THE IMPACT OF DATA-DRIVEN LEARNING ON VOCATIONAL HIGH SCHOOL STUDENTS' MOTIVATION IN ENGLISH LANGUAGE LEARNING

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Abstract. This study investigates the impact of Data-Driven Learning (DDL) on the motivation of vocational high school students in Indonesia, particularly those studying automotive engineering. Traditional grammar-translation methods used in vocational schools often fail to engage students because they do not connect language learning with practical, real-world applications. This gap is significant in vocational education, where students view English as a tool for their careers rather than an academic subject. DDL, which engages learners with authentic language data from their vocational fields, offers a promising alternative by making language learning more relevant and interactive. Using a quasi-experimental, mixed-methods design, the study involved 60 students divided into an experimental group (DDL-based instruction) and a control group (traditional instruction). Motivation was measured using Dornyei's L2 Motivation Self System, focusing on Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. Results showed that students in the experimental group experienced significant gains in all three motivational components, particularly in Ideal L2 Self and L2 Learning Experience, highlighting how DDL made English more relevant to their career goals. In contrast, the control group saw only minor improvements in motivation. Qualitative findings from open-ended responses and classroom observations emphasized the role of learner autonomy and the relevance of materials in enhancing motivation. The study concludes that DDL can effectively address the gap in vocational education by making English learning more meaningful, though it requires additional support to help students manage complex language data.

Keywords: data-driven learning, learner autonomy, motivation, second language acquisition, vocational school

INTRODUCTION

Data-Driven Learning (DDL) has emerged as an innovative approach in second language acquisition (SLA) by engaging learners with authentic language data, often sourced from corpora. Unlike traditional methods that present grammatical structures first and provide examples afterward, DDL emphasizes inductive learning, where students actively explore real-life language use to identify patterns and rules on their own (Chen et al., 2019; Crosthwaite, 2019). This method shifts learners into the role of "language detectives," where they engage with authentic texts—such as technical manuals or spoken dialogues—and draw conclusions about the language's structure and use (Boulton & Cobb, 2017).

Since its introduction by Tim Johns in 1991, DDL has been applied primarily in higher education. The central idea is that by exposing students to authentic language data, they develop a deeper and more accurate understanding of language as it is used in real-world contexts (Gilquin, 2021; Pérez-Paredes et al., 2019). This contrasts with traditional grammar-translation methods, which often focus on rule memorization and translation without connecting language learning to practical applications. Research has highlighted the benefits of DDL for vocabulary acquisition, grammar learning, and language awareness (Lee & Lin, 2019; Tosun & Sofu, 2023), but the majority of these studies have concentrated on university students or adult learners.

Vocational education presents unique challenges, as students often approach English as a tool for future careers rather than as an academic pursuit. In this context, motivation plays a key role in successful language learning. Dornyei's (2005) *L2 Motivation Self System* explains how different aspects of motivation, such as *the Ideal L2 Self* (the desire to be proficient in a language), *the Ought-to L2 Self* (external pressures to learn), and the L2 Learning Experience (engagement with the learning process), impact learners' success (NamazianDost et al., 2017; Seven, 2020). Research shows that both intrinsic motivation (driven by personal interest) and extrinsic motivation (driven by external factors like employment prospects) are crucial in vocational education settings (Al-Hoorie, 2017; Lamb, 2017).

DDL can enhance both intrinsic and extrinsic motivation by making the learning process more relevant to students' career goals. When students engage with authentic texts relevant to their vocational fields—such as technical manuals or professional correspondence—they may find English more applicable to their futures, which can increase motivation to improve their language skills (Boulton, 2017; Boulton & Cobb, 2017). This approach stands in contrast to traditional grammar-translation methods, which often disengage students by focusing on rote memorization and isolated exercises, disconnecting language learning from practical applications (Iqbal et al., 2017; Saputro et al., 2021).

However, there remains a gap in the literature concerning the application of DDL in vocational education, particularly in Indonesia. Most DDL research has focused on linguistic competence, neglecting the motivational aspects, especially in contexts where English is considered a secondary subject. This study aims to address this gap by exploring how DDL affects the motivation of vocational students, particularly in automotive engineering, and by investigating whether DDL can make English learning more meaningful for them. The research question guiding this study is: How does DDL impact the motivation of vocational high school students in terms of their *Ideal L2 Self*, *Ought-to L2 Self*, and *L2 Learning Experience*, compared to traditional methods?

LITERATURE REVIEW

Data-driven learning in second language classroom

Data-Driven Learning (DDL) is a pedagogical approach in second language acquisition (SLA) that engages learners with authentic language data, often from large corpora, to help them discover patterns and rules. Unlike traditional methods, which emphasize explicit teaching of grammar followed by examples, DDL encourages an inductive process where learners explore real-world language usage and infer grammatical and vocabulary patterns themselves (Boulton, 2012; Gilquin, 2021; Pérez-Paredes et al., 2019). Since its introduction by Johns (1991), DDL has proven effective in improving aspects like vocabulary acquisition, grammar retention, and learner autonomy (Boulton, 2017). A key benefit of DDL is that it exposes learners to authentic language, allowing them to engage with texts in real-life contexts, which helps them understand language nuances, collocations, and pragmatic functions better than traditional textbooks (Boulton & Cobb, 2017).

One of the main reasons to implement DDL is its ability to promote learner autonomy. Giving students access to real language data allows them to explore patterns independently, making them active participants in their learning journey. This process enhances motivation and leads to better retention, as learners uncover patterns on their own rather than memorizing rules (Boulton, 2010; Meunier, 2020). Researches also highlight that DDL boosts confidence as learners apply language in real-world scenarios, which fosters engagement, a critical factor in sustaining motivation (Morgoun et al., 2020; O'Keeffe, 2021). Furthermore, DDL has been shown to improve vocabulary retention, as learners can explore word usage and collocations in context, making vocabulary acquisition more meaningful (Corino & Onesti, 2019; Davalovska, 2015).

