



The Implementation of Task-Based Learning in English Language Teaching for Mechanical Engineering Students at Kupang State Polytechnic



Dessy Meliani Para ¹, Bernadus Stefanus Wuwur ², Dedy Nataniel Uly ³, Desi Natalia Ratu ⁴, Paula Rita ⁵, Amros Alfonsius Tuati ⁶

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Abstract

This study aims to implement the Task-Based Learning (TBL) approach in teaching English to students of the Mechanical Engineering Department at Kupang State Polytechnic and analyze its impact on students' mastery of technical English. The study involved 30 students, with the learning application structured through three main stages: pre-task, task cycle, and language focus. Learning tasks were designed according to the Mechanical Engineering context, including tool identification and functions, explanations of machine operations, descriptions of working procedures, mechanical workshop conversations, group presentations, and problem-solving in English. Data were obtained through pre-tests, post-tests, classroom activity observations, and student response questionnaires. The results showed an improvement in students' English proficiency after the implementation of TBL. The students' average score increased from 64.8 on the pre-test to 79.6 on the post-test, representing an increase of 14.8 points (22.84%). The percentage of students in the good and excellent categories rose from 20% to 70%, while students in the poor and very poor categories decreased significantly. Student responses and classroom observations indicated that TBL makes learning interesting, relevant, and well-suited to the field of Mechanical Engineering. Thus, the implementation of Task-Based Learning can be an effective approach to enhance technical English skills while encouraging active engagement and student confidence in using English in both academic and workplace contexts.

¹ Politeknik Negeri Kupang, Indonesia

² Politeknik Negeri Kupang, Indonesia

³ Politeknik Negeri Kupang, Indonesia

⁴ Politeknik Negeri Kupang, Indonesia

⁵ Politeknik Negeri Kupang, Indonesia

⁶ Politeknik Negeri Kupang, Indonesia

1. Introduction

The development of technology and globalization has significantly transformed the working world, including the field of engineering and technology. Mechanical Engineering students are not only required to master technical knowledge and skills but must also possess foreign language competence, particularly in English. This proficiency has become vital as English is the primary language used in technical documentation, product specifications, international standards, scientific journals, and cross-border professional communication.

In the modern industrial world, the use of English in a working context is no longer uncommon. As future technicians, engineers, or operators in manufacturing, automotive, or energy companies, Mechanical Engineering students must be capable of reading machine manuals in English, understanding work instructions, writing tool maintenance reports, and presenting ideas orally in technical forums or project presentations. Unfortunately, many engineering students experience difficulties in mastering English, especially when the taught material is too general and does not match their specific needs as vocational students.

One of the primary issues in teaching English within engineering departments is the use of non-contextual approaches. Learning that focuses too heavily on grammar and general reading makes students feel uninterested and view English as a burden. Additionally, conventional passive lecturing methods leave students less actively involved in the learning process. To address these challenges, the Task-Based Learning (TBL) approach offers a more contextual and applicable solution. TBL is a language teaching approach centered on completing meaningful, relevant, real-world tasks that reflect the actual workplace. In the context of Mechanical Engineering, these tasks may include creating tool inspection reports, explaining machine operations, or delivering presentations on mechanical design. This approach encourages students to use English directly and functionally, rather than merely memorizing formulas or sentence structures. Task-Based Learning also creates a classroom atmosphere that is more communicative, collaborative, and rooted in active student participation. Through challenging yet discipline-specific tasks, students not only learn the language but also train their critical thinking, teamwork, and confident expression of ideas.

Several previous studies indicate that TBL can increase learning motivation, enrich technical vocabulary mastery, and help students internalize language structures more naturally. Furthermore, this approach has proven effective across various ESP (English for Specific Purposes) fields, including engineering, healthcare, and tourism. However, the implementation of TBL within Mechanical Engineering departments remains limited, especially within the context of vocational or polytechnic education in Indonesia. Therefore, further study is required on how TBL can be effectively applied in teaching English to Mechanical Engineering students and the extent to which this approach can improve their technical language skills.

Based on this background, the study aims to implement the Task-Based Learning approach in teaching English in the Mechanical Engineering department and analyze its impact on students' technical English mastery. Research on the application of Task-Based Learning in teaching English to Mechanical Engineering students at Kupang State Polytechnic supports the achievement of SDG 4 (Quality Education) by improving the quality of student-centered learning. This method helps students develop vocational English competence, communication, collaboration, and problem-solving skills needed in the global workforce and industry, thereby supporting the creation of competent, adaptive graduates who are ready to compete nationally

and internationally. Based on the background above, the research problems are formulated as follows:.

