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RESEARCH ARTICLE

The impact of data-driven learning form-focused tasks on learners' task engagement: An intervention study

Javad Zare
Kosar University of Bojnord, Bojnord, Iran (javadzare@gmail.com)

Mostafa Azari Noughabi
Hakim Sabzevari University, Sabzevar, Iran (mostafaazari2015@gmail.com)

Ahmad Al-Issa
American University of Sharjah, Sharjah, United Arab Emirates (aissa@aus.edu)

Abstract

Data-driven learning (DDL) form-focused tasks are a relatively new concept. These tasks involve using concordance lines to teach language in a way that integrates discovery learning, authentic language use, consciousness-raising, and the communicative use of language. Given their novelty, there haven't been many studies on how they impact learners' engagement. Therefore, this study sought to study whether DDL form-focused tasks influence English as a foreign language (EFL) learners' task engagement. A total of 114 Iranian EFL learners were randomly divided between comparison and intervention groups in a study that utilized an experimental (comparison group, pretest, and post-test) design within a sequential explanatory mixed-methods design. The comparison group completed 10 non-DDL form-focused tasks, whereas the intervention group completed 10 DDL form-focused tasks. The results of *t*-tests and repeated-measures ANOVA indicated that incorporating DDL form-focused tasks into English classes enhanced EFL learners' task engagement in the short run. However, the impact of DDL form-focused tasks on EFL learners' task engagement was not durable. Moreover, analyzing semi-structured interview data suggested that using DDL-enhanced tasks with a form-focused approach increases EFL learners' task engagement by triggering their curiosity, improving their autonomy, enhancing their concentration and interest, and facilitating their discovery learning. The present study lends more credence to the application of such tasks. The paper ends with implications for English language teaching and materials development.

Keywords: data-driven learning; form-focused; task engagement; EFL learners

1. Introduction

Exposure to a certain amount of language is key to learning a second or foreign language. This is where data-driven learning (DDL) comes into use in second language acquisition (SLA) (Boulton, 2017). DDL deals with using corpora and corpus analytic tools to learn about how the target language works in different contexts (Boulton, 2009). Corpora as collections of naturally occurring language provide learners with several instances of target language forms. DDL turns language learners into researchers by embracing language discovery (Johns, 1986). In addition to learning language forms, DDL involves generalizing contextualized patterns of language use. The real

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advantage of DDL is in turning learners into better language learners and users (Boulton, 2017). That is, given its constructivist and inductive method, which allows individuals to draw their own conclusions that hold personal significance to them, DDL enables learners to master the learning process, rather than simply teaching them (Boulton, 2017). Regarding its effectiveness in SLA, Boulton and Cobb (2017) conclude in their meta-analysis that "DDL works pretty well in almost any context where it has been extensively tried" (p. 386). This may be in part due to its compatibility with the current understanding of task-based language teaching (TBLT) – that is, form-focused instruction (Leńko-Szymańska & Boulton, 2015). In form-focused instruction, learners are directed to specific language forms while using language meaningfully (Ellis, 2016). This is what DDL entails: attention to forms in contexts associated with language use and meaning. In this respect, Zare and Aqajani Delavar (2023) integrated DDL with form-focused tasks and proposed a new task type – that is, DDL form-focused tasks (defined as consciousness-raising tasks aimed at facilitating the communicative use of language through access to authentic input and discovery learning) – and investigated its effect on improving students' comprehension of academic English lectures. Their results pointed to both temporary and durable gains.

DDL is a flourishing field of research (Boulton & Cobb, 2017). Several studies have pointed to the beneficial effects of DDL on language learning (e.g. Zare, 2020; Zare & Aqajani Delavar, 2023; Zare, Karimpour & Aqajani Delavar, 2023). DDL is effective in SLA contexts due to its positive impact on learners, including motivation, discovery learning, awareness-raising, autonomous learning, exposure to authentic language use, and cognitive engagement (Boulton, 2017; Flowerdew, 2015; O'Keeffe, 2021). Despite its effectiveness in improving language learning outcomes, it has not taken ground in mainstream English language teaching and learning (O'Keeffe, 2021). This could be partly because, despite the valuable insights gained so far, some issues remain as barriers to our thorough understanding of DDL. One such issue is the concept of task engagement, which has slipped the minds of DDL researchers. As one of the concepts that have recently sparked much attention in SLA research, engagement is defined as "how actively involved a student is in a learning task and the extent to which that physical and mental activity is goal-directed and purpose-driven" (Hiver, Al-Hoorie, Vitta & Wu, 2024: p. 202). It is so essential in second/foreign language learning that no learning is likely to take place without it (Philp & Duchesne, 2016). More importantly, it is highly situated and context-dependent (Hiver *et al.*, 2024; Philp & Duchesne, 2016). That is, engagement is a dynamic attribute that shifts according to the specific learning environment and the tasks at hand. Therefore, engagement responds differently to different language learning situations and tasks. As such, it needs to be studied in relation to different tasks, such as DDL form-focused tasks. Yet, to the best of our knowledge, no study has so far investigated the impact of such tasks on learners' engagement.

With the above points in consideration, the present analysis, drawing on an experimental design within a sequential explanatory design, set out to explore the impact of using DDL form-focused tasks on 114 Iranian English as a foreign language (EFL) learners' task engagement. The findings could inform the research and practice of SLA regarding DDL and task engagement.

