



Review article

A scoping review of research on languaging in second language education

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ABSTRACT

With the rapid development of studies on second language acquisition (SLA) and sociocultural theory, languaging has recently gained increasing attention. To assess the existing research on languaging and determine implications for future research, the present study aims to present a scoping review of research on languaging in second language (L2) education. Specifically, this study intends to explore the major subjects of languaging, the effects of languaging, the factors that may influence the effects of languaging, and the ways in which languaging is integrated into the L2 class. In total, 27 relevant peer-reviewed articles were selected for further analysis using the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P) for further analysis. The findings of this review show that a) languaging subjects are primarily pertinent to university learners; b) the facilitative effect of languaging on language learning has been verified, with written languaging being the most frequently practiced form of languaging task; c) learner language proficiency, learning style, and corrective feedback are the critical factors contributing to the effect of languaging; and d) three ways of integrating languaging into L2 classes are identified: experiment, pedagogical means, and a mixed mode of experiment and pedagogical techniques. Based on the findings of this review, a model of languaging integration was proposed in four steps: task assignment, languaging with prompts, a post-test, and reflection. This review suggests future avenues for researching and implementing languaging in L2 classes.

1. Introduction

With the advent of the social turn in second language acquisition (SLA) research, sociocultural theory has been attracting increasing attention from both academia and practitioners in the past decades [1,2]. As one of the core concepts of socio-cultural theory, languaging has recently emerged as a hot topic [3–5]. This refers to the process of constructing meaning, shaping knowledge, and generating experiences through language [6]. It has been applied to the analysis of video games, linguistics, artificial intelligence, educational virtual worlds, and other topics at various education levels (e.g., Ref. [7]).

Scholars have displayed a growing interest in the practice of languaging in second language (L2) classes at different levels, ranging from primary schools to tertiary institutions [8]. Previous studies have explored the effect of languaging on L2 learning among divergent learner populations in different contexts (i.e., [9–11]). However, knowledge of how learners as subjects of languaging perceive languaging is limited.

Languaging has been reported to be effective in promoting language learning, particularly in the domains of speaking [11], writing

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[12], listening [4], and reading [15]. For instance, grammar test-takers treated with languaging outperformed their counterparts without languaging [12]. Incongruous results have been reported regarding the effects of languaging on L2 writing. Independent learning without languaging has been reported to be more effective for beginner learners in learning L2 writing [14]. Nevertheless, it has been found that languaging in rewriting tasks is beneficial to L2 writing learners [15]. These early studies report inconsistent results regarding the effects of languaging on L2 learning.

In addition, factors that may influence the effects of languaging have been explored in previous studies [4,16–18]. Factors such as corrective feedback [19,20], learning style [21], learning environment [7], and language proficiency [22] have been identified as influential elements. For example, proficient learners distinguish themselves from their less proficient counterparts when languaging [23]. Factors other than language, however, like proficiency have been less addressed [24]. Therefore, it is unclear how these factors contribute to the effects of languaging.

In tandem with the exploration of the effects of languaging, there has been an emerging trend in how languaging is integrated with education in recent years. Languaging has been used as a pedagogical technique to guide learners' revision of L2 writing [23]. This classroom practice supports the pedagogical value of languaging. Languaging is also applied as an experimental means to examine its potential effect on L2 learning, as in story writing [15]. Moreover, languaging has been used as an experimental strategy to validate the effectiveness of indirect feedback in L2 writing revision [14]. Existing studies have indicated multiple ways to integrate languaging into L2 classes. Thus, it is necessary to obtain a complete picture of how these languaging methods are integrated into classroom language teaching.

The inconsistencies in the findings pertaining to languaging in L2 classes reported in previous studies thus necessitate further exploration. This is of considerable significance given that a large proportion of students express an earnest expectation of seeking strategic instruction for effective languaging from their teachers [9,25,26]. However, there has been little work synthesizing the existing research on languaging. To bridge this gap, the present study aims to systematically review the current state of research on languaging in L2 classes. To this end, this review specifically examines the main subjects of languaging, the effects of languaging and their influencing factors, and the ways in which languaging is integrated into L2 classes.

To the best of our knowledge, four reviews of languaging are currently available (i.e., [24,27–29]). For instance, Zeng [24] systematically reviewed the methods applied to languaging research, the means and types of languaging, and languaging tasks. However, he did not specify the principles for selecting or including the literature to be reviewed. Another review synthesised forms of languaging, such as oral and written, using various tasks [27]. Xu and Fu [28] primarily reviewed research on private speech, a form of languaging, but did not offer a complete picture of languaging research. The fourth review analysed the functions and research topics of written languaging [29]. The aforementioned studies diverge from the present study, which concentrates on other critical aspects of sustaining L2 education (Table 1).

2. Literature review

Recent years have witnessed the prevalence of sociocultural theory in SLA studies [1,30]. Sociocultural theory views language as an essential mediator of cognitive development [2,31]. In an early attempt to explore the role of output in SLA, Swain [32] proposed the far-reaching influential comprehensible output hypothesis. This later led to the emergence of a number of sociocultural concepts including 'output', 'verbalizing', 'verbalization', 'collaborative dialogue' and 'languaging', which are applied to capture the role of language production in L2 learning [27].

