

IMPLEMENTING DDL IN ENGLISH LEARNING APPLICATION FOR UNIVERSITY STUDENTS IN INDONESIA: STUDENT'S PRESPECTIVE

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Abstract

This research aimed to analyze students' perspectives on using Data-Driven Learning in our English Learning Application to enhance students' understanding of English grammar. The post-test and pre-test were employed in this study. The results of the post-test and pretest were analyzed quantitatively to measure the effectiveness of Data-Driven Learning in improving students' understanding of English grammar. Moreover, the 5-point Likert questionnaire was also used to know students' perspective of its approach. The results showed that the students generally had a positive experience of exploring Data-Driven Learning instruction in our application. It also supports independent learning, promoting engagement, curiosity, and self-discovery. However, several challenges limit its positive impacts. It will be a challenging learning experience if Data-Driven Learning is applied to a web-based English learning application, which aims for independent learning. Therefore, the instructions in data corpus exploration must be delivered clearly. So that, the students can understand the instruction and the materials clearly.

Keywords— Corpus-based, Data-driven learning, DDL, Web-based English Learning

Introduction

English is an international language that has been used in various fields, for example in medical research (Outemzabet & Sarnou, 2023) (Džuganová, 2019) and also in education. English has also become a lingua franca in the world. It becomes the primary language of communication in many fields and is spoken by people all around the world (Chen, 2023). Therefore, mastering English is crucial in the modern, globalized, and competitive world, particularly for job positions necessitating cross-cultural communication (Liu, 2023) to enhance students' skills and perspectives (Qureshi et al., 2020).

Most countries have recognized the importance of English in education, and they have addressed shortcomings by prioritizing English language instruction in their planning and strategies (Chandrasekaran et al., 2021). Therefore, English has been widely taught in schools around the world. The students are taught general English. General English emphasizes comprehensive language proficiency, highlighting essential grammar, vocabulary, and communication skills relevant to many everyday and academic situations (Muthukumar et al., 2025).

In Indonesia, English becomes a foreign language and it is taught in schools for more than twelve years, from elementary to university. However, Most Indonesian students do not experience a significant improvement in their English language skills although they have studied

English for over 12 years in school (Sahid et al., 2024), especially in grammar. It can be caused by the lack of interest in studying English (Sahid et al., 2024). Whereas, one of the factors that influences a people's English speaking skills is motivation (Bagheri Nevisi & Farhani, 2022) (Ningtiyas & Rahmawati*, 2024), in addition to learning methods and the intensity of speaking practice (Apsari et al., 2022).

Several factors contribute to the low interest in learning English. One of these is the use of teaching methods that are still conventional and outdated (7). Additionally, uninteresting learning material (8) also affects student's interest and motivation in learning English. Several researches found that most of high education students consider English a foreign language that is difficult (Rahmawati et al., 2025). Many university students are still struggle with grammar accuracy, vocabulary range, and contextual language use, despite their long exposure to English instruction.

This persistent problem reflects the limitations of conventional classroom-based teaching that often emphasizes memorization and test preparation rather than authentic language use. Therefore, there is an urgent need to analyze the implementation of Data-Driven Learning in English learning applocation to enhance students motivation and understanding in learning English.

Data-Driven Learning or DDL is one of pedagogical approaches in language learning. This approach use language corpora (Crosthwaite et al., 2021). Corpus-based learning has been widely implemented in foreign language learning, particularly English. It has been a crucial component of language instruction and learning during the last thirty years (Sfeir, 2025). The analysis of both spoken and written from corpus linguistics has yielded valuable findings regarding vocabulary, grammar, and pragmatic skills that can be used by language learners across various disciplines (Friginal & Cox, 2025).

DDL is learning second or foreign language methods that use corpus linguistic tools and techniques directly (Boulton & Forti, 2025). It has two methods. Those are direct and indirect. If students use corpus data "indirectly," they encounter it indirectly thru course materials, dictionaries, and word lists. However, if students use corpus data "directly," they can access it through direct corpus consultation or paper-based tasks (Sfeir, 2025).

Moreover, Sun et al (2020) also explained that while the "indirect" approach used corpus-informed, paper-and-pen learning exercises, the "direct" approach required students to do guided searches and analysis of target hedges in online corpora (Sun & Hu, 2023). However, for classes with students who are new to linguistic corpora, the indirect DDL approach is more effective. This is because the indirect method does not require training. Indirect DDL proves that implementing DDL may not always require extensive training or reliance on a corpus (Sun & Hu, 2023).

Additionally, indirect DDL is suitable for teaching English to university students. This does not only improves their English language skills but also enhances their critical thinking abilities by analyzing grammar and vocabulary in sentence examples taken from corpus data. The data-driven approach enhances EFL students' learning capabilities and engagement, as well as their capacity for creative and critical thinking (Zhang, 2022).

