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This article has been published in Journal of Child Language, <https://doi.org/10.1017/s0261444823000393>

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STATE-OF-THE-ART REVIEW

Written corrective feedback in second language writing: A synthesis of naturalistic classroom studies

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(Received 3 February 2023; revised 5 September 2023; accepted 9 September 2023)

Abstract

Written corrective feedback (WCF) is a ubiquitous pedagogical activity in second language (L2) classrooms and has become a key area of inquiry in L2 writing research. While there have been several reviews on experimental WCF research, there is not yet a synthesis of naturalistic classroom studies where the type and amount of feedback provided on students' writing performance is not manipulated or controlled. This state-of-the-art article intends to fill the gap by providing a comprehensive and critical review of naturalistic WCF studies in L2 writing, with significant implications for practice and research. A systematic search generated 50 empirical studies that met our inclusion criteria for the current review, which revealed four major themes: (1) teacher WCF practices in L2 writing classrooms, (2) L2 learner responses to WCF, (3) stakeholders' beliefs and perspectives on WCF, and (4) WCF-related motivation and emotions. Based on the reviewed evidence, we propose pedagogical implications for enhancing teacher WCF practices and student learning, as well as potential avenues for further exploration. This article contributes to a nuanced understanding of current empirical advances in naturalistic research on WCF in L2 writing, providing insights to inform WCF pedagogy and new lines of inquiry.

1. Introduction

Written corrective feedback (WCF) refers to the provision of markings, symbols, or comments on written language for the purpose of correcting linguistic errors and improving writing quality. As “the most important pedagogical subtopic within the (sub)discipline of L2 writing” (Ferris, 2022, p. 344), WCF has become a key area of inquiry in second language (L2) writing and second language acquisition (SLA) research (Bitchener & Storch, 2016; Crosthwaite et al., 2022), which is evidenced by a vast amount of information on the topic including journal articles (Brown et al., 2023; Kang & Han, 2015; Li & Vuono, 2019) and teaching guides (Ferris & Hedgcock, 2023; Hyland, 2019). Bringing together the concerns of researchers and teachers, WCF constitutes an “interface issue” where research and pedagogy converge and are mutually informing.

Despite the considerable amount of attention that WCF has received, the practical applications of WCF studies are often compromised due to a lopsided emphasis on experimental studies. Since the publication of Truscott's (1996) polemical article advocating the abandonment of grammar correction in L2 writing classes, WCF research has emerged as a research hotspot in the realms of L2 writing and SLA (Ferris, 2012; Lee, 2019). In response to Truscott's argument, researchers have conducted two distinct strands of WCF research in experimental and naturalistic contexts, with the bulk of attention focused on how an experimental approach could be used to test the efficacy of numerous WCF types (for a review, see Bitchener & Storch, 2016). Nevertheless, these experimental studies have

generated inconclusive evidence regarding what feedback strategies should be used (i.e., WCF explicitness) and the extent to which errors should be corrected (i.e., WCF scope).

Importantly, this dominating line of research lacks pedagogical value because of its little resemblance to authentic classroom contexts (Lee, 2020; Storch, 2018). In view of this, classroom-based interventionist research, which is a type of experimental research, has recently emerged with the aim to assess the effectiveness of feedback interventions in classroom rather than laboratory settings. Classroom studies are more ecologically valid than laboratory-based experimental studies in that they attempt to reflect the real conditions and contexts of language learning and teaching (DeKeyser & Botana, 2019; Loewen & Plonsky, 2017). However, these classroom-based interventionist studies often face challenges in controlling for confounding variables, which pose difficulties in isolating the causal effect of the independent variable and measuring the effectiveness of the intervention (Li, 2022).

In the other strand of WCF research, which occurs in naturalistic classroom settings, the researcher does not control or manipulate the independent variable such as the type and amount of feedback. This strand of research has offered a growing body of empirical evidence that captures the complex, contextualized nature of WCF (Crosthwaite *et al.*, 2022; Lee, 2020). Naturalistic research is distinct from experimental studies that attempt to determine the utility of WCF or the comparative effects of different WCF types (Bitchener & Ferris, 2012; Li, 2018); but rather, it addresses the “how” and “why” questions with a view to providing an in-depth understanding of WCF phenomena in real-world contexts (Mao & Lee, 2020). This line of investigation consists predominantly of observational or descriptive studies, seeking to explore teachers’ WCF practices, students’ responses to WCF, stakeholders’ beliefs and attitudes, and their motivational and emotional experiences with WCF. With a focus on the complex nature of WCF and the context-specific knowledge it produces, naturalistic WCF research has great potential for guiding teachers’ decision-making and impacting pedagogical practices.

Notwithstanding the important contribution of naturalistic WCF research to the literature, there is not yet a review that synthesizes the findings of these investigations and distills their implications for practice and research. This state-of-the-art article seeks to fill the gap by providing a comprehensive and critical review of naturalistic WCF research in L2 writing over the past two decades (2002–2022). In this article, naturalistic classroom research involves investigations carried out in language classrooms by classroom teachers or external researchers (Gass & Mackey, 2007), with an intention to provide an authentic look at language learning processes and instruction (Hulstijn, 1997). These studies may take place in various L2 contexts, including elementary, secondary, and college-level settings, where students learn English or other languages as a second or foreign language. Notably, although the majority of the studies included in our review were conducted in English as a foreign language (EFL) and English as a second language (ESL) contexts, the findings could have relevance for multifarious instructional settings, with pedagogical implications transferable to similar contexts.

This review article is intended for a diverse range of audiences, including all who seek to gain insights into the developments in naturalistic WCF research and its applications in L2 classrooms. For researchers and graduate students in applied linguistics and language teaching, in particular, the present review can advance their understanding of this relatively understudied research domain and provide implications for further studies with strong pedagogical relevance. In addition, teachers and teacher educators working in various L2 school or tertiary contexts can develop a nuanced understanding of the complexities of WCF and how it could be optimized in L2 classrooms. Unlike experimental studies that tend to employ one-shot treatments and provide feedback on a restricted range of errors (Ferris, 2010; Storch, 2010, 2018), naturalistic studies can reflect real classroom conditions and carry high ecological validity by putting WCF “in situ” (Atkinson & Tardy, 2018, p. 91). Therefore, readers will benefit from a detailed discussion of issues and problems concerning WCF practices, and be empowered to enhance their WCF pedagogy through reflecting on and reshaping their classroom practices.

Following this introduction, Sections 2 and 3 examine the importance of this article and the research methodology adopted, respectively. Findings in relation to four foci are presented – namely, theoretical tenets that underpin naturalistic WCF research (Section 4), major themes and salient findings (Section 5), methodological features in this domain (Section 6), and implications for WCF pedagogy and future research (Section 7). The article concludes with ten questions that aim to provide a springboard for further research and scholarly discussion about this topic.

2. Importance of this state-of-the-art article

While the role of various types of WCF has been investigated in both experimental and naturalistic studies, previous reviews have mainly focused on experimental research by testing the effectiveness of WCF through meta-analyses (e.g., Brown et al., 2023; Kang & Han, 2015; Truscott, 2007) or tracking its methodological progress (e.g., Liu & Brown, 2015). These laudable endeavors have deepened our knowledge of the overall effects of WCF and its moderating variables or methodological issues based on integrated quantitative evidence. Yet, as noted in two recent reviews on feedback scope in WCF (Mao & Lee, 2020) and selected WCF studies published in the journal *System* (Li & Vuono, 2019), a growing amount of naturalistic WCF research has been undertaken, despite an unbalanced prioritization of experimental studies. As such, a comprehensive review of naturalistic WCF research in L2 writing represents a much-needed addition to current scholarship.

The importance of this state-of-the-art article lies in four main aspects. First, the review expands the scope of WCF research in L2 writing, broadening our understanding of the state of knowledge and empirical advances in the field beyond quantitative syntheses of experimental WCF studies. Second, through encompassing case studies (e.g., of learner engagement with WCF), surveys (e.g., student/teacher views and attitudes about WCF), and observational studies (e.g., teachers' WCF-related beliefs and practices) conducted in naturalistic classroom contexts, this review can capture the complexity of WCF in situ, shedding light on individual variations (e.g., individual goals, beliefs, and motivation) in the provision of and responses to WCF as well as the role of context in shaping the outcomes of WCF activities (Lee, 2013, 2019; Storch, 2018). Third, considering that the design and methods of naturalistic studies are starkly different from experimental studies, a synthesis of the research will contribute to a precise understanding of the methods adopted in naturalistic WCF studies, offering methodological implications for future research. Fourth, in addition to research findings and methods, the synthesis also provides an analysis and discussion of theoretical frameworks guiding naturalistic studies, which can inform interpretations of the findings and methods in future research.

In sum, a state-of-the-art article on naturalistic WCF research in L2 writing is a timely addition to the extant scholarship. To provide a comprehensive survey of the state of knowledge in naturalistic WCF studies and identify their implications for pedagogy and research, the current study is guided by the following four research questions:

1. What key theoretical tenets are drawn upon to inform naturalistic WCF research in L2 writing?
2. What are the major themes and salient findings of naturalistic WCF research in L2 writing?
3. What are the methodological features of naturalistic WCF research in L2 writing?
4. What implications could be offered for WCF pedagogy and future research?

3. Research methodology

A systematic review was conducted by the review team to synthesize and interpret findings accumulated across individual primary studies. Characterized by being methodical, comprehensive, transparent, and replicable (Li et al., 2012; Li & Wang, 2018; Siddaway et al., 2019), a systematic review utilizes a rigorous and transparent approach to identify, select, appraise, and analyze research relevant to the designated domain of investigation. Following the reporting standards and best-practice recommendations for

conducting systematic reviews (Siddaway *et al.*, 2019; Timulak & Creaner, 2023), this review seeks to provide a critical synthesis of a selective but broad and international bibliography as well as an integration of evidence in relation to the above research questions. In so doing, the systematic methodology and presentation could minimize subjectivity and bias, making a meaningful contribution to knowledge and practice.

