

L1 Typological Distance and Arabic L2 Writing Development in a Multinational Saudi University Program: A Cross-Level Learner-Corpus Study

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Abstract

Arabic as a second language remains underrepresented in corpus-based writing research, particularly in studies that explain learner development through multilingual background variables and first-language typological distance. This study examined how L1 typological distance from Arabic relates to Arabic L2 writing development in a multinational Saudi university program. Using a cross-sectional, cross-level learner-corpus design, the study analyzed controlled and free-composition texts produced by 27 Level 3 and Level 4 learners, together with verified learner-background metadata. The analysis focused on orthographic accuracy, morphosyntactic accuracy, lexical-bundle use, syntactic complexity, and recurrent transfer-sensitive error patterns. The findings revealed a clear descriptive gradient: learners in the low-distance band produced fewer orthographic and morphosyntactic errors, more lexical bundles, and higher clauses-per-T-unit values than learners in the moderate- and high-distance bands. Level 4 learners also outperformed Level 3 learners overall, especially in phraseological density and syntactic complexity, although typological-distance differences remained visible at the higher level. Qualitative excerpts showed recurring agreement, pronominal-reference, and definiteness-related difficulties among more distant L1 profiles, alongside target-like academic bundles among lower-distance profiles. The study contributes to Arabic L2 writing research by linking typological distance, learner-corpus evidence, and cross-level developmental patterns in a multilingual Saudi university context.

1. Introduction

Arabic occupies a distinctive but still insufficiently examined position in second-language writing research. It is learned in religious, academic, professional, and migration-related contexts, and it is increasingly taught in higher-education environments that bring together learners from markedly different linguistic and literacy backgrounds. Recent Arabic-focused scholarship has begun to show that Arabic language development is shaped by a complex interaction of linguistic, motivational, cognitive, affective, and multilingual factors rather than by proficiency level alone. For example, Ramezanzadeh et al. (2025) demonstrate that achievement in L2 Arabic is embedded in a multiglossic learning context in which learners' self-concepts and language outcomes interact, Alharbi and Sa'ad (2026) argue for a multidimensional model of Arabic competence that accounts for the language's linguistic, cognitive, and communicative complexity, and Saputri et al. (2025) highlight the role of cognitive and affective factors in Arabic second-language acquisition. Yet, despite these advances, Arabic remains underrepresented in second-language writing research that links learners' verified linguistic profiles to measurable developmental outcomes in written production. This imbalance is consequential because Arabic differs from many learner first languages in script directionality, root-and-pattern morphology, agreement systems, and discourse-organizational tendencies, all of which may shape how multilingual learners develop written proficiency.

The present study responds to this gap through a cross-level learner-corpus investigation of Arabic L2 writing in a multinational Saudi university program. The target setting is pedagogically and theoretically significant because the student population includes learners from a wide range of national and linguistic

backgrounds distributed across instructional levels. Rather than treating this diversity as a demographic backdrop, the study conceptualizes it as a central explanatory resource. It asks whether and how first-language typological distance from Arabic is associated with variation in orthographic accuracy, morphosyntactic control, lexical-bundle use, syntactic complexity, and transfer-sensitive error-pattern profiles across proficiency levels. This focus is strengthened by recent work showing that Arabic L2 writing quality is linked to multiple dimensions of linguistic complexity, particularly phraseological diversity, rather than to accuracy measures alone (Alzahrani & Alfaifi, 2026).

The study is grounded in crosslinguistic influence theory, which holds that second-language performance is shaped by similarities and differences between the target language and previously acquired linguistic systems (Jarvis & Pavlenko, 2008; Odlin, 1989). It further draws on empirical work demonstrating that linguistic distance can predict variation in language-learning outcomes in multilingual classrooms and adult writing contexts (Jaekel et al., 2023; Mavrou & Chao, 2023). Related multilingual research also suggests that learners' prior linguistic systems may contribute to later language development through metalinguistic and syntactic awareness. Bakry et al. (2025), for instance, show that within- and cross-language metalinguistic awareness contributes to vocabulary knowledge in Arabic–German bilingual learners, while Razkane et al. (2025) demonstrate that explicit syntactic awareness in an additional language can influence syntactic performance across previously learned languages. Taken together, these findings make typological distance and broader multilingual repertoires especially promising constructs for Arabic L2 writing research.

A typological perspective is particularly appropriate for Arabic because the language presents interlocking challenges at several linguistic levels. Its writing system is an abjad with context-sensitive letter forms and optional short-vowel representation; its morphology is nonconcatenative and often realized through root-and-pattern structures; its agreement system encodes number, gender, and person; and its clause patterns may differ sharply from those familiar to learners whose L1s favor other constituent orders. Berg's (2009) dynamic treatment of structural representation provides a useful theoretical orientation for analyzing such differences, since it emphasizes that structural patterns are gradient, hierarchical, and sensitive to branching and organization. In the present study, typological distance is therefore treated not as a broad family label but as a multidimensional set of linguistic contrasts relevant to written production. This position is also compatible with recent Arabic proficiency research that calls for integrated rather than single-trait measurement of non-native Arabic competence (Alharbi & Sa'ad, 2026).

At the same time, the study avoids a common methodological error: equating nationality with first language. The multinational enrollment profile provides a sampling frame, not a substitute for linguistic evidence. Accordingly, the design includes a learner-background questionnaire that documents verified L1, additional languages, script familiarity, prior Arabic exposure, and years of study. This decision is informed by multilingual-profiling scholarship, particularly Pienemann and Keßler's (2007) argument that bilingualism and multilingualism must be measured directly if they are to serve as meaningful explanatory variables. It is also supported by recent multilingual Arabic-learning research showing that

learners may deploy different lexical-learning strategies across Arabic and other languages within the same repertoire (Sonbul et al., 2026). Such evidence underscores the need to treat multilingual experience as an empirically documented dimension of learner variation rather than as an assumed background characteristic.

Methodologically, the study advances Arabic L2 writing research through a learner-corpus design. Alfaifi et al. (2014) established the importance of Arabic learner-corpus development by introducing a large written and spoken corpus of Arabic learners. The present study builds on that precedent but is more narrowly theorized: it constructs a cross-level writing corpus explicitly designed to examine typological-distance effects. Hejazi's (2021) corpus-based analysis of lexical bundles and keyness across B1, B2, and C1 ESL writing provides a useful developmental model, while Römer-Barron's (2024) work on constructional development in learner English demonstrates how corpus methods can track shifts in phraseological and grammatical productivity across proficiency levels. Recent Arabic evidence further validates this approach: Alzahrani and Alfaifi (2026) show that L2 Arabic writing quality is associated with lexical, syntactic, and phraseological complexity across genres. These converging perspectives inform the present study's attention to lexical bundles, constructional repertoire, and cross-level developmental patterns in Arabic writing.

The study makes three contributions. First, it extends linguistic-distance research into Arabic L2 writing, a domain that remains comparatively underdeveloped despite the growing recognition that Arabic proficiency is multidimensional and context-sensitive (Alharbi & Sa'ad, 2026; Ramezanzadeh et al., 2025). Second, it integrates multilingual learner profiling with cross-level corpus analysis, thereby avoiding reductive groupings and improving the interpretability of learner differences. Third, it offers pedagogical value by identifying which aspects of Arabic writing are most sensitive to typological distance, script familiarity, multilingual repertoire, and prior exposure. The resulting evidence can inform differentiated instruction, targeted feedback, and more realistic writing-support models for multilingual Arabic classrooms.

