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Research Paper

Fixing the Underuse of Code Glosses in Iranian EFL Learners' Academic Writing: A Corpus-based Comparison of Three Pedagogical Approaches

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Abstract
In light of the importance of metadiscursive code glosses in establishing writer-reader interactions and the necessity of teaching these markers according to the genre of interest, this study aimed to evaluate the comparative effect of three instructional approaches on fixing the underuse of code glosses in Iranian intermediate English as a foreign language learners' expository essay. Sixty Iranian EFL learners with underuse of code glosses in the Iranian Corpus of Learner English were recruited through a purposive sampling procedure and randomly assigned to four groups: production-oriented approach, genre awareness, data-driven learning, and control. After the treatment phase, three 250-word expository essays were assigned to groups. Four learner corpora were compiled from the learners' expository essays. Statistical comparisons of the corpora with their counterparts from the

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pre-treatment phase suggested significant improvements in the frequency of the use of code glosses in the production-oriented approach and data-driven learning groups but not in the genre awareness and control groups. Moreover, learners in the production-oriented approach group outperformed those in the data-driven learning group. Implications of the results, including the potential use of the production-oriented approach in the Iranian EFL context for the instruction of other metadiscourse types, in particular, and academic English instruction at large, have been considered.

Keywords: Code Glosses, Data-driven Learning, Expository Essays, Genre-based Approach, Production-oriented Approach

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1. Introduction

A number of theories and models concerning second language writing and genre (e.g., English for specific purposes [ESP] with such prominent figures as Bhatia, Hyland, and Swales) have considered academic writing as entailing interactions between writers and readers (A. M. Johns, 2008). Metadiscourse, or writers' commentary on language content, plays a key role in creating such interactions (Hyland, Wang, & Jiang, 2022). Code glosses, markers such as *for example* and *that is*, which guide the readers through texts by elaborating, reformulating, and exemplifying the previous stretches of discourse (Al-Subhi, 2022), are examples of what Hyland (2005) called interactive metadiscourse in his interpersonal metadiscourse model. According to Hyland, code glosses are used to portray a more vivid picture of the previous discourse chunks so that the upcoming discourse sections can better cement themselves in readers' minds.

One of the roles of code glosses is to elaborate on previous chunks of discourse (Hyland, 2007). Elaboration is defined as expanding the discourse content by Halliday (1994), who believed that it does not give rise to new

themes in discourse but provides an additional characterization of one that already exists. Punctuation marks (e.g., brackets, dashes, etc.) and such "elaborating conjunctions" (Hyland, 2007, p. 268) as *that is* and *in slightly different terms* are frequently used by writers to denote elaboration in discourse.

As stated by Hyland, reformulation is another discourse function of code glosses, whereby the discourse excerpt marked by a code gloss is a rewording or reinforcement of the previous discourse piece. As Hyland further added, reformulation is often signaled "parenthetically" (p. 269) or "lexically" (p. 269) through "reformulation markers" (p. 269) in academic writing. According to Hyland, while some academics regard reformulation as a type of "repair" (p. 269) in unplanned conversation, it is intentionally used in written discourse, "demonstrating the writer's aim to achieve specific rhetorical effects" (p. 269).

Hyland also contended that exemplification—an essential function of expository discourse—is the third function of code glosses, whereby writers clarify or enhance the last stretch of discourse through an example. Hyland restricted this function of code glosses to referring to a "group, clause, word, or numerical figure" (p. 270) signaled by such 'exemplificatory markers' (p. 270) as "punctuation, normally parentheses, by linking adverbials and by abbreviations" (p. 270).

Previous research on code glosses has indicated they are underused in Iranian tertiary-level English as a foreign language (EFL) learners' academic expository essays compared with tertiary-level native speakers of English (Khazaee et al., 2020). Khazaee et al. highlighted the need for the instruction of such markers according to the genre of interest. This instruction can be operationalized in various ways, including through the production-oriented approach (POA), the genre awareness approach, and the corpus-based or

data-driven learning (DDL) approach. Consciousness-raising tasks and explicit teaching of genres (genre acquisition) are other choices in this regard.

With this end in view, the present study aimed to evaluate the comparative effect of three instructional approaches (i.e., the POA, genre awareness, and DDL) on fixing the underuse of code glosses in Iranian intermediate EFL learners' expository essays. Specifically, this study seeks to bridge the gap between research findings on the claims regarding the superiority of the POA to overcome the constraints of genre-based and DDL approaches in teaching academic writing. Chen (2020), for example, identified several limitations of the genre-based and DDL approaches, including

- the observed informality in academic writing,
- a lack of guidance for teachers on how to teach and materialize the instructional content since these approaches mainly focus on "what to teach" (p. 344),
- the de-contextualized (p. 344) presentation of "linguistic features of academic writing, such as discourse structure and moves" (p. 344),
- and finding a balance between macro- and micro-education, that is, "teachers are not informed of how to decompose a piece of academic writing into smaller output tasks and what specific operational teaching process to follow" (p. 344).

Among the benefits of the POA, Chen referred to the capacity of the POA to help learners turn explicit language knowledge into implicit language knowledge. With this in mind, the following research questions arose from the issues raised in the current study:

1. Does the POA contribute to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays?
2. Does a genre awareness approach contribute to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays?