Moreover, DDL is pedagogically suitable for improving university students' understanding of English grammar (M. H. Lin, 2021). A systematic literature review of DDL in language learning reported that most young learners have a positive attitude toward DDL, and it is efficient for them across a range of age groups and corpus interaction styles (Huang & Ma, 2025). However, although DDL is effective in learning English, especially grammar, not many English language learning platforms implement the DDL approach on their platforms. Therefore, we try to implement DDL for our web-based English learning application.

Some of previous studies had been analysed the effectiveness of web-based learning platform to enhance students English skill. Alsuhaibani et all (2024) had been analysed the effectiveness of web-based pronunciation training and learning consonant among EFL students. The study highlight the effectiveness of web-based pronunciation training as a valuable tool for teaching second language pronunciation (Alsuhaibani et al., 2024).

Another year, Sfeir (2025) has been analysed about the benefit of corpus creation and its role in rising learners awareness. The results showed how corpus construction may be rethought as worthwhile activities that enhance students' cognitive abilities (Sfeir, 2025). However, those

studies focused on only web-based learning resources or only DDL with limited exploration of how to integrate DDL and web-based learning platforms to enhance student ability and motivation in learning English, especially within the Indonesian EFL context. Therefore, in this study, we focused on analyzing how are students' perspectives on using the DDL approach in our application? This study aims to evaluate students' perspectives of the implementation of DDL approach for a web-based English learning application to support grammar learning.

Literature Review

DDL in English Learning and Teaching

A common approach to learning other languages, especially English, is corpus-based learning or Data-Driven Learning (DDL). Over the past decades, it has been an essential part of language learning and instruction (Sfeir, 2025). Corpus linguistics has produced useful results on vocabulary, grammar, and pragmatic abilities that may be used by language learners in a variety of fields by analyzing both spoken and written language (Friginal & Cox, 2025).

There are two ways to use DDL to the process of learning and teaching English. Those are direct and indirect. DDL often entails direct learner interaction with corpus data, either through written materials or learner-directed hands-on corpus consulting, enabling students to visualize and assimilate statistical and contextual information regarding language in use. When students utilize corpus data "indirectly," they come into contact with it through word lists, dictionaries, and course materials. On the other hand, if students use corpus data "directly," they can do so through paper-based assignments or direct corpus consultation (Sfeir, 2025).

The DDL approach offers a powerful pedagogical framework. Pioneered by Johns (1991), DDL encourages learners to explore linguistic data directly from corpora and draw their own conclusions about language patterns. This inductive, discovery-based approach promotes learner autonomy, critical thinking, and awareness of authentic usage. Therefore DDL become effective approach in learning English

Web-Based Learning English

The term "web-based learning" describes the delivery of educational information over the World Wide Web, which allows students to access learning materials remotely. Web-based learning is a digital platform that offers all the services and tools required to facilitate and online and independent learning. The platform efficiently supports interactions and communication between students and teachers, efficiently maintains and delivers educational content, and provides powerful tools for tracking and evaluating academic achievement (Alterkait & Alduaij, 2024).

Web-based learning can boost students' enthusiasm to learn English since digital information is quicker, easier to use, and less environmentally harmful than paper content (Rukhiran, Buaroong, et al., 2022). Additionally, it offers long-term learning materials. Both within and outside of the classroom, several educational institutions have used digital learning technologies to support long-term learning (M.-H. Lin et al., 2017) (20) (21). Web-based learning also gives students the flexibility to learn at their own speed and according to their own interests and requirements. Learners can modify the timings, places, routes, and/or speeds of the digital learning system in web-based learning (Rukhiran, Phokajang, et al., 2022). Web-based learning may thus be the most effective way to increase students' motivation for learning English.

Research Method

Research Design

In designing and implementing DDL in our web-based English language learning application, we employed a Research and Development (R&D) design adopting the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) integrated with a pre-experimental one-group pretest–posttest design. According to Sugiyono, development research is a research method used to produce a specific product and to test the effectiveness of that product (Sugiyono, 2015). We also used pre-experimental research. pre-experimental research is an experiment involving only one group and no comparison or control group (Rukminingsih et al., 2020). The research

Pre-test	Treatment	Post-test
Y1	X	Y2

Participants

Data Collection Instruments

The second was the student's perception questionnaire. It was adapted from Yoon and Hirvela (2006) and Chanie (2024). We adopted this questionnaire because two experts in Teaching English as a Foreign Language (TEFL) had examined it for content validity. The majority of the questionnaire items were essentially accepted by them (Chanie et al., 2024). This questionnaire was used to assess ESL students attitudes toward corpus use in L2 writing (Chanie et al., 2024). It consisted of 18 statements covering the use of DDL in learning grammar and the difficulties in the use of the DDL approach. The Students responded on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability of the instrument was verified using Cronbach's Alpha, where a value greater than 0.91. It showed that it was reliable.

