Error Analysis in English Vowel Acquisition: A Case Study of Yi Ethnic Junior High School Students in Liangshan

Xia Cai[1]

[1] Southwest Minzu University, China

Correspondence: Xia Cai, Southwest Minzu University, China. Email: hailaiaxia2013@gmail.com. ORCID:0009-0006-7406-1182

Received: February 18, 2025 Accepted: July 21, 2025 Online Published: September 2, 2025

doi:10.5430/wjel.v15n8p275 URL: https://doi.org/10.5430/wjel.v15n8p275

Abstract

This study focuses on the challenges faced by Yi minority students in Liangshan Yi Autonomous Prefecture, China, in acquiring English phonetics within a trilingual educational context (Yi/Mandarin/English). Through field questionnaire surveys, various phonetic errors made by Yi students in English vowel pronunciation were identified and statistically analyzed. The study attempts to explore the underlying causes from the perspectives of language acquisition and trilingual education. Additionally, exam-oriented motivational factors further exacerbate learning difficulties. The research reveals a dual transfer mechanism: cognitive-perceptual filtering dominated by L1 phonological categories and socio-affective influences such as classroom anxiety. Based on dynamic multilingualism and selective transfer theories, an integrated intervention framework is proposed, combining contrastive tri-lingual vowel training with culturally responsive pedagogy. Key strategies include articulatory visualization, pronunciation activities grounded in Yi oral traditions, and structured perceptual-production training sequences. This approach transforms L1 transfer from a learning obstacle into a pedagogical resource, offering practical solutions for improving vowel acquisition in minority trilingual education contexts. The study emphasizes the importance of integrating psycholinguistic perspectives with culturally sustaining pedagogy to effectively address persistent phonological challenges in third language acquisition.

Keywords: error analysis, English vowel acquisition, phonological transfer, Yi Ethnic Students, third language acquisition (L3 Acquisition)

1. Introduction

The Liangshan Yi Autonomous Prefecture(28°15′N-29°56′N, 100°03′E-103°52′E), recognized as the largest compact Yi community in China, occupies 60,423km²in southwestern Sichuan Province, administering 17 administrative divisions(15 counties, 2 cities)(Sichuan Bureau of Statistics, 2022).This ethnolinguistically diverse region hosts 14 officially recognized ethnic groups, with the 2020 census recording a total population of 5.43 million, of which 55.04%(n=2,998,720) identify as Yi-constituting Sichuan's most ethnically varied jurisdiction(National Ethnic Affairs Commission, 2021).

The Yi community demonstrates robust ethnolinguistic vitality through three key mechanisms:(1) intergenerational transmission of Nuosu(the standardized Yi language) (2) presevation of traditional knowledge systems(e.g.,the Bimo religious texts and Yi syllabary), and (3) strategic integration of Han cultural elements. This curtural dynamism operates within China's national bilingual education framework (Policy Document No.14, Ministry of Education, 2018), which mandates L1(Yi)-L2(Mandarin) parallel instruction while introducing L3 (English) at junior secondary level-creating a unique trilingual acquisition environment seldom addressed in SLA literature.

This study adopted a purposive sampling approach to examine English language acquisition among Yi ethnic minority junior high school students in Liangshan Yi Autonomous Prefecture, Southwest China. Three respresentative ethnic middle schools -Xide MinZu Middle School, Zhaojue MinZu Middle School, and Dechang MinZu Middle School-were selected as research sites. Quantitative and qualitative methods were combined to analyze recurrent phonetic errors in L3 acquisition. Employing a mixed-methods design, the investigation analyzed recurrent phonetic errors in third language (L3) acquisition through systematic surveys and acoustic analysis. The study specifically focused on identifying patterns of phonological transfer in students' English pronunciation development.

2. Literature Review

2.1 Theoretical Framework

This review is theoretically anchored in three foundational SLA frameworks: Error Analysis (Corder, 1967), Interlanguage Theory (Selinker, 1972), andCross-linguistic Transfer (Odlin, 1989). Corder's (1967) seminal work reconceptualized learner errors as systematic indicators of developing linguistic competence, marking a paradigm shift from Skinner's (1957) behaviorist view of errors as habit formation failures. This theoretical breakthrough established that errors manifest learners' active hypothesis-testing in transitional grammatical systems.