3. Does DDL contribute to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays?
4. Which of these three approaches (the POA, genre awareness, and DDL) will likely result in better performance (lower underuse, greater comparability with a normative corpus) in applying code glosses in academic expository essays among Iranian intermediate EFL learners?

In the following section, the POA and its underlying structure, genre awareness, and DDL will be focused on in detail.

1.1 POA

The POA arose from the ideas of Wen (2007), who proposed that output-driven practice is the best strategy for optimizing foreign language instruction in higher education. The approach has experienced various upgrades since its first emergence in 2007 (Sun & Asmawi, 2021). Zhang (2020) discussed its efficacy in the Chinese context. Academics (e.g., Balázs, 2020) have localized it in contexts other than China, and some prominent figures (e.g., Ellis, 2017; Widdowson & Seidlhofer, 2018) have devoted paper-length discussions to its benefits. Figure 1 shows the whole system of the POA and what it entails.

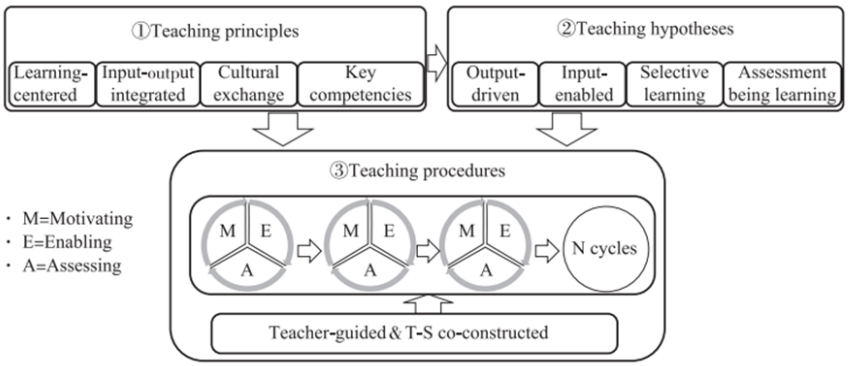

Figure 1. The Whole System of the POA (Wen, 2018a)

In terms of the POA teaching principles, we see four categories in Figure 1 that serve as a guide for selecting instructional materials, establishing objectives, and planning classroom activities (Sun, 2020a). The first two categories, according to Sun, are concerned with the POA's teaching procedures, while the third and fourth ones deal with the content and aims of POA-based instruction.

Figure 2 depicts POA's four teaching hypotheses that theoretically underpin its three teaching procedures. Among these, as Sun asserted, the output-driven hypothesis emphasizes the use of productive activities as motivators and final learning outcomes at the start and end of an instructional phase. This is what is seen in the motivating phase of the POA. Based on Sun, the input-enabled hypothesis implies that properly selected language materials and well-designed exercises can assist learners in performing tasks that are currently beyond their abilities. Sun also asserted that, according to the selective learning hypothesis, care must be taken over the selection of instructional activities since, if properly designed, they can improve learners' productive skills. The input-enabled hypothesis and selective learning hypothesis are portrayed in the enabling phase of the POA. Sun also mentioned that the assessment being learning hypothesis, which determines the assessment phase of the POA, suggests that assessing is a learning process in and of itself, and integrating assessment and learning can increase learning outcomes.

The three teaching procedures of the POA constitute its actual instructional scene. In the motivating or *iPrepare* phase (Wen, 2018b), the instructor first uses a communicative scenario to describe the production activity and then invites the learners to complete it (Sun, 2020a). Wen (2018b) asserted that this helps learners notice their cognitive and language limits (information or language gap) and inspires them to focus on the

supporting activities that follow. Zhang (2020) explained that motivating can be direct or indirect, complex or simple. According to Zhang, learners are invited to engage in productive activities and experience the challenges involved in direct motivating. Zhang also added that the learners watch a video clip of other learners with similar language proficiency levels performing the same productive activity in indirect motivating. When teachers know their learners' personas and know where their learning gaps lie, simple motivating means skipping some of the steps. On the other hand, complex motivating, according to Zhang, requires learners to walk through a thorough course of action in order to complete a new productive task and perceive the challenges.

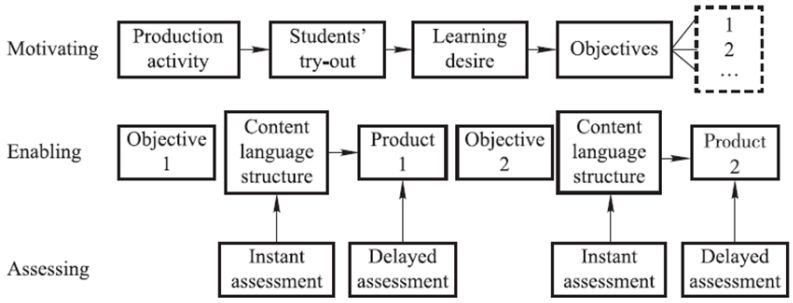

Figure 2. The POA Teaching Procedures (Sun, 2020a)

In the enabling or *iExplore* phase (Wen, 2018b), the instructor picks relevant material and plans a sequence of exercises to give language, content, and structure scaffolds (Qiu, 2020). According to Qiu, three criteria (i.e., alignment, gradualness, and variety) determine the effectiveness of the enabling phase. Qiu added that, based on these criteria that do not function in isolation but are intertwined, the enabling tasks are followed in sequential order in a single teaching session. They start with the easier ones and progress to more challenging ones that require more advanced cognitive and language abilities.