2. Literature Review

2.1. Crosslinguistic Influence and Typological Distance

Crosslinguistic influence has long been recognized as a core mechanism in second-language development. Odlin (1989) defines transfer broadly as the influence of similarities and differences between a target language and any previously acquired language, while Jarvis and Pavlenko (2008) expand this account by distinguishing among semantic, conceptual, and production-related dimensions of influence. These perspectives are especially relevant to L2 writing because written production requires learners to coordinate orthographic encoding, lexical selection, grammatical structuring, and discourse planning under conditions that may invite reliance on prior linguistic routines.

Typological distance refines transfer research by specifying where and why crosslinguistic influence may be stronger. Rather than treating all non-native writers as a single group, linguistic-distance approaches compare target-language demands with concrete properties of learners' prior languages. Jaekel et al. (2023) demonstrate the value of such measures in linguistically diverse classrooms, while Mavrou and Chao (2023) show that distance is predictive of L2 writing outcomes among adult learners of Spanish from many linguistic backgrounds. Their findings suggest that written accuracy, fluency, and overall performance are not simply proficiency effects; they are partly shaped by how structurally familiar or unfamiliar the target language is to the learner.

The Arabic context makes a typological-distance perspective especially necessary because learners enter Arabic classrooms with markedly different linguistic and literacy backgrounds. Their first languages may vary in morphological organization—for example, isolating, agglutinative, fusional, or templatic systems—as well as in script type, including alphabetic, abugida-based, logographic, or Arabic-derived writing systems. They may also differ in the extent to which their L1s encode grammatical gender, inflectional agreement, and constituent-order preferences, all of which are directly relevant to Arabic written production.

A typological-distance model therefore allows these contrasts to be treated as systematic explanatory variables rather than as incidental demographic background. Berg's (2009) account of structural representation is useful here because it emphasizes that linguistic systems differ in hierarchical organization and branching relations, dimensions that may shape how learners construct Arabic clauses and larger discourse units. Recent multilingual research further supports this orientation: Bakry et al. (2025) show that cross-language metalinguistic resources contribute to language development in Arabic-related bilingual contexts, while Razkane et al. (2025) demonstrate that explicit syntactic awareness in one additional language can influence grammatical performance across other languages. Taken together, these studies reinforce the premise that Arabic L2 writing should be interpreted in relation to learners' prior structural repertoires, especially when examining morphosyntactic encoding, clause organization, and crosslinguistic transfer.

2.2. Multilingual Learner Profiling and Background Variables

Typological-distance research is only as strong as the quality of its learner-background data. Pienemann and Keßler (2007) argue that bilingualism and multilingualism should be measured through explicit profiling rather than reduced to coarse labels. This point is crucial for the present study, because many learners in Arabic-for-non-native-speakers programs may have complex multilingual histories that include home languages, regional lingua francas, colonial languages, religious literacy, and prior formal Arabic instruction. Without direct measurement, these factors may be conflated with typological distance.

The present study therefore treats multilingual profile variables as central components of the explanatory model. Verified L1, additional languages, script familiarity, years of Arabic study, prior schooling through Arabic or Arabic-script traditions, and exposure to Qur’anic or religious Arabic were documented before writing outcomes were analyzed. These variables serve two purposes. Analytically, they help isolate the specific contribution of typological distance. Pedagogically, they provide a richer basis for interpreting why learners with apparently similar proficiency levels may demonstrate different writing strengths and weaknesses.

2.3. Learner Corpora and Cross-Level Writing Development

Learner corpora offer a powerful means of tracing writing development across proficiency levels and linguistic backgrounds. Rather than relying on isolated examples, corpus analysis makes it possible to identify recurrent lexical, grammatical, and phraseological patterns across a structured dataset. Alfaifi et al. (2014) demonstrate the feasibility and value of Arabic learner-corpus construction through the Arabic Learner Corpus, which includes written and spoken materials produced by learners of Arabic. Their work establishes an important precedent but also points to the need for more theory-driven corpora that are designed around specific explanatory questions.

The present study addresses that need by developing a cross-level Arabic writing corpus linked to typological and multilingual metadata. Hejazi’s (2021) work on lexical bundles and keyness across B1, B2, and C1 ESL learners shows that recurrent word sequences and lexical salience can function as developmental indicators. Although Hejazi’s target language is English, the analytical principle is transferable: as learners advance, their writing may show broader lexical repertoires, more stable phraseological sequences, and a shift from general lexical reliance toward more context-appropriate bundles. Applying this logic to Arabic provides a basis for examining whether learners at higher levels display greater use of cohesive phraseology, formulaic academic sequences, or target-like multiword patterns.

Römer-Barron (2024) extends corpus-based developmental analysis by examining how constructions with modal verbs become more frequent, productive, and aligned with native-speaker usage as proficiency develops. This constructional perspective is useful for Arabic L2 writing because many target features are best understood not as isolated forms but as recurring form–function pairings: nominal–sentence patterns, adjective–noun agreement constructions, relative-clause structures, prepositional sequences, and textual connectors. The present study therefore adopts a corpus-sensitive view of writing development in which lexical bundles and grammatical constructions are treated as complementary evidence of growing proficiency.

2.4. Corpus Construction, Comparability, and Annotation

A learner corpus is only analytically useful when its design supports principled comparison. Voormann and Gut (2008) propose an agile approach to corpus creation that emphasizes iterative refinement of workflow, annotation, and corpus structure. This approach is well suited to multilingual Arabic learner writing because pilot coding may reveal unexpected error types, script-related phenomena, or discourse features that require careful revision of the annotation manual. Rather than imposing a rigid coding scheme from the outset, an agile procedure allows the corpus to become more analytically precise while preserving replicability.

Anstein's (2013) work on semi-automatic comparison of regional variety corpora also offers a methodological insight that is relevant here: computational comparison can support, rather than replace, linguistically informed manual analysis. In the present study, manual annotation of Arabic learner writing was combined with corpus-assisted procedures such as frequency profiling, keyword or keyness analysis, lexical-bundle extraction, and distributional comparison across proficiency and typological-distance groups. This mixed analytic logic is particularly important in Arabic writing research, where errors may be orthographic, morphological, or discourse-based and may not be captured adequately by fully automated pipelines.

2.5. Arabic L2 Writing: Orthography, Morphosyntax, and Discourse Organization

Arabic L2 writing development should be examined as a *multilayered process* because the formal properties of Arabic impose demands that extend beyond isolated grammatical accuracy. At the orthographic level, learners must acquire right-to-left script orientation, context-dependent letter shapes, dot placement, diacritic conventions where relevant, and phoneme–grapheme correspondences that may be absent from their prior literacy systems. Russak and Fragman (2014) show that Arabic spelling development is strongly shaped by phonological and orthographic pressures, even among learners whose linguistic background is comparatively closer to Arabic. Related evidence from Arabic–German bilingual learners further indicates that phonological, morphological, and orthographic awareness contribute to Arabic-language lexical development, reinforcing the importance of treating script familiarity and metalinguistic awareness as relevant learner-background variables rather than peripheral factors (Bakry et al., 2025).

At the morphosyntactic level, Arabic requires control of gender and number agreement, verbal morphology, definiteness marking, nominal modification, and constituent-order patterns that may differ substantially from those available in learners' first languages. These features make Arabic writing especially sensitive to typological distance. Learners whose L1s lack grammatical gender, rich inflection, or comparable agreement systems may be more likely to rely on lexical sequencing or default forms rather than target-like morphological encoding. This expectation is consistent with broader linguistic-distance research showing that structural distance predicts variation in L2 writing accuracy (Mavrou & Chao, 2023). It is also supported indirectly by multilingual transfer research demonstrating that syntactic

awareness and cross-language structural knowledge can shape grammatical development across additional languages (Razkane et al., 2025). Arabic-specific evidence likewise suggests that morphosyntactic control remains a meaningful area of learner difficulty, as reflected in non-native learners' mastery of transitive and intransitive verb patterns (Ismail et al., 2025).