Languaging has been conceptualized as the process of making meaning, shaping knowledge, and generating experience through language [6,26]. There are two forms of languaging, oral and written. Oral languaging has been identified as facilitating L2 learning (e.g. Refs. [25,33]). Compared to oral languaging, written languaging has been examined less frequently. Nevertheless, written languaging has merits in terms of data collection, thus having the advantages of operationalizability in research and practice [3]. Accordingly, languaging, particularly in written language, has recently drawn attention from academia [4,14,20,34].

Languaging has been examined in various educational fields such as virtual realities, journalism and communication, literature, and language. In tertiary education, it is common for art and education students to integrate languaging into their respective disciplinary studies. In language learning, languaging is considered effective in facilitating learners' acquisition of the target language. Languaging plays a mediating role in improving learners' oral fluency [22]. The facilitative effect of languaging has also been verified [3]. However, languaging activities pose challenges to learners. To accommodate these challenges, regulation skills including paraphrasing, integration, elaboration, hypothesis formation, self-assessment, and rereading have been suggested [6].

Despite the increasing number of studies on languaging, attempts to synthesise relevant studies are limited [24,27–29]. Among the few review studies, Zeng [24] examined research on languaging in foreign language education, but did not explain how the reviewed

Table 1
The comparison between previous studies and this study.

N.	Study	Databases	Quality Assessment	Subject	Task	Factor	Function
1	2014	Not available	×	×	✓	×	×
2	2017	15 empirical studies	×	×	×	×	✓
3	2019	Not available	×	×	×	✓	×
4	2021	Not available	×	×	×	×	×
5	This Study	WoS Core Collection, CNKI and EBSCO	✓	✓	✓	✓	✓

studies were selected. Qin and Niu [29] discussed topics in empirical studies of languaging, but did not report the source of the literature. Niu and Li [27] selected 15 articles and reviewed language studies published between 2006 and 2017. In addition, they did not introduce sources of the literature. Xu and Fu [28] focused only on oral languaging in private speech. Overall, none of these reviews specified the source of the literature or criteria for selecting the papers to be reviewed. As languaging has been increasingly drawing attention [29], the latest development trends in languaging are worth exploring.

Early reviews offered a detailed picture of the current research on languaging. However, these are mainly subjective summaries and interpretations of previous studies without reporting the principles of scoping or selecting the reviewed papers. Moreover, these reviews did not focus on the research subjects of languaging. In fact, existing research has explored languaging among multiple populations such as public school teachers [11] and tertiary EFL students [9], undergraduate students [10], and adult learners [5]. The attitudes of these participants towards languaging activities may be divergent. However, there is limited knowledge of how these diverse subjects perceive languaging. Thus, the authors propose the following research question (RQ1): **Who are the major subjects of languaging?**

It has been validated that languaging can promote language learning. Research has mainly explored the effect of languaging through various tasks, such as speaking with pronunciation tasks [23], listening with dictogloss tasks [4], reading with translation tasks [22], vocabulary [4], and writing [12]. The facilitative impact of languaging on L2 reading learning has also been verified using a set of grammar tests [3]. Language has a positive effect on grammatical accuracy and fluency in learners' writing [14]. However, languaging for different grammatical tasks tends to elicit different sentence patterns [30]. Research has also confirmed the role of languaging in vocabulary acquisition [4]. Previous studies demonstrated the effects of languaging on language acquisition. For example, Xu and Fu [28] combined languaging from a vocabulary acquisition perspective. However, none of the four available reviews summarises the effect of languaging at the domain level of language learning. Therefore, the effects of language must be investigated systematically. Thus, the following research question was proposed (RQ2): **What are the effects of languaging?**

Existing research has explored factors that may contribute to the effects of languaging, including corrective feedback [16,19],