3.1 Literature search

We conducted a comprehensive search of the literature published between January 2002 and December 2022 to identify relevant articles. The first step involved a search of three academic databases commonly used in applied linguistics – namely, Web of Science, Scopus, and Linguistics and Language Behavior Abstracts. To identify relevant journal articles that might have been missed at the database searching stage, we also conducted a manual search of Google Scholar and eight publisher websites: Cambridge Core, De Gruyter, Elsevier, Oxford Academic, Sage, Springer, Taylor & Francis, and Wiley. Search terms and combinations included corrective feedback OR error correction OR error feedback OR grammar correction OR error code OR response OR comment OR editing OR revision OR direct feedback OR indirect feedback OR metalinguistic feedback OR comprehensive feedback OR unfocused feedback OR focused feedback, AND foreign language OR second language OR L2, AND writ*. Finally, we inspected the reference list of previous meta-analyses and reviews related to our research topic (e.g., Kang & Han, 2015; Li & Vuono, 2019; Mao & Lee, 2020).

The search process aimed to find as many articles as possible potentially relevant to our topic area. Although this systematic, comprehensive search yielded numerous results, including many irrelevant studies, a large pool of studies were whittled down and important studies were not missed (Siddaway *et al.*, 2019).

3.2 Inclusion and exclusion criteria

After the prospective studies were identified, search results were then screened for potential inclusion based on a set of eligibility criteria. Studies had to pass all the following criteria for inclusion in the present review: (a) the study sought to understand a phenomenon related to WCF, without controlling, manipulating, or altering the independent variable; (b) the study had to be conducted in naturalistic classroom contexts where the teacher planned the writing instruction and provided feedback on student writing; (c) the study investigated written assignments and WCF activities were part of the lesson plan and curriculum; (d) WCF decisions, such as the target of WCF, feedback scope, and feedback strategies, were made by the classroom teacher; (e) students received no external instruction or treatment beyond what was described or specified in the course syllabus; (f) the study is published in SSCI and AHCI-indexed academic journals (which more likely publish research that meets the standards of scientific rigor and ethics than other non-indexed journals, as recognized by the academic community); and (g) the study is reported in English.

A study was excluded if: (a) it was conducted in laboratory-based conditions in which variables were controlled or manipulated; (b) the researcher (not the classroom teacher) made WCF decisions and/or provided feedback to students; (c) it focused exclusively on WCF provided by peers or computers (i.e., research on peer feedback or automated feedback); (d) it examined written feedback as a whole without reporting findings about WCF specifically; (e) it is unpublished (e.g., dissertations and conference proceedings); and (f) it is not written in English.

Figure 1 depicts the flow of information through the different phases of the systematic review.

Our final sample contains 50 journal articles, which are listed in Table 1. *Journal of Second Language Writing* (k = 12; 24.0%) and *Assessing Writing* (k = 11; 22.0%) are two primary publication venues for naturalistic WCF studies in L2 writing, while the rest of the included research was published in a variety of journals.

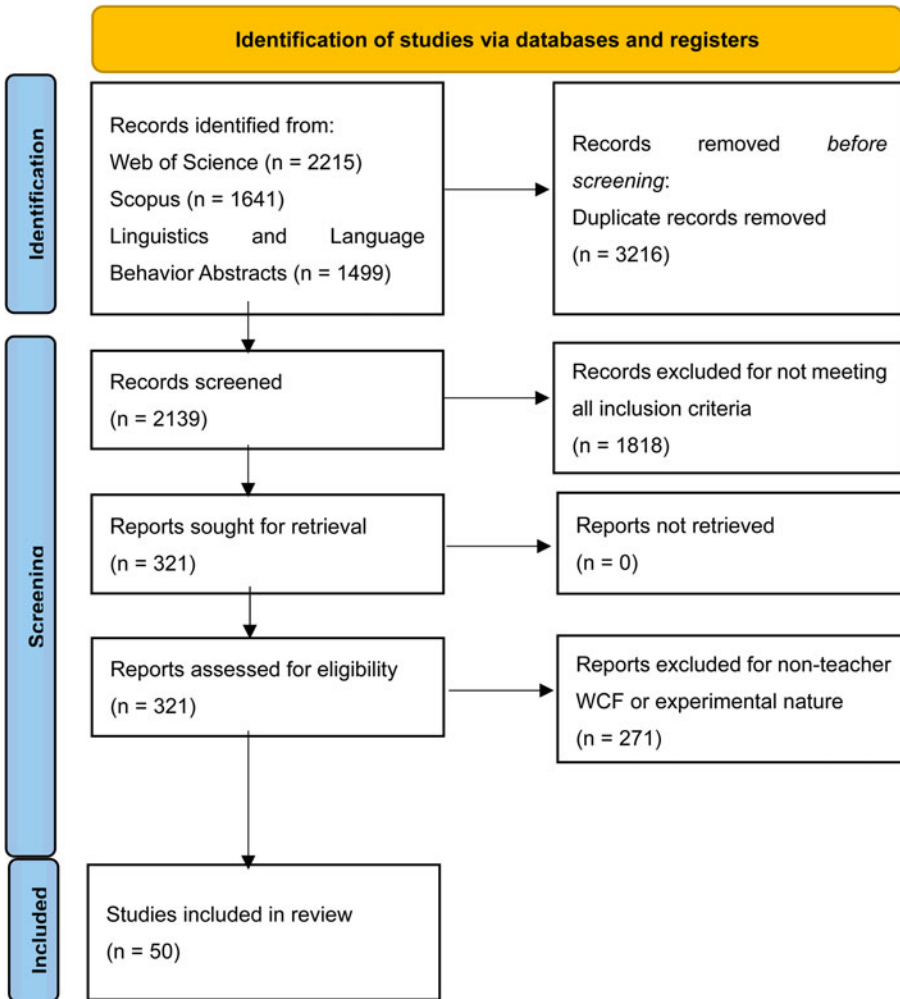


Figure 1. Flow diagram of the systematic review process

3.3 Data extraction and analysis

From each included study in our sample, we extracted the following information: study identification (author, year, and journal title), research questions, theoretical perspectives (if any), methodology, research context, participants, data collection method, data analysis method, and key findings. The extracted information was placed into a spreadsheet that was sent to the review team for discussion. For instance, the team members negotiated the coding and categorization of raw data (e.g., to determine which research strand an individual study falls under) and shared comments about the primary studies such as their importance, contributions, and limitations. Such a process helped to ensure data accuracy and quality by means of a thorough and unbiased examination of the collected data.

Data analysis consisted of summarizing study attributes – for example, research questions, foci, and methodology – following an inductive research methodology that involved the coding and categorizing of raw data in a transparent manner (Fingeld-Connett, 2018). Based on the similarities and associations among the coded data, the extracted information was grouped across studies into categories and subcategories, wherein information was iteratively examined to result in greater abstraction and generalizability (see Table 2 for an example). Of note, some of the included studies investigated WCF as a

Table 1. Source and number of the included journal articles

Source	Number (k)	Percentage (%)
<i>Journal of Second Language Writing</i>	12	24.0
<i>Assessing Writing</i>	11	22.0
<i>System</i>	5	10.0
<i>Frontiers in Psychology</i>	4	8.0
<i>The Canadian Modern Language Review</i>	3	6.0
<i>Language Awareness</i>	2	4.0
<i>Language Teaching Research</i>	2	4.0
<i>Sage Open</i>	2	4.0
<i>Teaching in Higher Education</i>	2	4.0
<i>Assessment & Evaluation in Higher Education</i>	1	2.0
<i>English Teaching: Practice & Critique</i>	1	2.0
<i>International Journal of Applied Linguistics</i>	1	2.0
<i>Journal of English for Academic Purposes</i>	1	2.0
<i>Reading and Writing</i>	1	2.0
<i>RELC Journal</i>	1	2.0
<i>Spanish Journal of Applied Linguistics</i>	1	2.0
Total	50	100

component of a larger context, given the fact that teachers in authentic classroom contexts usually provide a variety of feedback (e.g., content-related feedback) in addition to WCF. In these studies, we teased out the findings about WCF specifically.

4. Theoretical underpinnings of naturalistic WCF research

The first research question asks about the key theoretical underpinnings that have informed naturalistic WCF research in L2 writing. Among the 50 articles included in this review, most were not theoretically motivated, and only 11 studies (22.0%) made explicit reference to theoretical tenets. In these studies, nine theoretical underpinnings were drawn upon to guide researchers' investigation, including complexity theory (Chen, 2022; Lee et al., 2021b), sociocultural theory (Saeli & Rahmati, 2022; Yu et al., 2021b), ecological perspectives (Han, 2019; Lee et al., 2021b), activity theory (Liu et al., 2022), reflective practice perspectives (Yu, 2021), teacher cognition theory (Wei & Cao, 2020), theory of motivation (Papi et al., 2020; Waller & Papi, 2017), self-determination theory (Busse, 2013), and self-efficacy theory (Busse, 2013). Worthy of note is that multiple theoretical lenses could be used to provide guidance for individual studies, as shown in Lee et al.'s (2021b) integration of ecological perspectives and complexity theory, and Busse's (2013) combination of self-determination theory and self-efficacy theory.