In the assessment or *iProduce* phase (Wen, 2018b), there are two types of assessments: immediate and delayed. The former refers to the enabling phase, in which the instructor assesses learners in an ongoing fashion and provides the material, language, and structure they need to complete a task (Sun, 2020b). The latter, according to Sun, occurs during the following class session and is dependent on the learners' after-class work.

1.2 Genre Awareness

As A. M. Johns (2008) specified, there are three different definitions and pedagogies of genre used by three major schools of thought, namely the North American tradition of the new rhetoric (NR), the ESP tradition, and the Sydney school's systemic functional linguistics (SFL). A. M. Johns asserted that genres have been primarily recognized and defined by their contextual and social characteristics in the NR tradition. The underlying belief here is that genres are variable, meaning that even knowledge of genres acquired through instructional courses will not guarantee that, in dealing with a new context, past experiences of a specific genre will be functional in producing a text in that genre (Russell, 1997). Here, rare efforts have been made (e.g., Devitt, Reiff, & Bawarshi, 2004), which, in A. M. Johns' (2008) terms, led to "genre curricula that begin with the situations in which genres are produced" (p. 242).

A. M. Johns considered the NR tradition's contributions to a genre-awareness approach (compared with genre acquisition) very useful, especially if one intends education rather than training. A. M. Johns elaborated on the distinction between education and training by saying that if one intends genre awareness and thus education concerning genres, care must be taken to note "the immediate contexts in which texts from a genre are produced, the roles of readers and writers in those texts, their ideologies, and the communities to which they belong and many other factors influencing writers" (p. 242).

The ESP school, according to A. M. Johns, is "more linguistically and textually oriented" (p. 243) compared with the NR tradition. Here several names are seen, including Bhatia (1993), Hyland (2005, 2007), and Swales (1990), who, as A. M. Johns (2008) asserted, began "their pedagogical work with the language and structure of the text rather than the context, and they tend to hypothesize about context from studies of texts" (p. 243). A. M. Johns also added that the seminal term *relationship between writers and audiences* is the offspring of this school.

According to A. M. Johns, SFL has a genre acquisition orientation. She elaborated that genre acquisition concerns the replication of a specific text type based on the instruction and learning of similar text types and a writing template that is provided to learners. An example is the five-paragraph essay approach, which is prevalently applied in the Iranian context of academic writing instruction. In this approach, learners are instructed to write essays that have three essential parts: introduction, body, and conclusion. The weak transfer of this approach to writing competence and dealing with genres in academic settings is well cited in the literature (e.g., Derakhshan & Karimian Shirejini, 2020).

1.3 DDL

DDL, or the use of online or offline corpus materials in language instruction, originated from the ideas of T. Johns (1991a, b). The proponents of DDL believe that through examining linguistic data and investigating huge volumes of authentic language, learners can find grammatical patterns, word meanings, and other elements of language (Boulton & Cobb, 2017). Boulton and Cobb asserted that DDL has various advantages, including bringing authenticity into the classroom, having a corrective role, and offering a sense of discovery. Teachers can utilize pre-compiled corpora or create their own specific corpora for DDL aims (T. Johns, 1991a, b). The merits of DDL may

be debated indefinitely, but the scope of the current study prevents us from doing so. Interested readers can refer to studies by Boulton and Cobb (2017) and Gilquin and Granger (2010) for further details. In what follows, a review of comparative and instructional studies on code glosses is presented.

2. Review of the Related Literature

An overview of the literature about metadiscourse and specifically code glosses shows that the pendulum has often swung in favor of studies with a comparative nature. Through such studies, comparisons have been made between native and non-native speakers of English (e.g., Guziurová, 2020; Hosseini & Mayahi, 2015; Hui, 2009; Khazaee et al., 2020; Jalilifar, 2007; Talebinejad & Ghadyani, 2012), between groups with different first languages (e.g., Edusei, 2015), and non-native speakers of English with the same first language writing in different genres, sub-genres, or fields of studies (e.g., Babaii et al., 2015; Barabadi et al., 2021; Hyland, 2007; Qin & Uccelli, 2019; Safari, 2018). Most of these studies have pointed to differences in applying metadiscourse and code glosses between the categories of users mentioned, with exceptions in between. Such differences arose as a result of issues such as the specificity and requirements of writing in the fields as well as the expectations of the community of scholars in the fields (Hyland, 2007), the impact of the first language and culture (Hinds, 1987; Rasti, 2011), academic disciplines (Hyland, 2005), language proficiency level (Intaraprawat & Steffensen, 1995), and previous instruction (Cheng & Steffensen, 1996).

Searching the literature for studies with instructional themes on code glosses reveals that the broader category of metadiscourse has received the most attention (e.g., Ädel, 2017; Alavinia & Aftabi, 2013, Asadi, 2018; Dastjerdi & Shirzad, 2010; Steffensen & Cheng, 1996; Xiaoguang & Hui, 2004). Almost all of these studies have referred to the positive effects of explicit instruction of metadiscourse on learners' writing quality. More

importantly, genre-based and DDL techniques prevail in the practice of academic writing instruction. Through a search in different databases, no research has been found concerning the use of POA for the instruction of code glosses. With this in mind, the following section deals with methodological issues concerning the present study.