- How is Task-Based Learning implemented in teaching English in the Mechanical Engineering department?
- Can the implementation of Task-Based Learning improve the technical English mastery of Mechanical Engineering students?
- What are the students' perceptions of the Task-Based Learning method in English language learning?

2. Research Method

The methods employed in this study involve a systematic process of identifying problems, analyzing their underlying causes, collecting relevant data and information, developing instructional solutions, implementing the proposed solutions, and evaluating the outcomes. This process aims to address the challenges associated with teaching English in the Mechanical Engineering Department through the application of Task-Based Learning (TBL). The approach emphasizes the integration of English language instruction with mechanical engineering content to make learning more relevant, practical, and engaging for students while supporting the development of language skills required in academic and professional contexts.

The initial stage focuses on identifying the major challenges encountered in teaching English to mechanical engineering students. One of the primary challenges is students' limited proficiency in technical English, particularly their unfamiliarity with specialized vocabulary related to machinery, tools, mechanical components, and manufacturing processes. This limitation may affect their ability to understand technical texts, interpret engineering manuals, and follow written operating procedures. Students may also experience difficulties communicating technical information in English, especially when describing machine components, explaining operational procedures, or presenting engineering concepts. Furthermore, some students demonstrate limited engagement in English language learning because they perceive English as less relevant to their field of study than technical subjects. Identifying these challenges provides a foundation for developing instructional strategies that connect English language learning with students' academic needs and future professional responsibilities.

Following the identification of these challenges, an analysis is conducted to determine the factors that contribute to the difficulties experienced by students and lecturers. From the instructional perspective, limited teaching resources and insufficient pedagogical preparation may hinder the effective integration of technical content into English language instruction. Some lecturers may also have limited experience implementing Task-Based Learning or designing tasks that reflect authentic mechanical engineering situations. From the students' perspective, low motivation may result from the perception that English is disconnected from their technical coursework and future occupational requirements. Differences in students' initial English proficiency may further influence their participation and performance during classroom activities. Understanding these factors is essential for determining the instructional strategies, learning materials, and pedagogical support needed to improve the teaching and learning process.

To obtain a more comprehensive understanding of the existing problems, data and relevant information are collected through several complementary methods. A pre-test is administered to assess students' initial technical English proficiency before the implementation of Task-Based Learning. The results provide baseline information regarding students' strengths and weaknesses and establish a basis for evaluating subsequent learning outcomes. Surveys or questionnaires are distributed to investigate students' perceptions of English language learning, their motivation to participate in classroom activities, and the difficulties they encounter when

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learning technical English. Classroom observations are conducted to examine instructional practices, student participation, classroom interaction, and the relevance of existing learning activities to mechanical engineering contexts. In addition, interviews with lecturers are carried out to explore their experiences, instructional challenges, available resources, and perspectives on the use of Task-Based Learning. Information gathered through these methods provides an empirical basis for developing instructional solutions that respond to the needs of both students and lecturers.

Based on the findings from problem identification, problem analysis, and data collection, instructional solutions are developed to improve students' technical English proficiency. Task-Based Learning is proposed as the principal instructional approach because it emphasizes the use of language to accomplish meaningful tasks related to real-world situations. In the context of mechanical engineering, learning activities can include writing technical reports, describing machine components, interpreting technical manuals, explaining mechanical operating procedures, and presenting engineering-related information in English. These activities enable students to develop their language competencies while engaging with subject matter relevant to their academic discipline. By completing practical tasks, students are encouraged to use English as a tool for communicating technical knowledge rather than merely studying grammatical structures and vocabulary in isolation.

Collaborative learning is also incorporated into the instructional design to encourage students to work together in discussing technical topics, solving engineering-related problems, and delivering presentations in English. Group activities provide opportunities for students to practice technical vocabulary, exchange ideas, develop communication skills, and build confidence in expressing their thoughts. Problem-solving activities may involve analyzing machinery malfunctions, evaluating tool designs, or explaining manufacturing processes through authentic or simulated engineering cases. These activities encourage students to apply English in meaningful technical contexts while developing their analytical and collaborative abilities. Technology is also integrated into the learning process through online learning platforms, digital technical resources, and language-learning applications that support independent practice. Students can use these resources to improve their ability to read technical articles, prepare written reports, and communicate engineering information in English.