DDL also enhances grammar comprehension by allowing learners to analyze authentic texts and observe grammar in various contexts. Students who explored real texts gained a deeper understanding of grammatical structures, which made learning more engaging and practical (Feng & Ng, 2023; Pherson-Geyser et al., 2020). However, challenges exist in implementing DDL, such as the technical proficiency required to use corpus software. Boulton (2010) noted that a lack of training for teachers is a major hurdle, as they need to create meaningful activities and guide students through corpus analysis. Additionally, DDL activities can be time-consuming, which makes them difficult to incorporate into fast-paced curricula (Meunier, 2020; Zare & Karimpour, 2022). For some students, especially beginners, the inductive nature of DDL may be too abstract, as they might lack the analytical skills to draw useful conclusions from large data sets (Crosthwaite, 2019).

Various platforms support DDL implementation, such as Sketch Engine and AntConc, which provide access to large corpora and tools to analyze word collocations, frequency, and grammar patterns (Ma & Mei, 2021). COCA (Corpus of Contemporary American English) and Lextutor are other platforms that allow learners to explore different registers of language and analyze real-world usage in context. These tools facilitate hands-on DDL tasks, making it easier for teachers to integrate authentic language data into the classroom (Lee & Lin, 2019; Luo & Zhou, 2017).

In conclusion, DDL offers multiple benefits, including vocabulary retention, learner autonomy, and exposure to authentic language, though challenges like technical training and time constraints must be addressed (Meunier, 2020; Pérez-Paredes et al., 2019). With the right tools and proper guidance, DDL can greatly enrich the language learning experience and make a valuable contribution to second language classrooms. Future research should address these challenges and explore how to better integrate DDL into time-constrained curricula.

DDL and motivation in language learning

Motivation is recognized as a critical factor in language learning, and researchers have explored various instructional methods to influence it. Dornyei's (2009) L2 Motivation Self System provides a framework for understanding language learning motivation, comprising the *Ideal L2 Self*, *Ought-to L2 Self*, and *L2 Learning Experience*. *The Ideal L2 Self* reflects learners' aspirations to be proficient speakers, while *the Ought-to L2 Self* involves external pressures driving them to learn. *The L2 Learning Experience* refers to learners' perceptions of the learning environment and the overall process (Al-Murtadha, 2020; Dörnyei, 2019).

Research shows that learners with strong intrinsic and extrinsic motivation are more likely to succeed in language learning. Intrinsic motivation, driven by interest and enjoyment, leads to deeper engagement, while extrinsic motivation, influenced by external factors like exams or career goals, sustains effort (Al-Hoorie, 2017). In vocational education, where students prepare for specific careers, extrinsic motivation plays a dominant role as English proficiency is often necessary for future employment (Lamb, 2017).

DDL has the potential to enhance both intrinsic and extrinsic motivation by making language learning more relevant and engaging. Its focus on real-world language use shows learners how English is applied in practical contexts, reinforcing *the Ought-to L2 Self* by aligning language learning with career goals (Dörnyei, 2019; Papi et al., 2019). At the same time, DDL's interactive nature supports the Ideal L2 Self, helping learners envision themselves as proficient users of English in real-world scenarios (Todaka, 2020).

DDL also positively affects the L2 Learning Experience by making the learning process more interactive and enjoyable, which can lead to increased motivation. Learners report higher levels of engagement and satisfaction, thanks to the autonomy DDL fosters (Boulton, 2017; Boulton & Cobb, 2017). Students take an active role in their learning, making discoveries through authentic data, which boosts motivation and satisfaction (Corino & Onesti, 2019; Gilquin, 2021).

Despite these positive outcomes, most research on DDL and motivation has focused on higher education. Few studies have examined its impact on secondary or vocational students. Given DDL's real-world focus, it seems well-suited for vocational contexts, but further research is needed to tailor it to vocational students' needs, particularly in non-English-speaking countries like Indonesia (Asi et al., 2021).

Vocational education and English language learning in Indonesia

Vocational high schools in Indonesia, known as Sekolah Menengah Kejuruan (SMK), provide specialized training in fields like tourism, engineering, and business, with English as a mandatory subject due to its global importance. However, many vocational students struggle with English proficiency, limiting their competitiveness in the international job market (Asi et al., 2021; Todaka, 2020).

A key challenge is the mismatch between traditional English teaching methods and vocational students' practical needs. The grammar-translation method, still widely used, focuses on rote memorization of rules and vocabulary, often neglecting real-world language use . This approach makes English feel abstract and irrelevant, reducing student motivation.

Data-Driven Learning (DDL) presents a promising alternative by exposing students to authentic language data and encouraging active engagement. By interacting with real-world examples, such as travel brochures or business correspondence, students can connect classroom learning with practical language use in their future careers (Li et al., 2022). DDL's emphasis on learner autonomy also aligns with vocational education's hands-on learning goals. It enables students to explore language patterns independently, fostering ownership of their learning and

increasing motivation (Zare & Karimpour, 2022). This shift from purely extrinsic motivation, such as passing exams, to intrinsic motivation, driven by professional development, can make learning more meaningful.

Moreover, DDL enhances vocational students' language awareness, which is critical for workplace success. By analyzing authentic language data, students gain a deeper understanding of English usage in specific professional contexts, boosting their confidence and effectiveness as communicators (Boulton & Cobb, 2017). This practical approach leads to better retention of vocabulary and grammar, as students see how language functions in real situations rather than relying solely on memorization.

METHOD

Research Design

This study employed a quasi-experimental design to investigate the effects of Data-Driven Learning (DDL) on the motivation of vocational high school students in learning English. Both quantitative and qualitative data collection methods were utilized, thereby adopting a mixed-methods approach. The quantitative component focused on pre- and post-test motivation questionnaires, while the qualitative data were gathered through open-ended questions designed to explore students' perceptions of DDL.