2. Review of the literature

2.1 DDL and TBLT

A DDL approach to learning has several advantages, although it has been treated marginally in real classroom practice (Leńko-Szymańska & Boulton, 2015). As a bottom-up inductive approach to learning, DDL involves "identification," "classification," and "generalization" (Johns, 1991), which are crucial for discovery learning (Bernardini, 2004). This requires mastering several cognitive skills, such as predicting, observing, noticing, thinking, reasoning, analyzing, interpreting, reflecting, exploring, making inferences (inductively or deductively), focusing, guessing, comparing, differentiating, theorizing, hypothesizing, and verifying (O'Sullivan, 2007:

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277). Acquiring these skills enables learners to manage their own learning (Boulton, 2019; O'Keeffe, 2021; O'Sullivan, 2007). In other words, instead of relying solely on the teacher's instructions, learners are empowered to take charge of their own learning, using the skills acquired through DDL to pursue their learning objectives at their own pace and according to their individual needs. Additionally, it gives learners access to rich authentic examples of language use (Leńko-Szymańska & Boulton, 2015), which increases their motivation to learn. Consciousness-raising is another benefit of DDL (Boulton, 2009). DDL raises learners' awareness of the target language by giving them access to multiple examples of target language forms, which may be construed as input flooding. In DDL, teachers may use complete sentences from the corpora for the students. DDL may also expose learners to language forms in key-word-in-context (KWIC) format, which may be seen as equivalent to input enhancement. Input enhancement through "bolding, italics, underlining, or highlighting" features (Schenck & Baldwin, 2019: 12) and input flooding by providing multiple samples of target language use (Hernández, 2018) increase the saliency of target language forms, which can turn into linguistic intake (VanPatten & Smith, 2015). Input enhancement and input flooding are the two variants of form-focused instruction that, due to drawing learners' attention to linguistic forms in context, has a central role in TBLT (Long, 2000). Form-focused (focus on form) instruction stresses attention to language forms besides meaning (Ellis, 2003). This is done by engaging learners in language use while their attention is focused on forms (Long, 2015). Form-focused instruction "overtly draws students' attention to linguistic elements as they arise incidentally in lessons whose overriding focus is on meaning, or communication" (Long, 1991: 45–46). Hence, it enables learners to develop both fluency and accuracy by creating conditions for restructuring interlanguage (Ellis, 2015). Incorporating discovery learning activities in form-focused instruction can help learners develop certain cognitive skills such as connecting, generalizing, and hypothesizing (Tomlinson, 1994). Students can also use the explicit knowledge presented in form-focused instruction tasks to develop consciously implicit knowledge by actively observing and exploring the features of the material being taught (Tomlinson, 2007).

In this connection, Zare and Aqajani Delavar (2023) integrated DDL with form-focused instruction and proposed DDL form-focused tasks. Such tasks borrowed consciousness-raising and communicative language use from form-focused instruction, and discovery learning and authentic language use examples from DDL. These tasks raised learners' attention to language forms through KWIC concordance lines while they were involved in the communicative use of language. Additionally, as the tasks provided learners with authentic language use examples without any metalinguistic descriptions of how the target language forms worked, it required discovery learning on the part of learners. In an intervention study, Zare and Aqajani Delavar (2023) investigated the impact of using such tasks against form-focused tasks on learners' understanding of academic English lectures. Their findings indicated that learners experienced both short-term and long-term improvements in comprehension as a result of increased noticing, metalinguistic awareness, discovery learning, and agency. They concluded that integrating discovery learning and authentic language use from DDL and consciousness-raising and communicative language use from form-focused instruction is an efficient approach for improving EFL learners' academic English lecture comprehension.

2.2 DDL and task engagement

Engagement is a complex concept (Philp & Duchesne, 2016). Part of its complexity is due to its highly individual, dynamic, and contextual nature (Hiver *et al.*, 2024; Reschly & Christenson, 2012). Its multidimensional nature also adds to its complexity. As Philp and Duchesne (2016) note, engagement is "a state of heightened attention and involvement, in which participation is reflected not only in the cognitive dimension, but in social, behavioral, and affective dimensions as well" (p. 51). While scholars disagree on its components, engagement can be categorized into

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behavioral, cognitive, social, affective, and agentic types. Behavioral engagement concerns actual participation and on-task behavior. Cognitive engagement deals with attention and mental effort in completing the task (Helme & Clarke, 2001). In this connection, research shows that DDL requires learners' cognitive engagement in tasks that call for the activation of higher-order cognitive skills (O'Sullivan, 2007). However, the connection between DDL and cognitive engagement has not been studied (O'Keeffe, 2021). Emotional engagement concerns emotional stimulation and showing positive affective emotions/attitudes towards the task at hand (Skinner, Kindermann & Furrer, 2009). In this regard, previous research shows that incorporating a DDL approach impacts and fosters language learners' positive emotions (Zare, Karimpour & Aqajani Delavar, 2022). Social engagement involves negotiating and collaborating with peers and the teacher. Socially engaged learners "listen to one another, draw from one another's expertise and ideas, and provide feedback to one another" (Philp & Duchesne, 2016: 57). Research indicates that DDL leads learners toward higher levels of social engagement in negotiating form-focused episodes (O'Keeffe, 2021). Agentic engagement concerns how learners contribute to the learning and teaching environment and shape instruction (Oga-Baldwin, 2019). This is mostly done by asking questions from the teacher or other students. According to Lee, Warschauer and Lee (2019), the discovery-oriented nature of DDL is related to learners' agentic involvement with concordances. According to Egbert *et al.* (2021), task engagement can be measured through various levels or indicators. Their model identifies authenticity, social interaction, learning support, interest, autonomy, and challenge as factors that promote engagement.