Complexity theory, sociocultural theory, ecological perspectives, and theory of motivation were each referred to in two studies. Complexity theory is a perspective that views language and language learning as complex dynamic systems that are constantly changing and evolving in response to various factors and influences (Larsen-Freeman, 2023). It challenges the traditional view of language as a fixed and stable system, and instead emphasizes the emergent, adaptive, and nonlinear nature of language and its use, with a focus on the interrelatedness and interdependence of language with other systems, such as cognition, culture, society, and environment. Conceptualizing teachers' beliefs and provision of

Table 2. Example of data extraction and categorization

Study identification	Research questions	Theoretical perspectives	Methodology	Context	Participants	Data collection method	Data analysis method	Findings	Foci
Han (2019) <i>System</i>	<ol style="list-style-type: none"> 1. What learner factors and contextual factors influence learner engagement with WCF? 2. In what ways do the two sets of factors together influence learner engagement with WCF? 	Ecological perspectives	Qualitative case study	Chinese EFL university	Two undergraduates (an average student and an under-achieving student), and their English teacher	Students' drafts with written feedback, semi-structured interviews, retrospective verbal reports, classroom observations, and class documents	Text analysis of WCF and students' revisions, and content analysis of the interview data, verbal reports, field notes, and class documents	Although the two students were in the same classroom, their engagement with WCF was different, which was influenced by learner factors (language abilities and beliefs) and the context in which WCF was provided and used. Learner factors mediated students' agency to use WCF, and contextual factors shaped the learning opportunities available to them. An alignment between learner agency and the context is crucial to engagement.	L2 student responses to WCF (L2 student engagement with WCF)
Lee et al. (2021b) <i>Journal of Second Language Writing</i>	<ol style="list-style-type: none"> 1. How do teachers attempt to implement focused WCF within the writing classroom? 2. In the classrooms that adopt focused WCF, 	A complexity perspective informed by an ecological approach	Qualitative case study	Hong Kong EFL secondary school	Two secondary English teachers and their 62 students (32 + 30 in two classes)	Interviews with teachers and students, classroom observations, students' writing, pre-and post-writing tests	Qualitative analysis of interview transcripts; textual analysis of student revisions; error analysis in writing texts	Focused WCF is feasible in authentic classrooms when it is aligned with writing instruction and provided on preselected error types and selective errors based on individual students' needs.	Teacher WCF practices (teacher WCF innovations)

(Continued)

Table 2. (Continued)

Study identification	Research questions	Theoretical perspectives	Methodology	Context	Participants	Data collection method	Data analysis method	Findings	Foci
	how do students perform in terms of written accuracy and revision?							WCF innovations provide an impetus for teachers to strengthen their writing pedagogy and free them up to enhance feedback on other areas of student writing.	

WCF as complex systems where humans' beliefs, actions, and various contexts are sets of interacting variables, two studies adopted complexity theory to examine how teachers' WCF beliefs and practices connected and interacted in different and changing contexts over time (Chen, 2022), and teachers' attempts to put focused WCF on specific error types into practice (Lee et al., 2021b). Collectively, the results of the two studies suggest that teachers' WCF beliefs and/or practices are best studied in situated contexts, given that their beliefs and practices are not only emergent and adaptive, but also influenced by various factors, such as learners' linguistic background, teachers' teaching experience, and institutional policies. Complexity theory can thus offer a rich and comprehensive framework for understanding a WCF-related phenomenon as a complex system in its own right, as well as its interactions with other systems in the feedback activity.

Drawing on sociocultural theory (Vygotsky, 1978), which considers language development as essentially a socially situated process and views feedback as a process embedded in and affected by the social context of learning, two studies delved into an Iranian EFL teacher's beliefs and perspectives about written feedback (Saeli & Rahmati, 2022) and Chinese EFL teachers' emotional experiences in giving feedback (Yu et al., 2021b), respectively. Heeding the sociocultural and contextual facets of teachers' work, Saeli and Rahmati (2022) uncovered multifarious factors that shaped the participating teacher's beliefs about WCF (changed from comprehensive into selective WCF), including teaching and learning experiences, interactions with colleagues, and students' preferences about feedback. Conceptualizing teacher emotion as a sociocultural experience, Yu et al. (2021b) not only investigated the emotions displayed by teachers when giving feedback, but also probed the sources of their varied emotions, such as teacher beliefs and institutional criteria. With a detailed, situated account of individual teachers' emotional experiences, the sociocultural perspective aids in illuminating the emotional nature of teachers' feedback-giving practice.

The interaction between the context and individuals was also highlighted in studies underpinned by ecological perspectives, which view language learning as the amalgamation of relationships between learners and the teaching/learning contexts (van Lier, 2004). Ecological perspectives conceptualize learners and teachers as active agents who continuously perceive and act on the possibilities that the environment offers (e.g., resources in the environment) for achieving their goals. Informed by ecological perspectives, Han (2019) and Lee et al. (2021b) view L2 students and teachers as organisms that are interconnected with their surrounding environment. Focusing on this interconnection, the two studies examined how L2 students and teachers exercised their agency to recognize potential actions within their environment (i.e., affordance), such as students' engagement with received WCF, and teachers' WCF innovations in authentic classroom settings. By adopting ecological perspectives, the studies showcase how WCF could create opportunities for learning and development, as well as challenges and constraints, for both learners and teachers.

Guided by theory of motivation, which accentuates the role of motivational characteristics in shaping the way learners perceive and pursue a goal (Dweck, 2000), Papi et al. (2020) and Waller and Papi (2017) believed that learners' motivational dispositions might result in variations in learners' orientations toward WCF (e.g., feedback seeking/avoiding orientations). To provide a theory-driven and evidence-based explanation for individual differences, they examined the connection between L2 writers' motivational characteristics and their WCF orientations. As early attempts to apply implicit theories of intelligence in the field of L2 writing, the two studies drew upon the theory of motivation to unveil individual learner differences in the process of learning to write in an L2, and the role of motivation in shaping L2 writers' orientations towards WCF.

The other four theory-driven investigations were guided by different theoretical tenets. Liu et al. (2022) used the lens of activity theory to better understand the causes and interaction of behaviors related to WCF by capturing the perspectives of both teachers and students in the WCF activity. A framework that examines human activity as a complex, dynamic, and socially situated phenomenon (Engeström, 1999), activity theory focuses on the interactions between the subject (the individual or group who performs the activity), the object (the goal or motive of the activity), the tools (the physical or symbolic means used to carry out the activity), the rules (the norms and conventions that

regulate the activity), the community (the social group that shares the same object), and the division of labor (the roles and responsibilities of different participants in the activity). Within the activity systems, Liu *et al.* (2022) found three main factors shaping the teacher–student relationship in WCF activities: the alignment of goals (objects), the fulfillment of expectations (rules), and the power relationship (division of labor). Providing a useful framework for understanding WCF as a situated social activity that involves multiple factors and interactions, activity theory uncovers factors shaping the teacher–student relationship and its impact on the quantity of teachers’ WCF and students’ responses.

A reflective practice perspective is a way of looking at one’s own actions and experiences in order to learn from them and improve oneself (Schon, 1983). Through developing awareness of people’s strengths and weaknesses, assumptions and biases, goals and motivations, and their impact on others, reflective practice helps teachers develop new skills, knowledge, strategies, and solutions for various situations and challenges. From a reflective practice perspective, Yu (2021) interpreted the changes of L2 writing teachers in their knowledge, orientation, and skills resulting from giving feedback to student writing, arguing that teacher learning could take place through reflections in action and reflections on feedback-giving practices. It is suggested that by taking a critical and reflective stance towards feedback, L2 writing teachers could recognize the learning potential of feedback-giving and develop their expertise and professionalism.

The other two studies, adopting teacher cognition theory (Wei & Cao, 2020) and self-determination theory and self-efficacy theory (Busse, 2013), emphasized the role of beliefs in teachers’ choices of instructional practice and students’ perceptions of WCF practices. With a focus on mental processes, the three theories aim to understand how humans process information and make decisions in different situations (cognition theory), how humans are motivated by their psychological needs and how different types of motivation affect their behavior and well-being (self-determination theory), and how beliefs about one’s own capabilities influence behavior and outcomes (self-efficacy theory). Based on teacher cognition theory (Borg, 2003), Wei and Cao (2020) underscored that although teachers’ beliefs could guide their thoughts and behaviors in the feedback practice, cognitive change in their beliefs about WCF strategies may not result in their behavioral change in providing feedback due to various individual, contextual, and cultural factors. From the learner’s perspective, Busse (2013) pointed to the detrimental impact of negative feedback on demotivating students and deterring autonomy and stressed the importance of increasing students’ self-efficacy and motivation through selective and in-depth WCF so as to provide students with a better sense of progress and continued enjoyment of learning.

In studies that did not explicitly refer to theoretical underpinnings, researchers largely started with practical issues in the classroom (e.g., teachers’ dissatisfaction about the feedback process and low level of student feedback uptake) or focused on describing and understanding WCF-related phenomena, such as investigations into the ways L2 students engage with teacher WCF (e.g., Zheng & Yu, 2018) and the characteristics and features of teacher WCF in the L2 classroom (e.g., Ene & Kosobucki, 2016). Based on a review of previous studies, the researchers elaborated the rationale for the study and provided a description of what was happening in the classroom without relying on pre-existing explanations or theoretical frameworks. Of note, while theory-free research can allow for multiple interpretations and perspectives from different stakeholders without imposing a predefined lens or perspective, researchers may face a range of challenges in providing a clear justification for its design, analysis, or interpretation, as well as difficulties in establishing a connection to the existing literature or knowledge base (VanPatten *et al.*, 2020). Thus, it is suggested that researchers of non-theory studies systematically evaluate the validity and reliability of the research findings to enhance the robustness of their work.

5. Major themes and salient findings of naturalistic WCF research in L2 writing

The second research question centers around major themes and salient findings of naturalistic WCF research in L2 classroom contexts. An inductive and iterative approach was adopted to identify concepts during the extraction and analysis of data, which were then grouped into broader categories or themes that capture the main aspects of the outcome or questions. By comparing and contrasting the

categories or themes identified, we looked for patterns, similarities, differences, and gaps across the studies, and synthesized the key empirical findings into four research strands: (a) teacher WCF practices in L2 writing classrooms; (b) L2 learners' responses to WCF; (c) stakeholders' beliefs and perspectives on WCF; and (d) WCF-related motivation and emotions. Among the 50 studies included in this review, three investigations have dual research foci, and their findings were presented in respective sections in relation to the identified research strands.