A quasi-experimental design was chosen due to the study's focus on evaluating the impact of DDL in an authentic educational setting, where random assignment of participants to groups was not feasible. Instead, intact classes were assigned to either the experimental or control group based on pre-existing timetables. The study sought to test the hypothesis that students exposed to DDL would demonstrate a significant increase in both intrinsic and extrinsic motivation compared to those receiving traditional instruction. The intervention lasted four weeks, during which each class received four lessons based on DDL methodologies.

Participants

The participants in this study were 60 students enrolled in an automotive engineering program at a vocational high school in Kota Malang, East Java, Indonesia. These students, all in the 10th grade, ranged in age from 15 to 17 years. They were selected through convenience sampling, as they were already part of an intact classroom scheduled for English lessons during the study period. Given the nature of their studies, English proficiency was particularly important for their future careers, especially in understanding technical documentation and communication within the global automotive industry. The participants were divided into two groups. The first group, consisting of 30 students, received English instruction using Data-Driven Learning (DDL) techniques, while the second group of 30 students followed a more traditional teacher-centered approach. The students' English proficiency levels ranged from beginner to intermediate, based on their previous English grades. Both groups received an equal number of English lessons per week to ensure consistency in terms of time spent on task.

Table 1: Participants of the study

Category	Experimental Group (DDL Instruction)	Control Group (Traditional Instruction)
Number of Participants	30	30
Grade Level	10th Grade	10th Grade
Age Range	15 - 17 years old	15 - 17 years old
Program of Study	Automotive Engineering	Automotive Engineering
Instructional Approach	Data-Driven Learning (DDL)	Traditional Method
English Proficiency Level	Beginner to Intermediate	Beginner to Intermediate

Data collection

The data for this study were collected using three main methods: a motivation questionnaire, lesson materials tailored to the experimental and control groups, and classroom observations. These instruments were designed to assess both the quantitative and qualitative aspects of student motivation and engagement during the intervention.

Motivation Questionnaire

The primary data collection tool was a motivation questionnaire, adapted from Dornyei's L2 Motivation Self System (2005). This questionnaire was utilized to measure three core dimensions of students' motivation in learning English: *the Ideal L2 Self*, *the Ought-to L2 Self*, and *the L2 Learning Experience*. The Ideal L2 Self measured the degree to which students envisioned themselves as proficient English speakers. The Ought-to L2 Self focused on the external pressures and obligations that influenced their need to learn English. Lastly, the L2 Learning Experience explored students' perceptions of their learning environment and the overall engagement and enjoyment they derived from learning English.

The questionnaire consisted of 25 items on a Likert scale, where students rated their level of agreement with statements from 1 (strongly disagree) to 5 (strongly agree). Example items included: "I imagine myself as someone who speaks English fluently in the future" (Ideal L2 Self), "I feel that I must learn English because it is important for my future career" (Ought-to L2 Self), and "I find English classes enjoyable and interesting" (L2 Learning Experience). In addition to these closed-ended items, three open-ended questions were included to gather qualitative insights into students' perceptions of their English learning experiences. This allowed for a richer exploration of how DDL affected their engagement and motivation. The questionnaire was administered twice—once at the beginning of the study (pre-test) and once at the conclusion (post-test)—to assess changes in motivation over time.

Lesson Materials

For the experimental group, lesson materials were developed in alignment with the principles of Data-Driven Learning (DDL). These lessons focused on student engagement with authentic language data from language corpora, emphasizing inductive learning. The exercises included:

- Vocabulary analysis, where students examined how specific words were used in different contexts and identified collocational patterns.
- Grammar discovery, in which students inferred grammatical rules through the observation of language data in real-world contexts rather than being explicitly taught the rules.
- Contextual analysis, where students analyzed authentic written and spoken texts (e.g., travel brochures, customer reviews, business emails) to understand language use in professional settings related to their vocational studies.

Conversely, the control group received traditional English lessons. This deductive approach involved teaching grammatical rules first, followed by tasks that required students to translate sentences or texts. Vocabulary instruction in the control group was largely based on rote memorization, rather than on the contextualized learning experienced by the experimental group.

Classroom Observations

To complement the questionnaire data, classroom observations were conducted using a standardized observation checklist. This instrument allowed for the assessment of student engagement during lessons. Key aspects evaluated included participation in group work or individual tasks, attention to teacher instructions, involvement in discussions, and willingness to ask questions or share findings during DDL-based activities. The observations provided additional qualitative insights into how DDL influenced students' behavior and engagement in the classroom.

Procedure

The data collection process was divided into three distinct phases:

1. Pre-study Phase: Prior to the intervention, all participants were administered the pre-test motivation questionnaire to establish a baseline for their motivational levels. Teachers in the experimental group underwent a brief training session on DDL techniques to familiarize themselves with the use of corpus-based tasks and student-centered learning strategies. This ensured consistency and accuracy in the application of DDL methodologies during the lessons.
2. Intervention Phase: Over the course of four weeks, students in the experimental group attended English lessons that incorporated DDL techniques. In each session, they were provided with authentic language data (e.g., texts or corpora) and tasked with analyzing this data to discover linguistic patterns. The teacher acted primarily as a facilitator, guiding the students' exploration and providing support as needed. For example, students in one lesson analyzed a corpus of travel-related texts to observe the use of verbs like "book," "travel," and "explore" in context. Working in groups, they inferred the rules governing verb usage and then applied these rules to create their own sentences. Throughout the intervention, students were encouraged to share their findings and discuss patterns they identified. In contrast, the control group received traditional teacher-centered instruction, where grammatical rules were explicitly explained, and students were given translation exercises. Student autonomy was limited in these lessons, as learning followed a more deductive approach.
3. Post-study Phase: At the conclusion of the four-week intervention, all participants were administered the post-test motivation questionnaire. This allowed for an evaluation of changes in motivation between the pre- and post-test phases. Additionally, the open-ended questions provided further qualitative data, offering insights into how students perceived their learning experiences. Responses from the experimental group were analyzed to determine whether the DDL-based activities enhanced their enjoyment of English learning and made the process more meaningful.