The developed instructional solutions are subsequently implemented through structured classroom activities guided by Task-Based Learning principles. Lesson plans are prepared to integrate clear learning objectives, engineering-related topics, appropriate instructional materials, and meaningful learning tasks. Each lesson is designed to address relevant language competencies, particularly reading technical texts, writing technical documents, and speaking about engineering concepts and procedures. Depending on the learning objectives, students may be asked to analyze technical information, prepare reports, explain machine operations, participate in group discussions, or present solutions to engineering problems. The learning activities are organized to provide opportunities for students to prepare for tasks, complete them individually or collaboratively, and reflect on their performance. This process is intended to create an interactive learning environment in which students actively use English to accomplish practical and discipline-specific objectives.

Throughout the implementation process, lecturers provide constructive feedback on students' language use, technical vocabulary, grammatical accuracy, pronunciation, and organization of ideas. Such feedback helps students recognize their strengths, identify areas

requiring improvement, and develop greater confidence in communicating within engineering contexts. Lecturers also monitor student participation, collaboration, task completion, and progress toward the established learning objectives. Students' performance is assessed through task-based assessments and a post-test administered after the instructional intervention, where applicable. These procedures provide information about changes in students' technical English proficiency and their ability to communicate engineering-related information effectively following the implementation of Task-Based Learning.

The effectiveness of the instructional approach is evaluated by examining the learning outcomes and experiences of students and lecturers. Pre-test and post-test results are compared to determine whether students demonstrate improvements in technical English proficiency following the intervention. Depending on the assessment instruments, the evaluation may focus on technical vocabulary, reading comprehension, written communication, and oral presentation skills. A student satisfaction survey is also conducted to investigate students' perceptions of the learning activities, the relevance of engineering-based tasks, their level of engagement, and the extent to which Task-Based Learning supports their understanding and use of technical English. These findings provide additional insights into the perceived usefulness and acceptability of the instructional approach.

Classroom observations conducted after implementation provide further information about changes in student participation, peer collaboration, classroom interaction, and the practical use of English during task completion. Discussions with lecturers are also undertaken to identify successful instructional practices, implementation difficulties, limitations in learning resources, and areas requiring further development. The results of these evaluation activities are used to refine lesson plans, improve task design, adjust instructional materials, and strengthen the integration of English language learning with mechanical engineering content. This continuous process of evaluation and improvement enables the instructional approach to respond more effectively to students' learning needs and the practical demands of their academic discipline.

Overall, the methodological process establishes a systematic framework for addressing the challenges of English language teaching in the Mechanical Engineering Department. By integrating problem identification, data collection, task development, instructional implementation, and outcome evaluation, the study seeks to promote a more practical and discipline-oriented approach to English language learning. The application of Task-Based Learning is expected to support students in developing technical vocabulary, improving their comprehension of engineering texts, strengthening their oral and written communication skills, and increasing their engagement in classroom activities. Nevertheless, the effectiveness of this approach must be established through empirical evidence obtained from pre-test and post-test results, classroom observations, student questionnaires, and lecturer interviews.

3. Results and Discussion

This study aims to determine the implementation of Task-Based Learning (TBL) in teaching English to students of the Mechanical Engineering Department at Kupang State Polytechnic. The of TBL is directed towards contextual English learning related to the expertise field of Mechanical Engineering students. The research was carried out through several learning stages, namely pre-task, task cycle, and language focus. In the pre-task stage, the lecturer introduces the topic, vocabulary, and English expressions related to the field of Mechanical Engineering. In the task cycle stage, students are given tasks to be completed individually or in groups. Meanwhile, in the language focus stage, students and the lecturer discuss the language use that emerged during task completion. The tasks given relate to real situations in the field of Mechanical Engineering, such as identifying tool functions, explaining machine operations,

describing tool usage procedures, conducting simple conversations in the workshop, and presenting work results in English.

Student English Proficiency Results Before TBL Implementation

Before the implementation of Task-Based Learning, students were given a pre-test to determine their initial English proficiency. The test covered vocabulary, grammar, reading, and the ability to use English in a Mechanical Engineering context.

Table 3.1 Pre-test results

No	Score Category	Score Range	Number of Students	Percentage (%)
1	Excellent	86–100	1	3.33%
2	Good	76–85	5	16.67%
3	Fair	66–75	9	30.00%
4	Poor	56–65	10	33.33%
5	Very Poor	≤55	5	16.67%
TOTAL			30	100%

Based on the table, it can be seen that most students were still in the fair, poor, and very poor categories. Only a small fraction of students obtained scores in the good and excellent categories. The average pre-test score was 64.8. These results indicate that the initial ability of students to use English still needed improvement, particularly in using Mechanical Engineering vocabulary, sentence construction, speaking skills, and the ability to explain a process using English.

Implementation of Task-Based Learning

The implementation of Task-Based Learning was carried out by providing tasks directly related to student activities in the field of Mechanical Engineering. Learning focused not only on mastering language structures but also on the students' ability to use English to complete specific tasks.