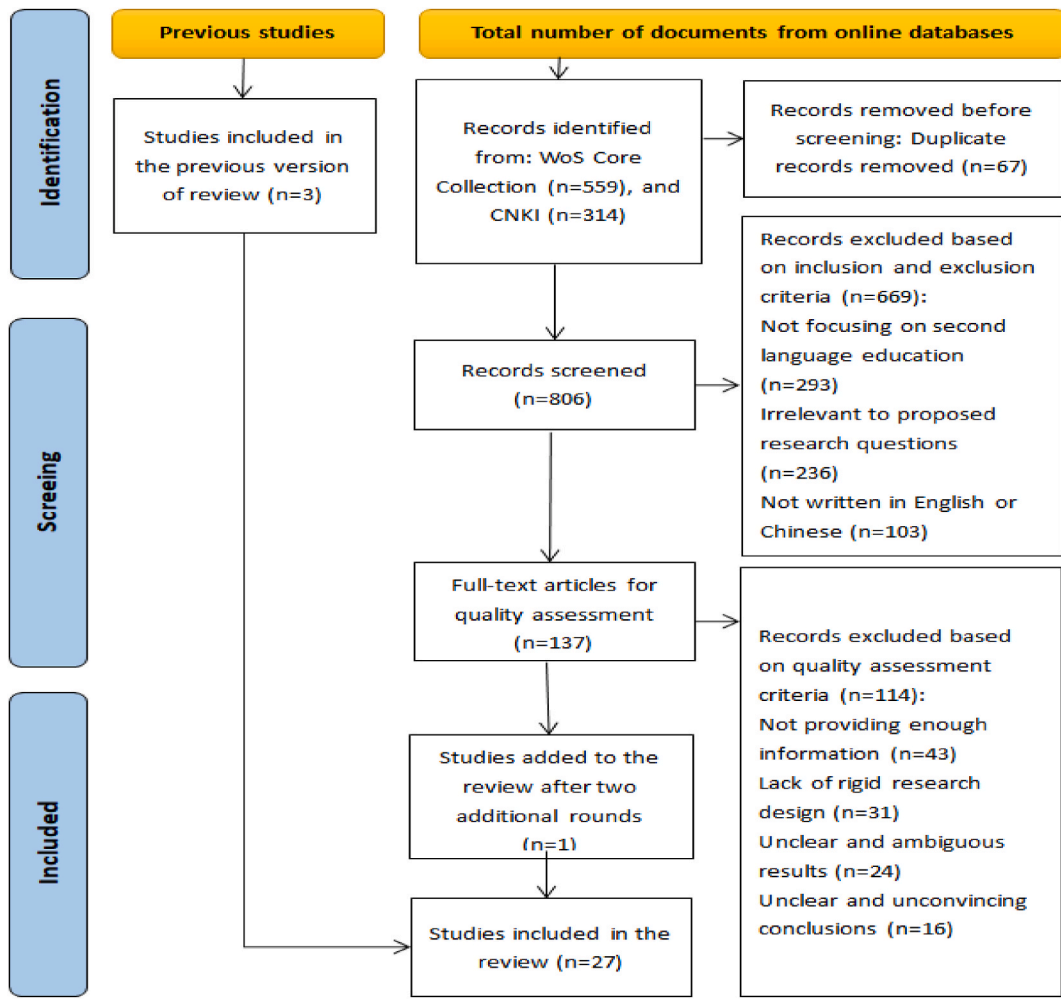


Fig. 1. Flow diagram of literature selection.

language proficiency [18], ways of regulation [17], and learning style [21]. For example, indirect corrective feedback is more effective than direct corrective feedback because the former facilitates a deeper level of processing [16]. Nevertheless, indirect corrective feedback has been argued to be too demanding for learners during languaging [19]. It has also been found that pairs who collaboratively write an essay with languaging produce more error-free clauses than those who write the same essay alone with languaging [21]. In other words, different learning styles may influence the effects of languaging differently. Language proficiency also plays a significant role in languaging. Less proficient learners are dwarfed compared to their counterparts in their quantity and quality of languaging [18]. Although the influence of language proficiency on languaging has been examined, review articles have primarily focused on proficient learners [24]. Additionally, it has been found that proficiency level may undergo a shift if the less successful learners are provided with proper instruction [17]. Therefore, further exploration of the factors influencing the effects of languaging is necessary [29]. This review thus investigates a third research question (RQ3): **What are the factors that may influence the effect of languaging?**

Methods for integrating languaging into L2 classes have recently drawn attention from academia (i.e., [15,29]). It has been found that Content and Language Integrated Instruction (CLIL) could effectively promote learners' internalisation of content knowledge and language knowledge through oral languaging activities [29]. Similarly, an opportunity to engage in languaging with the support of source reading and models can facilitate the generation of students' ideas and allow them to reflect on their language knowledge [15]. It seems that languaging has been integrated into L2 classes using different pedagogical and experimental techniques. However, there is currently no literature summarising the ways in which languaging is integrated into L2 classes, a gap that warrants further exploration of the integration of languaging into L2 teaching and learning. Thus, the authors propose the following research question (RQ4): **What are the ways to integrate languaging into L2 class?**

3. Research methods

This review followed the rapid assessment of the literature method [35], namely the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P). As a scoping review framework, PRISMA-P has been extensively applied in a variety of disciplines including humanities [36], engineering [37], education [8], and linguistics [38], because of its advantage in presenting a highly focused thematic systematic examination of research on a particular topic [39]. The selection process of the retrieved literature was as follows (Fig. 1). Following the PRISMA-P approach and grounded on the research questions, the literature on several online databases was first searched. The retrieved studies were screened according to the inclusion and exclusion criteria. Subsequently, a quality assessment questionnaire (see Supplementary Materials for the PRISMA checklist) was administered to identify the included studies. Finally, the literature was examined and synthesised.

3.1. Literature search

On December 30, 2022, 559 results were retrieved from the Web of Science (WoS) Core Collection by keying in 'languaging' OR 'language output' AND 'education' OR 'second language' OR 'written' OR 'reflection' (topic), and 314 results were obtained from China National Knowledge Infrastructure (CNKI) on 30 December of 2022 by keying in 'languaging' OR '言语化' OR '言说' OR '语言表达' OR '语言输出' (key words) AND '外语教学' OR '二语教学' (topic). Consequently, the literature search generated a total 873 results, which were imported into EndNote to remove duplicate studies. The study was conducted from January 2002 to December 2022.

3.2. Inclusion and exclusion criteria

The retrieved studies were selected based on the inclusion and exclusion criteria. Studies were included if they (1) focused on second language education, (2) targeted at least one question in the review study, and (3) were written in English or Chinese. Studies were excluded if they (1) did not focus on second-language education, (2) were not related to any question in the review study, (3) were written in other languages, or (4) were not journal articles. Based on the aforementioned scoping procedures, the inclusion and exclusion of the retrieved articles were conducted as follows. Before screening, 67 papers were removed because they were duplicates, leaving 805 articles for later analysis. Subsequently, articles that did not focus on L2 education ($n = 293$) or were unrelated to the research questions ($n = 236$), not written in English or Chinese ($n = 103$), or not journal articles ($n = 37$) were all excluded under the inclusion and exclusion criteria. This step yielded 137 articles for further quality assessment.