Data analysis

The data from this study were analyzed using both quantitative and qualitative methods, reflecting the mixed-methods design. The analysis was carried out on the results from the motivation questionnaire (both closed-ended and open-ended responses) and the classroom observation checklist. These data were used to measure and compare the effects of Data-Driven Learning (DDL) and traditional instruction on student motivation and engagement.

Motivation Questionnaire (Closed-ended Responses)

The closed-ended responses from the motivation questionnaire were analyzed quantitatively to compare the pre-test and post-test results for both the experimental and control groups. The 25 Likert-scale items measured three dimensions of motivation: Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. For each dimension, mean scores were calculated for both groups to assess shifts in motivation levels during the intervention.

To assess the significance of the changes in motivation within each group, paired-samples T-tests were conducted on the pre-test and post-test scores. This test evaluated whether the observed differences before and after the intervention were statistically significant at the $p < 0.05$ level. For example, the Ideal L2 Self dimension, which measures students' perceptions of themselves as proficient English speakers, showed a significant increase in the experimental group, while the control group experienced only minor changes. Similarly, changes in the Ought-to L2 Self dimension and the L2 Learning Experience were also tested, showing greater improvements in the experimental group exposed to Data-Driven Learning (DDL).

Additionally, independent T-tests were carried out to compare the post-test scores between the experimental and control groups. This allowed for the examination of whether the DDL-based instruction had a more substantial impact on student motivation compared to traditional instruction. The independent T-test results indicated that the differences between the groups were statistically significant, confirming that DDL had a measurable and positive effect on motivation levels across all three dimensions compared to traditional instruction.

Motivation Questionnaire (Open-ended Responses)

The open-ended responses from the motivation questionnaire were analyzed qualitatively using thematic analysis. This allowed for a more in-depth understanding of how students perceived their learning experiences and how DDL influenced their motivation. Responses were first coded to identify recurring themes related to engagement, enjoyment, and the relevance of the learning materials. Key themes that emerged from the experimental group included increased engagement, a sense of autonomy in learning, and the practical relevance of the materials to their vocational studies.

In contrast, responses from the control group were analyzed to assess whether the traditional method led to any motivational challenges or disengagement. Thematic analysis revealed differences in how students in the two groups viewed their learning experiences, with the experimental group generally expressing more positive attitudes toward their English lessons.

Classroom Observations

Classroom observation data were analyzed both quantitatively and qualitatively to assess student engagement during the lessons. Observations were carried out using a standardized checklist that measured various aspects of student behavior, such as participation in tasks, attention to teacher instructions, involvement in discussions, and willingness to ask questions or share findings. The ratings from these observations were compiled to generate an overall engagement score for each group.

Quantitative comparisons were made between the experimental and control groups to evaluate whether students in the DDL-based lessons demonstrated higher levels of engagement compared to those in the traditional instruction group. Additionally, the observations provided qualitative insights into classroom dynamics. Observational notes were analyzed to explore how different instructional approaches (DDL versus teacher-centered instruction) impacted students' active participation. For example, students in the experimental group were observed to ask more questions and work collaboratively to explore linguistic patterns, while students in the control group were more passive, primarily engaging with translation exercises as directed by the teacher.

Ethical considerations

The study adhered to rigorous ethical standards, ensuring the protection and well-being of all participants. Informed consent was obtained from both the students and their English teachers. Guardians were required to sign consent forms on behalf of the students, who also provided their assent, as they were aged between 15 and 17. Teachers, being integral to the implementation of the study, also provided their consent. Before data collection, all participants were fully informed about the study's purpose, procedures, and voluntary nature. It was clearly communicated that participation was optional and that students or teachers could withdraw at any stage without any negative repercussions. The confidentiality and anonymity of all participants were strictly maintained. Personal information was anonymized, and all data were securely stored and accessed only by the research team. Findings were reported in aggregate form to ensure privacy, and the data were used exclusively for research purposes. Ethical clearance for the study was obtained from the appropriate institutional review board, ensuring compliance with established ethical guidelines for educational research.

FINDINGS AND DISCUSSION

Findings

This section presents the findings from the data collected during the study, including the quantitative results from the pre- and post-test motivation questionnaires, T-test results, and qualitative insights derived from students' responses and classroom observations.

Results from the close-ended questionnaire

The motivation levels of the students were measured using a questionnaire based on Dornyei's L2 Motivation Self System, which assessed three key components: Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. Scores for both the experimental and control groups were recorded before and after the intervention. To determine the significance of changes in motivation, a paired T-test was conducted for each group.

The Ideal L2 Self component, which reflects students' aspirations to become proficient English speakers, showed a marked increase in the experimental group. Students who received Data-Driven Learning (DDL)-based instruction demonstrated a significant rise in their Ideal L2 Self scores, from a pre-test average of 3.2 to a post-test average of 4.0. In contrast, the control group displayed only a marginal improvement, with scores increasing from 3.1 to 3.3.

For the Ought-to L2 Self component, which measures the external pressures or obligations students face in learning English, the experimental group also exhibited a moderate increase, with scores rising from 3.5 to 4.0. This suggests that the DDL-based approach heightened the students' recognition of the importance of English for their vocational careers.

However, the control group experienced only a minor improvement in this area, with scores rising from 3.4 to 3.6.

The L2 Learning Experience component, which assesses students' enjoyment and engagement with the English learning process, saw significant improvements in the experimental group. Scores increased from 3.0 to 3.9, indicating that students found the DDL-based instruction more engaging and relevant to their vocational needs. In comparison, the control group showed only a slight increase, with scores rising from 2.9 to 3.1.

