

## Blended English for Vocational Learners: Mixed-Methods Evidence on Student Engagement and Reading Gains in a Batam High School

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### Abstract

Blended learning, which combines traditional classroom instruction with online activities, is increasingly recognized as a powerful approach in English Language Teaching. Offering flexibility and promoting active engagement is promising for vocational education, where English reading comprehension is crucial for academic and career success. This study examined the impact of blended learning on student engagement and reading comprehension in a vocational high school in Batam, Indonesia. Adopting a sequential explanatory mixed-method design, the research involved 80 second-grade students selected through cluster sampling and divided into experimental and control groups. Quantitative data were collected through pre- and post-tests of reading comprehension and a 25-item engagement questionnaire. Qualitative data were obtained from semi-structured interviews with six students representing high, moderate, and low engagement levels to complement these findings. The results demonstrated that blended learning significantly improved reading comprehension, with the experimental group achieving higher post-test scores than the control group. The questionnaire indicated that students generally displayed moderate to high levels of engagement across behavioral, emotional, cognitive, technological, and satisfaction dimensions. However, interviews revealed variations, particularly in emotional and cognitive engagement, influenced by factors such as confidence, motivation, and preferences for instructional style. The study proves blended learning enhances engagement and reading comprehension in vocational ELT contexts. These findings highlight the importance of integrating digital tools with face-to-face instruction, offering valuable implications for teachers, schools, and policymakers seeking to better prepare students for the demands of the global workforce.

### Keywords:

Blended learning,  
Student engagement,  
Reading comprehension,  
Vocational education,  
English language  
teaching

## 1. Introduction

Effective English communication is a vital career skill in today's interconnected economy, especially for students preparing to work in technology, logistics, and international trade (Manolescu, 2023; Nurlaily, 2021). For vocational learners, English is not an abstract academic subject but a practical tool: they must read technical manuals, follow safety instructions, write workplace documents, and communicate with clients and colleagues in English (Gani et al., 2024; Hernandez-Gantes, 2022). However, many vocational classrooms still use teacher centred, textbook-driven methods that fail to spark cognitive relevance or emotional investment, contributing to low engagement and weak reading comprehension (Oliveira, 2022; Perry, 2022). This mismatch between teaching practices and workplace needs motivates a search for pedagogies that make learning meaningful and usable.

Blended learning (the careful integration of face-to-face teaching with online activities) offers a promising response. By combining multimedia pre-class exposure, online practice, and active in-class application, blended approaches can increase learner autonomy, provide varied input, and create more interactive learning pathways (Albatti, 2023; Al-Mamoori & Hosseinpur, 2024; Sunubi & Bachtiar, 2022). For vocational students, these features help link language tasks to real job demands (ESP), scaffold repeated exposure to technical vocabulary, and offer flexible review opportunities that support deeper comprehension and strategy use.

Batam City provides a timely context for this study. As an industrial hub, Batam needs graduates who can function effectively in English across manufacturing, hospitality, electronics, and logistics (Pohan et al., 2025). However, research on blended ELT in Indonesian vocational schools (especially outside Java) is sparse, and evidence that directly connects blended designs to engagement and measurable reading gains in such settings is limited (Chusniah et al., 2024; Rozi, 2023). Therefore, practitioners lack context-specific guidance on aligning classroom instruction with workplace literacy needs and local digital realities.

Methodologically, this study responds to those gaps by using an explanatory sequential mixed-methods design. Quantitative pre/post measures and engagement scales establish the magnitude of learning gains, while follow-up qualitative interviews explain how and why those changes occur in practice. The Flipped Classroom model was chosen as the instructional framework because it pairs pre-class content exposure with rich, teacher-facilitated in-class application, an arrangement well suited to vocational tasks and to strengthening cognitive, social, and teaching presences simultaneously.

Against this background, the study asks three focused questions: (1) How does blended learning impact students' engagement? (2) What impact does blended learning have on students' reading comprehension? and (3) To what extent does blended learning significantly affect engagement and reading comprehension? Answering these questions aims to provide actionable, context-sensitive evidence for teachers, curriculum developers, and policymakers seeking to make ELT in vocational schools more relevant, equitable, and effective.

In short, this research investigates whether a carefully designed flipped-classroom blended model (supported by purposeful teacher facilitation) can increase vocational students' behavioural, emotional, and cognitive engagement and produce measurable gains in English reading comprehension in a Batam vocational high school. The study, therefore, combines rigorous outcome measurement with close attention to students' lived experiences, offering both practical recommendations and theoretical insight for blended ELT in vocational contexts.