Arabic L2 writing also develops at the discourse level, where learners must organize information coherently across clauses and paragraphs, deploy cohesive devices, and manage textual progression in culturally and rhetorically appropriate ways. Blond's (1984) contrastive analysis of Arabic and English expository paragraphing remains relevant because it demonstrates that differences in information structure and textual development cannot be reduced to sentence-level grammar. For this reason, the present study treats discourse organization—through cohesion, connector use, paragraph unity, and coherence-related features—as an essential component of writing development, particularly in the free-composition task.

Recent Arabic L2 scholarship strengthens the case for this multidimensional framework. Alzahrani and Alfaifi (2026) show that L2 Arabic writing quality is associated with multiple dimensions of linguistic complexity across genres, with phraseological diversity emerging as a meaningful predictor of stronger writing performance. Similarly, Alharbi and Sa'ad (2026) argue that Arabic competence among non-native learners should be measured through an integrated model that reflects the language's linguistic, cognitive, and communicative complexity rather than through narrowly isolated indicators. Accordingly, the present study conceptualizes Arabic L2 writing development as a composite construct involving orthographic accuracy, morphosyntactic control, lexical expansion, phraseological development, syntactic complexity, and discourse organization.

2.6. Literature Synthesis

The literature supports a clear research opportunity. Crosslinguistic influence and linguistic-distance research explain why learners with different L1 backgrounds may not follow identical developmental pathways (Jaekel et al., 2023; Jarvis & Pavlenko, 2008; Mavrou & Chao, 2023; Odlin, 1989). Corpus-based studies demonstrate the value of tracing lexical and constructional development across proficiency levels (Hejazi, 2021; Römer-Barron, 2024). Arabic learner-corpus scholarship confirms that large-scale, multilingual datasets are feasible (Alfaifi et al., 2014), while work on Arabic spelling and discourse organization underscores the importance of orthographic and text-level variables (Blond, 1984; Russak & Fragman, 2014). What remains missing is an integrated study that brings these strands together to model Arabic L2 writing development in a multilingual cohort through verified learner profiles and typological-distance measures.

3. Theoretical Framework

3.1. Framework Overview

The study is guided by an integrative framework that links learner linguistic profiles, typological-distance dimensions, transfer-sensitive developmental mechanisms, and observable Arabic L2 writing outcomes. The framework rests on four interrelated assumptions. First, second-language writing is shaped by crosslinguistic influence because learners draw on previously acquired linguistic systems when encoding orthography, morphology, syntax, lexical choice, and discourse organization (Jarvis & Pavlenko, 2008; Odlin, 1989).

Second, such influence is not uniform across learners; rather, it varies according to the degree of structural distance between prior languages and the target language. This assumption is supported by recent work showing that linguistic distance predicts variation in L2 performance and writing outcomes across multilingual learner populations (Jaekel et al., 2023; Mavrou & Chao, 2023).

Third, learner-background variables—particularly script familiarity, prior Arabic exposure, multilingual repertoire, and metalinguistic resources—may moderate or partially offset distance effects. This position is consistent with multilingual profiling theory (Pienemann & Keßler, 2007) and with newer evidence that cross-language metalinguistic awareness and multilingual learning strategies shape language development in Arabic-related contexts (Bakry et al., 2025; Sonbul et al., 2026).

Fourth, Arabic L2 writing development should be assessed multidimensionally through corpus-sensitive indicators of accuracy, linguistic complexity, lexical growth, phraseological development, and discourse control, rather than through error counts alone (Hejazi, 2021; Ortega, 2003; Römer-Barron, 2024; Alzahrani & Alfaifi, 2026).

Within this framework, typological distance is conceptualized not as a binary distinction between “close” and “distant” languages, but as a composite explanatory construct comprising several dimensions directly relevant to Arabic writing: morphological distance, word-order distance, agreement-system distance, script distance, and phonological–orthographic distance. These dimensions are expected to influence a set of transfer-sensitive developmental mechanisms, including orthographic mapping, morphosyntactic encoding, lexical selection, phraseological formation, constructional development, and discourse organization. Their effects are then observable in writing outcomes such as orthographic and grammatical error density, lexical-bundle use, syntactic complexity, cohesion, and overall text quality.

This multidimensional treatment aligns with recent Arabic-language assessment work arguing that competence among non-native Arabic learners cannot be captured adequately through isolated indicators, but requires an integrated model sensitive to linguistic, cognitive, and communicative complexity (Alharbi & Sa’ad, 2026). It also resonates with evidence that L2 Arabic outcomes emerge within complex multilingual and multiglossic learning environments rather than through a single linear proficiency pathway (Ramezanzadeh et al., 2025).

Proficiency level and exposure-related variables are therefore treated as moderators within the model. The framework predicts that typological-distance effects will be strongest at lower instructional levels, when learners have less target-language entrenchment and are more likely to rely on previously

established linguistic routines. As proficiency increases, some distance-related effects may attenuate, especially in surface-level orthographic control, but they may remain visible in more persistent domains such as agreement morphology, phraseological sophistication, syntactic elaboration, and discourse structuring. Prior Arabic exposure and familiarity with Arabic-based scripts are expected to reduce specific orthographic barriers even when broader typological distance remains high, while multilingual experience may contribute additional compensatory resources for vocabulary learning and cross-language structural awareness (Bakry et al., 2025; Razkane et al., 2025; Sonbul et al., 2026). In this way, the model explains Arabic L2 writing development as the product of an interaction between linguistic distance, multilingual experience, instructional progression, and domain-specific writing demands.

A further strength of the framework, as illustrated in Figure 1, is that it treats Arabic L2 writing outcomes as the product of a *layered developmental pathway* rather than as the direct consequence of a single learner characteristic. Verified linguistic profiles first shape the typological-distance conditions under which Arabic is learned; these conditions then influence transfer-sensitive writing mechanisms, which are ultimately reflected in measurable outcomes such as accuracy, lexical-bundle use, syntactic complexity, and discourse coherence. The figure also makes explicit that *proficiency level* and *exposure variables* operate as moderating forces, helping explain why learners with similar typological profiles may nevertheless display different developmental trajectories. This architecture is consistent with recent Arabic L2 research emphasizing that learner outcomes emerge from the interaction of linguistic complexity, multilingual experience, motivational context, and prior exposure rather than from isolated predictors alone (Alzahrani & Alfaifi, 2026; Alharbi & Sa'ad, 2026; Ramezanzadeh et al., 2025). It is also compatible with evidence that metalinguistic awareness and multilingual learning resources contribute to language development across Arabic-related learning contexts (Bakry et al., 2025; Sonbul et al., 2026). Thus, the model provides a theoretically grounded basis for interpreting Arabic L2 writing as a *multifactorial developmental system* in which typological distance is central, but never analytically detached from proficiency growth and prior linguistic experience.

3.2. Theoretical Propositions

P1. Typological distance will shape Arabic L2 writing through identifiable differences in orthographic mapping, morphosyntactic encoding, and discourse organization.

P2. Multilingual profile variables will explain additional variance beyond typological distance alone, particularly where script familiarity or prior Arabic exposure is relevant.

P3. Cross-level learner-corpus evidence will reveal both developmental progression and persistent transfer-sensitive patterns.

P4. Lexical bundles and constructional repertoire will provide evidence of phraseological and grammatical development that cannot be captured fully by error counts alone.