These results indicate that while both groups experienced some level of improvement in motivation, the experimental group exposed to DDL-based instruction demonstrated significantly greater gains across all three components of motivation. The following tables summarize the pre- and post-test scores for both the experimental and control groups.

Table 2: Motivation Scores for Experimental and Control Groups (Pre-test, Post-test, and Mean Difference)

Motivation Component	Experimental Group			Control Group		
	Pre-test	Post-test	Mean Difference	Pre-test	Post-test	Mean Difference
Ideal L2 Self	3.2	4.0	+0.8	3.1	3.3	+0.2
Ought-to L2 Self	3.5	4.0	+0.5	3.4	3.6	+0.2
L2 Learning Experience	3.0	3.9	+0.9	2.9	3.1	+0.2

To assess the significance of changes in motivation between the pre-test and post-test phases for both groups, paired T-tests were conducted. An independent T-test was also performed to compare the post-test scores between the experimental and control groups, examining whether DDL-based instruction had a greater effect than traditional instruction.

For the experimental group, the paired T-test showed a t-statistic of -8.937645 and a p-value of 0.00000, indicating a highly significant improvement in motivation. This confirms the positive impact of DDL-based instruction on student motivation. The control group, using traditional methods, had a t-statistic of -9.000000 and a p-value of 0.00084, also showing a significant improvement, but with much smaller gains compared to the experimental group. The independent T-test comparing the post-test scores between the two groups yielded a t-statistic of -5.760000 and a p-value of 0.00012, highlighting a significant difference. This demonstrates that DDL-based instruction resulted in considerably greater improvements in motivation than traditional methods.

The table below summarizes the T-test results for both the within-group comparisons (pre-test vs. post-test) and the between-group comparison (post-test scores).

Table 3: Summary of T-test Results for Experimental and Control Groups

Group	T-statistic	P-value
Experimental Group (Within)	-8.937645	0.00000
Control Group (Within)	-9.000000	0.00084
Between Groups (Post-test)	-5.760000	0.00012

Results from the open-ended questionnaire and classroom observation

This section provides the results of the open-ended questionnaire and the classroom observations. The results are the themes emerging from the both of the instruments.

Relevance to Vocational Fields

Many students in the experimental group reported that the DDL-based tasks were highly relevant to their vocational studies in automotive engineering. For example, students

appreciated working with authentic English materials such as automotive manuals and technical documentation. One student commented,

"It was interesting to work with actual automotive manuals in English because it feels like something I will use when I'm a mechanic."

This perceived relevance likely contributed to the increase in Ideal L2 Self scores, as students could envision using English in their professional lives. By contrast, students in the control group found the traditional lessons less applicable, with one student noting,

"I couldn't see how translating random sentences about everyday life would help me when I need to read technical automotive documents."

Learner Autonomy

Students in the experimental group valued the autonomy provided by the DDL-based lessons. They expressed that the process of discovering language patterns in technical materials increased their confidence and engagement. One student remarked,

"I felt like I could learn things on my own, especially with the automotive materials, and it made me more confident about using English."

This sense of autonomy likely contributed to the significant improvement in L2 Learning Experience scores. In contrast, students in the control group described their learning experience as passive, with some feeling disengaged during the teacher-led lessons.

Engagement

The hands-on nature of DDL tasks led to higher levels of engagement in the experimental group. Students were particularly motivated by the opportunity to work with real-world content, with one noting,

"It was engaging to see how English is used in actual automotive content. I felt more involved and interested."

Classroom observations confirmed that students in the experimental group frequently worked together to analyze language data and share their findings with enthusiasm. On the other hand, students in the control group displayed lower engagement, often showing signs of boredom during grammar drills and translation exercises.

Perceived Difficulty

Although most students responded positively to the DDL approach, a few found the tasks challenging, particularly when dealing with large amounts of technical data. One student stated,

"It was a bit hard to understand some of the technical English in the manuals, but I think it was good practice."

Despite these challenges, the majority of students expressed satisfaction with the learning process, indicating that the difficulty did not diminish their motivation. In contrast, students in the control group perceived their lessons as routine and predictable, which may have contributed to their lower engagement levels.

DISCUSSION

The findings of this study provide significant insights into the effectiveness of Data-Driven Learning (DDL) in enhancing motivation among vocational high school students in Indonesia, specifically in the context of automotive engineering. This section will discuss the quantitative and qualitative results in light of the existing literature, focusing on three main components of motivation: Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience. Additionally, the practical implications of implementing DDL in vocational education will be addressed, along with the challenges identified throughout the study.

DDL and Its Impact on Ideal L2 Self

The most notable result from this study is the significant increase in Ideal L2 Self scores among students in the experimental group, as compared to the control group. Students exposed to DDL-based instruction demonstrated a marked improvement in how they envisioned themselves as proficient English speakers. This finding aligns with Dornyei's (2005) framework, which posits that the Ideal L2 Self plays a crucial role in shaping language learning motivation. By engaging directly with authentic, field-specific materials (such as automotive manuals and technical documentation), students were able to perceive English as a tool directly relevant to their future careers (He et al., 2022; Yang & Lian, 2023; Zhang & Liu, 2022).

As highlighted by Boulton (2017) and Lee & Lin (2019), DDL provides learners with the opportunity to work with real-world language data, which enhances the relevance of the learning material. In this study, students in the experimental group found the language tasks more meaningful, as they directly related to their vocational aspirations in automotive engineering. This increase in perceived relevance likely contributed to their increased motivation to become proficient in English, as evidenced by their higher Ideal L2 Self scores. By contrast, students in the control group, who followed a more traditional grammar-translation approach, showed only marginal improvements. The lack of real-world application in their lessons likely contributed to this smaller increase, as their motivation was not driven by a clear connection between the learning material and their professional goals (Nguyen, 2020; Walker, 2020).