These facilitators are directly or indirectly relevant to DDL. Authenticity, as one of the core facilitators of task engagement, is a principal feature of DDL. As Leńko-Szymańska and Boulton (2015) note, DDL gives learners access to authentic language, "which they can query in a variety of ways for the information which is interesting and relevant to them" (p. 3). Social interaction is another key facilitator of engagement, which underscores interacting with others (peers and the teacher) and using language (Batstone, 2010). In DDL, however, learning is mediated through metatalk, which is the result of interaction with corpora and concordances (Flowerdew, 2015). Yet, given the challenges learners face in concordancing, providing scaffolding prompts by the teacher seems necessary (Chang & Sun, 2009). Related to social interaction is learning support, another facilitator of task engagement, which involves addressing learners' concerns by providing feedback, scaffolds, and structured tasks that seem important to DDL. Interest, another crucial facilitator of task engagement, is relevant to DDL as well. The authenticity and richness of the samples of language DDL provides learners with make it interesting to them (Mishan, 2004). Autonomy, another facilitator of language task engagement, concerns the learners' ability to take control of their learning. DDL increases learner autonomy and lifelong learning (Boulton & Cobb, 2017). As Gilquin and Granger (2010) highlight, DDL involves frequently formulating and testing hypotheses and rules, which makes learners more active, involved, and autonomous in their learning paths. Task engagement increases with the right amount of challenge or where the difficulty of the task aligns with the learners' skills (Csikszentmihályi, 1990). In this respect, Leńko-Szymańska and Boulton (2015) consider DDL a challenging technique, as it requires certain technical and cognitive skills. To work with corpora, learners need to be able to manipulate concordancers and formulate and verify appropriate queries. Whether the challenge DDL brings to the learner is optimal or not is an issue that needs to be investigated through research.

2.3 The present study

Although there appears to be a strong connection between DDL and task engagement, no empirical study has explored the relationship between these two concepts. This study aims to address this gap by answering the following research questions:

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1. Does using DDL form-focused tasks enhance the EFL learners' task engagement significantly in the short and long run?
2. What are EFL learners' perceptions of the role of DDL form-focused tasks in their task engagement?

3. Methods

3.1 Setting and design

The study was conducted in an EFL context. Initially, an experimental comparison group design was followed to implement the intervention and investigate the impact of using DDL form-focused tasks on the learners' task engagement. To this end, learners were pre-tested and randomly divided into intervention and comparison groups. Both groups underwent the respective intervention and control treatments and were post-tested immediately and after one month. A sequential explanatory mixed-methods design was also implemented to collect both quantitative and qualitative data on the impact of using DDL form-focused tasks on the learners' task engagement. In sequential explanatory designs, researchers first collect quantitative data and then use qualitative data to explain their findings. In this design, qualitative data are collected to contextualize and enrich the quantitative findings while highlighting the participants' viewpoints. Here, qualitative data (i.e. interviews and narrative frames) were collected to explore EFL learners' perceptions of how (in qualitative terms) the DDL form-focused tasks affected their task engagement. What is important to note is that the study relied on self-report measures. While we acknowledge that self-report data are susceptible to several biases and weaknesses, including honesty, social desirability, response bias, and introspective ability (Demetriou *et al*., 2015), given the mostly mental, dynamic, and multidimensional nature of engagement, we relied on the learners' own perceptions of their engagement to assess their task engagement. More importantly, given the fact that we needed quantitative data (repeated measures) to analyze the short- and long-term effects of DDL form-focused tasks, we couldn't think of other means to measure task engagement. Although prior studies have used time on task and the number of turns, for example, to measure engagement, these means mostly assess behavioral engagement, and other aspects of engagement, including affective, social, cognitive, and agentic, are left unexplored. So we assumed the most reliable source for assessing learners' engagement was the learner herself.

3.2 Participants

A total of 114 Iranian English learners volunteered to take part in the study. They were all BA university students majoring in English language teaching at a state-run single-sex (female) university with the age range of 19 to 23 ($M = 20.31$, $SD = 1.08$). Sixty-six (57.90%) were second-year students and 48 (42.10%) were third-year students. Before the study, they were asked to sign a written informed consent form where the outlines and steps of the study were explained. Their general English language proficiency, English-lecturing ability, and task engagement were gauged using the Oxford Online Placement Test (OOPT), an English-lecturing test, and a task engagement questionnaire, respectively, before the study. Their English language proficiency level was B1 according to the Common European Framework of Reference for Languages (CEFR). Their lecturing ability and task engagement in English varied within one standard deviation from the mean.

3.3 Instruments

3.3.1 English language proficiency test

The study utilized OOPT to gauge the English proficiency level of the students. OOPT was used solely for participant sampling purposes. OOPT is a computer-adaptive test used for English

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placement. It generates a candidate's score on the CEFR score band. The test comprises two sections: Use of English and Listening. The Use of English component evaluates the candidate's grammar and vocabulary knowledge, while the Listening section measures the ability to comprehend spoken language. The test takes approximately 45–60 minutes and provides a score ranging from 1 to 120.

3.3.2 English-lecturing test

In addition to the OOPT, an English-lecturing test, developed and validated by Zare and Aqajani Delavar (2022), was used to measure the learners' English-lecturing ability (see Appendix A) and sample participants. The purpose was to ensure that all learners had comparable English-lecturing abilities before the intervention so that any post-intervention changes in their task engagement could be attributed to the intervention and not their initial English-lecturing abilities. The test provided learners with some information on "the role of culture in language learning" where some pieces of information were marked in red as a sign of importance. The test then asked them to prepare and audio-record a lecture on the same topic with the presented information. Learners were given the same information and asked to give a lecture on the same topic to ensure that their background knowledge of the subject was comparable. This was done to prevent it from affecting their ability to lecture in English. Grading the test was based on four criteria: organization, content, language, and the correct use of importance markers. The "organization" criterion evaluated the proper arrangement of information; "content" assessed if the information was conveyed accurately; and "language" evaluated correct language use. "The correct use of importance markers" dealt with the use of discourse structuring expressions.

3.3.3 Task engagement questionnaire

See Appendix B and C for information regarding the piloting of the task engagement questionnaire.

