, phrasing, or mechanical accuracy. While their writing reflected awareness of the correct structure and function, occasional issues in coherence, grammar, or scientific precision prevented them from reaching the Excellent level.

3. Fair Category

Students in this group provided basic procedures with limited structure, often missing key components such as materials, caution, or full step clarity.

a. Student 1

Total Score: 72

Table 5. Student 1's paper analysis

Title	
Content	How To Use Bunsen Burner
Analysis	Procedural form is correct, but lacks punctuation and article ("a Bunsen burner"). Capitalization is consistent.
Rubric Score	3/5
Goal	
Content	(Not explicitly stated)
Analysis	Missing goal statement weakens the structure. Purpose is implied but not formally introduced.
Rubric Score	(Scored under Grammar/Coherence)
Materials	
Content	(Not listed separately)
Analysis	Key tools (e.g., gas hose, lighter) are only mentioned within steps, not grouped or clearly named. This affects readability and clarity.
Rubric Score	10/15
Steps	
Content	1. Preapared the area. Clear the surrounding area of any flammable materials. 2. Check the Equipment: Ensure the gas hose is securely connected to the gas supply. 3. Turn on the gas: Slowly turn on the gas tap to allow gas to flow to the burner. 4. Light the burner: Use a match or lighter to ignite the gas at the top of the burner. 5. Adjust the burn: Twist the collar to open the air hole slightly for a yellow (safety) flame. For a hotter blue flame.
Analysis	Mixed formatting (titles vs. instructions), spelling error ("Preapared"), and an incomplete final step (no shut-off). Structure is present but lacks consistency.
Rubric Score	16/25
Grammar	
Analysis	Some sentence fragments, verb inconsistencies, and minor grammar

	lapses.
Rubric Score	14/20
Coherence	
Analysis	Steps follow logical order, but formatting inconsistencies disrupt the overall flow.
Rubric Score	13/20
Mechanics	
Analysis	Minor spelling and punctuation issues; lacks clarity in transitions.
Rubric Score	9/15

b. Student 6
Total Score: 70

Table 6. Student 6's paper analysis

Title	
Content	How to Use Erlenmeyer
Analysis	Procedural form is correct, but lacks article ("an Erlenmeyer flask") and scientific precision.
Rubric Score	3/5
Goal	
Content	(Not explicitly stated)
Analysis	The purpose of using the Erlenmeyer is only implied through grouped functions (mixing, heating, titration, storing).
Rubric Score	(Scored under Grammar/Coherence)
Materials	
Content	(Not listed separately)
Analysis	Tools are spread throughout the text and not clearly grouped. Readers must infer equipment from each activity.
Rubric Score	10/15
Steps	
Content	1. Measuring & Mixing Solutions: Pour your liquid. Use a funnel if needed. Swirl the flask gently. Avoid vigorous shaking unless closed with stopper or parafilm. 2. Heating: Heat gently over Bunsen burner with gauze. Never heat sealed flask. 3. Titration: Swirl while titrant is added from burette. 4. Storage: Cover with stopper or parafilm.
Analysis	Steps are functional but grouped by type, not sequence. Some fragments and unclear phrasing appear. Structure deviates from expected procedural flow.
Rubric Score	15/25
Grammar	
Analysis	Some imperatives are clear, but others are cut off or missing verbs.
Rubric Score	14/20
Coherence	
Analysis	The use of category-based steps instead of sequential steps reduces cohesion.

	Unreadable parts further disrupt clarity.
Rubric Score	13/20
Mechanics	
Analysis	Minor errors appear. A corrupted portion ("id vigorous shaking") is left as is, contributing to lower score.
Rubric Score	8/15

Student 1 and Student 6, along with others in the Fair category, showed basic understanding of procedural text structure but lacked consistency and clarity in execution. Their texts often missed key components such as a goal or materials list, and formatting or grammar issues reduced the effectiveness of communication. While their efforts showed foundational knowledge, these students still need more guidance in organizing and expressing procedural tasks with academic precision.

4. Needs Improvement Category
   The Needs Improvement category (scores 50–59) indicates minimal control of procedural writing. However, no students in this study fell into this range, as all submissions scored 60 or above. Thus, this category is noted but has no representative sample.
5. Poor Category
   The Poor category (scores 0–49) indicates failure to meet basic procedural writing criteria. In this study, Student 13, 23, and 31 were placed in this category not due to poor writing, but because they did not submit any text. As no samples were available, this category is acknowledged without analysis.

Discussion

This chapter discusses the findings presented in Chapter IV in relation to the research questions and the theoretical framework outlined in Chapter II. The aim of this discussion is to interpret how the integration of chemistry laboratory equipment as authentic materials influenced students' ability to write procedure texts in a vocational school setting. The analysis considers not only what students did, but why they responded in such ways, grounded in theories of writing instruction, English for Specific Purposes (ESP), and the use of authentic materials in language learning.