5.1 Teacher WCF practices in L2 writing classrooms

The first strand of research contains 12 studies that concentrate on teachers' WCF practices in naturalistic L2 classroom settings, covering topics related to: (1) teachers' implementation of WCF in various L2 learning contexts such as mainland China, Hong Kong, Taiwan, Canada, and the USA, (2) how teachers undertake changes and innovations in their WCF practices, and (3) factors that influence teachers' WCF practices.

5.1.1 Teacher implementation of WCF practices

Within the first research strand, most attention has been given to the types of WCF teachers use to correct L2 learners' written errors, with a focus on feedback scope and strategies in WCF provision. The scope of WCF, or the extent to which teachers respond to student writing errors, seems to vary across different learning contexts. In EFL learning contexts, participating teachers were found to largely employ a comprehensive approach to WCF provision by marking all errors in student writing (Cheng & Zhang, 2021; Lee, 2003, 2008b, 2011). For example, an exploratory study by Cheng and Zhang (2021) examined 80 Chinese EFL students' writing samples that received WCF provided by four native English speakers and four non-native English speakers, revealing that both groups of teachers adopted a comprehensive approach in their WCF practices. The finding echoes Lee's (2008b, 2011) investigation into 26 Hong Kong secondary EFL teachers' feedback practices, in which the teachers responded to all the errors in student writing. Underlying this approach is teachers' perceived responsibility to meet students' and parents' expectations about error correction, as well as their routinized, habitual behavior driving them to point out all errors for students (Lee, 2003). In contrast, teachers working in ESL contexts were inclined to a more selective approach (Guénette & Lyster, 2013; McMartin-Miller, 2014), through which they paid special attention to several linguistic targets, such as the most frequent error types in student texts.

A more complicated picture emerges from the research results regarding the use of WCF strategies in teachers' classroom feedback practices. Generally, two main types of WCF with different levels of explicitness could be identified – namely, direct WCF and indirect WCF. Direct WCF refers to explicit corrections or comments on errors made in a student's written work, with the correct form or structure provided explicitly. Indirect WCF, on the other hand, entails the provision of suggestions or guidance for improvement without providing the correct form or structure, and it may take the form of underlining, circling, and error codes. While four studies (Guénette & Lyster, 2013; Lee, 2008b, 2011; Mikulski et al., 2019) showed that teachers primarily provided direct WCF to student writing, Ene and Kosobucki (2016) found that more indirect WCF was given by the teacher informants in their study. Worthy of note is that the directness of teachers' WCF might depend on the type of error (e.g., more indirect WCF on word choice errors) and may change over time (McMartin-Miller, 2014). As shown in McMartin-Miller (2014), the WCF from one of the teacher participants tended to be more indirect as the essay progressed. For example, the teacher provided correct forms in students' first drafts, but only identified errors without giving correct forms when encountering the same type of error in the second or subsequent drafts.

5.1.2 Changes and innovations in conventional WCF practices

A recent line of research has examined how teachers undertake changes or innovations that involve a focused approach as opposed to a conventional comprehensive approach to WCF provision, pointing

to the value of meaningful feedback innovations for informing WCF-related decisions and benefiting student learning. Given the prevalence of comprehensive WCF in many EFL contexts and the heavy workload induced and discouraging effects documented in the feedback literature (e.g., Hyland & Hyland, 2019; Lee, 2017), Lee and her collaborators conducted a series of qualitative case studies (Lee et al., 2015, 2016, 2021b) to investigate how Hong Kong secondary English teachers undertook feedback innovations concerning WCF scope. In contrast to their conventional WCF practices that covered a comprehensive range of written errors, the teacher participants pre-selected three or four linguistic items and responded to errors on those items only. Taking place in authentic classroom contexts with ecological validity, such studies have suggested that focused WCF is a viable option for responding to student writing, especially for low-proficiency students. For instance, Lee et al. (2021b) used a combination of interviews with teachers and students, classroom observations, examination of students' writing, and pre- and post-writing tests to investigate teachers' use of focused WCF in the Hong Kong EFL writing context. The study indicated that focused WCF, if aligned with writing instruction and tailored to the specific error types and individual students' needs, could be effectively implemented in authentic classrooms to enhance student learning.

Focused WCF entailed in feedback innovative practices was found to bring benefits to both teachers and students. Through this approach, teachers were empowered to strengthen their writing pedagogy and freed up to provide feedback on other aspects of student writing beyond language errors (Lee et al., 2021b). As reported in Yu's (2021) inquiry informed by a reflective practice perspective, five out of the twenty-seven Chinese EFL university teachers showed a change from providing comprehensive WCF to focused WCF due to their improved feedback literacy, perceiving the focused WCF approach to be more catered to students' needs and conducive to student engagement with feedback. Additionally, the six Hong Kong elementary students in the interviews regarded such feedback delivery as beneficial to their interest, confidence, and motivation in L2 writing (Mak, 2019). Despite the promising potential of innovative focused WCF for improving written accuracy and increasing student engagement with the revision process, teachers might face various issues in feedback innovations, such as the number and targets of errors selected for focused WCF (Lee et al., 2021a). Therefore, teachers are encouraged to conduct classroom-based inquiries to navigate the potential challenges, examine their own WCF innovations, and find out what works best in their specific contexts.

5.1.3 Factors that influence teacher WCF practices

Three studies (Guénette & Lyster, 2013; Lee, 2008b; Liu et al., 2022) have sought to uncover the factors that influence teacher decisions in relation to their WCF practices. Through a combination of questionnaires and interviews, Guénette and Lyster (2013) and Lee (2008b) both revealed that teacher WCF practices were impacted by an array of factors including accountability, teachers' beliefs and values, examination culture, and (lack of) teacher training, which were in turn shaped by the cultural and institutional contexts. As shown in the two studies, teachers were accountable to the school administrator and students who had respective requirements and expectations about their WCF practices. Furthermore, due to teachers' entrenched belief about the importance of writing accuracy, which was emphasized in public exams or previous training programs, teachers tended to prioritize language errors in their assessment and correct all errors for students. Another factor shaping teacher provision of WCF is the nature of the teacher–student relationship in the classroom. Informed by activity theory, Liu et al.'s (2022) case study focused on interpersonal interactions that occurred when teachers and students worked towards a jointly-constructed object (i.e., WCF activity). The findings suggested that the teacher participants tended to mark more errors in the work of their favored students but gave less feedback to students they disapproved of, highlighting the impact of the nature of the teacher–student relationship on the amount of WCF in teachers' feedback practices.

On the whole, the findings provide useful information to complement experimental research on the effectiveness of WCF. Rather than seeking to identify the most effective WCF type via a comparison experimental design, naturalistic research in this area suggests that WCF options should be deployed

flexibly, depending on students' learning needs and specific contexts. Teachers working in ESL and EFL contexts differed in the scope of WCF, with a comprehensive approach prevailing in EFL classrooms. However, teachers' attempts at WCF innovations (focused WCF) suggested that their conventional practices of comprehensive WCF might not work best for their students, indicating the need to bring about meaningful changes in WCF practices for teachers and students to reap benefits. It is worth noting that teacher provision of WCF was influenced by myriad factors (e.g., accountability, teachers' beliefs and values, examination culture, and teacher training) shaped by their work contexts, which might pose obstacles to effective WCF practices and possible innovations, such as local cultural traditions and constraints. Thus, teachers working in different contexts need to develop nuanced understandings of the contextual constraints that hinder their WCF practices and utilize strategies that suit the exigencies of the teaching and learning in their particular classrooms.

5.2 L2 learner responses to WCF

In view of the central role that students play in feedback processes, researchers have also attempted to explore students' subsequent responses after receiving WCF (17 studies within this strand). While experimental studies have tended to evaluate the outcome or product of revisions by calculating the accuracy rate in L2 writers' use of the target structure(s) that received WCF treatment (e.g., Rahimi, 2021; Truscott & Hsu, 2008), naturalistic research often consists of descriptive case studies and utilizes multiple data sources to look at how and what WCF is responded to, and more recently, learner engagement with WCF through a multidimensional lens.

5.2.1 Learner immediate revisions and reactions to WCF

Two earlier studies have examined learner responses to WCF as manifested in students' immediate revisions to their drafts (Hyland, 2003) or reactions to WCF (Lee, 2008a), which have informed subsequent studies that adopted a tripartite framework to research learner engagement with WCF in a more systematic manner. Based on teacher think-aloud protocols and interviews as well as six ESL writers' interviews and texts, Hyland's (2003) case study revealed that students were able to incorporate teacher WCF in their immediate revisions and valued the WCF received highly. Individual differences were also observed, as evidenced by the contrast between one student's tendency to use feedback on simple language structures only and another student's tendency to take advantage of feedback on complex structures.

The above findings resonate with Lee's (2008a) investigation into students' reactions to teacher WCF, in which quantitative and qualitative data were gathered, including 58 Hong Kong secondary students' survey responses, nine focal students' (six high proficiency and three low proficiency students) checklists and protocols, and teacher written feedback and interviews. While both the higher proficiency and low proficiency student groups appreciated teacher provision of more explicit WCF, they showed different reactions to teacher feedback, with lower proficiency students exhibiting greater resistance to WCF than their higher proficiency counterparts.