3.3.4 DDL and non-DDL form-focused tasks

Ten DDL form-focused English-lecturing tasks (see Appendix D), which had been developed in a former study by Zare and Aqajani Delavar (2022), were used for the intervention group. DDL form-focused English-lecturing tasks integrated DDL activities, based on a corpus-based study of importance markers in English academic lectures by Zare and Keivanlou-Shahrestanaki (2017), in form-focused tasks to improve the English-lecturing abilities of learners. Importance markers are defined as lexicogrammatical expressions that are used to highlight information in discourse (e.g. the point is, what I'm trying to say is, what you need to know is) (Zare & Keivanlou-Shahrestanaki, 2017). These tasks borrowed consciousness-raising and communicative use of language from form-focused instruction and discovery learning and authentic language use examples (concordance lines) from DDL. Overall, the tasks promoted learning and use of importance markers in giving English lectures. They followed a similar design but focused on different topics. A typical DDL form-focused English-lecturing task comprised three main parts. First, a short audio lecture was given with important information highlighted, followed by comprehension questions. Students were required to listen to the lecture and answer the related questions, which took an average of 10 minutes to complete. Next, some concordance lines from a study by Zare and Keivanlou-Shahrestanaki (2017) were presented, and students had to analyze how importance was emphasized in English lectures. This was followed by a written explanation of how these markers were produced, which took an average of 25 minutes. Lastly, some facts on a particular topic were given in the form of bullet points, some of which were highlighted as important. The students were supposed to study them and record an English audio lecture where these facts were

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marked as important through the use of importance markers. This part took 45 minutes on average.

Ten non-DDL form-focused English-lecturing tasks (see Appendix E) were also used for the comparison group. Like the DDL form-focused English-lecturing tasks, these tasks were developed by Zare and Aqajani Delavar (2022). The tasks were designed based on the principles of form-focused instruction to improve the English-lecturing ability of learners by enabling them to use importance markers (Zare & Aqajani Delavar, 2022). As such, they promoted learning and use of importance markers in giving English lectures via consciousness-raising while learners were engaged in using language for communicative purposes. However, they did not feature concordance lines and discovery learning, which made them different from DDL form-focused tasks. DDL promotes discovery learning by exposing learners to several instances of the target language structure through concordance lines (Zare, 2020). Each form-focused task followed the same design but focused on a different topic. A typical form-focused English-lecturing task consisted of three parts. First, a short audio lecture was presented, followed by comprehension questions. This took an average of 10 minutes. The second part involved a written transcript of the previous lecture, with importance markers highlighted in it, and an explanation of how they were used in English lectures. This took around 25 minutes. Lastly, bullet points on a specific topic were presented, with some being highlighted as important. The learners were required to record an English audio lecture with the important points marked using importance markers. On average, this part took 45 minutes to complete.

The DDL form-focused and non-DDL form-focused English-lecturing tasks were paired based on their topic and content. This means that the first DDL form-focused English-lecturing task was similar to the first non-DDL form-focused English-lecturing task in topic and content; the second DDL form-focused task was similar to the second non-DDL form-focused task, and so on. The content of the lectures was in English, while the directions for the tasks were given in Persian.

3.3.5 Narrative frame

A narrative frame was used to complement the results of the task engagement questionnaire and provide answers to the second research question. The narrative frame was designed in Google Forms format. It included a sentence prompt in Persian that asked students to explain how the tasks and their features kept them engaged (*What kept me dis/engaged in the tasks was* . . .). The students were supposed to fill it out every two weeks. The narrative frame was used to elicit learners' perceptions regarding how the tasks affected their dis/engagement.

3.3.6 Semi-structured interviews

In addition to the narrative frame, online (via WhatsApp) one-on-one semi-structured interviews were also held in Persian (the students' native language) with five students to expand the results of the task engagement questionnaire and provide answers to the second research question. The overall purpose of the interviews, along with narrative frames, was to investigate what and how aspects of the tasks affected the students' task engagement. A typical interview began by introducing its aims. Next, the students were supposed to answer the following questions: (1) Were you dis/engaged in the tasks? (2) What do you think of the tasks? (3) What feature of the tasks affected your engagement? In addition to these questions, they were allowed to share their concerns regarding the tasks and their engagement. Each interview lasted 30 minutes on average.

3.4 Procedures

First, 138 students were pre-tested in their general English language proficiency, English-lecturing ability, and task engagement via the OOPT, English-lecturing test, and task engagement questionnaire (see section 3.2). The purpose of administering the OOPT, English-lecturing test,

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and task engagement questionnaire before the intervention was to ensure that any post-intervention changes in the learners' task engagement were due to the intervention and not pre-intervention differences in their general English language proficiency, English-lecturing abilities, and task engagement. As a result, 114 English learners with a B1 level of English language proficiency and similar English-lecturing ability and task engagement were selected. We split the students into two groups: intervention (57 students) and comparison (57 students), taking into account their age and years of study, and assigned them to the groups, using stratified random sampling. Stratified random sampling involves forming strata or subgroups. In this case, subgroups were formed based on the learners' age and years of study. And then they were divided between the two groups. The two groups were created by selecting an equal number of learners of the same age, based on the frequency in the sample. In terms of year of study, each group consisted of 33 second-year and 24 third-year students. This was done to ensure that the two groups were similar in age and years of study. Each group underwent a different treatment. The intervention group received 10 one-and-a-half-hour sessions of instruction, during which they completed 10 DDL form-focused English-lecturing tasks. The control group received the same number of sessions, but instead completed 10 non-DDL form-focused English-lecturing tasks. The students in both groups received assistance from the same English teacher to complete their tasks while receiving feedback and guidance. The reason we employed one teacher for both groups was to ensure that the teacher and the way he provided learners with guidance and feedback did not affect learners' task engagement. The intervention and control treatments lasted for five months. Every two weeks, the students were required to complete an online narrative frame using Google Forms. This narrative frame required them to explain how the tasks and their associated features affected their engagement with the task. Upon completion of the program, the students were asked to fill out the online task engagement questionnaire through Google Forms. The purpose of this implementation of the questionnaire was to investigate the immediate effects of completing DDL form-focused English-lecturing tasks on the students' task engagement. Next, during online one-on-one semi-structured interviews with five students who volunteered to participate in the interviews, they explained the different aspects of the tasks that influenced their task engagement in English lecturing. To protect students' confidentiality, aliases are used in the paper instead of their real names. Finally, after a one-month interval, the students were asked to fill out the online task engagement questionnaire again. The purpose of this implementation of the questionnaire was to investigate the delayed effects of completing DDL form-focused English-lecturing tasks on the students' task engagement.