4. Research Gap

Despite expanding scholarship on Arabic language learning, learner-corpus research, and multilingual development, the literature has not yet integrated these strands into a single explanatory account of Arabic L2 writing shaped by verified learner linguistic profiles and typological distance. Recent studies have advanced important but largely separate lines of inquiry. Alzahrani and Alfaifi (2026) demonstrate that L2 Arabic writing quality is associated with multidimensional linguistic complexity, particularly phraseological diversity, while Alharbi and Sa'ad (2026) call for broader models of Arabic competence that move beyond isolated indicators of performance. Other Arabic-related work highlights the importance of multilingual and learner-background factors: Ramezanzadeh et al. (2025) show that L2 Arabic outcomes emerge within a multiglossic learning ecology, Bakry et al. (2025) identify cross-language metalinguistic contributions to Arabic-related lexical development, and Sonbul et al. (2026) document the significance of multilingual vocabulary-learning strategies among Arabic and English learners. However, these studies do not directly examine how typological differences in script, morphology, agreement systems, and clause organization shape measurable variation in Arabic L2 writing development within a learner-corpus framework.

The present study addresses this gap by constructing a cross-level Arabic learner-writing corpus linked to verified L1, script-background, and multilingual-profile data. Rather than treating Arabic writing development as a matter of error frequency alone, the present corpus analysis focuses on orthographic and morphosyntactic accuracy, lexical-bundle use, syntactic complexity, and qualitative transfer-sensitive error patterns. This design extends recent Arabic L2 work on complexity and competence by embedding these outcomes within a typological-distance model that can explain why learners with different linguistic repertoires may follow different developmental pathways. It contributes to corpus-based SLA, multilingual education, and Arabic writing pedagogy by moving from descriptive accounts of learner difficulty toward a theoretically grounded model of how linguistic distance and multilingual experience jointly shape Arabic L2 writing development.

5. Research Questions

RQ1. How does L1 typological distance from Arabic relate to Arabic L2 writing development across instructional levels?

RQ2. To what extent is typological distance associated with differences in orthographic accuracy, morphosyntactic accuracy, lexical-bundle use, and syntactic complexity?

RQ3. Do learners at different proficiency levels display distinct phraseological, syntactic, and error-pattern profiles in Arabic writing?

RQ4. Does proficiency level moderate the relationship between typological distance and Arabic L2 writing outcomes?

RQ5. How do script familiarity, prior Arabic exposure, and multilingual repertoire influence Arabic writing development after typological distance is considered?

RQ6. What corpus-based patterns distinguish learners from relatively closer and more distant L1 backgrounds?

6. Hypotheses

H1. Greater L1 typological distance from Arabic will be associated with lower overall Arabic L2 writing performance.

H2. Greater typological distance will be associated with lower morphosyntactic accuracy, especially in agreement morphology, inflectional marking, and constituent ordering.

H3. Learners with greater script distance from Arabic will produce more orthographic errors than learners with prior familiarity with Arabic or Arabic-based scripts.

H4. Lexical-bundle use will increase across proficiency levels, but this development will be weaker among learners from more typologically distant L1 backgrounds.

H5. Syntactic complexity will increase with proficiency, but the rate of growth will vary by typological-distance group.

H6. Proficiency level will moderate the relationship between typological distance and writing outcomes, with distance effects strongest at lower levels and attenuated at higher levels.

H7. Prior Arabic exposure and script familiarity will partially reduce the negative association between typological distance and orthographic accuracy.

H8. Corpus-based error analysis will reveal distinct transfer-sensitive profiles across L1 backgrounds, including differential patterns in morphology, agreement, pronoun reference, definiteness, and phraseological control.

7. Methodology

7.1. Research Design

The study employed a cross-sectional, cross-level learner-corpus design with a comparative explanatory orientation. It was cross-sectional in that learners from multiple instructional levels were sampled during a single study window; it was cross-level because the design compared writing outcomes across the program's proficiency sequence. As a learner-corpus-based study, the primary evidence consisted of systematically collected Arabic writing texts linked to participant metadata. The study was explanatory in orientation: it examined whether L1 typological distance and related profile variables were associated

with measurable differences in Arabic L2 writing outcomes, while the present report retains a descriptive and corpus-interpretive analytic emphasis.

Each participant contributed two Arabic writing texts: one controlled writing task and one free-composition task. The use of two tasks balanced comparability and ecological validity. The controlled task facilitated targeted analysis of orthographic and morphosyntactic forms under standardized elicitation conditions, while the free-composition task permitted the examination of lexical diversity, phraseological development, syntactic complexity, and discourse organization in a less constrained writing context. A supplementary oral reading task was collected where feasible to support the interpretation of script-related decoding and orthographic patterns.

7.2. Research Context and Sampling Frame

The study was conducted within the Arabic Language Unit for Non-Native Speakers at the University of Ha'il, Saudi Arabia, during the first semester of the 1447H (2025–2026) academic year. This setting was characterized by substantial learner diversity. The program's student enrollment lists served as the initial sampling frame, identifying the accessible population across the proficiency levels.

A critical step in the preparation phase involved reconciling level-classification records. The initial enrollment lists contained an inconsistency where a group of students were administratively listed as "Level 4" in the header but designated as "Level 3" in the status column. To ensure the integrity of the cross-level comparison, the research team verified the actual instructional placement of these students through departmental records before assigning them to a level group for analysis. Furthermore, while the enrollment lists provided the country of origin, these were not used as direct evidence of first language; instead, L1 and multilingual backgrounds were verified through a dedicated questionnaire.

7.3. Participants and Inclusion Criteria

The participants consisted of consenting non-native learners of Arabic enrolled in the University of Ha'il program. The cohort represented a wide geographical and linguistic distribution, including students from West Africa (e.g., Gambia, Ivory Coast, Benin, Nigeria, Ghana, Burkina Faso), Central Africa (e.g., Chad), South and Southeast Asia (e.g., Bangladesh, Indonesia, the Philippines, India), East Asia (e.g., China), Central Asia (e.g., Afghanistan), and Europe (e.g., Great Britain).

All participants met the following inclusion criteria: (a) current enrollment in the University of Ha'il Arabic program during the data-collection window; (b) status as a learner of Arabic as an additional language; (c) completion of the learner-background questionnaire; and (d) completion of at least one writing task. Participants who declined consent or provided insufficient background data for typological coding were excluded from the final analytic corpus. The final analytic sample was stratified by instructional level and

typological-distance bands. In cases where specific L1s were represented by small numbers, the analysis utilized composite distance measures to ensure statistical robustness.

7.4. Instruments and Data Sources

The instrument set comprised: (a) a learner-background and multilingual-profile questionnaire, (b) a controlled Arabic writing task, (c) a free-composition writing task, and, where feasible, (d) a supplementary oral reading task. The full instruments, typological-distance coding rubric, corpus annotation matrix, and validation summary are provided in Appendices A–G.

7.4.1. Learner-Background Questionnaire

The questionnaire documented the learner variables required for theoretically defensible typological analysis. Items covered first language, home language(s), additional languages, literacy in each language, script familiarity, prior exposure to Arabic through school, religious education, family contexts, or self-study, years of formal Arabic instruction, and prior experience with Arabic writing. The instrument was essential to prevent nationality from serving as an imprecise proxy for L1 and to distinguish typological-distance effects from broader multilingual-experience effects.

7.4.2. Controlled Arabic Writing Task

The controlled writing task elicited a short Arabic text under standardized conditions. It was designed to create opportunities for the production of target structures relevant to the study, including agreement morphology, nominal modification, verb use, definiteness, and basic clause linking. A visually supported prompt was used to reduce topical-knowledge demands while maintaining comparable elicitation conditions across learners. Instructions specified a recommended length appropriate to the task, and all texts were retained and later normalized analytically through length-sensitive measures such as errors per 100 words.

7.4.3. Free-Composition Task

The free-composition task required learners to write connected prose on a culturally accessible, non-specialized topic. This task supported the analysis of lexical diversity, lexical-bundle use, syntactic complexity, discourse cohesion, and paragraph organization. The prompt was designed to permit authentic expression while preserving comparability across the cohort. Using both a controlled task and a free-composition task also responds to evidence that writing-task complexity can shape performance and engagement, making it important to distinguish tightly elicited production from more open-ended composition (Ndruru et al., 2025). Participants were instructed to avoid disclosing private or sensitive personal details.