Selinker's (1972) Interlanguage theory subsequently identified fossilization as a critical feature of L2 acquisition. Han (2004) demonstrated that approximately 95% of adult learners stabilize below native-like proficiency. Furthermore, Long (2003) found that

phonological features are particularly susceptible to such stabilization, which helps explain the persistent L1-influenced vowel patterns in Yi-English learners' interlanguage.

The analysis then extends to multilingualism theories. Jessner's (1999) Dynamic Model and Cenoz's (2003) Cumulative Enhancement Model (developing Cook's (1992) multicompetence framework) collectively account for metalinguistic advantages in Yi-Mandarin-English trilingualism, particularly in phonological awareness transfer (Cenoz & Gorter, 2011). However, Phillipson's (1992) Linguistic Imperialism framework reveals how sociostructural factors in Chinese minority education - notably Mandarin-dominant pedagogies and limited trilingual teacher resources (Tsung, 2014) - constrain these potential advantages.

Finally, Odlin's (1989) transfer theory, which builds on Weinreich's (1953) language contact framework, illustrates how Yi learners' psychotypology (i.e., their perception of linguistic similarity) influences L3 English vowel transfer. According to Eckman's (1977) Markedness Differential Hypothesis, when learners perceive typological differences between the Yi and English vowel systems, the likelihood of L1-to-L3 transfer increases significantly (Jarvis & Pavlenko, 2008). This is often reflected in phenomena such as the monophthongization of /aɪ/.

2.2 Empirical Studies on Yi Students' English Learning

Chen's (2010) structural analysis of Yi monophthongs demonstrates how L1 phonemic inventory constraints systematically shape L2/L3 perception. His documentation of Yi's six-unit vowel system (lacking diphthongs) provides the empirical basis for predicting English diphthong monophthongization (e.g., /aɪ/→[a], 70% occurrence).

Existing scholarship on English acquisition among Yi learners has primarily addressed four interrelated dimensions. First, regarding contextual and attitudinal factors, Sun (2011) demonstrated that sociocultural and instructional variables exert a stronger influence than learner-internal factors, a finding corroborated by Yang (2022), who reported that 93% of learners expressed a need for technological support, and Chen (2017), who documented Mandarin-dominated classroom dynamics (78%) alongside predominantly instrumental motivations for English learning (31%). Complementing these findings, Xiao (2003) highlighted the challenges of Yi-English bilingual education in ethnic middle schools of Xichang city, noting that limited teacher proficiency in English and insufficient culturally responsive pedagogical approaches hindered effective language acquisition. Xiao emphasized the need for integrating Yi cultural elements and local linguistic realities into English teaching, to enhance learner engagement and contextual relevance.

Second, studies on motivational and strategic approaches reveal complex patterns. Wang (2009) observed variations in achievement linked to L1 proficiency and cognitive styles, while Duan (2013) proposed a taxonomy of L2 reading motivations. Intervention studies by Sun (2015) and Fang (2018) further substantiated the pedagogical efficacy of reading strategies and mind-mapping techniques, respectively.

Within the unique trilingual (Yi-Mandarin-English) context, specialized research has emerged on phonological acquisition. Luo (2017) developed a technology-enhanced blended learning model for phoneme instruction, while Shi (2018) empirically analyzed L3 transfer effects to formulate targeted remediation strategies. Recent work has also highlighted socio-psychological considerations, particularly Yang's (2024) finding that elevated foreign language boredom correlates with phonetic transfer effects, and Tong's (2015) advocacy for culturally responsive pedagogy tailored to Yi learners' sociolinguistic positioning. Furthermore, Feng and Adamson (2015) provided a broader overview of trilingual education models in China, underscoring the complexities faced by ethnic minority students, including Yi learners, in balancing their mother tongue, Mandarin, and English. They stressed that effective trilingual education requires not only linguistic competence but also institutional support and curriculum design that respects minority language rights and cultural identities.

While third language acquisition theory (Luo, 2017) and phonetic transfer research (Shi, 2018) provide this study's theoretical foundation, the persistent misarticulation of English vowels (e.g., /æ/, /ɪ/) observed during the author's fieldwork in Xide County reveals a theory-practice gap. To address this, the present study adopts a tripartite approach: (1) questionnaire-based analysis of attitude-error correlations among Yi learners from three Liangshan middle schools; (2) systematic documentation of vowel transfer patterns using narrow phonetic transcription (substituting for initially planned acoustic analysis); and (3) evidence-based pedagogical strategies leveraging positive L1 transfer—a contribution addressing the paucity of actionable guidance in extant literature.