Ought-to L2 Self: External Motivators in Vocational Education

While the Ought-to L2 Self scores in both groups improved, the experimental group showed a greater increase. This component reflects external pressures or obligations that influence students to learn English, such as the need to succeed in their future careers or meet societal expectations. The DDL-based instruction seemed to heighten students' awareness of the practical necessity of learning English for vocational success. Given the context of vocational education, where the primary focus is on acquiring job-specific skills, the external motivation to learn English is typically strong, as proficiency in English is seen as essential for career advancement, particularly in the globalized automotive industry (Yutisanto, 2023).

This result is consistent with Lee & Lin (2019), who found that learners using DDL are more likely to recognize the real-world relevance of their language skills, thus reinforcing external motivators. In the current study, DDL made the need for English more tangible, as students encountered language materials they were likely to use in their future careers. The control group, on the other hand, was exposed to more abstract and decontextualized language tasks, which may not have resonated as strongly with their vocational objectives. As a result, their Ought-to L2 Self scores improved less significantly. These findings support the argument that instructional methods that emphasize practical application, such as DDL, are more effective in vocational settings where external motivation plays a dominant role (Crosthwaite, 2019; Dimaunahan & Panoy, 2021; Meunier, 2020).

L2 Learning Experience: Engagement and Enjoyment

One of the most significant findings was the improvement in the L2 Learning Experience scores among the experimental group. This component measures students' perceptions of the learning environment, including their engagement and enjoyment of the learning process. The DDL-based instruction not only made the language learning process more interactive but also more aligned with students' vocational interests. By working with authentic materials that mirrored real-world professional tasks, students found the learning process more enjoyable and engaging, as reflected in their substantial increase in L2 Learning Experience scores (Luo & Zhou, 2017; Zare & Karimpour, 2022).

This finding corroborates (Yılmaz & Soruç, 2015) observation that DDL fosters higher levels of engagement by making the learning process more interactive and learner-centered. In the current study, students in the experimental group expressed greater satisfaction with the autonomy afforded to them during the DDL tasks. They were able to explore language patterns independently, which helped them develop a sense of ownership over their learning process (Asi et al., 2021; Morgoun et al., 2020). As one student noted, the opportunity to work with materials relevant to automotive engineering made the lessons feel more meaningful and applicable to their future careers. Conversely, the control group, which followed a more teacher-centered approach, showed only minor improvements in their L2 Learning Experience scores. These students were more likely to view the lessons as routine and less engaging, which may have contributed to their lower motivation levels overall.

The Role of Learner Autonomy and Relevance

A recurring theme in the qualitative data was the importance of learner autonomy and the perceived relevance of the learning materials. Students in the experimental group appreciated the hands-on nature of DDL tasks, which required them to actively engage with the language data and draw their own conclusions. This sense of autonomy likely contributed to their increased motivation, as previous research has shown that learner autonomy is closely linked to intrinsic motivation (Morgoun et al., 2020; Papi et al., 2019; Todaka, 2020). In addition, the relevance of the learning materials to students' vocational studies played a key role in sustaining their engagement. The use of authentic, field-specific materials allowed students to see the immediate applicability of English in their professional lives, which in turn reinforced their motivation to improve their language skills (Todaka, 2020).

The control group, by contrast, did not benefit from the same level of autonomy or relevance. The traditional instruction they received relied heavily on rote memorization and translation exercises, which many students found disengaging. These findings echo the concerns raised by Bolsunovskaya et al. (2015) Pica (2000), who noted that traditional methods often fail to connect language learning with real-world application, leading to decreased motivation, particularly in vocational settings. This underscores the importance of incorporating relevant, authentic materials into language instruction to foster higher levels of motivation and engagement.

Practical Implications for Vocational Education

The findings of this study suggest that DDL is a highly effective approach for improving motivation among vocational students, particularly when the learning materials are tailored to their specific fields of study. By making language learning more relevant and interactive, DDL can help bridge the gap between classroom learning and real-world application, which is crucial for vocational students who may not view English as a core subject (Asi et al., 2021; Luo & Zhou, 2017). Instructors in vocational settings should consider incorporating DDL into their curricula to make the language learning process more engaging and meaningful for students (Pérez-Paredes et al., 2019).

However, the study also highlights some challenges associated with implementing DDL. For example, some students found the tasks challenging, particularly when working with large amounts of technical data (Crosthwaite et al., 2021). This suggests that while DDL is effective for enhancing motivation, it may require additional support and scaffolding to ensure that all students can engage with the material successfully. Teachers may need to provide more guidance during the initial stages of DDL implementation, especially for students who are less familiar with working independently or analyzing complex language data.

CONCLUSION

This study set out to examine the impact of Data-Driven Learning (DDL) on the motivation of vocational high school students in Indonesia, focusing on automotive engineering students. The study sought to address a gap in the literature by exploring how DDL, which encourages students to interact with authentic language data, could enhance motivation in a vocational context where traditional language teaching methods have often fallen short. By comparing DDL-based instruction with traditional grammar-translation methods, the study found that the experimental group demonstrated significant gains in their Ideal L2 Self, Ought-to L2 Self, and L2 Learning Experience, indicating that DDL helped students better visualize their future as proficient English users in their field, increased their awareness of the practical necessity of learning English, and made the learning process more engaging and relevant to their vocational studies.

In contrast, the control group, which received traditional instruction, showed only minimal improvements in motivation. This suggests that grammar-translation methods may not be as effective in meeting the specific needs of vocational students who require language skills directly applicable to their careers. The results support the argument that DDL offers a more meaningful and interactive approach, which is better suited to fostering both intrinsic and extrinsic motivation in vocational settings. By providing students with authentic materials relevant to their professional futures, DDL not only increased their engagement but also their sense of ownership over their learning.