3.5 Data analysis

The present investigation involved collecting and analyzing both quantitative and qualitative analyses. The quantitative data were collected to address the first research question, while the qualitative data were collected to provide answers to the second research question. As with every sequential explanatory design, qualitative data are analyzed to complement the results of quantitative data. As the results of running Shapiro–Wilk's test for the pre-task survey, immediate post-task survey, and delayed post-task survey confirmed normality of the data ($p = 0.11$, 0.21, $0.83 > 0.05$) using SPSS, parametric tests were used. This required running three independent-samples *t*-tests using SPSS: one for the task engagement questionnaire used as a pre-task survey, one for the task engagement questionnaire as an immediate post-task survey, and the last one as a delayed post-task survey. We also ran two separate repeated-measures ANOVAs in SPSS, one for the comparison group and one for the intervention group, to investigate whether the students' task engagement statistically significantly differed from the pre-task survey to the immediate and delayed post-task survey stages.

Next, we analyzed the qualitative data by following Gao and Zhang's (2020) framework. The data included students' responses to narrative frames (in text format) and semi-structured

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interviews (in audio format). We transcribed the audio interviews verbatim and combined them with the narrative frame responses. After removing errors and irrelevant responses, we used bottom-up coding. The bottom-up coding helped us identify codes without any preconceived notions. It also helped us maintain the confirmability of the analysis, a quality criterion for qualitative data analysis. Next, we reviewed the emerged codes and grouped them into themes. Last, we wrote a detailed report of the analysis with the emerged codes and themes, complemented with associated excerpts from the students' responses to interviews and narrative frames, to enhance the transferability of the analysis. We also invited a foreign coder (Chinese) to code the data and develop themes. This was done independently to maintain both emic (the native coders) and etic (the Chinese coder) perspectives by considering researcher positioning. It also helped us enhance the dependability of the analysis. Inter-coder and intra-coder reliabilities were also estimated with Cohen's kappa ($\alpha = 0.77$, 0.81, respectively) to enhance dependability. Finally, through member checking or participant validation, we sent the report of the analysis presenting the emerged codes and themes along with examples from the students' responses to the five interviewed students by email and asked them to check if their concerns had been addressed in interpreting their responses.

In our analysis, we also took ethical considerations into account, including confidentiality and informed consent. To protect confidentiality, we presented the results using aliases. Additionally, we only included students who volunteered for the study and signed a written informed consent form before the study. This form was prepared according to the guidelines set forth by the British Educational Research Association for educational research in 2018.

4. Results

4.1 Research question one (quantitative results)

The first research question set out to investigate whether using DDL form-focused tasks enhances EFL learners' task engagement significantly in the short and long run. Table 1 shows descriptive statistics of the task engagement questionnaire as pre-task, immediate, and delayed post-task surveys.

Table 1 points to different means for the students in the comparison and intervention groups on the pre-task survey, immediate post-task survey, and delayed post-task survey. To determine statistical significance, we conducted three independent-samples *t*-tests: one for the pre-task, one for the immediate post-task, and one for the delayed post-task survey. The results of these three *t*-tests are displayed in Table 2.

As Table 2 shows, the difference between the two groups in their task engagement before the intervention was not statistically significant ($p = 0.93 > 0.05$). In terms of task engagement immediately following the intervention, however, the results pointed to a small (Plonsky & Oswald, 2014) yet statistically significant difference between the intervention and comparison groups ($p = 0.01 < 0.05$). In other words, DDL form-focused tasks significantly enhanced the learners' short-term task engagement.

Additionally, in terms of delayed task engagement, the results pointed to a small (Plonsky & Oswald, 2014) and statistically insignificant difference between the two groups in their delayed task engagement ($p = 0.28 > 0.05$). In other words, DDL form-focused tasks did not enhance the students' task engagement statistically significantly in the long run.

To investigate if the difference between students' task engagement was statistically significant at different time points in the study (i.e. before the intervention, immediately after the intervention, and with a one-month interval following the intervention), we ran two separate repeated-measures ANOVAs for both the comparison and intervention groups. The results of the repeated-measures ANOVAs are displayed in Tables 3–6.

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Table 1. Descriptive statistics for task engagement

	Group	*N*	*M*	*SD*	Std. error mean
Pre-task survey	Intervention	57	82.14	14.40	1.90
	Comparison	57	81.89	15.85	2.09
Immediate post-task survey	Intervention	57	89.59	11.27	1.49
	Comparison	57	84.28	10.47	1.38
Delayed post-task survey	Intervention	57	86.12	14.34	1.90
	Comparison	57	83.38	12.96	1.71

Table 2. Independent-samples *t*-tests for task engagement

		Levene's test for equality of variances		*t*-test for equality of means						
									95% CI of the difference	
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Pre-task survey	Equal variances assumed	.09	.75	.08	112	.93	.24	2.83	−5.37	5.86
Immediate post-task survey	Equal variances assumed	.14	.70	2.60	112	.01	5.31	2.03	1.27	9.35
Delayed post-task survey	Equal variances assumed	.12	.72	1.06	112	.28	2.73	2.56	−2.33	7.81

Note. CI = confidence interval.