3. Method

3.1 Participants

Sixty male and female Iranian EFL learners who had participated in the compilation of the Iranian Corpus of Learner English (Khazaee et al., 2020) were recruited through a purposive sampling procedure. The participants' language proficiency levels, their fields of study, and the underuse of code glosses (in the essays they sent for the compilation of the Iranian Corpus of Learner English) were the major selection criteria for the present study. A note on the selection of the participants of the current study seems necessary here. In order to compile the Iranian Corpus of Learner English, the authors had the names and contact information of the participants who took part in the study by means of a learner profile form that the learners sent with their essays. This helped the researchers recruit participants for the present study.

The participants were all Persian native speakers and intermediate (B1) in terms of language proficiency level. In order to check the language proficiency levels of the learners, they were asked to take the EF Standard English Test and report the results to the researchers. All of them graduated from different branches of the Islamic Azad University in Iran with Bachelor's degrees in English Translation. At the time of data collection for this study, the learners' average age ranged from 28 to 34 (mean = 31.6). These learners signed consent forms after the first author explained the goals of the study.

3.2 Instrumentation

The following instruments were utilized in different phases of the study:

- The EF Standard English Test was used to check the proficiency levels of the participants;
- Microsoft Word was used for writing essays by participants of the study;
- The Foxit PDF Reader was used to convert the essay's Microsoft Word files into PDF format;
- The AntFileConverter version 2.0.0 (Anthony, 2017) was used to convert the essays' PDF files to plain text (.txt) format. This was done because corpus software such as AntConc only reads text files.
- The AntConc version 4.0.3 (Anthony, 2021) was used to extract code glosses from the BAWE sub-corpus (explained below) for the DDL group's treatment as well as to extract code glosses from the compiled learner corpora in the pre- and post-treatment phases;
- The corpus builder engine at the Compleat Lexical Tutor website (Cobb, 2016) was used to convert plain text (.txt) files into four learner corpora in both the pre- and post-treatment phases;
- A subset of the normative BAWE corpus (92,984 words from expository essays by 44 English-native linguistics students) was used as the normative corpus to be compared with the four learner corpora in the post-treatment phase. The corpus was also used to teach code glosses to the DDL group. The essays in the corpus were downloaded as resource number 2,539 from the University of Oxford Text Archive at http://ota.ahds.ac.uk/headers/2539.xml and compiled as a corpus using the corpus builder engine at http://www.lextutor.ca;

- The Skyroom web conferencing platform was used in the pre-treatment phase as well as for the instruction of groups in the treatment phase; and
- IBM SPSS Statistics version 26 and Lancaster University's log-likelihood and effect size calculator (available at https://ucrel.lancs.ac.uk/llwizard.html) were used for statistical comparisons of corpora between pre- and post-treatment phases as well as with the BAWE sub-corpus.

3.3 Procedure

3.3.1 Pre-treatment Phase

This phase of the study started with contacting the subjects and requesting their participation, receiving the results of the proficiency test, explaining the research aims, and gathering the consent forms. A random assignment took place to assign the 60 participants of the study to four groups: the POA, genre awareness, DDL, and control. Before the treatment phase, each group was asked to write three 250-word expository essays. The topics of the essays were chosen from Tham (2013). The topics were "Discuss how traveling widely can be beneficial to students" (p. 33), "Should the word 'fail' be removed from our education system? What are your views?" (p. 49), and "How can relationships between the older generation and the younger generation be improved?" (p. 53). For each group, an 11,250-word learner corpus was compiled and analyzed for instances of the use of code glosses. It was done to make sure that the period between the compilation of the Iranian Corpus of Learner English and the present study did not influence the participants' underuse of code glosses.

The four corpora were analyzed for instances of code glosses using version 4.0.3 of AntConc, and qualitative analyses of the results produced raw frequencies of elaborating, reformulating, and exemplifying code glosses

for each group. Log-likelihood tests (G^2 *tests*) were conducted by means of Lancaster University's log-likelihood and effect size calculator to compare each group with the BAWE sub-corpus (elaborated above in section 3.2). As Lancaster University's log-likelihood and effect size calculator normalizes the frequency counts, there was no need to normalize the frequency counts here. All four groups showed underuse of code glosses compared with the normative BAWE sub-corpus.

3.3.2 Treatment Phase

The treatment phase of the study included the instruction of code glosses to the POA, genre awareness, and DDL groups. The control group received no instruction on code glosses. The following are details of the treatment phase of the study. The teacher of the POA, genre awareness, DDL, and control groups was the first author of the current study.

3.3.2.1 POA Group

The instruction of code glosses to this group was based on the POA. In order to do this, a communicative scenario and some enablers were designed. The POA-based instruction was followed within 12 class hours, with three hours for motivating, eight hours for enabling, and one hour left for assessing. The instruction for this group was as follows:

- **Motivating:** The researchers deployed direct and simple motivating in three rounds in the present study. The first round of the motivating phase was carried out by providing a communicative scenario. The scenario was designed assuming that it would happen in the learners' future jobs and was cognitively demanding to complete. The communicative scenario was as follows:

  You hold a bachelor's degree in English translation. One of the things you will do as a language service provider is to

revise translated or spontaneously written academic texts in terms of language issues. One of your friends from university gave you an essay that he had submitted to his professor's email box as part of the final grade he would get for the semester's academic writing course. Unfortunately, the essay has been returned to him to be revised in terms of language because he did not use code glosses appropriately. Code glosses are such metadiscourse markers as or, such as, brackets, dashes, and so forth that are prevalently used in academic discourse to elaborate, reformulate, or exemplify specific stretches of discourse. Since the essay is of utmost importance to your friend and will impact his final score, he asked you to help him overcome this problem.