3.3. Quality assessment

Quality assessment was conducted based on the University of West England Framework [40] for the objective of guaranteeing the quality of the finally included studies. Each study was evaluated according to the following questions (Appendix A): (1) Adequate information available for this review study. (2) Rigid design and clear description of the research design. (3) A clear and unambiguous presentation of results. (4) Clear and convincing conclusions. The four assessments followed the quantitative principle: 'Yes (2)', 'Limited (1)', and 'No (0)'.

Articles that did not provide sufficient information ($n = 43$), lacked rigid research methods ($n = 31$), had ambiguous results ($n = 24$), or had unconvincing conclusions ($n = 16$) were removed according to the quality assessment criteria. In addition, two articles were added before screening and one article was added after two rounds of screening. Finally, 27 articles were obtained for this review, including 23 empirical articles and 4 review articles. Based on these measurements, the assessment scores of the selected articles

ranged 0–8.

4. Results

4.1. Subjects of languaging

Table 2 provides information on the main subjects of languaging in the literature. Previous studies have primarily focused on both student learners and teachers. Specifically, 23 studies set their subjects as languaging on students, and only 2 focused on teachers. It appears that student learners have received overwhelmingly more attention than teachers in languaging research. Among student learners, university undergraduates were the largest group ($N = 15$) explored in terms of languaging. The second group comprised secondary school students ($N = 5$). Limited attention has been paid to other groups of subjects, including postgraduates ($N = 2$), adults ($N = 1$), secondary school English teachers ($N = 1$), and university English teachers ($N = 1$).

Table 3 reveals four features of subjects' attitudes towards languaging activities. First, the majority ($N = 12$) of the surveyed participants seemed to have a positive attitude towards the effect of languaging. It has been suggested that learners tend to use languaging to reflect on their language learning and improve their language proficiency. Thus, they display a strong willingness to cooperate with their teachers when conducting languaging activities [4,17,34]. Similarly, teachers, when practising languaging as reported in some studies, acknowledge its value in improving their pedagogical competence [11]. Unlike those subjects who endorsed the positive effects of languaging, three studies revealed negative attitudes among the surveyed participants. These participants did not seem to understand the facilitative function of languaging but were concerned with their translation accuracy when participating in languaging activities [41]. The third attitude towards languaging pertains to participants' perceived challenges when languaging. While being clear about the potential significance of conducting languaging activities, they tend to be reluctant towards languaging with grammar tasks because of the difficulties they encounter in languaging activities [10]. It is also noteworthy that the three other studies did not explicitly indicate their participants' attitudes towards languaging.

4.2. Effect of languaging

Languaging has the following three functions: attention to the target language, hypothesis testing for learning the target language, and metalanguage [42]. These functions have been manifested in previous studies (i.e., [3,4,14]). The empirical research under the present review reveals that the effects of languaging may be mainly summarised under the following two aspects: The first is the medium through which languaging works. A series of languaging tasks were deployed as media to promote their effect on language learning. The second category pertains to the positive and negative effects of languaging.

4.2.1. Media through which languaging works

Researchers have focused on various tasks to explore the effects of languaging. These tasks are considered media through which languaging can affect language learning at the domain level (Table 4). Most included papers ($N = 23$) were empirical studies which adopted different languaging tasks. Among these tasks, the major medium was writing ($N = 12$), followed by grammar ($N = 4$) and translation ($N = 3$). Other languaging tasks were also applied, including pronunciation ($N = 1$), dictogloss ($N = 1$), vocabulary ($N = 1$), and omnibus tasks ($N = 1$).

Writing was the most frequently used language task ($N = 12$). Writing tasks are often used to verify the quality and quantity of languaging. Writing generally offers learners more time to reflect on their thoughts [3]. The analysis of written products in terms of syntactic complexity, grammatical accuracy, and fluency shows that languaging itself may have been effective in improving students' writing skills [14]. The facilitative effect of writing as a languaging tool has been demonstrated in rewriting activities. For instance, it has been found that learners benefit from languaging with peers and models when approaching rewriting tasks, which testifies that languaging could serve as a critical means for language learning [15].

A few studies ($N = 3$) have shown that languaging facilitates the learning of translation [21,30,43]. In the realm of L2 pedagogy, translation has an obvious place in the framework of task-based language teaching since translation can constitute an authentic problem-solving activity [10]. Translation is used as a languaging activity with intermediate and advanced L2 learners [43]. As translation is a complex task involving the comparison of two languages, it is likely to engender the use of language among learners who discuss various aspects of language use [21].

Grammar tasks ($N = 3$) were often combined with contextualised pedagogic activities. Contextualised grammar tasks can enable

Table 2
Subjects of languaging.

N.	Main Subjects	No. of Included Studies	Total Number
1	Adult Learners	1	1
2	Secondary school students	2, 8, 14, 15, 17	5
3	University undergraduate students	3, 4, 5, 7, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21	15
4	Secondary English teachers	6	1
5	University English teachers	4	1
6	Postgraduates	22, 23	2

Table 3
Learner attitudes towards languaging.

N.	Attitudes	No. of Included Studies	Total Number
1	Positive	1, 3, 6, 7, 8, 14, 16, 18, 19, 20, 21, 23	12
2	Negative	5, 11, 12	3
3	Challenging	2, 4, 9, 17	4
4	No mention	10, 13, 22	3

Table 4
Languaging tasks.