Table 3. Tests of within-subjects effects for the comparison group

Measure: Task engagement							
Source		Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Time	Sphericity assumed	165.626	2	82.813	.409	.665	.007
	Greenhouse–Geisser	165.626	1.982	83.558	.409	.664	.007
	Huynh–Feldt	165.626	2.000	82.813	.409	.665	.007
	Lower bound	165.626	1.000	165.626	.409	.525	.007
Error (Time)	Sphericity assumed	22680.374	112	202.503			
	Greenhouse–Geisser	22680.374	111.001	204.325			
	Huynh–Feldt	22680.374	112.000	202.503			
	Lower bound	22680.374	56.000	405.007			

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Table 4. Pairwise comparisons for the comparison group

Measure: Task engagement						
					95% CI for difference	
(I) Time	(J) Time	Mean difference (I–J)	Std. error	Sig.	Lower bound	Upper bound
1	2	−2.386	2.709	1.000	−9.072	4.301
	3	−1.491	2.745	1.000	−8.266	5.284
2	1	2.386	2.709	1.000	−4.301	9.072
	3	.895	2.538	1.000	−5.369	7.158
3	1	1.491	2.745	1.000	−5.284	8.266
	2	−.895	2.538	1.000	−7.158	5.369

Note. CI = confidence interval.

Table 5. Tests of within-subjects effects for the intervention group

Measure: Task engagement							
Source		Type III sum of squares	*df*	Mean square	*F*	Sig.	Partial eta squared
Time	Sphericity assumed	1586.889	2	793.444	4.271	.016	.071
	Greenhouse–Geisser	1586.889	1.921	825.874	4.271	.018	.071
	Huynh–Feldt	1586.889	1.988	798.119	4.271	.016	.071
	Lower bound	1586.889	1.000	1586.88	4.271	.043	.071
Error (Time)	Sphericity assumed	20805.111	112	185.760			
	Greenhouse–Geisser	20805.111	107.602	193.352			
	Huynh–Feldt	20805.111	111.344	186.854			
	Lower bound	20805.111	56.000	371.520			

As Table 3 shows, the repeated-measures ANOVA with a Greenhouse–Geisser correction did not point to a statistically significant difference for the comparison group, $F(1.982, 22680.374) = 0.409$, $p = 0.664 > 0.05$.

According to Table 4, the post hoc analysis with a Bonferroni adjustment did not reveal any significant difference in task engagement for the comparison group learners. This was observed from the pre-task survey to both the immediate and delayed post-task surveys ($p = 1.0 > .05$), as well as between the immediate and delayed post-task surveys ($p = 1.0 > .05$).

The Greenhouse–Geisser corrected repeated-measures ANOVA pointed to a statistically significant difference for the intervention group, $F(1.921, 107.602) = 4.271$, $p = 0.01 < 0.05$, as shown in Table 5.

According to Table 6, the post hoc analysis with a Bonferroni adjustment revealed that there was a significant difference in the task engagement of learners in the intervention group between the pre-task survey and the immediate post-task survey ($p = 0.01 < .05$). However, there was no significant difference in task engagement between the pre-task survey and the delayed post-task survey ($p = 0.48 > .05$) or between the immediate and delayed post-task surveys ($p = 0.45 > .05$).

4.2 Research question two (qualitative results)

The results of quantitative analyses pointed to the significant effect of using DDL form-focused tasks in enhancing EFL learners' task engagement. To further shed light on this finding, the second

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Table 6. Pairwise comparisons for the intervention group

Measure: Task engagement						
					95% CI for difference	
(I) Time	(J) Time	Mean difference (I–J)	Std. error	Sig.	Lower bound	Upper bound
1	2	−7.456	2.455	.011	−13.515	−1.397
	3	−3.982	2.797	.480	−10.885	2.920
2	1	7.456	2.455	.011	1.397	13.515
	3	3.474	2.388	.454	−2.421	9.368
3	1	3.982	2.797	.480	−2.920	10.885
	2	−3.474	2.388	.454	−9.368	2.421

Note. CI = confidence interval.

research question set out to address the learners' perceptions of the role of DDL form-focused tasks in impacting their task engagement. In this regard, thematic analysis of the learners' responses to the narrative frames and semi-structured interviews led to the emergence of seven themes: (1) motivation, (2) rich unteachable materials, (3) curiosity, (4) interest and challenge, (5) discovery learning, (6) concentration, and (7) autonomy (see Appendix F for a further discussion).

Motivation is the initial intention or drive that leads to subsequent action or engagement, as Reschly and Christenson (2012) note. Hence, motivation is an antecedent or precursor of engagement. Motivation is associated with DDL (Curado Fuentes, 2015). Interestingly, motivation was one of the recurrent themes regarding DDL tasks that increased learners' engagement in them ($n = 24$). This may deal with the authenticity and richness of DDL materials. In this respect, Mia (an alias) wrote in her narrative frame:

> At first, I didn't know what the tasks were and didn't feel much like doing them. But later when I realized what interesting English phrases I could learn from the activities I became motivated and did the rest of the tasks with energy and excitement (Mia, a 22-year-old English learner).

Closely related to motivation is the theme of "rich unteachable materials," which was repeatedly mentioned by learners ($n = 9$). The authenticity and richness of DDL materials, a core facilitator of task engagement (Egbert *et al.*, 2021), make them suitable for learning language forms that are "normally untaught and possibly unteachable" (Johns, 1991: 28). In this regard, Olivia said in the interview:

> I think what I found interesting about the tasks was that I learned things that I had never learned before. For instance, I learned to use "the thing is" or "the point is". So simple but useful. These were new to me (Olivia, a 20-year-old English learner).

"Curiosity" was another theme that came up frequently in the learners' responses ($n = 22$). Although it is not discussed among facilitators of engagement (Egbert *et al.*, 2021), several learners pointed out that their curiosity was raised in the course of tasks and that's why their engagement increased. In this regard, Ava said in her interview:

> Doing the tasks raised my curiosity and interest. There was a problem that needed to be solved. And the clue was in the task itself. So, I just needed to focus. When going back and

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> forth in the task, I felt I was getting closer to the answer. So, this way my curiosity and interest to do the task increased (Ava, a 20-year-old English learner).