7.4.4. Supplementary Oral Reading Task

Where feasible, a brief oral reading task was collected to measure script-related processing. This supplementary task did not serve as the primary outcome of the study; rather, it functioned as an auxiliary explanatory source for interpreting whether orthographic inaccuracies co-occurred with decoding difficulties among learners from different script backgrounds.

7.5. Data Collection Procedures

Data collection took place in scheduled sessions coordinated with instructors at the University of Ha'il. Participants first received information sheets and provided written consent. They then completed the background questionnaire, followed by the controlled and free-writing tasks. To preserve the validity of learner-generated written production, participants worked individually under supervised conditions without access to translation tools, generative AI systems, grammar checkers, or dictionaries. This restriction was methodological rather than evaluative: recent L2 writing research indicates that AI-based writing tools can affect writing competency and writing-related affect, which would confound interpretation of unaided learner-corpus measures (Abuhussein & Badah, 2025; Tanino, 2026).

Writing was collected by hand to minimize keyboard-autocorrection effects and preserve naturally occurring orthographic forms. Handwritten texts were subsequently transcribed into a digital corpus using a two-layer protocol: (a) a diplomatic transcription preserving learner spelling, spacing, and non-target forms as closely as possible; and (b) a normalized reference layer used only for selected lexical and phraseological analyses. All texts were anonymized through unique participant IDs before transcription and coding.

7.6. Corpus Preparation and Annotation

The corpus was organized by participant ID, instructional level, task type, verified L1, additional-language profile, script familiarity, prior Arabic exposure, and typological-distance scores. Following the agile corpus-creation logic outlined by Voormann and Gut (2008), the annotation scheme was piloted and refined before full coding. The final annotation manual defined coding units, error categories, lexical-bundle extraction procedures, and discourse-level criteria to maintain transparency and replicability.

Annotation proceeded in five layers. The orthographic layer coded spelling-related phenomena, omitted or substituted letters, hamza-related forms where applicable, spacing, and other script-sensitive errors. The morphosyntactic layer coded agreement errors, inflectional marking, word-order deviations, verbal morphology, nominal modification, and clause-linking patterns. The lexical layer identified lexical diversity, key lexical items, and recurrent multiword sequences. The constructional layer tracked selected Arabic form–function patterns, such as noun–adjective structures, relative clauses, prepositional

sequences, and conjunctive constructions. The discourse layer examined paragraph organization, cohesion devices, connector use, and coherence-related features.

Corpus-assisted procedures complemented manual coding. Frequency lists, normalized frequency counts, lexical-bundle extraction, and keyness-style comparisons across instructional levels and distance groups were used to identify patterns warranting closer interpretation.

7.7. Operationalization of Variables

The primary explanatory variable was L1 typological distance from Arabic. Rather than relying on language-family membership alone, the study operationalized typological distance through a multi-component rubric covering script relation, morphological profile, grammatical-gender encoding, agreement systems, dominant constituent-order patterns, and selected phonological–orthographic contrasts. Each dimension was coded using a predefined rubric and reviewed by linguistically trained coders. The resulting score was used as a composite distance index and, where analytically appropriate, as a set of component predictors.

The primary outcome variables reported in the present article included: (a) orthographic accuracy, indexed by spelling and script-related errors normalized by text length; (b) morphosyntactic accuracy, indexed by coded grammatical errors per 100 words or per clause-based unit; (c) lexical-bundle use, based on recurrent three- or four-word sequences interpreted in relation to task type; (d) syntactic complexity, indexed through clause-based measures such as clauses per T-unit; and (e) qualitative transfer-sensitive error profiles derived from diplomatic transcription and annotation. The broader annotation framework also preserved lexical-diversity, constructional, and discourse-related codes for future expansion, but those dimensions are not presented as standalone quantitative outcomes in the current results.

Moderating and contextual variables included instructional level, script familiarity, prior Arabic exposure, years of formal Arabic study, and multilingual repertoire size. These variables were coded to support interpretation of the descriptive patterns and to enable future model-based examination of whether typological-distance effects remain meaningful when broader educational and linguistic experience is taken into account. The present findings do not claim inferential estimates for these moderators.

7.8. Reliability, Validity, and Quality Control

The instruments underwent a structured validation process. Face and content validity were established through formal review by a panel of nine faculty members from the American University in Cairo and the University of Ha'il, who evaluated the prompts and questionnaire for linguistic appropriateness, construct alignment, and cultural neutrality. Lawshe's content-validity ratio for retained materials was reported as .92.

Prior to the main study, a pilot study involving 300 participants was conducted to refine the instruments and assess their measurement properties (See Table 1). The pilot-stage evidence supported the adequacy of the structured instrument components: Cronbach’s alpha for the multilingual-profile questionnaire items reached .88, the Kuder–Richardson KR-20 coefficient for the controlled grammar-sensitive binary checklist was .84, and the confirmatory instrument check yielded standardized factor loadings ranging from .74 to .82. Model-fit indices were acceptable ($\chi^2/df = 2.45$, CFI = .96, RMSEA = .052). These CFA and pilot validity indices are reported in the Methodology/Reliability and Validity subsection rather than in the Results section because they establish instrument adequacy rather than report findings from the 27-learner analytic corpus. Pilot data were not merged with the main learner-corpus dataset.

Table 1

Pilot-Stage Validity and Reliability Evidence for the Instrument Package

Construct/Measure	Statistic	Value	Interpretation
Orthographic mapping	Standardized loading	.82	Strong indicator loading
Morphological encoding	Standardized loading	.79	Strong indicator loading
Phraseological choice	Standardized loading	.74	Acceptable-to-strong indicator loading
Model fit	χ^2/df ; CFI; RMSEA	2.45; .96; .052	Acceptable confirmatory fit
Reliability	α ; KR-20; κ	.88; .84; .89	Strong internal consistency and annotation agreement

Note. Pilot-stage indices are reported in the Methodology section because they document instrument adequacy, not substantive outcomes from the 27-learner analytic corpus.

Inter-rater reliability for corpus annotation was assessed by double-coding 20% of the texts, achieving Cohen’s kappa of .89. Disagreements were resolved through discussion and rule refinement before the final coding pass. The study preserved both diplomatic and normalized transcription layers so that orthographic inaccuracies were not inadvertently erased during digitization.

7.9. Data Analysis Plan

The analysis proceeded in four stages: (1) descriptive profiling of the multilingual cohort; (2) summary statistics for corpus measures, task types, and text lengths; (3) cross-level and cross-band comparisons using normalized writing indicators; and (4) qualitative error profiling to interpret the linguistic nature of observed differences. Given the modest 27-learner corpus and uneven band-by-level cell sizes, the

present paper reports a descriptive and corpus-interpretive analysis rather than formal inferential confirmation. This decision aligns the analytic claims with the available dataset while preserving the study’s explanatory theoretical orientation.

Because each participant contributed more than one text, the study design is compatible with future mixed-effects modeling once a larger, fully questionnaire-linked dataset is available. However, those models are not reported as part of the present findings. The current article therefore emphasizes normalized descriptive metrics, transparent cross-level and cross-band comparisons, and qualitative corpus evidence, and it avoids causal or formally confirmatory claims.

7.10. Ethical Considerations

The study was reviewed and approved by the University of Ha’il Research Ethics Committee / Institutional Review Board (Approval ID: 4519; approved on 1 November 2025). The study was conducted in accordance with the Declaration of Helsinki and the relevant institutional ethical guidelines for research involving human participants. Participation was voluntary, and learners were informed that their decision to participate or withdraw would have no effect on course standing or evaluation. Written informed consent was obtained from all participants before data collection. Because learner writing can contain personally revealing details, prompts were designed to avoid sensitive autobiographical disclosures, and participants were instructed not to include private identifying information.