## **2. Method**

### **2.1. Research Design**

This study used an explanatory sequential mixed-methods design. A quasi-experimental quantitative phase (pre-test/post-test with intact classes) was carried out first to measure the effects of a blended-learning intervention; a subsequent qualitative phase (semi-structured interviews) then explained and enriched the numerical results. The quasi-experimental approach is appropriate here because randomising individual students was impractical in a real classroom setting; intact classes were therefore used as experimental and control units. Combining quantitative and qualitative strands enabled methodological triangulation and a more complete understanding of the magnitude and the mechanisms of any observed changes in engagement and reading comprehension.

### **2.2. Participants**

The study was conducted in a vocational school in Batam with second-grade students from the Computer and Network Engineering programme. From a population of approximately 240 students organised in six parallel classes, two intact classes were randomly selected by cluster sampling, yielding a sample of 80 students (40 per class). One class received the blended-learning intervention (experimental group) and the other continued with conventional face-to-face instruction (control group). Using whole classes preserved ecological validity and minimised disruption. To support the qualitative strand, six students were purposively sampled from the experimental class (two high, two moderate, and two low engagement, based on questionnaire scores) to provide varied perspectives during interviews. The same subject teacher taught both classes to reduce instructor-related confounds.

### **2.3. Research Instruments**

Three instruments were used. The reading comprehension test comprised 20 multiple-choice items targeting literal, inferential, and evaluative comprehension; it was administered as an identical pre-test and post-test. The test demonstrated acceptable internal reliability (Cronbach's  $\alpha = 0.789$ ) and was piloted and content-validated by experienced English teachers and an educational researcher. The student engagement questionnaire contained 25 Likert-scale items across five dimensions (behavioural, emotional, cognitive, technological interaction, and overall satisfaction). Items were adapted to the vocational ELT context, translated into Bahasa Indonesia for clarity, expert-validated, and pilot-tested; dimension alphas ranged from about .83 to .89, indicating good internal consistency. Finally, a semi-structured interview guide with 10 open-ended questions probed students' blended learning experiences (preparation, participation, challenges, perceived effects on reading). Interviews were conducted in Bahasa Indonesia, audio-recorded with consent, and later transcribed verbatim.

#### **2.4. Data Collection Procedure**

Data collection lasted approximately five weeks. After obtaining institutional permission and briefing the teacher, both classes completed the baseline (pre-test) reading assessment under standardised conditions. The experimental class then received six 90-minute sessions of blended instruction (Flipped Classroom design: asynchronous pre-class materials plus focused in-class activities). At the same time, the control class covered the duplicate content through conventional teacher-centred lessons. Immediately after the intervention, both groups completed the post-test; the engagement questionnaire was only administered to the experimental group. Six purposively selected students participated in 20–30 minute semi-structured interviews (audio recorded). The researcher monitored implementation fidelity, provided technical support where necessary, and adhered to ethical safeguards (informed consent, voluntary participation, confidentiality, and data anonymization).

#### **2.5. Data Analysis**

Quantitative data were analysed with JASP v0.19.3.0. Initial steps included descriptive statistics (means, SDs, ranges) and assumption checks (normality and homogeneity of variance). Within-group change was tested using paired-sample t-tests, and between-group differences on post-test scores were assessed with independent-sample t-tests; effect sizes were reported alongside p-values. Engagement scores (post-treatment, experimental group only) were summarised descriptively and classified into low, moderate, and high bands (equal-interval method) to inform qualitative sampling.

Qualitative and quantitative findings were integrated through a joint display and narrative weaving. Quantitative results identified patterns of engagement and reading comprehension improvement, while qualitative themes provided explanatory insights into students' learning processes, challenges, and perceived benefits of the blended model. Meta-inferences were generated by comparing, contrasting, and synthesizing both strands to explain the mechanisms underlying the observed effects.

#### **2.6. Integration of Quantitative and Qualitative Data**

In this explanatory sequential mixed-methods study, integration occurred at three points: connecting, building, and merging (Creswell & Plano Clark, 2018). First, quantitative engagement scores were used to purposively select interview participants representing high, moderate, and low engagement levels (connecting). Second, quantitative findings informed the development of the qualitative interview protocol, focusing on aspects of behavioural, emotional, cognitive, and technological engagement that showed significant statistical patterns (building). Finally, quantitative and qualitative findings were integrated during interpretation using a joint display matrix to generate meta-inferences explaining how and why the blended learning model influenced student engagement and reading comprehension (merging). This integration strengthened the explanatory power of the study by linking statistical outcomes with students' experiential narratives.