"Interest and challenge," which were mostly reported with each other, were also repeatedly mentioned by learners as reasons for increasing their engagement in DDL form-focused tasks ($n = 14$). Interest and challenge are both key facilitators of task engagement (Egbert *et al.*, 2021). Presenting an optimal level of challenge may drive learners to invest more in the task than become disengaged (Aubrey, King & Almukhaild, 2022). As Ainley (2012) notes, personal interest could enhance situational interest and promote persistence in tasks. In this connection, Kate commented in her narrative frame:

> The tasks were both interesting and challenging. They also helped me make more progress in English. They seemed difficult and challenging at first. But when I got to know how to do it, it became easier and more interesting (Kate, a 21-year-old English learner).

"Discovery learning" was also mentioned by learners as one of the reasons that promoted their engagement in DDL form-focused tasks ($n = 17$). As a bottom-up inductive approach to learning, DDL enhances learners' awareness of target language forms through the three major steps of identification, classification, and generalization (Johns, 1991), which reflects discovery learning (Bernardini, 2004; Boulton, 2019). Such an approach makes learning more motivating and fun (Gilquin & Granger, 2010). Concerning "discovery learning," Charlotte wrote in her narrative frame:

> Completing each task was exciting because it was like exploring, you know. It was like doing something new or discovering something (Charlotte, a 19-year-old English learner).

"Concentration" was another common theme among learners' responses to narrative frames and semi-structured interviews ($n = 13$). DDL requires focusing on and analyzing particular language forms to induce rules of how such forms work in different contexts. Such efforts promote learners' language consciousness (Flowerdew, 2015). This underscores the noticing hypothesis according to which conscious attention to linguistic forms is necessary for input to turn into intake (Schmidt, 1990, 2001). In this respect, Molly highlighted in the narrative frame:

> Doing the tasks helped me concentrate more. I couldn't miss a thing in them. It was like the pieces of a puzzle. So, I had to concentrate and think more about what each piece had to do to make the whole picture (Molly, a 21-year-old English learner).

Several learners pointed to "autonomy" as another reason for their engagement in DDL form-focused tasks ($n = 12$). In this regard, Rose mentioned in her interview:

> It helped me learn better. I think things that I learn this way stay longer in my mind. I think it was because I learned them by myself. So, in a sense, not only did I learn new things about English, but also I became a better English learner (Rose, a 20-year-old English learner).

As Rose and other learners pointed out, DDL form-focused tasks promoted their autonomy as English language learners. As a core facilitator of engagement (Egbert *et al.*, 2021), autonomy enhances learners' engagement in tasks (Mozgalina, 2015). Putting learners in the driving seat and hence promoting their autonomy are also core features of DDL (Boulton, 2019; Boulton & Cobb, 2017). The constructivist inductive approach DDL involves helps learners reach their own conclusions that are meaningful to them (Boulton, 2017). Also, the cognitive processes involved in DDL may lead to longer retention (Boulton, 2017). In other words,

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> the real advantages lie not so much in the explicit knowledge gained as in the processes involved – ability to deal with authentic texts in different genres; awareness of frequency, chunking, and collocation; noticing forms and variation; formulating hypotheses and inferring meanings; and so on. In other words, it should help students become better language learners and users. (Boulton, 2017: 2).

5. Discussion

The present study aimed to investigate the role of DDL focus-on-form tasks in EFL learners' task engagement. The results of quantitative analyses indicated that incorporating DDL form-focused tasks into English language classes significantly increased L2 learners' task engagement in the short run. Additionally, the results of qualitative analyses showed that DDL form-focused tasks enhanced learners' task engagement by promoting their motivation, curiosity, interest, discovery learning, concentration, and autonomy and giving them access to rich unteachable materials. The findings further support the arguments made in previous studies regarding the beneficial role of DDL form-focused tasks in learners' academic English lecture comprehension, task motivation, and autonomy (Lin & Lee, 2015; Zare & Aqajani Delavar, 2022, 2023). The present study lends more credence to the facilitative role of DDL tasks incorporated in a form-focused approach to English language teaching (Boulton, 2017, 2019; Leńko-Szymańska & Boulton, 2015; Zare & Aqajani Delavar, 2023). It is interpreted that the direct use of classroom concordancing provides L2 learners with rich, naturally occurring linguistic input (Leńko-Szymańska & Boulton, 2015), which subsequently develops their autonomy and motivation for language learning (O'Keeffe, 2021). With regard to the tenets of self-determination theory (Ryan & Deci, 2017), it is believed that L2 learners with higher levels of motivation and autonomy are more likely to be engaged in language learning despite hurdles and difficulties (Mercer, 2019).

In addition, as the findings suggested, the significant impact of the proposed DDL tasks on task engagement was not durable. This finding can be attributed to the complicated nature of engagement (Philp & Duchesne, 2016) being affected by a multitude of social, contextual, and psychological factors (Hiver *et al.*, 2024). Furthermore, as stressed by Zhang (2022), a combination of different aspects of learner engagement with appropriate language learning tasks coupled with productive learning contexts is conducive to L2 achievement. Moreover, it might be interpreted that discovery-based language learning can be challenging and disengaging for learners in longer periods of time (Boulton, 2010). The temporary impact of form-focused DDL on EFL learners' task engagement can also be explained by the fact that DDL causes an increase in learners' foreign language anxiety (Zare *et al.*, 2022), which negatively impacts language learners' engagement (O'Reilly & García-Castro, 2022). Accordingly, to obtain more conclusive evidence, further longitudinal studies are required to explore whether DDL tasks exert any significant influence on learners' task engagement in the long run.