5.2.2 Learner engagement with WCF

Informed by the aforementioned earlier studies on certain aspects of student reactions to feedback and the engagement framework (Fredricks et al., 2004; Christenson et al., 2012) in educational literature, a recent burgeoning line of research has focused on learner engagement with feedback – a tripartite construct encompassing the behavioral, cognitive, and affective aspects of “how learners respond to the feedback they receive” (Ellis, 2010, p. 342). In this multifaceted framework, behavioral engagement refers to whether and how learners take up feedback in their revisions, while cognitive engagement pertains to how students attend to feedback through revision operations (such as rewriting and reorganization) and cognitive strategies (such as evaluating and monitoring), and affective engagement comprises learners' emotional responses and attitudinal reactions to feedback (Han & Hyland, 2015; Zhang & Hyland, 2018).

The bulk of research in this area has employed cross-sectional designs and utilized various data sources, such as students' texts, interviews, and retrospective reports, to depict the ways L2 writers engage with WCF, especially Chinese undergraduate EFL students (Cheng & Liu, 2022; Pearson, 2022a; Zhang & Hyland, 2018; Zheng & Yu, 2018; Zheng *et al.*, 2023). What stands out in these studies is the high degree of variation in individuals' engagement in terms of their cognitive evaluating and monitoring strategies employed to process feedback, feedback uptake, and affective attitudes. As revealed in these studies, concerning cognitive engagement, highly-engaged students with effective learning goals and high motivation were more skilled at using cognitive operations (e.g., allocate attentional resources to WCF and deploy learning strategies to memorize target structures) to enhance their understanding of WCF than under-achieving students (Cheng & Liu, 2022; Han, 2017). Variations in affective engagement and behavioral engagement were also captured. Even within the same class, L2 student writers may have various emotional reactions to the usefulness of WCF and differ in their feedback uptake rate; for example, some learners were highly committed to utilizing WCF to achieve higher writing accuracy, whereas others were reluctant to take advantage of the feedback received (Han, 2019; Zheng & Yu, 2018).

To date, only four studies have attempted to capture the potential changes in student engagement over time, offering empirical evidence concerning the non-static, mutable state of student engagement with WCF. Shi (2021) and Tian and Zhou (2020) looked at how focal Chinese university students engaged with feedback during three feedback-revision stages that integrated teacher feedback with other sources of feedback (peers and computers), which provided insights into the dynamic and reciprocal characteristics of engagement with WCF. For instance, one of the five participants in Tian and Zhou (2020) held a negative view toward teacher WCF at the beginning of the semester but became incrementally positive later and adjusted her feedback uptake decision-making accordingly. The finding about the mutability of student engagement with WCF is further supported by two subsequent studies (Zhang, 2022; Zhang & Hyland, 2022), which explored how a group of 33 Chinese undergraduates engaged with a collaborative approach involving group writing and revising in response to teacher feedback (Zhang, 2022), *vis-à-vis* a pedagogical approach that integrated teacher feedback with automatic and peer feedback (Zhang & Hyland, 2022). Both pedagogical approaches were found to play a facilitative role in enhancing student engagement with teacher WCF, either by encouraging discussion and joint efforts among student peers through the collaborative approach or by making student revision more manageable via the systematic integration of multi-source feedback.

5.2.3 *Factors that influence learner responses to WCF*

In an attempt to account for the variations in individuals' responses to WCF, several studies have sought to explore the factors that impact student reactions to or engagement with WCF. A number of influencing factors have been identified, especially individual difference factors such as learning goals and beliefs (Han, 2017; Han & Hyland, 2015; Hyland, 2003; Pearson, 2022b), language proficiency (Zhang & Hyland, 2018; Zheng & Yu, 2018), and feedback literacy (Han & Xu, 2021). As reported in these studies, students of low English language proficiency and less feedback literacy (i.e., limited cognitive and social-affective capacity and disposition to make sense of feedback information and use it to improve writing) had insufficient knowledge about the target linguistic forms and thus were inclined to invest little effort into understanding their language problems and correcting their errors (Han & Xu, 2021; Zheng & Yu, 2018), which consequently resulted in limited cognitive processing and uptake of WCF. Student emotional reactions were also shown to be mediated by learner factors such as learner beliefs, with findings suggesting that deeper affective engagement was associated with student belief in the value of WCF for improving their writing (Han, 2017; Pearson, 2022b).

These studies have generated valuable insights into the possible factors influencing students' engagement with WCF. Yet, the extant research centered largely around a few learner factors in a rather piecemeal manner, overlooking the role of contexts in shaping learners' responses to WCF. As noted by Han (2019), who conceptualized engagement with WCF as a process of perceiving

and acting upon embedded feedback from ecological perspectives, the interaction between the context and the students played a significant role in mediating the engagement process. For students to effectively engage with WCF, it is crucial to establish an alignment between learner agency and affordances provided by the feedback-related context. Hence, it was suggested that students' responses to WCF should be situated in their specific contexts (Lee, 2008a; Mao & Lee, 2022), with contextual factors taken into account to better suit student needs, such as specific learning tasks/activities, classroom settings, and cultural and institutional norms and expectations. To enrich our knowledge of the underlying mechanisms shaping students' responses to WCF, more attention should be given to the interaction between individual students and the context in which feedback is provided, processed, and utilized.

To summarize, studies on L2 learners' responses to WCF have contributed to the WCF scholarship by illuminating the dynamic and agentic role of learners as well as the centrality of alignment between the context and the learner in shaping L2 students' responses to WCF. In the meantime, a number of under-explored issues have emerged, which warrant further research attention. Specifically, we still have a limited understanding of the underlying factors that drive or shape the process of how L2 students respond to WCF, and the possible changes in this process. Future longitudinal investigations are thus encouraged to explore the synergy of multiple influencing factors such as writer-related factors and contextual factors, and how they interact with and impinge on learner responses to WCF across varying time scales.

5.3 Stakeholders' beliefs and perspectives on WCF

Beliefs and perspectives on WCF concern the views, opinions, or stances that stakeholders (e.g., learners and teachers) hold about the efficacy and implementation of WCF in the L2 classroom. As pointed out by Li (2017), investigating beliefs and perspectives on corrective feedback could afford useful information about how this construct could impact the effectiveness of feedback and student learning in the classroom. A total of 16 studies within this research strand have addressed two main areas: student and teacher beliefs about WCF, and congruence and incongruence between teachers' WCF beliefs and actual practices.

5.3.1 Student and teacher beliefs about WCF

Research on stakeholders' WCF-related beliefs has sought to uncover L2 students' and teachers' views about the utility of WCF, and their preferences on certain types of WCF in terms of feedback strategies and scope. These studies have largely utilized questionnaire surveys and semi-structured interviews or combinations of these data collection methods to gather information from EFL or ESL learners and teachers about their perspectives and opinions.

Students' beliefs about WCF are generally consistent, although they came from different contexts including EFL classes in Hong Kong, Spain, and Thailand (Lee, 2004; Mikulski et al., 2019; Zhang et al., 2021) and ESL classrooms in the United States and Canada (Dikli & Bley, 2014; Ene & Kosobucki, 2016; McMartin-Miller, 2014; Zhou et al., 2014). Overall, students in both ESL and EFL contexts perceive teacher WCF to be useful for improving their writing, and prefer a comprehensive approach to error correction. For example, 83.0% of the 320 surveyed students in Lee's (2004) study wanted their teachers to mark all their writing errors. In addition, slight variations were reported in their preferences on teachers' strategies for providing WCF: 117 students surveyed by Zhang et al. (2021) expressed their preferences on explicit WCF in the form of direct correction (especially low-proficiency learners) and considered indirect WCF to be "somewhat useful" only, whereas high-proficiency learners regarded less explicit WCF (e.g., underlining and error code) to be helpful. The finding indicates that language proficiency may influence students' ability to understand WCF with different levels of explicitness.

Teachers working in EFL and ESL contexts were found to hold differing beliefs about WCF scope and strategies. For instance, in Lee's (2004) survey research, the majority of the 206 EFL teacher

respondents favored comprehensive WCF due to the school requirements, student preferences, and self-perceived teacher responsibility. In contrast, most ESL teacher participants (14 out of 18 teachers) preferred a selective correction process that featured specific error types according to their judgment of the gravity of the error (Guénette & Lyster, 2013) and even reported reluctance to address grammar in student writing, as remarked by the five ESL instructors in Zhou *et al.* (2014). With regard to WCF strategies, while ESL teachers valued the use of indirect WCF such as marking error types or underlining/circling errors to initiate student self-corrections (Zhou *et al.*, 2014), EFL teachers preferred to provide correct forms or structures directly in order to save the trouble of providing explanations to students who were unable to fix the errors (Cheng & Zhang, 2022; Lee, 2004). These findings point to potential inconsistencies between students' and teachers' beliefs about WCF, indicating a need for teachers and students to communicate about WCF issues to develop mutual understandings and reduce dissonances.

5.3.2 *Congruence and incongruence between teachers' WCF beliefs and practices*

In recent years, scholars have paid growing attention to the extent to which teachers translate their WCF-related beliefs into practices. Four studies surveyed groups of teachers at Hong Kong secondary schools (Lee, 2003, 2009), an American university (Montgomery & Baker, 2007), and universities across three nations (*i.e.*, Thailand, China, and Vietnam) (Wei & Cao, 2020), to compare their WCF beliefs and actual practices. Findings revealed several mismatches between teachers' beliefs and practices, especially in terms of WCF scope and strategies. For example, although teachers believed that focused WCF could bring various advantages to teachers and students (*e.g.*, time-saving for teachers and less demotivating for learners), they tended to under-report the amount of feedback they provided on linguistic errors (Montgomery & Baker, 2007) or adopted a comprehensive approach to marking all errors in student writing (Lee, 2009; Wei & Cao, 2020). In addition, despite teachers' awareness of the need to vary their WCF strategies, in reality WCF practices were mainly restricted to limited feedback techniques such as indicating the errors with/without providing the correct form (Lee, 2003). These pioneering investigations have shed light on the possible incongruity between teachers' beliefs and WCF practices and accentuated the need to further probe the underlying reasons for such discrepancies.