Pre-Task Stage

In the pre-task stage, students were introduced to the learning topic and provided with relevant vocabulary in the field of Mechanical Engineering.

Table 3.2 Materials or vocabulary used include:

No	Component	Meaning
1	lathe machine	Mesin Bubut
2	drilling machine	Mesin bor
3	milling machine	Mesin frais
4	engine	Mesin / motor penggerak
5	diesel engine	Mesin diesel
6	wrench	Kunci pas / kunci inggris
7	hammer	Palu
8	caliper	Jangka sorong
9	measurement	Pengukuran
10	maintenance	Pemeliharaan / perawatan
11	repair	Perbaikan
12	lubrication	Pelumasan
13	cutting	Pemotongan
14	drilling	Pengeboran
15	turning	Pembubutan

Task Cycle Stage

During the task cycle stage, students were assigned individual and group tasks designed to develop their ability to use English in practical Mechanical Engineering contexts. The activities included identifying mechanical tools by naming their components and explaining their functions in English, describing how particular tools operate using simple sentences, and explaining the steps involved in mechanical procedures. Students also engaged in workshop simulations in which they practiced conversations between mechanics and machine operators. In addition, they worked collaboratively to prepare and deliver group presentations in English on mechanical engineering topics. Problem-solving activities were also introduced, requiring students to discuss simple machine-related problems, exchange ideas, and propose possible solutions using English. Through these activities, students were encouraged to participate actively in the learning process and apply their language knowledge to meaningful, discipline-specific tasks. Rather than merely listening to the lecturer's explanations, students were given opportunities to use English to communicate information, complete assignments, collaborate with peers, and solve practical problems. This approach helped create a more interactive learning environment in which English functioned as a tool for communication and problem-solving within the context of Mechanical Engineering.

Language Focus Stage

During the language focus stage, the lecturer provided feedback on students' English usage based on their performance during the task cycle. Language errors identified during classroom activities were used as learning opportunities to help students recognize and correct their mistakes. Particular attention was given to the use of the simple present tense when describing the functions and operations of mechanical tools, the appropriate use of the verb to be, and the correct application of verbs in sentences explaining mechanical processes. The lecturer also emphasized the development of Mechanical Engineering vocabulary, accurate pronunciation of technical terms, and appropriate sentence construction. In addition, students were guided in forming questions, responding to questions, and explaining procedures clearly and logically in English. Through this process, students received feedback directly related to their communication experiences and the tasks they had completed. The language focus stage therefore enabled students to reflect on their language use, improve grammatical accuracy, expand their technical vocabulary, and develop greater confidence in communicating technical information in English. By connecting language instruction with actual task performance, the lecturer helped students understand how grammatical structures and vocabulary could be applied effectively in practical engineering situations.

Student English Proficiency Results After TBL Implementation.

After the implementation of Task-Based Learning, students were given a post-test to determine changes in their English proficiency.

Table 3.3 Post-test results are as follows:

No.	Score Category	Score Range	Number of Students	Percentage
1	Excellent	86–100	7	23.33%
2	Good	76–85	14	46.67%
3	Fair	66–75	7	23.33%
4	Poor	56–65	2	6.67%
5	Very Poor	≤55	0	0%
Total			30	100%

Based on these results, there was an increase in students' English proficiency after the implementation of Task-Based Learning. The number of students in the good and excellent categories increased significantly compared to the pre-test results. The average post-test score reached 79.6, compared to the pre-test average of 64.8. Thus, there was an average increase of: $79.6 - 64.8 = 14.8$ points. Calculated as a percentage increase: $(14.8 / 64.8) \times 100\% = 22.84\%$. These results show an improvement in students' English proficiency after participating in task-based learning.

Comparison of Pre-Test and Post-Test Results

Table 3.4 Comparison of pre-test and post-test results can be seen in the following table.

No	Indicator	Pre-Test	Post-Test	Improvement
1	Average score	64.8	79.6	14.8
2	Highest score	86	94	8
3	Lowest score	48	61	13
4	Students in good/excellent category	20.00%	70.00%	50.00%
5	Students in poor/very poor category	50.00%	6.67%	-43.33%

Based on the table, the implementation of Task-Based Learning shows positive results. The improvement is visible not only from the average score but also from the change in the distribution of students' proficiency categories. In the pre-test, only about 20% of students were in the good and excellent categories. After the TBL implementation, this number increased to around 70%. Conversely, students in the poor and very poor categories decreased from around 50% to 6.67%.

Improvement in English Speaking Ability.