N.	Medium	No. Of Included Studies	Total Number
1	Writing	1, 4, 5, 7, 12, 14, 15, 16, 18, 20, 21, 23	12
2	Pronunciation	3,	1
3	Translation	6, 9, 11	3
4	Grammar	10, 13, 17, 22	4
5	Dictogloss	8	1
6	Vocabulary	19	1
7	Omnibus task	2	1

EFL learners to produce languaging on the use of target language. Different contextualised grammar tasks tend to elicit various amounts of languaging in the use of the target language [30]. The facilitative impact of languaging on L2 grammar learning with a set of contextualised grammar tests was further acknowledged in later studies (i.e. [3]). However, decontextualised grammar exercises have been reported to play an important role in L2 learning, particularly in EFL contexts, where the first language is common to the students and teachers [18]. Therefore, it is necessary to explore the role of languaging in L2 learning by using decontextualised grammar tasks.

Dictogloss is a technique for teaching grammatical structures, in which students form small groups and summarise target-language texts [44]. Students' listening, speaking, reading, and writing skills can be comprehensively improved during the dictogloss process using languaging [45]. For instance, L2 learners credited with the opportunity to conduct languaging have been reported to outperform those without the chance of languaging when fulfilling dictogloss tasks [4]. It seems that dictogloss is an effective languaging activity for improving learners' comprehension competence.

Vocabulary tasks are seldom used alone, but the effect of languaging on vocabulary acquisition has been confirmed [13,17]. For example, a significant difference in the use of target words between languaging and non-languaging groups was identified in an investigation of the effects of written languaging on vocabulary acquisition [13]. The Languaging group outperformed the non-languaging group in the acquisition of word forms and meanings. Moreover, the quality and quantity of languaging are not related to the use of vocabulary but to form and meaning to various extents [17].

In summary, several empirical studies have shown that organising students to participate in languaging activities through different kinds of tasks can promote the development of four domains of language learning such as grammar, reading, and vocabulary [46].

4.2.2. Effect of languaging

Synthesizing the 23 included empirical studies suggests that the effects of languaging fall into the following three types (Table 5): a positive effect on language learning ($N = 15$), a challenging effect ($N = 4$), and no obvious effect ($N = 4$).

Existing studies ($N = 15$) have verified that languaging has a positive effect on language learning (i.e. [4,33]). In an experimental study, five languaging writing tasks are conducted with two groups of Iranian intermediate English learners [4]. In each task, written languaging was administered to the experimental group but not the control group. There was a significant intergroup difference, indicating that written languaging had a positive effect on writing revision. The positive effect of languaging on grammar learning has been validated in previous studies (i.e., [33]). Additionally, the remaining studies ($N = 4$) held that languaging does have an effect, but one highly constrained. For instance, it has been suggested that the use of metalinguistic knowledge with feedback is not necessarily more effective than free languaging without feedback for beginner-level L2 writing development among beginner-level learners [14]. However, some studies ($N = 4$) did not explicitly indicate whether languaging was effective. In a study of the effect of written languaging among advanced Chinese English learners, it was found that the accuracy of composition revision improved in both the experimental group with languaging and the control group without languaging [34]. These studies seem to reveal that while languaging has been reported to have a positive effect on language learning, its influence is also constrained by certain factors.

Table 5
Effect of languaging.

N.	Effect of Languaging	No. of Included Studies	Total Number
1	Positive	1, 2, 3, 7, 8, 9, 14, 15, 17, 18, 19, 20, 21, 22, 23	15
2	Challenging	4, 5, 10, 13	4
3	No obvious effect	6, 11, 12, 16	4

4.3. Factors affecting the effect of languaging

Previous studies have explored the factors that may affect the effectiveness of languaging. As shown in Table 6, six studies focused on the influence of corrective feedback on the effect of languaging, followed by learning style ($N = 6$), and language proficiency ($N = 5$). Two studies examined the impact of the learning environment on languaging, with only one study examining the teaching model ($N = 1$) and regulations ($N = 1$) as influential factors. Moreover, there are two studies which did not consider other factors.

4.3.1. Corrective feedback

Six studies indicated an association between languaging and corrective feedback (i.e., [4,19,47]). These studies (i.e. [14,20]) concluded that languaging based on corrective feedback affects language learning: 1) direct and indirect corrective feedback with languaging is both effective for language learning and 2) indirect corrective feedback is more effective for languaging than direct corrective feedback if learners have metalinguistic knowledge.

In recent years, scholars have mainly examined the role of written corrective feedback in foreign language learning in combination with languaging. Written feedback is provided in both direct and indirect forms [48]. Direct corrective feedback refers to feedback given by pointing out the errors in learners' writing while simultaneously showing the correct form. Indirect corrective feedback is where the teacher indicates the location of errors by marking or underlining them but without showing the correct form [14].

It has been found that both direct and indirect corrective feedback with languaging are conducive in promoting language learning [4,18]. Specifically, languaging with indirect corrective feedback can improve students' grammatical accuracy while writing [18]. By contrast, direct corrective feedback with languaging is more effective than direct corrective feedback without languaging in writing [4].

Languaging based on direct and indirect corrective feedback is considered helpful for writing revision among low-level English learners [20]. Indirect corrective feedback is more effective because it facilitates a deeper level of processing by encouraging learners to engage in hypothesis testing [16]. However, indirect corrective feedback tends to pose certain challenges to learners and impedes hypothesis-testing [19]. It seems that indirect corrective feedback is less effective than direct corrective feedback when learners do not possess metalinguistic knowledge [19,47].