In particular, in line with the model of task engagement proposed by Egbert *et al.* (2021), the qualitative findings of the present study revealed that DDL tasks in form-focused instruction can pave the path for increasing task engagement through offering authentic language materials, a sense of autonomy, and interesting learning challenges. The findings also corroborate with the study of Leńko-Szymańska and Boulton (2015), noting that authenticity, interaction with concordancers, and autonomy are key features of DDL tasks that can facilitate the enhancement of L2 learners' engagement. One point worthy of mentioning is that to improve learners' involvement in learning, DDL tasks need to be authentically interesting and logically challenging (Csikszentmihályi, 1990; Mishan, 2004). Furthermore, analyzing the learners' perceptions revealed that DDL form-focused tasks could lead to increased engagement with working with corpora for formulating proper queries because doing such discovery-oriented tasks calls for high

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levels of concentration, interest, curiosity, and independence (Boulton & Cobb, 2017; Gilquin & Granger, 2010; Leńko-Szymańska & Boulton, 2015; Zare *et al*., 2022).

In sum, the present study revealed that incorporating DDL form-focused tasks into English language classes has the potential to increase EFL learners' engagement in the short run. Experiencing such an inductive, discovery-oriented approach to doing tasks would help EFL learners remain motivated and engaged (Gilquin & Granger, 2010). This is in line with the study of Daskalovska (2015), which argues that corpus-based language tasks are motivational and engaging enough and L2 learners discover the information autonomously. In other words, DDL requires that EFL learners become engaged in their learning process by using various cognitive skills such as comparing, classifying, reasoning, analyzing, inferencing, and interpreting (Boulton & Cobb, 2017). The students' perspective also noted a series of distinguishing DDL form-focused task features – that is, motivating, authentic, autonomy-raising, intriguing (curiosity), engrossing (concentration), and interesting, albeit challenging – required for task engagement. However, based on the findings of the current study, doing such tasks is less likely to have lasting significant effects on L2 learners' commitment due to their demanding and time-consuming nature. It might also be due to the novelty of the DDL form-focused approach to English language teaching (Zare *et al*., 2022) that calls for a revision in language teachers' and learners' roles in task-based classes.

The present study has some limitations that should be acknowledged. First, only female language learners with intermediate general English language proficiency levels were recruited to participate in the current study, which restricts the generalizability of the findings. Further studies are required to study both male and female learners with various levels of language proficiency. Second, the participants' task engagement was measured with self-report data. Self-report measures are prone to biases like honesty, social desirability, response bias, and introspective ability that can affect their reliability and validity (Demetriou *et al*., 2015). Hence, avid researchers are recommended to employ a more rigorous methodological triangulation (e.g. observing language learners while completing the form-focused DDL tasks, using think-aloud protocols, and utilizing video-stimulated recall) to depict a broader picture of the way the proposed tasks impact their task engagement. The use of tech-rich methods, such as eye tracking and automatic logging, is also recommended for measuring engagement (Dewan, Murshed & Lin, 2019). Last but not least, exploring the role of contextual factors was out of the scope of the present study. Future ecological studies are required to explore EFL learners' gains as a result of doing form-focused DDL tasks inside the dynamic nature of the classroom.

6. Conclusion

The current study set out to contribute to the understanding of the effect of DDL form-focused tasks on learners' task engagement. The results revealed that providing EFL learners with DDL form-focused tasks can be one way to enhance their task engagement in the short run by promoting their motivation, curiosity, interest, discovery learning, concentration, and autonomy. Moreover, it was indicated that DDL form-focused tasks did not have delayed significant effects on EFL learners' task engagement. These findings, while contributing to research on DDL learning, call for further investigation of the applicability of DDL form-focused tasks and their influence on the complicated network of learners' psychological states.

Based on the results of the present study, it might be concluded that DDL form-focused tasks improve language learners' task engagement by increasing their motivation, curiosity, consciousness, autonomy, and discovery learning by means of offering authentic unteachable materials that are interesting, albeit challenging. A pedagogical implication is that incorporating form-focused DDL tasks into English language classes can enhance learners' agency, motivation, and interest to sustain their engagement. Accordingly, materials developers are highly recommended to integrate DDL form-focused tasks to enhance L2 learners' task engagement

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as a prerequisite for academic success. Language teachers should bear in mind that modeling how to use concordancing for academic purposes coupled with the provision of scaffolded prompts are a useful means to familiarize L2 learners with the application of concordances in general and DDL form-focused tasks in particular. Another implication is that L2 teachers can take an integrated approach to their teaching with the inclusion of consciousness-raising, communicative tasks that enhance language learners' metalinguistic awareness and orientation towards discovery learning. We believe that such integration will result in more task engagement and language achievement.

Supplementary material. To view supplementary material referred to in this article, please visit https://doi.org/10.1017/S0958344024000120

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About the authors

Javad Zare is Associate Professor of Applied Linguistics at Kosar University of Bojnord, Bojnord, Iran. His most recent publications have appeared in *Applied Linguistics*, *System*, *Computer Assisted Language Learning*, *Journal of Second Language Writing*, *Language Teaching Research*, *ReCALL*, *Frontiers in Psychology*, *Educational Review*, *British Journal of Educational Studies*, *International Journal of Applied Linguistics*, *Current Psychology*, *Brain Sciences*, *Journal of Pragmatics*, *Lingua*, *English for Specific Purposes*, *Journal of English for Academic Purposes*, *Discourse Processes*, and *Text & Talk*. His research areas of interest include positive psychology, computer-assisted language learning, task-based language teaching, corpus linguistics, and English for academic purposes.

Mostafa Azari Noughabi has a PhD in applied linguistics from Hakim Sabzevari University, Iran. He has published articles in various journals, including *System*, *Studies in Second Language Learning and Teaching*, *Journal of Multilingual & Multicultural Development*, *Innovation in Language Learning and Teaching*, *The Asia-Pacific Education Researcher*, *English Teaching & Learning*, *Current Psychology*, and *Porta Linguarum*. He is a member of the editorial board of *Current Psychology*. His research interests are positive psychology in SLA, computer-assisted language learning, L2 teacher education, and L2 assessment.

Ahmad Al-Issa is Professor of English Linguistics at the American University of Sharjah in the United Arab Emirates. His research interests are in the areas of sociolinguistics, intercultural communication, language and identity, global English, pragmatics, language planning, and language policy.

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