In the second phase of motivating, the learners tried the above productive scenario. They were asked to find instances of misuse or avoidance of code glosses in an expository essay. For this to happen, several code glosses in the essay had been deleted or replaced with irrelevant words. After trying the productive activity (while the teacher was observing the whole process), learners were asked to share their ideas based on the following questions:

1.Do you know what code glosses are?
2.Can you describe some cases of code glosses that are missed or misused in this essay?
3.How can you revise the essay in terms of applying appropriate code glosses?

Following this brief scenario and group discussion, the learners became aware of the existing flaws in the essay and expressed their thoughts on them. They mentioned that there were language-related gaps when they sought to complete the productive activity. While most learners had a

relative understanding of elaborating, reformulating, and exemplifying stretches of discourse, they were unable to perceive the gaps precisely due to a lack of terminology related to the category of code glosses. They mentioned that they did not know that a list of such items (like the one provided by Hyland, 2005) existed. The name code gloss was also interesting to the learners. They mentioned that the education they had received was mostly limited to cohesive devices that provided a kind of what they called *connected writing*. After identifying their obstacles, the learners had a specific vision for their learning.

The teacher explained the learning objectives and productive activities in the third step of motivating. To supplement the learners' current knowledge of code glosses, the teacher presented new material tailored to their learning gaps. First, he explained what metadiscourse and code glosses are. Then, he provided the learners with a list of code glosses extracted from Hyland (2005), categorized into three classes: code glosses referring to elaboration, reformulation, and exemplification. The motivating phase project was to revise an essay for instances of misuse or avoidance of code glosses. For this to happen, each learner was provided with a short piece of a second expository essay, again with misuse or avoidance of code glosses, and asked to revise the essay.

- **Enabling:** During the enabling phase, the learners were instructed through a series of sequential enabling activities. They were provided with nine expository essays and three

types of exercises for each text as enablers. The first type of exercise was focused on locating code glosses in texts, assisting learners in extracting code glosses from the text that were relevant to the productive activity. The second type required them to perform replacements. Here, the learners replaced the misused or deleted code glosses with appropriate ones from the list of code glosses provided to them in the motivating phase. The third type asked the learners to insert code glosses in the essays with no clue as to where code glosses were necessary.

- **Assessing:** The ongoing diagnostic assessment was received by the POA group during the enabling phase when the students practiced mini-productive tasks. Another type of assessment was the achievement assessment at the end of instruction. The teacher asked the learners to write three 250-word essays and submit them to the first author of the present study. The topics were from Tham (2013). They were "What are some important qualities that a teacher should possess?" (p. 69), "What are some pros and cons of students taking up part-time jobs?" (p. 74), "What makes a good friend? What qualities do you look for when you choose friends in your life?" (p. 87).

3.3.2.2 Genre Awareness Group

This group received genre awareness concerning the roles and functions of elaborating, reformulating, and exemplifying code glosses (not to be mistaken with genre acquisition or the explicit teaching of genres as delineated in the Introduction section). Care was taken to follow the paradigmatic technicalities according to the designed framework for genre

awareness, which was based on A. M. Johns' (2008, p. 244) "prompt analysis for genre awareness," which is presented in Figure 4.

To the students: As you prepare to write, revise, and edit, consider these questions, particularly if you are given a writing task in your academic classroom:

[Note: If you cannot answer these questions from the task you have been given, how do you find out the answers?]

1. GENRE NAME: What is this text called (its genre name)? What do you already think you know about what a text from this genre looks and 'sounds' like? For example, how should the text be organized? What kind of language do you need to use?
2. PURPOSE: What are you supposed to DO as a writer when completing this task? Are you asked to make an argument? To inform? To describe or list?
3. CONTEXT: If you are writing this task in, or for, a classroom, what do you know about the context? What does the discipline require for a text? Under what conditions will you be writing? For example, are you writing a timed, in-class response?
4. WRITER'S ROLE: Who are you supposed to BE in this prompt? A knowledgeable student? Someone else?
5. AUDIENCE: Is your audience specified? If it is your instructor, what are his or her expectations and interests? What goals for students does the instructor have?
6. CONTENT: What are you supposed to write about? Where do you find this content? In your textbook? In lectures? Are you supposed to relate what you have heard or read in some way?
7. SOURCES: What, and how many, sources are you supposed to draw from to write your text? Have the sources been provided in the class? Are you supposed to look elsewhere? Are the sources primary or secondary?
8. OTHER SPECIFICATIONS: What else do you know about the requirements for this text? How long should it be? What referencing style (MLA, APA) should you use? What font type?
9. ASSESSMENT: How will your paper be graded? What does the instructor believe is central to a good response? How do you know? If you don't know, how can you find out?
10. MAKING THE TEXT YOUR OWN: What about the paper you write can be negotiated with the instructor? Can you negotiate the topic? The types of sources used? The text structure? If you can negotiate your assignment, it might be much more interesting to you.