4.3.2. Learning styles

The included six studies explore the impact of learning styles on the effects of languaging [17,21]. Their findings suggest that: 1) both collaborative and independent learning have a positive influence on the effect of languaging; and 2) collaborative learning exerts more influence than independent learning on the effect of languaging.

First, collaborative and independent learning have been found to positively influence the effects of languaging. For instance, one study explored how languaging helps learners create meaning between scientific and spontaneous concepts across different collaborative writing tasks. The results show that collaborative writing plays a significant role in the development of L2 learners' rhetorical concepts. It was also found that interactions among peers in collaborative writing tasks might shape, develop, and renew L2 learners' conceptualisation of the genre concept [49]. In addition, languaging is found to be observable in learners' Language-Related Episodes (LREs) [9]. Independent learning brings about significantly fewer LREs than collaborative learning, and independent learning LREs are similar to the LREs initiated by each learner in a collaborative study [5]. These results suggest that independent learning can identify language problems to a similar extent as collaborative learning. In other words, both collaborative and independent learning positively influence the effects of languaging.

Additionally, collaborative learning was found to be more influential than independent learning on the effect of languaging. Participants who collaboratively write argumentative essays have been found to produce significantly more error-free clauses than learners who write the same essay alone [21]. In addition, the additive effect of the two learners in a collaborative study leads to greater languaging than in independent studies [5]. It was concluded that collaborative learning contributes to the construction of meaning in L2 writing [50].

4.3.3. Language proficiency

Five selected studies of the impact of learners' language proficiency on languaging revealed the following findings: 1) proficient and less proficient learners can both benefit from languaging; 2) proficient learners can produce more language-related episodes than less proficient learners; and 3) less proficient learners benefit more from languaging than their proficient counterparts.

First, both proficient and less proficient learners have been reported to benefit from languaging. In a study investigating the

Table 6
Factors affecting the effect of languaging.

N.	Factors	No. of Included Studies	Total Number
1	Learning Style	1, 6, 7, 13, 14, 23	6
2	Language proficiency	3, 10, 11, 12, 16	5
3	Corrective Feedback	4, 5, 8, 15, 17, 19	6
4	Learning Environment	2, 9	2
5	Teaching model	21	1
6	Regulation	22	1

potential impact of proficiency level on languaging, a remarkable difference was identified between proficient and less proficient learners in terms of focus on the target form. There was no difference in the type or amount of languaging between the two groups [41]. Second, proficient learners who practice balanced languaging types outperform less proficient learners who rely mainly on one languaging form [23]. The former produce more grammatical language-related episodes than the latter [18]. In other words, proficient learners demonstrated a more accurate understanding of the languaging task. Moreover, compared to their less proficient counterparts, proficient learners seemed to attend more to L2 grammatical forms, regardless of the type of exercise [18]. Less proficient learners would language less about the targeted grammar than proficient learners. In fact, less proficient learners' attentional capacity is consumed more by processing meaning than linguistic forms [22]. Moreover, written languaging enables learners to work at their own pace under less time pressure, thereby providing more readily available permanent records [26]. Therefore, less proficient learners are likely to benefit more from written languaging than are proficient learners.

4.3.4. Other factors

Apart from the three factors mentioned above, two other variables, the learning environment and method of regulation, were also discussed in the remaining four selected studies. Regarding the impact of the learning environment on languaging, how learners interact in diverse learning environments (i.e. virtual reality and the classroom) has been explored [7]. It was shown that learners could be active observers in classrooms and virtual environments to various degrees. Conventional classroom environments offer predictable languaging conditions. In contrast, in a virtual space, students are invited to engage in different languaging settings. Although it has not been argued whether one learning environment is better than another, virtual environments clearly offer more opportunities for languaging with diversified activities that may not be available in real classroom settings.

Another influential factor is the method of languaging regulation. Both teacher regulation and self-regulation were found to have significant effects on languaging. While teacher scaffolding can engender significant improvements in grammar accuracy, it may fail to provide additional benefits to learners who do not recognise teacher scaffolding [9]. Furthermore, dual regulation combining teacher regulation and self-regulation could be accomplished to increase the accuracy of using targeted grammatical knowledge in language [9].

In summary, the effects of languaging are the result of multiple factors. It should be noted that these factors do not work independently. Instead, they collectively contribute to the effects of language. The interplay of factors such as learning styles, language proficiency, and corrective feedback might result from the effects of languaging [18,51,52].

4.4. Ways of languaging integration into L2 class

Through the analysis of the 23 included empirical studies (i.e. [53,54]), the ways of integrating languaging into L2 classes could be roughly divided into three types (Table 7): experiment, pedagogical means, and mixed integration of experimental and pedagogical techniques. The experimental method of languaging integration ($N = 6$) refers to directly leading students to perform languaging activities and analysing their language levels before and after the experiment. The pedagogical means ($N = 3$) deploy languaging as a teaching strategy. In the teaching process, students are often consciously instructed to perform languaging activities. In contrast to the previous two modes of languaging integration, an overwhelming number of studies ($N = 14$) have applied a mixed integration of experimental and pedagogical techniques. In other words, experiments designed with languaging activities were integrated into the classroom teaching process.