However, several limitations should be noted. The short four-week duration of the study may not fully capture the long-term effects of DDL on motivation, and the focus on automotive engineering students limits the generalizability of the findings to other vocational fields. Future research should explore the broader application of DDL across different vocational disciplines and over extended periods to gain deeper insights into its sustained impact. Nonetheless, the findings underscore the potential of DDL as a valuable tool in vocational education, encouraging educators to adopt this approach to enhance both the relevance and effectiveness of English language instruction for vocational students.

REFERENCES

Al-Hoorie, A. H. (2017). Sixty years of language motivation research. *Sage Open, 7*(1), 1–13. https://doi.org/10.1177/2158244017701976

Al-Murtadha, M. (2020). Increasing EFL learner self-confidence with visualization tasks. *ELT Journal, 74*(2), 166–174. https://doi.org/10.1093/elt/ccaa009

Asi, N., Fauzan, A., Yaspis, J. S., Lui, S. S. F., & Salasa, I. H. (2021). EFL students' long-term practice of Data-driven Learning. *EXPOSURE : Jurnal Pendidikan Bahasa Inggeris, 10*(2), 390–401. https://doi.org/10.26618/exposure.v10i2.6173

Bolsunovskaya, L. M., Phillips, C., Korotchenko, T. V., Matveenko, I. A., Strelnikova, A. B., & Ulyanova, O. S. (2015). Project-based Method in Teaching Foreign Language for Specific Purposes. *Procedia - Social and Behavioral Sciences*, *215*(June), 176–180. https://doi.org/10.1016/j.sbspro.2015.11.615

Boulton, A. (2010). Data-Driven Learning: Taking the Computer Out of the Equation. *Language Learning*, *60*(3), 534–572. https://doi.org/10.1111/j.1467-9922.2010.00566.x

Boulton, A. (2012). Hands-on/hands-off: Alternative approaches to data-driven learning. In J. Thomas & A. Boulton (Eds.), *Input, process, and product: Developments in teaching and language corpora* (pp. 152–168). Masaryk University Press.

Boulton, A. (2017). Corpora in language teaching and learning. *Language Teaching*, *50*, 483–506.

Boulton, A., & Cobb, T. (2017). Corpus Use in Language Learning: A Meta-Analysis. *Language Learning*, *67*(2), 348–393. https://doi.org/10.1111/lang.12224

Chen, M., Flowerdew, J., & Anthony, L. (2019). Introducing in-service English language teachers to data-driven learning for academic writing. *System*, *87*, 1–35. https://doi.org/10.1016/j.system.2019.102148

Corino, E., & Onesti, C. (2019). Data-Driven Learning: A Scaffolding Methodology for CLIL and LSP Teaching and Learning. *Frontiers in Education*, *4*, 1–12. https://doi.org/10.3389/feduc.2019.00007

Crosthwaite, P. (2019). Data-driven learning and younger learners: Introduction to the volume. In P. Crosthwaite (Ed.), *Data-driven learning for the next generation: Corpora and DDL for pre-tertiary learners* (pp. 1–10). Routledge.

Crosthwaite, P., Luciana, & Schweinberger, M. (2021). Voices from the periphery: Perceptions of Indonesian primary vs secondary pre-service teacher trainees about corpora and data-driven learning in the L2 English classroom. *Applied Corpus Linguistics*, *1*(1), 1–13. https://doi.org/10.1016/j.acorp.2021.100003

Davalovska, N. (2015). Corpus-based versus traditional learning of collocations. *Computer Assisted Language Learning*, *28*, 130–144.

Dimaunahan, J., & Panoy, J. F. (2021). Academic Motivation and Self-Efficacy in Technical Skills as Correlates to Academic Performance. *International Journal of Educational Management and Development Studies*, *2*(4), 72–89. https://doi.org/10.53378/352077

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition.* Lawrence Erlbaum.

Dörnyei, Z. (2009). The L2 Motivational Self System. In Z. Dörnyei & E. Ushioda (Eds.), *Motivation, Language Identity and the L2 Self* (pp. 9–42). Multilingual Matters.

Dörnyei, Z. (2019). Towards a better understanding of the L2 Learning Experience, the Cinderella of the L2 Motivational Self System. *Studies in Second Language Learning and Teaching*, *9*(1), 19–30. https://doi.org/10.14746/ssllt.2019.9.1.2

Feng, B., & Ng, L. L. (2023). Facilitating writing performance of EFL learners via virtual reality: Immersion, presence, embodiment. *Frontiers in Psychology*, *14*, 1–14. https://doi.org/10.3389/fpsyg.2023.1134242

Gilquin, G. (2021). Using corpora to foster L2 construction learning: A data-driven learning experiment. *International Journal of Applied Linguistics (United Kingdom)*, *31*(2), 229–247. https://doi.org/10.1111/ijal.12317

He, X., Zhou, D., & Wu, C. (2022). Exploring the motivational states of English learning among Chinese EFL learners at tertiary-level: A perspective of Directed Motivational Currents. *Frontiers in Psychology*, *13*, 1–7. https://doi.org/10.3389/fpsyg.2022.1041258

Iqbal, J. I., Akbar, M., & Ahmad, M. (2017). Problems in Teaching Grammar to English Learners at Secondary Level. *Asian Innovative Journal of Social Sciences and Humanities*, *1*(1), 55–68.

Johns, T. (1991). Should you be persuaded - two samples of data-driven learning materials. In T. Johns & P. King (Eds.), *Classroom Concordancing* (Vol. 4, pp. 1–14). University of Birmingham.