Figure 4. Prompt analysis for genre awareness (A. M. Johns, 2008, p. 244)

Using the Skyroom platform, the teacher and the learners worked on eight samples of expository essays through this prompt for eight weeks. Code glosses were specifically discussed with regard to questions 8 and 9 of the prompt. This was a new way of dealing with writing for the learners, and they expressed their interest in such a framework over the five-paragraph style of teaching writing provided to them in their paragraph development and essay writing courses at university. In the end, the learners were asked to write three 250-word essays on the same topics given to the POA group.

3.3.2.3 DDL Group

This group received DDL techniques. Learners received descriptions of how to use corpora and software for data mining and DDL first. The participants received eight weeks of education on code glosses through AntConc version 4.0.3 (Anthony, 2021). They had the software on their computers and, together with the teacher, were searching the corpus for instances of code glosses. This was in accordance with the corpus-based analysis of corpora by which a list of pre-determined items is searched in a corpus. The automatic results were then analyzed in terms of the contextual occurrence of code gloss candidates. The teacher helped them in the first cases of analysis. The expository essays from the sub-part of the BAWE corpus (referred to above) were used for this purpose. With a list of code glosses from Hyland (2005), the learners searched the entire corpus for instances of code glosses referring to elaboration, reformulation, and exemplification. They tried to identify cases of code glosses from terms similar to code glosses but referring to propositional meaning. In the end, the learners were asked to write three expository essays on the same topics given to the POA and genre awareness groups.

3.3.2.4 The Control Group

This group received the traditional five-paragraph framework instruction of academic writing, mainly expository essays. In the end, the learners were asked to write three expository essays on the same topics given to the POA, genre awareness, and DDL groups.

3.3.3 Post-treatment Phase

The post-treatment phase of the study entailed the following (in order of occurrence):

- After the treatment, the untimed essays were gathered.

- All essays were converted into PDF and then plain text (.txt) format.
- Using the corpus builder engine at the Compleat Lexical Tutor website (Cobb, 2016), four learner corpora were compiled and prepared for the next stage, code gloss extraction.
- Version 4.0.3 of AntConc was used for the extraction of code glosses based on the appendix of Hyland (2005).
- A manual analysis of the results of the automatic search was conducted by the first author. Hyland's (2005, 2007, among others) explanations concerning the line of distinction between propositional meaning and items demarcated as *code gloss* were used for this purpose.
- Raw frequencies of the use of code glosses in the four learner corpora were obtained.
- For statistical comparisons of corpora between pre- and post-treatment phases as well as with the BAWE sub-corpus, IBM SPSS version 26 and Lancaster University's log-likelihood and effect size calculator were used.

4. Results

Concerning the first research question—whether the POA contributes to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays—the results of the related-samples Wilcoxon signed ranks test on are shown in Tables 1-3. It should be noted that since the two corpora in the pre- and post-treatment phases were of equal size for all groups, there was no need to normalize the frequency counts for running the Wilcoxon test. To save space, the comparisons of corpora compiled from all groups after the treatment phase

with the BAWE sub-corpus by means of the log-likelihood test are put into one table, Table 4.

Table 1
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
POA Before the Treatment	15	.67	.724	0	2	.00	1.00	1.00
POA After the Treatment	15	5.00	1.309	3	7	4.00	5.00	6.00

Table 2
Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
POA After the Treatment - POA Before the Treatment	Negative Ranks	0[a]	.00	.00
	Positive Ranks	15[b]	8.00	120.00
	Ties	0[c]		
	Total	15		

a. POA After the Treatment < POA Before the Treatment
b. POA After the Treatment > POA Before the Treatment
c. POA After the Treatment = POA Before the Treatment

Table 3
Test Statistics

	POA After the Treatment - POA Before the Treatment
Z	-3.436[b]
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

As tables 1-3 show, the Wilcoxon signed ranks test showed that the POA group performed better after the treatment (Mdn = 5.00) than before the

treatment (Mdn = 1.00), and this difference was statistically significant: T = 120, z = -3.43, p < 0.001.

Table 4
Log-likelihood Test Results of Comparing the Use of Code Glosses Between the Four Corpora of the Study After the Treatment Phase and the BAWE Sub-corpus

Group	Code Glosses	O1	%1	O2	%2	LL	Bayes
POA		75	0.67	615	0.66	0.00	-11.55
Genre Awareness		15	0.13	615	0.66	-65.50	53.94
DDL		77	0.68	615	0.66	+0.08	-11.47
Control		13	0.12	615	0.66	-71.82	60.26

Note. O1 is the raw frequency of code glosses in the treatment group's corpus, O2 is the raw frequency of code glosses in the BAWE sub-corpus, %1 and %2 are normalized frequencies in both corpora., LL is the G^2 value, + before LL indicates overuse in the treatment group's corpus relative to the BAWE sub-corpus, - before LL indicates underuse in the treatment group's corpus relative to the BAWE sub-corpus. Bayes Factor (BIC) shows the effect size.

As Table 4 shows, the POA contributed to fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays (G^2 = 0.00, p < 0.05), indexing a very large effect size (BIC > 10).