Informed by the above survey research, subsequent case studies (Chen, 2022; Junqueira & Payant, 2015; Mao & Crosthwaite, 2019; Saeli & Rahmati, 2022) have collected data from multiple resources, including teacher interviews and student written texts, with a view to offering an in-depth, contextualized understanding of teachers' WCF beliefs and practices within their own classrooms. In line with the results of previous survey studies, the four qualitative inquiries identified inconsistencies between teachers' beliefs and practices, most notably the mistaken perception of the actual focus of their WCF and their strategies for providing WCF. For instance, most teachers (four out of five teacher cases) in Mao and Crosthwaite's (2019) study claimed they mainly provided direct WCF, while in reality they provided more indirect WCF in their feedback practices. More importantly, the studies identified various factors that accounted for these discrepancies, including heavy workload, time constraints, and students' individual needs (Junqueira & Payant, 2015; Mao & Crosthwaite, 2019; Saeli & Rahmati, 2022), suggesting that there are complex interactions among beliefs, practices, and contexts (*e.g.*, exam culture of teacher-centered contexts and specific educational and sociocultural contexts). As such, it is recommended that a complexity theory perspective be adopted to scrutinize interactions between teacher beliefs and behaviors within complex, dynamic, and contextualized systems (Chen, 2022).

In sum, previous studies have pointed to some disconnect between teachers' beliefs and their actual WCF practices, which is attributed to various context-related issues. The discrepancies between teachers' beliefs and practices about WCF may provide a strong impetus for teachers to re-examine their own beliefs, and to become aware of the incongruences between the beliefs they hold and their actual practices. Further in-depth investigations into the underlying factors behind the discrepancies would shed light on the factors that prevent teachers from putting their beliefs into practice,

yielding useful insights that help teachers reflect on their belief sub-systems, find incongruities between their beliefs and practices, and become agents for change.

5.4 WCF-related motivation and emotions

An emerging line of research has attended to students' and teachers' psychological states in relation to their motivational processes and emotions in WCF situations, including individuals' motivational characteristics and emotional experiences in giving and receiving WCF. By delving into motivational traits and emotional experiences involved in WCF practices, eight studies aim to unveil the role of motivation in shaping students' feedback orientations and students'/teachers' emotional experiences in WCF activities.

5.4.1 Students' motivational characteristics in WCF situations

Four studies have collected interview or questionnaire data from relatively large samples to examine students' motivational characteristics and their relationship with students' WCF orientations (Busse, 2013; Papi et al., 2020; Waller & Papi, 2017; Yu et al., 2020). Based on interviews with 12 first-year undergraduates in two UK universities, Busse (2013) identified the most frequent themes in the interview transcripts, showing that a comprehensive scope of WCF might negatively affect students' self-efficacy beliefs – namely, students' perceptions of their ability to perform well on a given task. During the interviews, comprehensive WCF practice was described by students as “disheartening”, with four of the respondents explicitly expressing a preference for more focused WCF. The demotivational effect of WCF was further elaborated by Yu et al. (2020), who developed an L2 writing feedback scale to investigate how feedback practices impact student writing motivation and engagement in Chinese EFL contexts. Based on Yu et al.'s (2019) conceptualization of L2 writing motivation and engagement represented by four overarching factors (i.e., adaptive motivation, adaptive engagement, maladaptive motivation, and maladaptive engagement) and 11 secondary factors (i.e., self-belief, valuing, learning focus, planning, task management, persistence, anxiety, failure avoidance, uncertain control, self-sabotage, and disengagement), their study investigated the impact of multiple L2 writing feedback strategies (i.e., scoring feedback, process-oriented feedback, expressive feedback, peer and self-feedback, and WCF) upon L2 writing motivation and engagement. As shown in the national survey with 1,190 students from 35 Chinese universities, WCF was associated negatively with valuing factor and positively with several indicators of maladaptive motivation and engagement, such as failure avoidance, uncertain control, self-sabotage, and disengagement. These results suggested that teacher WCF might induce self-sabotage with a sense of uncertain control and low valuing in L2 writers, who might then resort to failure avoidance strategies and disengage with WCF.

To further uncover the motivational mechanisms underlying learners' WCF orientations (namely, individuals' actions and strategies to seek feedback information to achieve their goals), Papi and his colleagues carried out two questionnaire studies (Papi et al., 2020; Waller & Papi, 2017) to explore the relationship of motivational characteristics and L2 students' orientations toward WCF. Drawing on multiple regression analyses of questionnaire data collected from 142 ESL writers at a large university in the United States, Waller and Papi (2017) affirmed that there was a positive and strong correlation between students' writing motivation and their WCF orientations, explaining almost 41.0% of the variance. The finding was further supported by their follow-up study conducted with 128 L2 writers from a major public university in the United States (Papi et al., 2020), showing that language mindsets were strong predictors of two strategies in feedback-seeking behavior: feedback monitoring and feedback inquiry, referred to as the amount of attention learners paid to WCF and their active elicitation of WCF from their teachers. Specifically, a growth language mindset (i.e., learners' belief that their L2 learning intelligence is malleable and can always grow) predicted the value of feedback seeking (the amount of value learners associated with teacher WCF), which, in turn, was a strong predictor of WCF monitoring and inquiry. On the other hand, a fixed language mindset (i.e., belief that

one's intelligence is unmalleable) predicted the self-presentation cost of feedback seeking (learners' perception of the risk of face-loss and embarrassment associated with seeking WCF), which, in turn, negatively predicted feedback monitoring. Taken together, the results of the two studies indicate that learners are proactive agents of learning in the WCF process where their strategic and agentic involvement is influenced by motivational mechanisms.

5.4.2 Students' and teachers' emotional experiences in WCF situations

So far, four studies have investigated students' and teachers' emotional experiences in WCF situations. While WCF was found to be associated with demotivating effects on student learning emotion and motivation (Yu *et al.*, 2020, 2021a), Han and Hyland's (2019) case studies on two Chinese university EFL students revealed that WCF could also elicit positive and neutral emotions, in addition to negative emotions. In particular, the negative emotions that initially emerged in both cases (e.g., anxiety and hopelessness) were not dominant, as they later became evanescent or overshadowed by neutral or positive emotions such as tranquility and contentment. The results indicate the need to take heed of both powerful elements of WCF and its possible negative influences on L2 student writers.

Only one study examined teachers' emotional experiences in giving feedback to L2 students. Gathering three types of data from 27 EFL writing teachers in Chinese universities – including interviews, student writing with teacher feedback, and teaching materials – Yu *et al.* (2021b) utilized a qualitative and interpretive approach to present a detailed account of the emotions experienced by the teachers when giving feedback. Over half of the 27 teacher participants (i.e., 16 participants) reported that the provision of WCF induced negative emotional experiences. As remarked by one teacher participant in the interview, he felt pained by the extensive time devoted to correcting writing errors, and even became angry and sad regarding the students' disengagement manifested by their lack of attention to teacher WCF.

Collectively, this new line of research has increased our knowledge of students' and teachers' psychological states in WCF practices. Given the potential negative emotions evoked in WCF activities, it is necessary for teachers and students to alleviate the negative side of feedback by facilitating emotion regulation and reflecting on WCF feedback practice, and – more importantly – to foster and sustain positive beliefs regarding WCF so as to encourage teaching and learning in L2 writing classrooms. Future studies may benefit from exploring the interaction between teacher and student emotions in the provision of and responses to WCF, as well as the integration of motivational and emotional components in the feedback process.

Salient findings and under-explored issues in each research strand are summarized in [Table 3](#).

6. Methodological design features

The third research question addresses the methodological features of the included WCF research. Adopting Dörnyei's (2007) taxonomy of research methodologies, we classified the primary studies into three types: quantitative research, qualitative research, and mixed methods research. Quantitative research involves data collection procedures that result primarily in numerical data, which is then analyzed mainly by statistical methods (e.g., survey research using questionnaires). Qualitative research entails data collection procedures that generate open-ended, non-numerical data (e.g., interview scripts), which is then analyzed primarily by non-statistical methods such as thematic or content analysis. Mixed methods research involves a combination of qualitative and quantitative methods either at the data collection or at the analysis levels (e.g., integration of questionnaire and interview studies).

6.1 Overview of research methodologies

A comprehensive examination of the research methodologies of the included studies revealed that various methodological approaches have been used in naturalistic research on L2 WCF, including

Table 3. Salient findings and under-explored issues in each research strand

Research areas	Salient findings	Under-explored issues
<p>Teacher WCF practices in L2 writing classrooms (k = 12)</p> <p>(1) Teachers' implementation of WCF in various L2 contexts.</p> <p>(2) How teachers undertook changes and innovations in their WCF practices.</p> <p>(3) Factors that influence their WCF practices.</p>	<ul style="list-style-type: none"> • The scope of WCF in teacher WCF practices varied across EFL and ESL contexts; individual differences were detected in teachers' use of WCF strategies. • Focused WCF entailed in feedback innovations brought benefits to both teachers and students. • Teacher WCF practices were shaped by an array of factors (accountability, teachers' beliefs, culture, and previous training) that were, in turn, shaped by the cultural and institutional contexts. 	<ul style="list-style-type: none"> • Little understanding of the contextual constraints that impinge on teacher WCF practices. • Research on teacher WCF innovations has been limited.
<p>L2 learner responses to WCF (k = 17)</p> <p>(1) Learner immediate revisions and reactions to WCF.</p> <p>(2) Learner engagement with WCF as a tripartite construct.</p> <p>(3) Factors that influence learner responses to WCF.</p>	<ul style="list-style-type: none"> • Differences were found in students' revisions; their reactions to WCF were influenced by language proficiency. • Individual variations were observed in learners' engagement with WCF, as evidenced by their use of cognitive strategies, behavioral revision actions and feedback uptake, and affective attitudes. In addition, engagement is not static and might undergo changes. • Several individual factors were identified, including learning goals and beliefs, language proficiency, and feedback literacy. There was interaction between the context and students. 	<ul style="list-style-type: none"> • Scant attention to the synergy of individual and contextual factors shaping learner reactions to and engagement with WCF. • Longitudinal investigations into the development of student engagement with WCF and its changes over time remain rare.
<p>Stakeholders' beliefs and perspectives on WCF (k = 16)</p> <p>(1) Student and teacher beliefs about WCF.</p> <p>(2) Congruence and incongruence between teachers' WCF actual practices.</p>	<ul style="list-style-type: none"> • Students generally perceived teacher WCF to be useful for improving their writing, and preferred a comprehensive WCF approach, whereas teachers held differing beliefs about WCF feedback and strategies across ESL and EFL contexts. • Some disconnect was observed between teachers' beliefs and actual WCF practices, which was attributed to various context-related issues. 	<ul style="list-style-type: none"> • Previous studies mainly described the discrepancies between beliefs and practices, without probing the underlying factors that prevent teachers from putting their beliefs into practice. • Little research about how teachers bridge the belief-practice gaps regarding WCF to improve their pedagogy.