### **3. Results and Discussion**

#### **3.1 Results**

##### **Reading Comprehension Test: Pre-test and Post-test Results**

The pre-test and post-test results indicated a substantial improvement in students' reading comprehension in the experimental group, with mean scores increasing from 61.13 to 80.63. In contrast, the control group demonstrated only modest gains. Non-parametric tests confirmed that the improvement was statistically significant (Wilcoxon Signed-Rank,  $p < .001$ ; Mann-Whitney U,  $p < .001$ ), and effect size estimates suggested a large intervention effect. These findings indicate that the blended learning model was associated with enhanced reading comprehension performance, likely due

to opportunities for repeated exposure to texts, multimodal input, and guided in-class consolidation of comprehension strategies.

However, given the quasi-experimental design, several potential confounding variables may have contributed to the observed gains. Differences in students' initial motivation levels, digital competence, and learning autonomy could have influenced their responsiveness to the blended intervention. In addition, although the same teacher taught both groups, variations in classroom interaction dynamics and student–teacher engagement may have affected learning outcomes. Qualitative findings suggested that students with higher digital readiness and stronger self-regulation benefited more from the blended model, which may partially explain the magnitude of improvement in the experimental group.

Despite these potential confounders, the magnitude of improvement in this study is noteworthy compared with previous research. For example, Rosalita (2022) reported a 12-point gain, whereas this study recorded nearly a 20-point gain. This suggests that contextual alignment with vocational content and task-based materials may have amplified the intervention's effectiveness by increasing student relevance and motivation. Therefore, while the results strongly suggest that blended learning contributed to enhanced reading comprehension, the influence of motivational and technological readiness factors should be considered when interpreting the findings.

### **Student Engagement Questionnaire: Behavioural, Emotional, Cognitive, Technological, and Satisfaction Dimensions**

The questionnaire results indicated overall moderate to high engagement; however, a dimension-specific analysis revealed nuanced patterns in how students interacted with the blended learning environment.

#### *Behavioural Engagement*

Behavioural engagement was relatively high, reflected in consistent attendance and task completion. This suggests that the structured flipped-classroom design effectively encouraged participation. However, lower engagement in asynchronous online activities ( $M = 2.95$ ) indicates that behavioural compliance did not fully translate into active digital participation. This gap suggests that while students were physically and procedurally engaged, self-directed online learning behaviours were less developed, supporting previous findings that behavioural engagement in blended contexts depends heavily on scaffolding and monitoring mechanisms.

Interestingly, students' motivation to explore additional learning resources ( $M = 3.68$ ) points to emerging self-directed learning tendencies, indicating that blended environments may gradually foster proactive learning habits when autonomy is supported by structured guidance.

#### *Emotional Engagement*

Emotional engagement was moderate, with students reporting enjoyment of the blended format ( $M = 3.30$ ). However, perceived teacher support and peer connection were comparatively low ( $M = 2.85$ ). This suggests that while students appreciated flexibility and multimedia materials, the blended model reduced opportunities for emotional and social interaction. From a Community of Inquiry perspective, limited social and teaching presence may constrain emotional engagement, which is critical for sustaining motivation in hybrid environments. Strengthening instructor immediacy and collaborative tasks could therefore enhance emotional connectedness and learning persistence.

#### *Cognitive Engagement*

Cognitive engagement showed the most variability. While over half of the students perceived that blended learning facilitated practical application, only a quarter reported improved concentration. This discrepancy indicates that cognitive engagement was task-oriented rather than sustained. Students may have engaged in surface-level processing during asynchronous tasks, consistent with literature showing that self-paced environments require explicit metacognitive scaffolding to promote deep processing. The findings imply that blended learning alone does not guarantee deeper cognitive engagement unless accompanied by structured reflective and monitoring activities.

#### *Technological Engagement*

Technological engagement received the most positive responses, with students appreciating the ability to learn at their own pace and revisit materials. This suggests high perceived usefulness of digital tools, aligning with technology acceptance and flexibility theories. However, reported difficulties in navigating platforms highlight unequal digital competence among students, which may moderate the

effectiveness of blended learning. These findings underscore the importance of digital literacy support as a prerequisite for meaningful engagement in technology-mediated instruction.

#### *Satisfaction and Overall Engagement Profile*

Overall satisfaction with the blended model was moderate to high, suggesting positive learner perceptions despite challenges in emotional and cognitive dimensions. The multidimensional engagement profile indicates that behavioural and technological engagement were stronger than emotional and cognitive engagement, implying that students were more procedurally and technologically involved than deeply cognitively or socially engaged. This pattern helps explain why improvements in reading comprehension were significant but not uniformly distributed among learners.