Concerning the second research question—whether a genre awareness approach contributes to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays—the results of the related-samples Wilcoxon signed ranks test are as follows:

Table 5
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
Genre Awareness Before the Treatment	15	.87	.640	0	2	.00	1.00	1.00
Genre Awareness After the Treatment	15	1.00	.535	0	2	1.00	1.00	1.00

Table 6
Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
Genre Awareness After the Treatment - Genre Awareness Before the Treatment	Negative Ranks	1[a]	2.50	2.50
	Positive Ranks	3[b]	2.50	7.50
	Ties	11[c]		
	Total	15		

a. Genre Awareness After the Treatment < Genre Awareness Before the Treatment
b. Genre Awareness After the Treatment > Genre Awareness Before the Treatment
c. Genre Awareness After the Treatment = Genre Awareness Before the Treatment

Table 7
Test Statistics

	Genre Awareness After the Treatment - Genre Awareness Before the Treatment
Z	-1.000[b]
Asymp. Sig. (2-tailed)	.317

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

As tables 5-7 show, the genre awareness group's use of code glosses after the treatment (Mdn = 1.00) and before the treatment (Mdn = 1.00) did not show a statistically significant difference: $T = 7.50$, $z = -1.000$, $p < .317$.

Table 4 above shows that the genre awareness approach did not contribute to fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays ($G^2 = -65.50$, $p < 0.05$), indexing a very large effect size (BIC > 10). The learners still underused code glosses relative to the BAWE sub-corpus.

Regarding the third research question of the present study—whether DDL contributes to a statistical difference and fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays—the results of the related-samples Wilcoxon signed ranks test are as follows:

Table 8
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
DDL Before the Treatment	15	.73	.594	0	2	.00	1.00	1.00
DDL After the Treatment	15	5.13	.990	4	7	4.00	5.00	6.00

Table 9
Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
DDL After the Treatment - DDL Before the Treatment	Negative Ranks	0[a]	.00	.00

	Positive Ranks	15[b]	8.00	120.00
	Ties	0[c]		
	Total	15		

a. DDL After the Treatment < DDL Before the Treatment
b. DDL After the Treatment > DDL Before the Treatment
c. DDL After the Treatment = DDL Before the Treatment

Table 10
Test Statistics

	DDL After the Treatment - DDL Before the Treatment
Z	-3.439[b]
Asymp. Sig. (2-tailed)	.001

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

As tables 8-10 show, a statistically significant difference was found in Iranian intermediate EFL learners' use of code glosses in academic expository essays before (Mdn = 1.00) and after (Mdn = 5.00) applying the DDL, with their outperformance after the treatment: $T = 120$, $z = -3.43$, $p < 0.001$.

As Table 4 above shows, DDL contributed to fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays ($G^2 = +0.08$, $p < 0.05$), indexing a very large effect size (BIC > 10). As a G^2 of 3.8 or higher is significant at the level of $p < 0.05$, the slight overuse in the comparison is ignored.

For the control group, the results of the related-samples Wilcoxon signed ranks test are as follows:

Table 11
Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles 25th	50th (Median)	75th
Control Group 1	15	.80	.561	0	2	.00	1.00	1.00
Control Group 2	15	.87	.743	0	3	.00	1.00	1.00

Table 12
Wilcoxon Signed Ranks Test

		N	Mean Rank	Sum of Ranks
Control Group 2 - Control Group 1	Negative Ranks	0[a]	.00	.00
	Positive Ranks	1[b]	1.00	1.00
	Ties	14[c]		
	Total	15		

a. Control Group 2 < Control Group 1
b. Control Group 2 > Control Group 1
c. Control Group 2 = Control Group 1

Table 13
Test Statistics

	Control Group 2 - Control Group 1
Z	-1.000[b]
Asymp. Sig. (2-tailed)	.317

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

As Tables 11-13 show, there was not any statistically significant difference in the performance of the control group: $T = 1$, $z = -1.000$, $p < .317$.

As presented in Table 4, the traditional approach of instructing writing in the control group did not contribute to fixing the underuse of code glosses in Iranian intermediate EFL learners' academic expository essays (G^2 = -71.82, $p < 0.05$), indexing a very large effect size (BIC > 10). The learners still underused code glosses relative to the BAWE sub-corpus.

Concerning the fourth research question—which of these three approaches (the POA, genre awareness, and DDL) will likely result in better performance (lower underuse, greater comparability with a normative corpus) in applying code glosses in academic expository essays among Iranian intermediate EFL learners?—the G^2 values in Table 4 show that the group with the closest similarity to the BAWE sub-corpus was the POA group with G^2=0.00, suggesting that this group outperformed all other groups.

5. Discussion

The present study evaluated the comparative effect of three instructional approaches on fixing the underuse of code glosses in Iranian intermediate EFL learners' expository essays. The approaches included the POA, genre awareness, and DDL. To make sure robust analytical protocols were followed during the study, a control group was added. Overall, the POA and DDL groups showed outperformance compared with their performances in the pre-treatment phase of the study, but there was no sign of improvement in the genre awareness and control groups. A curious reader would question why the POA and DDL groups improved while the genre awareness and control groups did not, and why the POA group achieved the greatest outcomes when compared with the normative BAWE sub-corpus. The following excerpts will go through these issues.

In line with the claims of the proponents of the POA, the underlying reason for the improvement in the functioning of the POA group resides in the structure of the POA. The POA begins with language production,

continues with language production, and ends with language production, while input serves as a support for learners to engage in productive activities (Wen, 2018a, b). This was observed in the motivating and enabling phases of the present study, where learners started being instructed by trying out a communicative scenario, something both realizable in their future job settings and at the same time cognitively challenging.