Data were anonymized through unique IDs, stored on secure encrypted drives, and reported only in aggregated or anonymized form. When illustrative excerpts were retained for analysis or publication, identifying content was removed or masked in accordance with the approved data-management plan.

8. Results and Findings

8.1. Corpus Composition and Typological-Distance Distribution

The analytic corpus comprised writing data from 27 learners of Arabic as an additional language enrolled in Level 3 and Level 4 of the Arabic Language Unit for Non-Native Speakers. Eighteen learners were drawn from Level 3 and nine from Level 4. Each learner contributed a controlled writing task and a free-composition task. Based on the verified learner metadata and the typological-distance coding framework, 12 learners were classified in Band 1 (low distance), nine in Band 2 (moderate distance), and six in Band 3 (high distance). The resulting distribution permitted cross-level and cross-band descriptive comparisons while requiring caution in interpreting small cell sizes (See table 2).

Table 2

Participant Distribution by Instructional Level and Typological-Distance Band

Instructional level	Band 1	Band 2	Band 3	Total
Level 3	10	5	3	18
Level 4	2	4	3	9
Total	12	9	6	27

Note. Band 1 = low typological distance; Band 2 = moderate typological distance; Band 3 = high typological distance.

8.2. Descriptive Writing Metrics Across Levels and Typological Bands

Table 3 reports the descriptive metrics derived from the raw learner-corpus data. The quantitative summary focuses on the outcome measures consistently available across the 27-learner corpus: orthographic error density, morphosyntactic error density, lexical-bundle frequency, and clauses per T-unit. Orthographic and morphosyntactic error rates were normalized per 100 words in the controlled writing task, while lexical-bundle frequency and clauses per T-unit were derived from the free-composition task. Three broad patterns emerged. First, higher typological distance corresponded to higher orthographic and morphosyntactic error density. Second, Level 4 learners generally outperformed Level 3 learners across phraseological and syntactic measures. Third, typological-distance differences remained visible at Level 4, even where overall performance improved.

Table 3

Descriptive Writing Metrics by Instructional Level and Typological-Distance Band

Level	Band	N	OE	ME	LB	C/T
3	1	10	2.87	6.10	4.00	1.16
3	2	5	7.68	10.54	2.20	1.07
3	3	3	18.49	20.61	0.67	0.98
4	1	2	0.34	1.01	11.00	1.60
4	2	4	3.99	4.83	6.25	1.33
4	3	3	7.44	9.30	3.67	1.22

Note. OE = orthographic errors per 100 words in Task 1; ME = morphosyntactic errors per 100 words in Task 1; LB = lexical bundles in Task 2; C/T = clauses per T-unit in Task 2.

8.3. Typological Distance and Accuracy in Arabic L2 Writing

The first two research questions examined whether typological distance was associated with Arabic L2 writing development and with accuracy-sensitive outcomes. The corpus showed a graded pattern across bands. When the full sample was examined descriptively, Band 1 learners averaged 2.45 orthographic

errors and 5.25 morphosyntactic errors per 100 words. Band 2 learners averaged 6.04 and 8.00 errors, respectively, while Band 3 learners averaged 12.97 orthographic errors and 14.96 morphosyntactic errors per 100 words. Thus, the distance gradient was visible in both accuracy domains.

The pattern was particularly pronounced at Level 3. Band 1 learners at this level produced 2.87 orthographic errors per 100 words, compared with 7.68 in Band 2 and 18.49 in Band 3. The same progression appeared in morphosyntactic error density: 6.10 errors per 100 words for Band 1, 10.54 for Band 2, and 20.61 for Band 3. These differences indicate that lower-level learners from more typologically distant L1 backgrounds exhibited the greatest difficulty in controlling Arabic script-sensitive and grammar-sensitive forms.

At Level 4, error rates declined across all bands, but the ordering remained consistent. Band 1 learners averaged 0.34 orthographic errors and 1.01 morphosyntactic errors per 100 words; Band 2 learners averaged 3.99 and 4.83; Band 3 learners averaged 7.44 and 9.30. The persistence of this ordering suggests that instructional advancement reduced the magnitude of error density without fully eliminating the descriptive distance gradient.

Individual cases illustrate the pattern. PID 016, a Level 3 Mandarin-speaking learner in Band 3, produced 14 orthographic errors and 15 morphosyntactic errors in a controlled text of 55 words. PID 024, a Level 4 English-speaking learner in Band 3, still produced nine orthographic errors and 11 morphosyntactic errors. By contrast, PID 025, a Level 4 Chadian Arabic learner classified in Band 1 because of relative proximity to Modern Standard Arabic, produced no orthographic errors and only one morphosyntactic error in the controlled task. These profiles provide descriptive support for the expectation that typological distance is associated with accuracy-sensitive writing outcomes.

8.4. Cross-Level Growth in Phraseological Density and Syntactic Complexity

The third and fourth research questions concerned cross-level differences in lexical, constructional, and error-pattern profiles, together with the potential moderating role of instructional level. The free-composition data revealed a clear Level 4 advantage. Across all bands, mean lexical-bundle use increased from 2.94 bundles per text in Level 3 to 6.44 in Level 4. Mean syntactic complexity also increased from 1.10 to 1.35 clauses per T-unit.

The same developmental direction appeared within each typological band. Band 1 learners increased from a mean of 4.00 bundles at Level 3 to 11.00 at Level 4, and their mean C/T-unit ratio rose from 1.16 to 1.60. Band 2 learners increased from 2.20 to 6.25 bundles and from 1.07 to 1.33 in complexity. Band 3 learners increased from 0.67 to 3.67 bundles and from 0.98 to 1.22 in complexity. These data indicate that instructional level was associated with substantial growth in phraseological and syntactic development, while typological-distance differences remained evident.

The descriptive moderation pattern was mixed but theoretically informative. Accuracy gaps between Bands 1 and 3 were numerically smaller at Level 4 than at Level 3, suggesting partial attenuation of basic orthographic and morphosyntactic difficulty with instructional advancement. However, differences in lexical-bundle use and syntactic complexity remained pronounced at Level 4. The Level 4 Band 1 mean of 11.00 bundles exceeded the Level 4 Band 3 mean of 3.67, and the corresponding complexity means were 1.60 and 1.22. Thus, growth occurred across all groups, but the higher-order developmental gap did not disappear.

8.5. Exposure Variables and Corpus Limitations

The fifth research question asked how script familiarity, prior Arabic exposure, and multilingual repertoire influenced Arabic writing development after typological distance was considered. The present results table reports writing outcomes and typological bands, but it does not include participant-level exposure scores or multilingual-repertoire indices. Consequently, the current descriptive corpus summary cannot directly test whether prior Arabic exposure or script familiarity attenuated writing difficulty. Those relationships require the questionnaire-linked modeling described in the methodology. Nevertheless, several learner profiles indicate why this question remains important. PID 025 and PID 021, both Level 4 Band 1 learners, showed very low accuracy-error counts, high lexical-bundle use, and the highest complexity values in the dataset. These patterns are compatible with the theoretical expectation that linguistic or script-related familiarity may support Arabic writing development, but the current table alone cannot establish a distinct exposure effect. Accordingly, the exposure-related hypothesis is retained as an analytic claim requiring direct testing with the questionnaire-derived variables.

8.6. Transfer-Sensitive Error Profiles in the Qualitative Corpus

The sixth research question asked what corpus-based patterns distinguished learners from relatively closer and more distant L1 backgrounds. The qualitative error corpus provided interpretive evidence that complements the quantitative gradients. The samples below show that distance-related difficulty emerged in noun morphology, noun–adjective agreement, pronominal reference, article use, and phraseological control (See Table 4).