One visible change during TBL implementation was the increase in students' courage to speak English. At the beginning of learning, some students seemed hesitant to speak due to limited vocabulary and fear of making grammatical errors. Students tended to use Indonesian during discussions. After being given group-based tasks and presentations several times, students began to show the courage to use English.

Table 3.5 This development can be described as follows:

No	Aspect	Before TBL	After TBL
1	Courage to speak	Low	Better
2	Use of Mechanical Engineering vocabulary	Limited	Increased
3	Ability to construct sentences	Poor	Better
4	Discussion participation	Low	Active
5	English presentation	Lacked confidence	More confident
6	Group cooperation	Fair	Good

Observation results showed that task-based activities provided opportunities for students to use English in more real situations. This made learning more communicative and not solely oriented toward grammar theory.

Improvement in Mechanical Engineering Vocabulary Mastery.

The application of TBL also had an impact on the mastery of English vocabulary related to the field of Mechanical Engineering. Prior to learning, students faced difficulties naming tools, machine parts, and terms related to machining processes. After being given repeated and contextual tasks, students began to be able to use these vocabularies in sentences. Before TBL implementation: "This is a lathe."

After several learning activities, students were able to expand the sentence into:

"This is a lathe machine. It is used to cut and shape metal."

This example shows a development from merely naming an object to explaining its function and use.

Student Responses to TBL Implementation.

Table 3.6 Questionnaire results from 30 students can be presented as follows:

No	Statement	Agree/Strongly Agree	Percentage
1	Tasks make learning more interesting	27	90%
2	Tasks help in understanding Mechanical Engineering vocabulary	28	93.33%
3	Tasks increase the courage to speak	25	83.33%
4	Group discussions help in understanding the material	26	86.67%
5	Presentations increase self-confidence	24	80%
6	TBL makes students more active	27	90%
7	Material is suitable for the field of Mechanical Engineering	28	93.33%
8	TBL helps use English in real situations	27	90%

Based on these results, most students gave a positive response to the implementation of TBL. Students assessed that tasks related to the field of Mechanical Engineering made English learning more relevant to their needs.

Student Activity Observation Results.

During the learning process, student activity also experienced an increase. At the beginning of learning, several students were still passive and tended to wait for the lecturer's instructions. However, after the implementation of task-based learning, students began to be involved in: group discussions; vocabulary searches; sentence construction; problem solving; conversation practice; presentations; and providing feedback to other groups. This shows that TBL can encourage students to become more active in the learning process.

4. Conclusion

Based on the results of data analysis, classroom activity observations, and students' responses to the questionnaire throughout the action cycles, the following are the main conclusions of the study on the implementation of the Task-Based Learning (TBL) approach:

The implementation of the Task-Based Learning (TBL) approach demonstrated a substantial improvement in Mechanical Engineering students' technical English proficiency. The students' average score increased from 64.8 in the pre-test to 79.6 in the post-test, representing an improvement of 14.8 points, or 22.84%. This result indicates that TBL can be an effective approach to developing students' English proficiency by engaging them in meaningful, task-oriented learning activities relevant to their academic discipline.

The improvement was also reflected in the distribution of students' competency levels. The proportion of students classified as having Good and Very Good English proficiency increased from 20% before the intervention to 70% afterward. In contrast, the proportion of students in the Poor and Very Poor categories decreased from 50% to 6.67%. These changes suggest that the implementation of TBL not only improved students' average performance but also helped a greater proportion of students achieve higher levels of technical English proficiency.

In addition to improving test scores, the task-based approach supported the development of students' oral communication skills, confidence, and technical vocabulary. Activities such as explaining mechanical procedures, describing the functions and operations of tools, participating in simulated workshop conversations, and delivering group presentations provided opportunities for students to use English in practical engineering contexts. Through these activities, students progressed beyond simply identifying and naming mechanical tools to explaining their functions and operations more comprehensively. The integration of language learning with discipline-specific tasks also encouraged active participation, collaboration, and the practical application of English in workplace-related situations.

Students' perceptions of the TBL approach were also overwhelmingly positive, with approximately 90% to 93.33% expressing agreement that the activities made learning more engaging, interactive, and relevant to their needs as Mechanical Engineering students. This positive response suggests that students recognized the value of authentic, task-oriented activities in connecting English instruction with their academic studies and future professional responsibilities. Overall, the findings indicate that TBL has considerable potential to improve technical English proficiency, strengthen communication skills, and promote student engagement in Mechanical Engineering education. However, the results should be interpreted in relation to the study's design and context, as the observed improvements alone do not establish that TBL was the sole cause of the gains.

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