#### **Semi-structured Interviews: Students' Perspective on Engagement and Reading Processes**

The qualitative interviews provided in-depth explanations of the differential engagement patterns identified in the questionnaire data. Highly engaged students described the blended learning environment as motivating due to its flexibility, multimodal resources, and opportunities for autonomy. They reported that pre-class videos, online quizzes, and interactive tasks enabled them to prepare before class and participate more actively during face-to-face sessions. These findings indicate that behavioural and technological engagement facilitated self-regulated learning, where students could control the pace and sequence of their learning. Moderately engaged students, however, emphasised the importance of teacher scaffolding and material relevance, suggesting that cognitive engagement was strongly mediated by instructional design rather than technology alone.

In contrast, students with low engagement reported difficulties sustaining attention, managing time, and maintaining motivation during asynchronous activities. They expressed a preference for direct teacher instruction and immediate feedback, indicating limited self-regulation skills and lower confidence in independent learning. These students also reported discomfort in online interactions, which contributed to reduced emotional and social engagement. This explains the lower questionnaire scores in emotional and cognitive dimensions and highlights that blended learning may disproportionately benefit students with stronger digital readiness and autonomous learning skills.

Overall, the qualitative findings elucidate how engagement dimensions interacted with students' reading processes. Highly engaged students reported using pre-class materials to activate background knowledge, identify key ideas, and clarify vocabulary, which facilitated deeper comprehension during in-class discussions. Conversely, less engaged students tended to rely on surface-level strategies, such as skimming or waiting for teacher explanations, resulting in more limited comprehension gains. These insights demonstrate that blended learning enhances reading comprehension not merely through technological exposure but through its capacity to foster behavioural discipline, emotional connection, and cognitive self-regulation, thereby explaining the mechanisms underlying the quantitative improvements observed.

### **3.2 Discussion**

The findings confirm that blended learning has a dual impact: it robustly enhances reading comprehension while producing moderate but uneven engagement gains. The significant improvement in reading comprehension supports prior evidence (Lan & Minh, 2023; Tsegaye & Belihu, 2024). However, the mixed engagement outcomes reveal that the benefits are conditional on learner readiness and instructional design. This underscores the importance of pairing autonomy with scaffolding—through structured guidance, relevant vocational content, and digital literacy support.

The results also carry practical implications for vocational ELT in Batam. Teachers should design shorter, vocationally relevant pre-class materials, embed accountability mechanisms (e.g., readiness checks), and offer explicit vocabulary and comprehension scaffolds for students with lower proficiency. Institutions must invest in teacher training and student digital skills to leverage blended learning's full potential (Gao & Tan, 2024; Nathan et al., 2025).

Finally, this study makes a unique contribution by explaining whether blended learning worked and why outcomes varied. Integrating quantitative and qualitative evidence shows that blended learning can deliver substantial reading gains even when mixed engagement profiles are provided, as long as digital resources are paired with contextual relevance and strong teacher facilitation.

### **4. Conclusion**

This study examined the impact of blended learning on vocational high school students' engagement and reading comprehension in Batam. Guided by three main objectives, the research sought

to measure the effect of blended learning on engagement, assess its influence on reading comprehension, and evaluate its combined impact on both areas. The findings demonstrated that the flipped-classroom model significantly improved students' reading comprehension while moderately enhancing their engagement, though the latter varied across behavioural, emotional, and cognitive dimensions.

From a scientific perspective, the study contributes context-specific evidence from vocational ELT in Indonesia an area where blended learning research remains limited. While previous studies often reported uniformly positive effects, this research shows that engagement outcomes depend on students' readiness, digital literacy, and the quality of instructional scaffolding. Combining statistical results with qualitative explanations, the study goes beyond asking "Does blended learning work?" to answering "Under what conditions does it work best?"

The practical implications of these findings are substantial. For teachers, the study highlights the importance of designing shorter and vocationally relevant pre-class materials, integrating readiness checks, and providing explicit scaffolds for students with lower proficiency levels. For institutions, the results stress the need to invest in digital infrastructure and teacher training to implement blended learning effectively and sustainably. The evidence supports integrating blended learning models into curriculum reforms at the policy level, ensuring that vocational graduates are better prepared for workplace literacy demands.

Future research should expand this study by testing blended models across multiple vocational schools and subject areas to strengthen generalisability. Longitudinal research is also needed to track whether gains in engagement and comprehension persist over time and transfer into workplace communication skills. In addition, investigating the mediating roles of digital literacy, motivation, and teacher presence will help refine theoretical models of blended learning effectiveness. Such extensions are critical for deepening understanding and ensuring that blended learning evolves into a robust, adaptable approach for diverse educational contexts.

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