Table 4

Selected Diplomatic-Transcription Examples from the Qualitative Error Corpus

PID	Task	Diplomatic transcription	Observed pattern	Analytic interpretation
016	T1	.مكتبة جامعة خ مكتبة جامعة خ	Non-target noun/gender form	A script- and morphology-sensitive form appears in a high-distance profile.
024	T1	.مكتبة جامعة خ مكتبة جامعة خ	Noun–adjective agreement	The adjective does not agree with the feminine noun مكتبة.
007	T2	مكتبة جامعة خ مكتبة جامعة خ .مكتبة خ	Pronoun reference/gender	The pronoun خ is used where feminine agreement would be expected.
001	T2	مكتبة جامعة خ مكتبة جامعة خ .مكتبة خ	Article/definiteness choice	The expression warrants qualitative coding for contextual definiteness.
013	T2	مكتبة جامعة خ مكتبة جامعة خ .مكتبة مكتبة خ	Target-like lexical bundle	The learner uses a conventional academic phraseological frame.

Note. Learner text is preserved in diplomatic transcription. Interpretive labels reflect the qualitative coding scheme and are used to contextualize corpus-level patterns. These excerpts align with the quantitative results. The Band 3 examples illustrate agreement and pronominal-reference difficulties that accompany higher error density, while the Band 1 example from PID 013 demonstrates successful use of a target-like academic bundle. The qualitative evidence therefore supports the claim that typological distance is reflected not only in aggregate counts but also in the linguistic nature of the errors and resources that learners mobilize.

9. Discussion

9.1. Typological Distance as a Graded Constraint on Accuracy

The study's first major finding is that Arabic L2 writing accuracy followed a graded typological-distance pattern. Learners in the low-distance band showed the lowest orthographic and morphosyntactic error densities, moderate-distance learners occupied an intermediate position, and high-distance learners showed the greatest difficulty. This pattern responds directly to the first two research questions and is consistent with crosslinguistic-influence theory, which predicts that learners rely on previously acquired linguistic systems when encoding unfamiliar target-language forms (Odlin, 1989; Jarvis & Pavlenko, 2008). It also converges with linguistic-distance research showing that structural distance can help explain variation in L2 performance beyond simple native/non-native labels (Jaekel et al., 2023; Mavrou & Chao, 2023).

The present findings extend that argument to Arabic L2 writing. The strongest descriptive contrast appeared in the controlled task at Level 3, where high-distance learners produced far higher orthographic and morphosyntactic error rates than low-distance learners. This observation is theoretically plausible because Arabic writing requires learners to coordinate script directionality, context-sensitive letter forms, and morphosyntactic encoding in a language with root-and-pattern morphology and robust agreement marking. Russak and Fragman's (2014) work on Arabic spelling development similarly demonstrates that orthographic and phonological mapping pose distinctive demands in Arabic as a foreign language. The present corpus shows that such demands may be especially concentrated among learners whose prior linguistic systems are more distant from Arabic.

9.2. Instructional Level, Phraseological Development, and Syntactic Growth

This addresses the third research question by showing that higher instructional levels were associated with distinct phraseological and complexity profiles, not merely with reduced error density. The result aligns with corpus-based work demonstrating that development in L2 writing involves more than accuracy: it also includes richer phraseological repertoires, greater constructional productivity, and increasing syntactic elaboration (Hejazi, 2021; Römer-Barron, 2024; Ortega, 2003).

The Arabic-specific relevance of this pattern is underscored by Alzahrani and Alfaifi's (2026) finding that complexity and phraseological diversity are meaningfully related to L2 Arabic writing quality across genres. In the present corpus, Band 1 Level 4 learners displayed the strongest phraseological and syntactic profile, but all groups showed upward movement from Level 3 to Level 4. This suggests that instruction supports developmental expansion across backgrounds, while typological distance continues to shape the pace or level of attainment in advanced production domains.

9.3. The Partial Attenuation of Distance Effects Across Levels

The fourth research question asked whether instructional level moderated the relationship between typological distance and writing outcomes. The descriptive findings suggest a partial attenuation pattern rather than complete convergence. Accuracy gaps narrowed by Level 4, which is consistent with the idea that sustained Arabic instruction can reduce basic script-related and morphosyntactic difficulty. However, high-distance learners continued to lag behind low-distance learners in lexical-bundle use and

syntactic complexity. This distinction matters theoretically: it suggests that surface accuracy and higher-order textual development may respond differently to proficiency growth.

This interpretation supports the study's broader model, in which proficiency level interacts with typological distance rather than simply overriding it. The present data do not justify a strong causal claim, but they do justify the inference that typological distance remained developmentally relevant even when overall writing performance improved. In that sense, the results provide descriptive support for a moderated developmental account of Arabic L2 writing.

9.4. Exposure-Related Variables as an Unresolved but Necessary Analytic Layer

The fifth research question and the second theoretical proposition concerned script familiarity, prior Arabic exposure, and broader multilingual experience. The present results cannot directly adjudicate this issue because the displayed corpus summary does not include the relevant questionnaire-derived exposure variables. This limitation is analytically important. Pienemann and Keßler (2007) emphasize that multilingual profiles must be measured directly rather than inferred from coarse group labels, and the present study follows that principle in its design. However, the specific influence of exposure-related variables must be tested in the linked models rather than assumed from country or L1 categories.

Accordingly, the findings support retaining exposure as a theoretically necessary moderator while avoiding an unsupported empirical conclusion. The questionnaire, pilot validation, and corpus structure position the study to assess whether script familiarity or prior Arabic exposure reduces the negative association between distance and orthographic accuracy. Until those models are reported, the present results should be interpreted as establishing the typological-distance gradient, not as fully resolving the exposure mechanism.

9.5. Qualitative Error Profiles and the Value of Learner-Corpus Evidence

Qualitative corpus analysis showed that typological distance was reflected not only in error frequency but also in the nature of learners' writing patterns. High-distance learners displayed noun–adjective agreement problems, pronominal-reference mismatches, and non-target nominal forms, whereas a lower-distance learner produced a target-like academic lexical bundle. These examples illustrate how diplomatic transcription and annotation clarify the linguistic patterns underlying the quantitative distance gradient.

This interpretive layer strengthens the study's explanatory value. It supports the propositions that typological distance operates through identifiable writing mechanisms and that phraseological development captures dimensions of proficiency not reducible to error density alone. It also reinforces the value of Arabic learner-corpus research that links observed learner forms to theoretically meaningful explanatory variables (Alfaifi et al., 2014).

9.6. Verification of Hypotheses and Theoretical Propositions

Table 5 summarizes the descriptive and qualitative evidence for each hypothesis and theoretical proposition. The labels supported, partially supported, and not directly tested indicate the strength of the available corpus-based evidence, not formal inferential confirmation.

Table 5

Interpretive Status of Hypotheses and Theoretical Propositions

	Evidence in the present corpus	Status
H1	Lower overall writing performance appeared with greater typological distance.	Supported descriptively
H2	Morphosyntactic error density increased from Band 1 to Band 3 at both levels.	Supported descriptively
H3	Orthographic error density was highest in Band 3; direct script-familiarity modeling remains pending.	Partially supported
H4	Lexical-bundle use increased across levels and remained lower in more distant bands.	Supported descriptively
H5	C/T-unit values increased across levels and differed by typological-distance band.	Supported descriptively
H6	Accuracy gaps narrowed at Level 4, but higher-order gaps remained; formal interaction testing is still required.	Partially supported
H7	The reported summary table does not include exposure measures needed for direct evaluation.	Not directly tested
H8	Qualitative excerpts showed transfer-sensitive patterns in morphology, agreement, pronoun reference, definiteness, and phraseological control.	Supported qualitatively
P1	Distance-linked differences appeared in orthographic and morphosyntactic writing behavior.	Supported in part
P2	Exposure and multilingual profile variables were built into the design but are not evaluated in the displayed results.	Not directly tested
P3	Cross-level evidence showed developmental gains alongside persistent distance-sensitive differences.	Supported descriptively
P4	Lexical-bundle and complexity measures added information beyond error counts.	Supported descriptively

Note. Interpretive status reflects the available descriptive, corpus-based, and qualitative evidence.