To determine the effectiveness of the DDL application in improving grammar performance and the students' perspectives of this approach, we employed quantitative methods. A Paired Sample t-test was used to assess the result of the pre and post test. It is also used to analyze the result of the questionnaire. If the p-value showed < 0.05 , the DDL approach is significantly appropriate for our web application.

Results

During the implementation, students were guided to notice the function of every linking syntactical patterns of linking adverbials through concordance lines taken from Coca (see picture 1).

Dashboard / 1. Explore / Task 1

1. Explore Linking adverbials in sentences

Here are some examples of linking adverbials taken from GCSE

1. **After the meeting**, the team decided to postpone the project.

2. The team decided to postpone the project **because of the lack of resources**.

3. The team decided to postpone the project, **but they will start it again next week**.

4. The team decided to postpone the project, **and they will start it again next week**.

After that, the students identified the syntactical pattern of linking adverbials in sentences (see picture 2)

Picture 2 Identified the syntactical pattern

2. Exploring syntactical pattern of linking adverbials

Pay attention to the position and punctuation in the following sentence:

1. The company lost many clients; however, it remained profitable.
2. Therefore, we can conclude that the hypothesis is supported.
3. The program was effective; moreover, it reduced costs.

Analyse the following aspect of the sentences above:

1. Where is the position of linking adverbial in the sentence? (before / in the middle / after the semicolon?)
2. Are there any special punctuation marks that appear before or after it?
3. Is it used to connect two independent clauses?

Previous Next

Discussion

Add a comment...

Post

The last, the students asked to apply the observed structures in contextual exercises (see picture 3).

Picture 3 Applying linking adverbials in writing

Title

Write your linking adverbials

Instructions

Write a short paragraph (5-7 sentences) about your learning experience using the following linking adverbials (use at least 3 different categories):

1. However
2. Additionally
3. In sum
4. Therefore

Students' test scores before and after the intervention

Test	N	Mean	Std. Deviation	Minimum	Maximum
Pre-test	40	43.63	11.08	15	65
Post-test	40	88.50	5.77	80	95

Table 2 result of Students' test scores before and after the intervention

According to table 2, the data showed that the average pre-test score of participants was 43.63, while the average post-test score increased drastically to 88.50. This indicated a 44.88-point increase after the implementation of Data-Driven Learning (DDL) through our web application.

Pair	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)
Post-test – Pre-test	44.88	10.27	27.67	39	0.000

Table 3 result of Students' T-test scores before and after the intervention

Table 3 showed that the t-value is 27,67 with a p-value $0.000 < 0.05$. It indicates a highly significant difference between pre-test and post-test scores.

The Student's Perspectives towards DDL



The results of the data questioner showed that all indicators obtained mean scores above **3.5** on a 5-point Likert scale, that is 3.69, indicating that students held **positive perceptions** toward the implementation of Data-Driven Learning (DDL) in learning English grammar, as shown by table 3 below.

No	Questionnaire Item	Mean	SD	Interpretation
1	The DDL instruction was interesting	2.95	0.55	Moderate agreement
2	The presentation of the DDL tasks and activities were good	3.45	0.51	High agreement
3	The DDL instruction helped you improve your grammar	3.70	0.46	High agreement
4	The DDL tasks were not difficult to complete	3.35	0.48	High agreement
5	If you attend a grammar lesson, you should always use the DDL units	4.00	0.00	Perfect agreement
6	The concordance-based activities were not relevant to the course seminar	1.00	0.00	Perfect disagreement (indicating <i>high relevance</i>)
7	The concordance inputs helped you discover new patterns	4.00	0.00	Perfect agreement
8	New vocabulary and formulaic expressions were taught in the DDL instruction	4.00	0.00	Perfect agreement
9	The DDL instruction helped you understand the use of linking adverbials	4.00	0.00	Perfect agreement
10	The DDL instruction helped you learn how to understand the use of linking adverbials	4.00	0.00	Perfect agreement
11	The DDL units helped you implement linking adverbials in sentences	4.00	0.00	Perfect agreement
12	The instruction in DDL helped you learn to create complex sentences	4.00	0.00	Perfect agreement
13	The units helped you understand the structure of complex sentences	4.00	0.00	Perfect agreement
14	The DDL-based instructions were easy to follow	2.55	0.51	Moderate agreement
15	The language points selected in the DDL instruction were useful	4.00	0.00	Perfect agreement
16	The concordance lines were easy to understand	3.00	0.00	Agreement
17	The concordance lines were well chosen	4.00	0.00	Perfect agreement
18	Noticing of language features in concordance lines was interesting	4.00	0.00	Perfect agreement
Total		3.69	0.27	

Table 4 The result of questioner of the students perspectives toward DDL

Statistic	Value
t-value (overall)	14.6
p-value (overall)	0.000
Significance	Yes ($p < 0.05$)

Table 5 Tt-test results of the students perspectives toward DDL

The table 5 showed the results of the one-sample t-test revealed that most questionnaire items showed mean scores significantly higher than the neutral value ($p < .05$), indicating that students had highly positive attitudes toward the DDL instruction and its activities. Specifically, items

related to grammar improvement, pattern discovery, and the use of linking adverbials reflected strong agreement among students.