(Continued)

Table 3. (Continued)

Research areas	Salient findings	Under-explored issues
WCF-related motivation and emotions (k = 8) (1) Students' motivational characteristics in the WCF process. (2) Students' and teachers' emotional experiences in WCF situations.	<ul style="list-style-type: none"> Learners are proactive agents of learning in the WCF process where their strategic and agentic involvement is influenced by motivational mechanisms. WCF can elicit students' positive and neutral emotions, apart from negative emotions. The provision of WCF could induce teachers' negative emotional experiences. 	<ul style="list-style-type: none"> Limited attention to the interaction between teacher and student emotions in the provision of and responses to WCF. The integration of motivational and emotional components in the feedback process is understudied.

Note. Among the 50 studies included in this review, three studies have dual research foci that address both teacher WCF practices and student responses to WCF (Liu *et al.*, 2022), or teacher WCF practices and stakeholder's beliefs and perspectives (Ene & Kosobucki, 2016; McMartin-Miller, 2014).

qualitative, quantitative, and mixed methods. Most of the studies in our review have adopted a qualitative research design, which account for 66.0% of the included studies. Additionally, 22.6% of the investigations have adopted a mixed-methods approach which involves both qualitative and quantitative methods in a single study. Though limited, quantitative studies have also been conducted in this research area, comprising 11.3% of all studies. Overall, methodologies employed in WCF research in naturalistic classroom contexts are diversified, with a primary focus placed on qualitative research methods.

6.2 Research instruments for data collection

Research instruments are the tools or methods that researchers use to collect data. In naturalistic WCF research, a wide range of research instruments were employed for collecting both qualitative and quantitative data. Common data sources include various types of interviews (used in 43 studies) in the form of semi-structured/focus group/stimulated recall/retrospective interviews, students' written texts with teacher feedback (used in 31 studies), classroom observations and materials (15 studies) such as lesson plans and/or teaching materials, and questionnaire surveys (14 studies). Other research instruments that were less commonly used include reflective journals/accounts, field notes, protocols, and checklists.

Of note, while experimental WCF research primarily relied on tests to measure outcome accuracy (Liu & Brown, 2015), researchers of naturalistic WCF studies tended to collect multiple sources of data to address the research questions, such as the integration of teacher interviews, student written texts, and classroom documents in research on teacher innovative WCF practices; the combination of written texts and students' stimulated recall and/or retrospective interviews in research on student engagement with WCF; and the use of questionnaire surveys together with follow-up interviews in research on stakeholders' beliefs and perspectives about WCF. In so doing, researchers could not only corroborate and augment evidence from diverse sources, but also gain a comprehensive and holistic understanding of the phenomenon being studied.

6.3 Methodological features

As shown in Table 4, all four research strands are dominated by the qualitative paradigm, most notably in studies on learner responses to WCF (16 out of 17 studies within this research strand). Specifically, a case study approach has been utilized to involve an in-depth investigation of several student/teacher participants (e.g., Chen, 2022; Han, 2017, 2019) or a small group of individuals (e.g., Yu, 2021; Zheng & Yu, 2018). Aiming to develop a comprehensive understanding of the participants'

Table 4. Methodological design features

	Teacher WCF practices in L2 writing classrooms	L2 learner responses to WCF	Stakeholders' beliefs and perspectives on WCF	WCF-related motivation and emotions	Column sum (%)
Quantitative	0	0	3	3	6 (11.3%)
Qualitative	7	16	7	5	35 (66.0%)
Mixed methods	5	1	6	0	12 (22.6%)
Total	12	17	16	8	53 (100%)

Note. Three studies with dual research foci were included in both research strands. Liu et al. (2022): teacher WCF practices and student responses to WCF; Ene and Kosobucki (2016) and McMartin-Miller (2014): teacher WCF practices and stakeholder's beliefs and perspectives.

experiences, behaviors, and interactions within a specific context or situation, these qualitative studies have collected data from multiple sources, such as interviews, written texts, and classroom observations, to cast light on the ways L2 students engage with teacher WCF (Cheng & Liu, 2022; Pearson, 2022a; Zhang & Hyland, 2018), how teachers undertake WCF innovations in their classroom practice (Lee et al., 2015, 2016, 2021b), and student and teacher emotions evoked by WCF (Han & Hyland, 2019). However, it is worth noting that given their specificity, care needs to be taken when attempting to generalize from the findings of case studies. Additionally, important insights or evidence that could be gained from other qualitative approaches may be downplayed or overlooked, such as ethnography (e.g., how teachers and students construct WCF activities in different cultural and educational contexts), action research (e.g., collaboration between researchers and teachers for developing teacher feedback literacy and improving WCF practice), and narrative inquiry (e.g., inquiries into lived experiences of providing/receiving WCF through narratives).

A mixed methods approach has primarily been employed in two strands of research – namely, teacher WCF practices in naturalistic classrooms and stakeholder's beliefs and perspectives on WCF – allowing for the combination and/or triangulation of quantitative and qualitative findings to offer a comprehensive understanding of the research questions. For instance, the integration of quantitative questionnaire data and qualitative data collected from follow-up interviews enabled researchers to scrutinize the gaps between teachers' WCF beliefs and practices (e.g., Mao & Crosthwaite, 2019; Wei & Cao, 2020). Combining questionnaires and case studies, Mak (2019) not only revealed the effects of two teachers' innovative feedback practices on 59 students' attitudes and their learning experiences via questionnaire data, but also substantiated the findings by drawing on six student cases' elaboration of the questionnaire statements and responses to teachers' WCF approaches. The advantage of mixed-methods research is also evinced by Cheng and Zhang (2021), who incorporated quantitative analysis of feedback (frequencies and percentages) and qualitative analysis of feedback instances (error type and feedback strategies) to present a complete picture of feedback scope and strategies in teacher WCF practices.

Finally, quantitative research methodology has been used to collect questionnaire data based on large samples, for the purpose of eliciting respondents' beliefs, motivation, and emotions related to WCF. For example, three studies (Lee, 2004; Mikulski et al., 2019; Montgomery & Baker, 2007) have used student and teacher questionnaires to elicit respondents' beliefs and perspectives on WCF within the contexts of Hong Kong, Spain, and the United States, respectively. Based on quantitative questionnaire data from a large number of respondents across various Chinese universities, Yu et al. (2020) conducted a national survey to better understand the impact of feedback practices on writing motivation and engagement. Papi et al. (2020) and Waller and Papi (2017) sought to unveil the motivational mechanisms underlying learners' WCF orientations based on multiple regression analyses of questionnaire data, which generated useful findings about the influence of motivational mechanisms on students' strategic and agentic involvement in the WCF process. By involving large

samples that are more representative of the entire population than smaller samples, these survey studies can potentially increase the statistical power of the results and provide insights into the attitudes and experiences of the general population.

7. Implications for pedagogy and research

The fourth research question focuses on the implications of the reviewed studies for pedagogy and research. By critically reviewing WCF research conducted in naturalistic L2 contexts, the current study can provide useful implications for pedagogical applications and identify potential avenues for future research agendas.

7.1 Implications for pedagogy

To optimize student learning opportunities and bring about maximum student improvement, we suggest the following pedagogical implications with clear ramifications for WCF practice in L2 classrooms.

One important line of WCF research pertains to teachers' deployment of WCF techniques in classroom practice. Instead of determining the most effective type of WCF, which is the focus of most experimental studies, findings of naturalistic research suggest that teachers should embrace diverse WCF options and vary them according to student needs and the classroom context. As shown in our review, while teachers working in EFL contexts tend to adopt a comprehensive approach to providing WCF (Lee, 2008b), such an approach might be detrimental not only to students' motivation (Yu *et al.*, 2021a), but also to teachers' emotional experience (Yu *et al.*, 2020). To maximize student learning from WCF, it is suggested that teachers implement a range of WCF techniques with flexibility and tailor them to student needs. For example, a combination of comprehensive and focused WCF could be adopted, with focused WCF being delivered to students who are able to self-correct the remaining errors and comprehensive WCF given to less capable students. Alternatively, teachers may consider providing focused WCF on the first draft and comprehensive WCF on the final draft, which can encourage student self-correction and alleviate the negative influences of WCF. Concerning WCF strategies, teachers may provide correct forms on errors that may be less amenable to self-correction such as sentence structure and word choice, and give hints or codes to facilitate student reflections on errors that can be easily self-corrected. Overall, teachers need to exercise their discretion and integrate various WCF options flexibly to benefit student learning from WCF.