The first languaging integration method involves experimentation. For instance, experiments have been conducted to examine the effect of languaging by asking four pairs of Chinese university English as a foreign language (EFL) students to rewrite a story from a different perspective in three stages (composing-comparing-revising) [15]. The opportunity to engage in languaging with the support of source readings and models can facilitate the generation of students' ideas and expressions that are essential for writing. Engagement in languaging could also allow learners to reflect on the language knowledge acquired during the process of writing and revising, which is conducive to improving their L2 writing performance.

With regard to languaging integration as a pedagogical method, teaching models such as Content and Language Integrated Instruction (CLII) have recently become prevalent [29]. Most studies of CLII set their research settings in English as a foreign or second-language context (i.e. [53]). Another notable feature of CLII is the implicit teaching mode used to teach knowledge of language rules such as grammar and vocabulary [48,55]. Using languaging activities and following sociocultural theory, Qin et al. [54] investigated the internalisation of content concept and language rule knowledge by students in the CLII model. It was found that CLII was helpful for students' internalisation of content and language knowledge.

The third method of languaging integration features a combination of experiments and pedagogical techniques. Various languaging activities are experimentally designed to be integrated into L2 classroom teaching [14,22]. The design of these languaging activities usually includes the following steps: task assignment, languaging with prompts, a post-test, and reflection. These steps are often

Table 7
Ways of languaging integration into L2 class.

N.	Ways of Languaging Integration	No. of Included Studies	Total Number
1	Experiment	1, 3, 7, 17, 20, 22	6
2	Pedagogical means	6,15,21	3
3	Mixed integration	2, 4, 5, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 23	14

designed to experiment with the effects of languaging for both research and pedagogical purposes. For example, the above steps were incorporated into an L2 class to test the effects of languaging on L2 learning and teaching [22]. The mixed integration of these steps in languaging was effective in eliciting information for research and in facilitating teaching.

The divergent methods of languaging integration justify the fact that languaging has value in facilitating teaching and learning. Languaging, as an important mediational tool, can assist participants in co-constructing meaning and solving problems in the process of learning. Under the CLII model, the internalisation of students' knowledge of content concepts increases with the progress of the course [54]. At the same time, although the knowledge of language rules is implicit teaching, students' language levels and quality improved [54].

5. Discussion

This review systematically analyses previous studies on languaging from the perspective of the main subjects, the effect of languaging, the factors that might influence the effect of languaging, and the ways in which languaging is integrated into the L2 class.

RQ1 aimed to explore the main subjects of languaging in L2 classes. The findings show that previous scholarship is associated more with student learners than with adult learners and teachers in the exploration of languaging in L2 classes. This is probably because tertiary learners, in contrast to younger learners such as pupils and middle schoolers, can comprehend languaging tasks more easily, and may have more free time at their disposal to accomplish languaging tasks [3]. Another possible explanation is that most researchers are teachers at higher education institutions. Thus, they can enjoy the convenience of recruiting samples on campus for their studies [23]. With regard to the subjects' attitudes towards languaging, the review revealed that a majority of the surveyed subjects had a positive attitude towards the effect of languaging [17], while a small number held a negative attitude [41]. Additionally, some studies have revealed that some surveyed subjects perceived it as challenging for them to undertake languaging activities [10]. It seems that most subjects realised the potential benefits of languaging in their L2 learning. It also implies that teachers need to provide appropriate scaffolding to learners when incorporating language into their teaching processes.

RQ2 aimed to identify the effects of languaging in L2 classes. First, it explores the media through which languaging is applied. It has been found that the prevalent media are writing tasks, followed by grammar tasks, translation tasks, and other tasks related to pronunciation, dictogloss, vocabulary and omnibus tasks. Of the diverse media for languaging tasks, writing is the most frequently used. This might be because of the longer time involved in completing the writing activities which could enable learners to fully reflect on their thoughts [3]. This finding indicates that L2 writing is a major focus of SLA research. In addition, this study found that grammar and translation tasks were used as media for languaging. It is noteworthy that these tasks are often not used alone but combined with other contextualised pedagogical tasks. In these contextualised tasks, vocabulary, translation, dictoglosses, and translation are involved when learners execute languaging tasks. Another objective of Research Question 2 was to explore the effects of languaging. Analysis of the relevant literature revealed that over two-thirds of the reviewed articles reported a positive effect of languaging. This result echoes what was found in languaging subjects' perceived attitude, as previously reported in Research Question 1. Another point that deserves attention is the challenge of languaging activities, as suggested by the literature. This further confirmed the languaging participants' perceptions of the first research question. This result may be interpreted as a reminder that the effect of languaging is associated with other constraining factors [14].

RQ3 focused on the factors that might be responsible for the effect of languaging in L2 classes. An analysis of the literature shows that a multitude of factors contribute to the effects of languaging in L2 classes, namely corrective feedback, learning style, language proficiency, learning environment, and regulation. Interestingly, corrective feedback is the most frequently reported determinant of the effect of languaging. This result corroborates the findings reported earlier in this review that writing tasks are one of the primary media through which languaging is executed. This finding confirms that corrective feedback is one of the research agendas in L2 writing studies. More importantly, the results revealed the possibility of examining corrective feedback through the lens of languaging. The second major factor contributing to the effect of languaging is learning style. As the literature suggests, learning styles such as independent and collaborative learning tend to exert different influences on languaging. Specifically, collaborative learning is more influential than independent learning in languaging. This can be explained by the fully exercised potential and possible peer review in collaborative work [17]. Third, language proficiency is a major contributor to the effects of languaging. While both proficient and less proficient learners can benefit from languaging, the latter seem to gain more than the former. This result may be explained as follows: Less proficient learners' attentional capacity is consumed more by processing meaning than linguistic form during languaging [22]. Written languaging generally enables learners to work at their own pace under less time pressure, and provides more readily available permanent records [26]. As a result, less proficient learners are more likely to benefit from written languaging than are proficient learners. Lastly, it is cautioned that the effect of languaging stems not purely from a single factor but from the interplay of all these potential factors.