The discussion is organized into three parts, each corresponding to a research question: how students utilized laboratory equipment to support procedural writing, the challenges they faced during this process, and the quality of their final written outputs. Drawing on relevant theories such as Hyland's (2003) genre-based approach, Gilmore's (2007) advocacy for authentic materials, and Royani's (2019) emphasis on context-based ESP instruction, this section offers deeper insight into the pedagogical implications of using real laboratory tools to improve students' functional writing skills in technical contexts.

How Tenth Graders of Vocational School Utilize Chemistry Laboratory Equipment as Authentic Materials to Support Their Understanding and Organization of Procedural Steps in Writing Procedure Texts

The integration of laboratory equipment as authentic materials enhanced students' ability to structure procedural texts effectively. This finding aligns with Sari & Apsari (2023), who argue that authentic materials help vocational students bridge classroom language with real-life

tasks, especially in ESP contexts. The direct interaction with laboratory tools allowed students to visualize each procedural step, enabling more detailed and coherent writing.

This also supports Zhang & Wang's (2021) view that authentic materials foster deeper engagement and conceptual clarity in genre-specific tasks. Students were able to internalize genre expectations such as goal setting, sequencing, and safety cautions more easily when the learning was grounded in tools familiar to their vocational training.

Moreover, the approach reflects Afriani, Fitrawati, & Wulandari's (2022) findings that contextual materials in ESP writing lead to increased motivation and greater genre control. By connecting their procedural texts with real laboratory practice, students became more confident in applying imperatives and technical vocabulary relevant to their field.

What Tenth Graders of Vocational School Encounter as Challenges in Writing Procedure Texts through Using

Despite the benefits, several students experienced difficulties translating physical actions into written form. These challenges reflect what Putra & Sari (2022) describe as a "disconnect between procedural awareness and linguistic expression" in ESP writing. Students often understood how to perform the procedures, but struggled to express them using correct grammar, vocabulary, and organization.

The absence of clear goal statements, incomplete material listings, or fragmented steps aligns with Fajriah et al. (2021), who noted that genre awareness among vocational students is often shallow when writing instruction is not scaffolded. These students require more guided support to internalize not only what to write but how to organize and express ideas using genre conventions.

The findings also echo Rahayu & Suharmanto (2023), who emphasize that students' procedural writing challenges often stem from limited exposure to English writing models and inadequate feedback during drafting. In this study, while laboratory practice supported understanding, it did not fully compensate for linguistic limitations. This suggests the need for integrating modeling, structured pre-writing, and vocabulary support into ESP writing instruction.

What Tenth Graders' Procedure Writing Text Results Reveal After Utilizing Chemistry Laboratory Equipment as Authentic Materials

The final writing scores revealed diverse student outcomes. Those in the Excellent and Good categories successfully applied genre conventions, used specific technical vocabulary, and organized content logically. This confirms Heriyanto & Fitrawati's (2023) claim that hands-on ESP instruction helps students write more accurate and coherent texts, especially when the materials mirror their real-world tasks.

However, students in the Fair and Poor categories struggled with cohesion, accuracy, and genre completeness. In line with Yunita & Novitasari (2022), this gap reflects how ESP students with lower language proficiency require more explicit scaffolding and exposure to exemplars of procedural writing.

Interestingly, no students scored in the Needs Improvement range, suggesting that authentic material use helped all participants reach at least a basic procedural understanding. This supports Harjanto & Amalia (2020), who advocate for task-based and contextualized ESP instruction to raise baseline writing competency even among struggling learners.

Research Limitations

This study provides valuable insights into the integration of chemistry laboratory equipment as authentic materials in ESP writing instruction for vocational students. However, to fully understand the scope and impact of the findings, several limitations must be acknowledged.

First, the study was limited to a single tenth-grade vocational class, which restricts generalization because students from other schools or programs may have different experiences or language abilities. Second, the instruments used—interviews, observations, and student texts—did not explore students' cognitive processes, making it hard to understand how they planned or organized their ideas. Third, the limited instructional time may have affected students' ability to revise or reflect deeply, especially those with lower proficiency. Fourth, the study focused only on procedural texts, so it remains unclear whether students could transfer these writing skills to other ESP genres like manuals or reports. These limitations should be taken into account when interpreting the results and can serve as a foundation for future research to expand the scope and depth of ESP writing instruction

CONCLUSION

This study examined the integration of chemistry laboratory equipment as authentic materials to support procedural text writing among tenth-grade vocational students in the Electronics and Communication Engineering program. Through classroom observation, student interviews, and rubric-based writing analysis, the findings revealed that real-world laboratory tools enhanced students' understanding of procedural text structure, use of imperative verbs, scientific vocabulary, and logical sequencing. Students reported higher motivation, engagement, and confidence when writing based on tools they used in practical lessons.

The writing outcomes demonstrated varying degrees of success, with most students falling into the Excellent, Good, or Fair categories. No students were classified in the Needs Improvement range, and those who failed to submit their work were placed in the Poor category. Overall, the use of authentic, vocationally relevant materials within a genre-based instructional framework enabled students to bridge technical knowledge with written English expression, making procedural writing more meaningful and accessible...

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