However, two items “*The DDL instruction was interesting*” and “*The concordance lines were easy to understand*” were not significantly different from the neutral point, suggesting that students found them satisfactory but not particularly impressive. One item, “*The DDL-based instructions were easy to follow*,” had a mean of 2.55 and was significantly lower than 3 (see table 4), indicating that some students experienced difficulty in following the DDL instructions. Meanwhile, the negative item “*The concordance-based activities were not relevant*” had a mean of 1.00 (see table 4), significantly below 3, which means that students perceived the activities as highly relevant to the course content.

Discussion

The implementation of DDL materials for a web-based learning application

The implementation of (DDL) materials in a web-based application was conducted over two instructional sessions. Each session focused on the pattern of complex sentences that use linking adverbials. The material and instruction should be designed by its level. For intermediate level it focused on analyzing the syntactical pattern of sentences. At the intermediate levels, the focus of DDL is on improving syntactic understanding (36). However, for my university students, I tried to use the syntactical pattern of linking adverbials as connectors in sentences.

Based on system usage logs and classroom observations, students demonstrated high engagement levels. Most students spent additional time exploring examples beyond the required tasks, suggesting the application effectively fostered learner autonomy. Out of 40 participants, 33 male and 7 female students reported that they enjoyed discovering syntactical patterns by themselves rather than relying solely on teacher explanations.

This implementation also revealed that DDL integration within a web-based application enhanced students' analytical awareness of form and meaning. The DDL approach enhances EFL students' learning capabilities and engagement, as well as their capacity for creative and critical thinking.

The interactive visualization of concordance results allowed learners to identify patterns in sentence constructions more effectively. It emphasizes how DDL facilitates noticing and self-discovery in second language grammar learning. Thus, DDL can be an effective approach to independent learning with instruction.

The effectiveness of DDL materials in web-based learning application to enhance students' ability and motivation in learning English.

The findings of the questionnaire revealed an overall positive perception of students toward the use of Data-Driven Learning (DDL) in learning English grammar, alongside a moderate level of perceived difficulty when engaging with the DDL approach. Most young learners have a positive attitude toward DDL, and it is efficient for them across a range of age groups and corpus interaction styles (29). These two constructs provide complementary insights into how learners experience and respond to the use of DDL within web-based language application.

Additionally, the results indicated that students highly value the use of DDL in grammar learning, with mean scores across relevant items ranging between 3.90, which fall under the “strongly agree” category. This demonstrates that the learners view DDL as an effective method for understanding syntactical pattern and function of linking adverbial through authentic language data. DDL is pedagogically suitable for improving university students' understanding of English grammar (27). Students acknowledged that accessing real examples from corpus databases helped them identify patterns and function or meaning in natural contexts.

The integration of DDL into a web-based application also contributes to the accessibility and interactivity of grammar learning. Learners can easily search, compare, and analyze authentic sentences, which supports inductive grammar learning. Teachers in Taiwan believe that DDL can make grammar learning more active and engaging (37).

However, despite the positive attitudes, the results also reveal several **perceived difficulties** in using DDL approach, with mean scores 2.55. It represents a moderate level of challenge. The challenge lies not in the concept of DDL itself but in the *technological and analytical literacy*

required to interpret large language datasets. Although DDL has a lot of potential as a teaching technique, but challenges exist limit its positive impact on language learning (37). Nevertheless, these challenges are not necessarily negative. It represents part of the *learning curve* in developing critical thinking.

Overall, this study's findings suggested several significant pedagogical ramifications. To scaffold users' analytical skills in recognizing grammatical patterns, we must first give unambiguous guided for corpus exploration activities when implementing DDL for web-based applications. Second, to ease people into corpus-based inquiry, it is essential to provide a simple interface and clear task instructions. Third, inductive discovery and organized grammar explanation can be balanced by combining DDL with explicit teaching. By addressing these challenges, DDL can be applied affectively in our web-based application.

Conclusion

Overall, the positive response to DDL indicates that it has implemented successfully in our application. It also supports Independent learning, promoting engagement, curiosity, and self-discovery in the learning process. However, it will be a challenging learning experience if DDL is applied to a web-based English learning application, which aims for independent learning. Therefore, the instructions in data corpus exploration must be delivered clearly and in easy-to-understand language.

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