RQ4 aimed to understand how languaging is incorporated into L2 classes. Three types of languaging integration were identified in

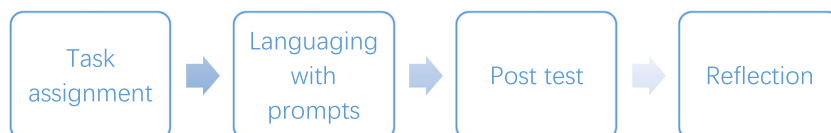


Fig. 2. A model of languaging integration.

the present review: experimental, pedagogical means, and mixed integration of experimental and pedagogical techniques. Of these three methods, mixed integration is the most frequently adopted, followed by experimental and pedagogical techniques. Specifically, it is found that Content and Language Integrated Instruction (CLII) is an emerging teaching model in languaging research. Previous studies have legitimised that the mixed integration of languaging with both experimental and pedagogical means can exert certain effects on L2 learning. Based on the findings of the present review, a four-step languaging integration model is proposed (Fig. 2). This model can also be applied in L2 classes. As shown in Fig. 2, teachers first choose tasks that are suitable for the students' levels, catering to their interests and reflecting the language learning goals to be achieved [4,23]. Second, teachers are suggested to guide students in the process of languaging, such as giving prompts to ensure that the students language in detail about the relevant knowledge [5]. After languaging, teachers can test the effect of languaging on L2 learning [3]. After the test, teachers can explain the purpose of this to students, that is, the role of languaging. Finally, students and teachers reflect on the effects of languaging and room for further improvement [54].

6. Conclusion

6.1. Major findings

This review aimed to provide an analysis of previous studies of languaging in terms of the major subjects of languaging, the effect of languaging, the influencing factors on languaging, and the ways in which languaging is integrated into the L2 class. First, the findings show that the main subjects of languaging are undergraduate students. Most of the surveyed participants showed a positive attitude towards languaging. Regarding the effects of languaging, writing tasks are the most frequently used medium through which languaging is conducted. In addition, a majority of research has verified the positive effect of languaging, although some research indicates possible challenges of languaging which deserve teachers' and researchers' attention. Third, this review found that languaging is related to multiple factors, including corrective feedback, learning style, and language proficiency. Finally, three methods of languaging integration into the L2 class were identified in this review: experimental, pedagogical means, and mixed integration of experimental and pedagogical techniques. Based on the review in this paper, a model of languaging integration into L2 classes was proposed with the following four steps: task assignment, languaging with prompts, post-test, and reflection.

6.2. Implications

This review has several theoretical implications. First, it suggests that existing research on languaging has mainly focused on tertiary learners, whereas other groups, such as teachers, adult learners, and postgraduates, have received limited attention. Therefore, more effort is needed to understand the languaging practices of less-examined groups [23]. Second, this review found that writing tasks are the primary medium through which languaging is applied. Other media used for languaging include grammar, translation, pronunciation, dictoglosses, and vocabulary. This result indicates multiple media for languaging [3] and shows writing to be central in SLA studies. Third, languaging was associated with several factors, including corrective feedback, learning style, language proficiency, and learning environment. These findings are evident in the multidimensional features of the factors influencing the effects of languaging in L2 classes. Of these factors, corrective feedback was the most frequently examined, implying that languaging might be an alternative perspective for studies on corrective feedback. As for the relatively less-addressed factors, such as learning environment, more effort is suggested in situating languaging in technology-mediated settings [18,56]. Finally, based on the three methods of languaging integration, a four-step model of languaging integration is proposed that should serve as a reference point for future research on languaging in L2 classes.

The most valuable benefit of language learning research lies in the use of research results to innovate teaching practices and increase learning efficiency [54]. Apart from its theoretical implications, this review holds pedagogical implications for learners and teachers. It is important for learners to improve their language proficiency, since it tends to influence the effect of languaging. It is also essential for learners to strengthen their awareness of self- and other-regulation in relation to their peers and teachers [51]. Interactions with peers and teachers can help learners benefit from languaging [26]. As for the implications for teachers, it is advisable that they improve their teaching quality in the following ways. Teachers are advised to design languaging tasks suitable for learners' current levels and in accordance with their interests. Teachers may also organise languaging activities through oral, written, network and other channels to provide students with languaging opportunities. Given that languaging is sometimes challenging for some learners, it is also necessary for teachers to scaffold learners when conducting languaging activities, which might help learners reflect on their own learning and improve their independent learning abilities [18].

6.3. Limitations

This study has several limitations. For example, this study may not have included all the related publications because of limited access to library resources. Second, learner perceptions of languaging may vary from context to context. Finally, there may be other ways to integrate languaging into L2 classes through the development of teaching and research methodologies. Therefore, languaging warrants further investigation. Specifically, future research should explore the languaging of different subjects in various contexts, as well as learners' perceived attitudes towards languaging.

Author contribution statement

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Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2023.e16300>.

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