The results of the study in the POA group further confirm and support the claims of the proponents of the POA (e.g., Chen, 2020; Sun, 2020 a, b; Wen, 2018 a, b; Zhang, 2020), who asserted that the integration of output—especially at the start of a teaching cycle with a productive scenario—helps learners have a vision of their learning gaps, whether information-related or linguistic. The learners in the POA group became aware of their shortcomings concerning their lack of knowledge, schema, and productive ability towards using code glosses in expository essays, a genre with which they had been familiar from the paragraph development and essay writing courses in the Iranian curriculum on English studies.

Through trying out a communicative scenario, the learners in the POA group noticed where they had problems and tried to overcome them in the subsequent enabling phase with the help of enabling activities that the teacher fed into the enabling phase. Assessment in the enabling phase served as a catalyst here. It fueled the ongoing process of identifying flaws and progressing in the learners' current abilities and skills. In other words, the POA helped learners reach their zone of proximal development (Vygotsky, 1978).

The learners in the POA group were exposed to a novel technique for dealing with code glosses. The integration of output and the selective procedure concerning the selection of language materials seems to be the key to the success of the POA group. Learners were flooded with enablers (a

form of tuned input), experienced flow during the instruction, and enjoyed what was being instructed. Learners in the POA group expressed their interest in the approach and called it one that could lead to communicative ability in a setting like the Iranian EFL tertiary one where communication is not dealt with seriously.

Moreover, as the proponents of the POA claim, the POA is mostly suitable for "young adult learners with intermediate-level proficiency in English or above who have already finished learning basic English grammar and have about 2,000 or more high-frequency words" (Wen, 2018b, p. 526). Therefore, one more reason for the success of the POA group in this study might be that the approach fitted the persona of the learners in terms of language proficiency.

According to Chen (2020), the POA assists teachers in teaching and materializing instructional content and finding a balance between macro- and micro-education. Compatible with this claim was the ease of design of the phases for the POA group in the Method section. Despite the claims of the proponents of the POA on its capability to help learners overcome the constraints of genre-based and DDL approaches in academic writing instruction (e.g., informality in academic writing), there is still a need for more in-depth studies. Future investigations should focus on the differences between the POA, genre-based, and DDL approaches in decreasing the informality of academic writing following Hyland and Jiang's (2020) framework. For this, the POA and other instructional approaches can be used for the instruction of writing, and corpora can be compiled and analyzed according to the procedure proposed by Hyland and Jiang.

The DDL group also performed well compared with the pre-treatment phase of the study. According to Boulton and Cobb (2017), DDL enables learners to see many real-world examples of language. It was this "condensed

exposure" (Gabrielatos, 2005, p. 10) that resulted in knowledge growth and increased awareness of code glosses in academic writing in the DDL group of the present study. DDL had a significant remedial role as well. Learners were able to rectify their interlanguage competence by comparing their work, which might include misuse, overuse, and underuse of code glosses, to the data supplied by English-native authors. DDL also led to the autonomy of the learners in producing code glosses in their academic expository essays in the post-treatment phase.

Regarding the continued underuse of code glosses in the genre awareness approach group, A. M. Johns' (2008) words concerning the shortcomings of the NR's approach in dealing with genre awareness seem plausible. This was because the prompt used in the treatment phase was based on the NR's approach. Regarding the shortcomings of the NR's approach, A. M. Johns asserted that:

> In my search for a genre-awareness approach, I have found the New Rhetoricians' contributions to be very useful. However, their work is written for native speakers of English, and the pedagogical materials are quite advanced and insufficiently scaffolded for the ESL/EFL or other novice students. In addition, there is little discussion of the sentence level, linguistic issues that must be considered when we teach diverse students. (p. 243)

According to NR's practitioners, genres are dynamic. This means that knowledge of a genre learned through teaching cannot promise that, in dealing with a new situation, past encounters with a specific genre would be useful for writing a text in a particular genre (Russell, 1997). This was also observed in the learners of the genre awareness group. Future research should

focus on A. M. Johns' (2008, pp. 246-250) other recommendations for genre awareness to happen: “interdisciplinary learning communities” and “disciplinary grouping of literacy responses into macro-genres.” Future studies could also more specifically address the differences between genre awareness and genre acquisition.

6. Conclusions

This research aimed to evaluate the comparative effect of the POA, genre awareness, and DDL approaches on fixing the underuse of code gloss in Iranian intermediate EFL learners’ expository essays. Based on the results, learners in the POA group outperformed all other groups. As proponents of the POA call it a superior approach in dealing with academic writing instruction compared with genre-based and DDL approaches, practitioners should consider the localization of the POA for the Iranian EFL context for English education, in general, and other metadiscourse types (including hedges, boosters, transitions, etc.), in particular.

Ignoring the communicative aspects in the instruction of academic language can be addressed through emphasis on production from the initial phases of the POA. In Iranian tertiary-level English education, the instructor is the center of attention, and grammar-based content, language context (EFL), and exam-oriented instruction are the things that are holding the learners back from achieving what they need for today’s competitive market, that is, being able to communicate. Even in university courses, the emphasis is on genre acquisition and not on flourishing the productive skills of learners and key competencies like critical thinking, the lack of which is felt in the Iranian EFL education context. Despite the findings of the research, more studies are required to compare the results of the approaches investigated here. In-person classes might have different stories from the virtual classes that were used in the study. Future research could delve deeper into this issue.

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