9.7. Pedagogical and Research Implications

The findings have direct implications for Arabic L2 pedagogy in multilingual university programs. Learners from more distant L1 backgrounds may benefit from early, explicit support in Arabic orthographic mapping, article and definiteness marking, gender agreement, and pronominal reference. At the same time, the Level 4 data show that successful writing development cannot be reduced to error

reduction alone; instruction should also promote formulaic academic sequences, cohesive multiword expressions, and clause-combining resources that support mature written discourse.

For research, the study demonstrates the value of integrating verified learner-background data with corpus-sensitive writing metrics. Future work should implement the planned questionnaire-linked mixed-effects models, test exposure-related moderation directly, expand the corpus to additional levels, and distinguish script distance from broader typological distance more sharply. A longitudinal extension would be particularly valuable for determining whether the cross-level patterns identified here reflect developmental trajectories within learners rather than differences between level cohorts.

10. Conclusion

This study examined Arabic L2 writing development in a multinational Saudi university program through a cross-level learner-corpus design grounded in typological-distance theory. Drawing on controlled and free-composition texts from 27 Level 3 and Level 4 learners, the analysis showed a clear descriptive gradient across typological-distance bands. Low-distance learners produced fewer orthographic and morphosyntactic errors, more lexical bundles, and greater syntactic complexity than moderate- and high-distance learners. Level 4 learners outperformed Level 3 learners overall, but the distance gradient remained visible, especially in phraseological and structural outcomes.

The study contributes to Arabic L2 writing scholarship in three ways. First, it demonstrates that multilingual heterogeneity can be modeled analytically rather than treated as background noise. Second, it integrates learner-corpus metrics with a typological framework, showing that error density, phraseological development, and syntactic complexity together provide a richer account of Arabic writing development. Third, it identifies a productive route for pedagogical differentiation in Arabic-for-non-native-speakers programs, particularly for learners whose prior linguistic systems are more distant from Arabic.

The conclusions should nevertheless be interpreted with appropriate caution. The analytic corpus is modest in size, some typological-band cells are small, and the reported findings are primarily descriptive rather than fully inferential. In addition, the present results do not directly test questionnaire-derived variables such as prior Arabic exposure, script familiarity, or multilingual repertoire size, even though these variables are central to the study's broader theoretical model. These limitations do not weaken the descriptive patterns observed; rather, they clarify the next stage of analysis required for stronger explanatory claims.

Future research should expand the learner corpus, integrate the questionnaire-linked exposure variables into the analytic dataset, and apply appropriately powered mixed-effects models to test whether exposure-related factors attenuate distance effects in orthographic and morphosyntactic performance. Longitudinal designs would further clarify whether typological-distance effects diminish, persist, or shift from accuracy to higher-order phraseological and structural domains over time. Taken together, the

present study offers a theoretically grounded and empirically transparent foundation for understanding how linguistic diversity shapes Arabic L2 writing development in university contexts.

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Figures

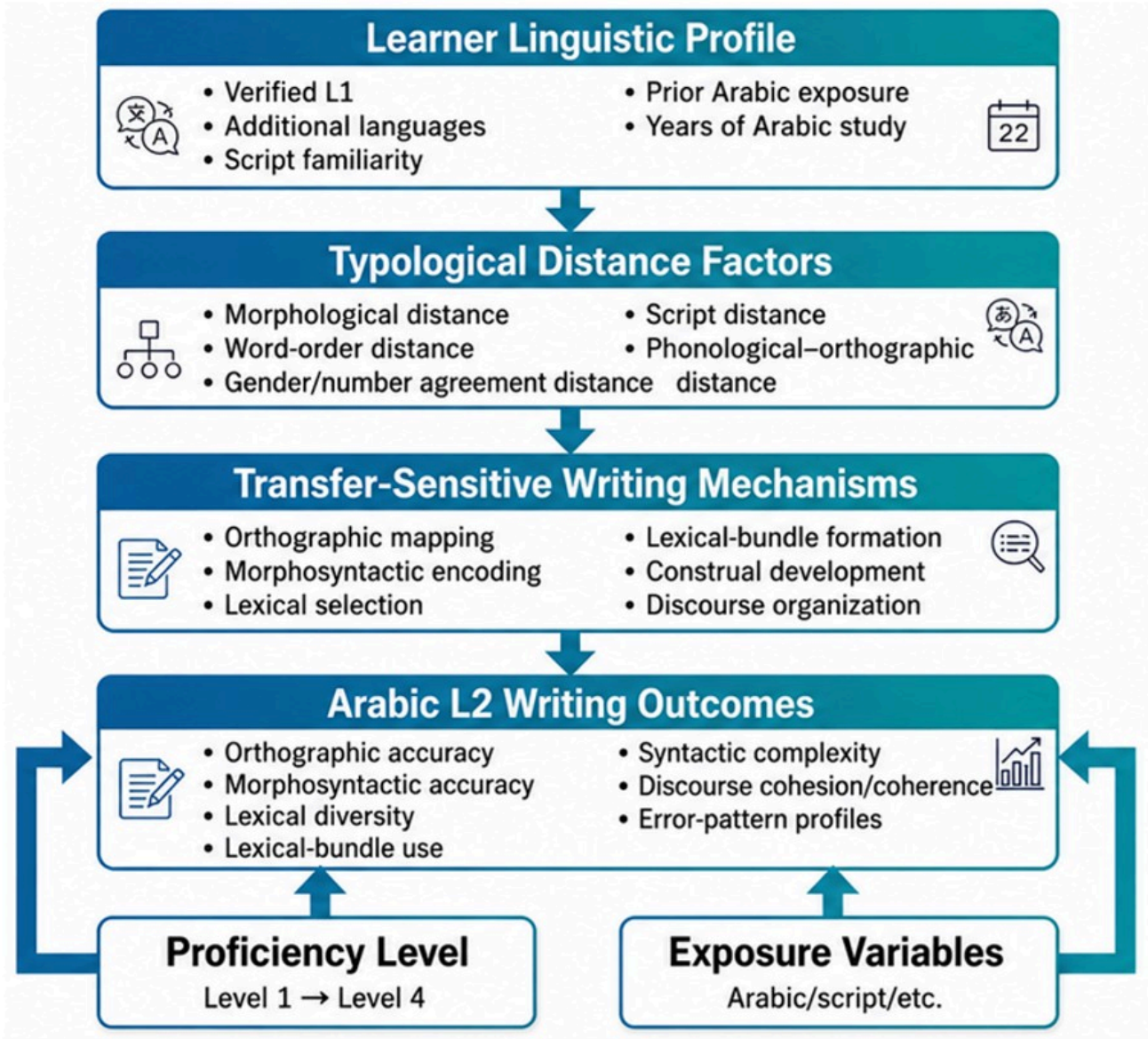


Figure 1

Typological-Distance Model of Arabic L2 Writing Development

Note. The model links verified learner background variables and typological-distance dimensions to transfer-sensitive writing mechanisms and measurable Arabic L2 writing outcomes. Proficiency level and exposure variables are modeled as moderators.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryFile1InstrumentsAppendicesAD.docx](#)

- [SupplementaryFile2CodingValidationAppendicesEG.docx](#)
- [Appendices.docx](#)