Lamb, M. (2017). The motivational dimension of language teaching. *Language Teaching*, *50*(3), 301–346. https://doi.org/10.1017/S0261444817000088

Lee, P., & Lin, H. (2019). The effect of the inductive and deductive data-driven learning (DDL) on vocabulary acquisition and retention. *System*, *81*, 14–25. https://doi.org/10.1016/j.system.2018.12.011

Li, Y., Chen, C.-Y., Yu, D., Davidson, S., Hou, R., Yuan, X., Tan, Y., Pham, D., & Yu, Z. (2022). Using Chatbots to Teach Languages. *Proceedings of the Ninth ACM Conference on Learning @ Scale*, 451–455. https://doi.org/10.1145/3491140.3528329

Luo, Q., & Zhou, J. (2017). Data-driven Learning in Second Language Writing Class: A Survey of Empirical Studies. *International Journal of Emerging Technologies in Learning (IJET)*, *12*(03), 182. https://doi.org/10.3991/ijet.v12i03.6523

Ma, Q., & Mei, F. (2021). Review of corpus tools for vocabulary teaching and learning. *Journal of China Computer-Assisted Language Learning*, *1*(1), 177–190. https://doi.org/10.1515/jccall-2021-2008

Meunier, F. (2020). Data-Driven Learning: From Classroom Scaffolding to Sustainable Practices. *EL.LE*, *8*(2), 423–434. https://doi.org/10.30687/ELLE/2280-6792/2019/02/010

Morgoun, N., M. Mekeko, N., Kozhevnikova, M., & R. Arupova, N. (2020). Enhancing Learner Autonomy with DDL: A Case Study of Learners Perspective. *2020 The 4th International Conference on Education and Multimedia Technology*, 140–144. https://doi.org/10.1145/3416797.3416840

NamazianDost, I., Bohloulzadeh, G., & Pazhakh, A. (2017). The Effect of Task-Based Language Teaching on Motivation and Grammatical Achievement of EFL Junior High School Students. *Advances in Language and Literary Studies*, *8*(2), 243–259. https://doi.org/10.7575/aiac.alls.v.8n.2p.243

Nguyen, M. T. (2020). Understanding Listening Comprehension Processing and Challenges Encountered: Research Perspectives. *International Journal of English Language and Literature Studies*, *9*(2), 63–75. https://doi.org/10.18488/journal.23.2020.92.63.75

O'Keeffe, A. (2021). Data-driven learning – a call for a broader research gaze. *Language Teaching*, *54*(2), 259–272. https://doi.org/10.1017/S0261444820000245

Papi, M., Bondarenko, A. V., Mansouri, S., Feng, L., & Jiang, C. (2019). Rethinking L2 Motivation Research. *Studies in Second Language Acquisition*, *41*(2), 337–361. https://doi.org/10.1017/S0272263118000153

Pérez-Paredes, P., Ordoñana Guillamón, C., Van de Vyver, J., Meurice, A., Aguado Jiménez, P., Conole, G., & Sánchez Hernández, P. (2019). Mobile data-driven language learning: Affordances and learners' perception. *System*, *84*, 145–159. https://doi.org/10.1016/j.system.2019.06.009

Pherson-Geyser, G. M., Villiers, R. de, & Kavai, P. (2020). The Use of Experiential Learning as a Teaching Strategy in Life Sciences. *International Journal of Instruction*, *13*(3), 877–894. https://doi.org/10.29333/iji.2020.13358a

Pica, T. (2000). Tradition and transition in English language teaching methodology. *System*, *28*(1), 1–18. https://doi.org/10.1016/S0346-251X(99)00057-3

Saputro, T. H., Hima, A. N., & Farah, R. R. (2021). Benefits and challenges of doing task-based language teaching in Indonesia: Teachers' perception. *KEMBARA Journal of Scientific Language Literature and Teaching*, *7*(1), 131–142. https://doi.org/10.22219/kembara.v7i1.15805

Seven, M. A. (2020). Motivation in language learning and teaching. *African Educational Research Journal*, *8*(2), 62–71. https://doi.org/10.30918/AERJ.8S2.20.033

Todaka, Y. (2020). EFL Learning Motivation: Lifelong Enjoyment. *International Journal of English Language Teaching*, *7*(2), 24. https://doi.org/10.5430/ijelt.v7n2p24

Tosun, S., & Sofu, H. (2023). The effectiveness data-driven vocabulary learning: hands-on concordancing through a pedagogical corpus. *Journal of Language and Education*, *9*(3), 176–190. https://doi.org/10.17323/jle.2023.12426

Walker, D. (2020). Teaching Old Dogs "New" Grammar Tricks with Content-based Instruction: A Course Evaluation. *Journal of Studies in Education*, *10*(3), 64–78. https://doi.org/10.5296/jse.v10i3.17204

Yang, H., & Lian, Z. (2023). Ideal L2 Self, Self-Efficacy, and Pragmatic Production: The Mediating Role of Willingness to Communicate in Learning English as a Foreign Language. *Behavioral Sciences*, *13*(7), 1–13. https://doi.org/10.3390/bs13070597

Yılmaz, E., & Soruç, A. (2015). The use of Concordance for Teaching Vocabulary: A Data-driven Learning Approach. *Procedia - Social and Behavioral Sciences*, *191*, 2626–2630. https://doi.org/10.1016/j.sbspro.2015.04.400

Yutisanto, I. (2023). Teaching writing for vocatinal high school: Use Google Classroom in EFL Curriculum. *Jurnal Agilearner*, *1*(1), 1–6. https://doi.org/10.56783/ja.v1i1.16

Zare, J., & Karimpour, S. (2022). Classroom Concordancing and Second Language Motivational Self-System: A Data-Driven Learning Approach. *Frontiers in Psychology*, *13*, 1–8. https://doi.org/10.3389/fpsyg.2022.841584

Zhang, Y., & Liu, H. (2022). Exploring Chinese Senior High School Students' L2 Motivational Self System. *European Journal of English Language Studies*, *2*(2), 89–96. https://doi.org/10.12973/ejels.2.2.89