Second, WCF should not be seen as a teacher monologue about student performance; rather, students should be involved in processing and acting upon feedback messages to bolster their engagement with WCF. As borne out in naturalistic WCF research, students are not passive recipients of feedback (Han, 2019) and could agentively employ cognitive and metacognitive operations and figure out appropriate revision operations to address WCF through effective pedagogical approaches (Zhang, 2022; Zhang & Hyland, 2022). To help students make better use of the feedback information available to them, teachers may construct feedback-related activities in ways that put students at the center of learning and facilitate iterative cycles of processing through student use of feedback – for example, multiple drafting, goal setting, and self-monitoring. Furthermore, the provision of post-feedback reinforcement, such as teacher–student writing conferences and student reflective journals and self-evaluations, has the potential for effectively engaging students with WCF and empowering them to develop ownership of their writing.

Third, considering the possible discrepancies between teachers' WCF beliefs and practices (e.g., Mao & Crosthwaite, 2019), it is crucial to foster a stronger congruence between their beliefs and practices to optimize the benefits of WCF. To do so, teachers may examine their own beliefs about feedback (e.g., Min, 2013) and the discrepancies between their beliefs and WCF practices through undertaking feedback innovations, which could also provide an impetus for strengthening their writing pedagogy and enhancing WCF practices. In light of the successful attempts documented in Lee *et al.* (2021b) and Mak (2019), teachers are encouraged to try out alternative feedback practices

(e.g., a more focused approach to WCF or a combination of comprehensive and focused WCF) to explore their impact on bolstering student learning. Such explorations are crucial to teacher empowerment in L2 classrooms, assisting them to identify WCF techniques most suitable for students in their own contexts and to enhance teacher professional development through meaningful pedagogical innovations.

Fourth, more recent WCF research has addressed the notion of feedback literacy, which has important implications for classroom practice. In order to maximize student learning opportunities, it is essential for teachers to develop feedback literacy – namely, teachers’ ability to use feedback effectively to help students improve their writing (Lee, 2021) – through a concerted effort by students, teachers, and schools. As pointed out by Lee (2017), teachers have to be feedback-literate in the first place so that they are able to provide opportunities and support to facilitate students to read, interpret, and use feedback. In addition, the development of student feedback literacy should not be underestimated given the centrality of the student’s role in sense-making and using feedback to improve learning (Carless & Boud, 2018; Zhang & Mao, 2023). Collaborative professional development in a community of practice is likely to lead to sustainable development of teacher and student feedback literacy. For instance, schools need to afford support and opportunities for the formation of professional learning communities in which teachers collaboratively develop their skills and knowledge regarding WCF in the writing classroom. Apart from the indispensable role of teachers in WCF-related activities, teachers may consider sharing responsibilities with students during feedback activities (Cao & Mao, 2022) by providing elaboration and coaching to guide WCF practices (e.g., spelling out teacher expectations about revision, modeling how feedback is to be addressed, and providing feedback training). Such a partnership approach is conducive to establishing mutual understandings and developing teachers’ and students’ capacities to enact complementary roles in the feedback process.

Finally, recent WCF research has also begun to heed the psychological and affective dimensions of WCF–student motivation and the emotions teachers and students experience during the feedback process. To enhance the effectiveness of WCF, it is crucial that teachers consider the possible sources of demotivation that may adversely impact student active engagement with and learning from teacher WCF and come up with ways to provide an emotionally positive experience for students as they cope with the WCF received (Han & Hyland, 2019; Yu, 2021). Through building a secure and supportive learning atmosphere (e.g., empowering students to express and reflect on their WCF-evoked de/motivation and emotions), students and teachers will develop a better understanding of the psychological and affective dimensions of WCF and become more adept at managing or regulating their motivation and emotions. In addition, professional development programs should increase teachers’ recognition of the intricate nature of motivation and emotions so that more efforts could be made to handle the motivational and emotional impact of WCF on student writers.

7.2 Implications for research

Together, the studies included in our review have highlighted the need for further investigations to shed light on under-addressed issues about WCF on L2 writing. Given the potential of feedback innovation for enhancing WCF pedagogy and promoting teacher feedback literacy, further research is needed to explore how teachers undertake feedback innovations in situ, including the impact of innovative feedback (e.g., comprehensive-focused integrative feedback and artificial intelligence-driven feedback) on students’ performance and the use of collaborative piloting as a strategy for promoting teachers’ professional learning regarding WCF. In line with the recent call for studying L2 writing and feedback processing in instructed SLA applied contexts (Manchón & Coyle, 2022; Manchón & Polio, 2022), we recommend that teachers and researchers conduct collaborative explorations to promote teacher empowerment and professional development, as well as to provide insights into how teachers draw on research findings to inform their own practice. For example, teachers and researchers could communicate about teachers’ needs and work together to plan WCF innovations, data collection

procedures, and dissemination of findings. Such research projects will provide teachers with opportunities to develop research skills and increase their engagement in educational research, producing a positive impact on the research-practice nexus that could lead to sustainable and meaningful innovations.

Another area of research worth exploring is the synergy of individual and contextual factors shaping learners' engagement with WCF over time. As borne out in our review, engagement provides an insightful, multidimensional lens for viewing students' behavioral, cognitive, and affective states in the feedback processes. However, previous studies have largely focused on individual difference factors in isolation, paying little attention to the role of context and its interplay with other individual difference factors (Li *et al.*, 2022). As such, further research may adopt a developmental perspective to elucidate how engagement develops over time and what individual and contextual factors influence its development as a whole (Mao & Lee, 2023). Mixed-methods research integrating questionnaires and case studies can enable researchers to scope out and capture general profiles in student engagement with WCF, and further illuminate how individual characteristics may lead to variations in learners' engagement. These operational and design choices will contribute to revealing the tendencies and developmental patterns of groups of L2 writers and while also scrutinizing the individual and temporal variability across engagement with WCF.

In light of the mismatches between teachers' WCF beliefs and practices identified in previous studies, more research is needed to provide a comprehensive and nuanced understanding about the underlying reasons for the discrepancies. In addition to describing the misalignment between the two, further attention should be directed towards revealing the underlying factors that preclude teachers from putting their beliefs into practice. It is necessary to guide teachers to re-evaluate their beliefs and render their WCF practices more principled, less random, and more subject to their own critical evaluation of teaching (Junqueira & Payant, 2015). Hence, it would be useful to engage teachers in action research, where they can reflect on and challenge their own assumptions about WCF and examine the impact of their WCF approaches on student learning (Mao & Lee, 2020).

Furthermore, as this review shows, the context in which feedback is provided and used not only influences teachers' beliefs and WCF practices, but also shapes the way L2 learners respond to teacher WCF. To better understand what works, for whom, in which contexts, and under which conditions, future research cannot underestimate contextual forces in teachers' provision of and students' responses to WCF, such as the instructional approach, the classroom atmosphere, student–teacher/peer relationships, and institutional policies. Privileging an exploratory paradigm, researchers are encouraged to carry out cross-context research to identify patterns, similarities, and differences in teacher WCF practices and student engagement characteristics across different contexts. This approach can provide a broader and more diverse understanding of the impact of context on WCF practices, generating insights into how WCF practices could be implemented in ways that are more conducive to teacher development and student learning.

8. Conclusion

Previous reviews have focused on experimental studies of WCF in L2 writing, largely overlooking naturalistic research on this topic. By synthesizing WCF studies in naturalistic classroom contexts and identifying their implications for practice and research, the current review advances our knowledge on this underexplored yet crucially important area.

Given the scope of the review study, two main limitations should be acknowledged. One is its exclusive focus on teacher WCF, without including research into WCF provided from other sources such as peers and computational tools. Readers are thus encouraged to refer to some recent reviews on peer written feedback (e.g., Vuogan & Li, 2022) and automated feedback (e.g., Lv *et al.*, 2021; Mohsen, 2022). Another limitation is that the publication bias of the review cannot be eliminated, which might arise from the exclusion of unpublished work and studies outside of our databases. As much unpublished work is produced in electronic or print format that has not been controlled by

commercial publishers, such as working papers from scientific research groups, conference proceedings, and doctoral dissertations, it is difficult to locate and retrieve such gray literature (Siddaway et al., 2019). To increase the credibility and authority of our review and enhance the relevance and usefulness of its implications, we focused on articles published in SSCI and AHCI-indexed journals, which may cover the most current and important topics and (more or less) represent the best practices in this domain (Al-Hoorie & Vitta, 2019; Nejadghanbar et al., 2023), whereas other relevant studies (e.g., published in non-indexed journals) were excluded in the study selection process.

Nonetheless, by systematically synthesizing this body of evidence to achieve robust conclusions and implications, we believe the present study could provide a bird's-eye, critical view of this important research area and make a significant contribution to L2 writing scholarship, with valuable implications for classroom applications and future research. Despite a growing perception that WCF is a saturated and over-researched topic due to a surfeit of experimental studies and their inconclusive findings (Atkinson & Tardy, 2018; Crosthwaite et al., 2022), our review suggests that there remain several under-explored issues and lines of inquiry open to further investigation in naturalistic research on WCF. It is hoped that this study could spark further research that will lead to a richer, more informative, and more diverse variety of studies on this topic.

Questions arising

1. What problems or challenges do teachers encounter in undertaking WCF innovations, and how do they navigate the challenges?
2. How do teachers exercise their agency and professional autonomy through undertaking WCF innovations?
3. How does L2 students' engagement with WCF change over time?
4. What individual and contextual factors, as a whole system, might influence L2 students' engagement with WCF?
5. What has shaped teachers' beliefs about WCF? To what extent are teachers' WCF beliefs translated into practice?
6. What are the underlying reasons for the discrepancies between teachers' beliefs and practices about WCF? How can the belief-practice gaps be bridged?
7. What factors might mediate the influence of WCF on student motivational processes and emotions in relation to WCF?
8. How do teachers develop their feedback literacy? What challenges do they face, and how do they navigate the challenges?
9. How may teacher feedback literacy impact student feedback literacy in the writing classroom?
10. How do teachers and students develop emotional resilience in coping with WCF?

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