3. Method--- Field Investigation

Researcher Background

The author holds a degree in English Education and served as a volunteer teacher in Liangshan Yi Autonomous Prefecture (2012-2015), teaching both Chinese and English to Yi students. This hands-on experience revealed systematic language transfer patterns in phonetics, semantics and syntax. Subsequently, the author pursued graduate studies in linguistics, specializing in phonetics and phonology, with professional training in IPA transcription and minority language documentation.

3.1 Questionnaire Design and Administration

The survey instrument was developed to systematically investigate Yi middle school students' English learning experiences, with particular attention to phonological acquisition challenges. (The complete questionnaire items and response scales are provided in the Appendices) The questionnaire comprised two principal sections:

1. Language Background and Learning Context

◇This section collected demographic and linguistic data including:

◇Regional dialect variations

◇Prior English exposure in primary education

◇Patterns of daily language use (Yi/Chinese/English distribution)

◇Functional contexts of English application

2. Learning Attitudes and Phonological Awareness

• Designed to measure:

• Motivational orientations (intrinsic/instrumental)

• Emotional engagement indicators

• Self-reported competency across language domains:

◇Phonetic comprehension (IPA recognition, sound discrimination)

◇Lexical acquisition patterns

◇Grammatical mastery challenges

◇Classroom experience evaluations

3.2 Survey Execution

The study employed a stratified multistage sampling method based on statistical sampling principles to select participants from three Yi minority middle schools located in Xide, Dechang, and Zhaojue counties. The target population comprised students in Grades 7 through 9 (junior high school level).

The sampling procedure was conducted as follows:

• Stratification: Schools were first stratified by geographic location (three counties)

• Random sampling: Within each school, 100 students were randomly selected from each grade • level (7th, 8th, and 9th grades)

• Final sample: This yielded a total potential sample of 300 students per school (900 total across three schools)

This sampling approach ensured:

• Representation across all junior high grade levels;

• Geographic diversity within the Yi autonomous region;

• Statistical validity through random selection at each stage;

The table below summarizes the final participation rates and demographic distribution:

Table 1. Survey Implementation Overview

Institution	Participants	Questionnaires	Phonetic Tests
Xide Ethnic Middle School	Grade 7 – 9	300 students	33 students
Dechang Ethnic Middle School	Grade 7 – 9	300 students	34 students
Zhaojue Ethnic Middle School	Grade 7 – 9	300 students	33 students

The survey distributed a total of 900 questionnaires, with 890 successfully collected, yielding a response rate of 99%. Among these, 861 questionnaires were deemed valid, representing a 96% validity rate, which meets the standard threshold for reliable survey data in educational research.

Key Findings from Questionnaire Analysis

The statistical results revealed that Yi junior high school students generally maintained positive attitudes toward English acquisition. Specifically:

• Students demonstrated particular diligence in word recognition and memorization, investing substantial time with measurable progress.

• Grammatical comprehension and application emerged as the most challenging aspects of English learning.

• Phonetic instruction was notably insufficient in actual classroom teaching, including critical areas such as:

◇Articulatory methods and positions

◇Syllable division

◇Connected speech phenomena (e.g., assimilation, elision)

This pedagogical gap in foundational phonetic knowledge led to cascading difficulties: initial failures in mastering phonetic transcription subsequently compounded into overwhelming learning burdens as vocabulary complexity increased. Questionnaire responses explicitly indicated that early struggles with accurate pronunciation directly contributed to waning motivation and confidence in later stages of English learning.

English Phonetics Assessment

The phonetic assessment component encompassed students from Grades 7 to 9. Test materials were systematically selected from corresponding grade-level English textbooks, focusing on:

• Articulatory positions and methods of English phonemes

• Phonological awareness

• Prosodic competence

• Stimuli Design:

For each grade, the test comprised:

◇50 lexical items (phonetically balanced)

◇3-5 contextualized sentences

◇One 200-word passage

Recording Procedure:

All recoedings were conducted in acoustically controlled environments with consistent microphone-to-mouth distance (15cm).

• Equipment (primary device): Sony ICD-UX570 digital recorder (S-Mic high-sensitivity microphone, 96kHz/24bit PCM sampling)

• Sampling: Selection criteria for the 100 participants included: (a) Yi-dominant language background, (b) absence of speech disorders, and (c) balanced gender representation.

• Administration: Individual audio recordings of all stimuli under controlled classroom conditions

The recorded speech samples were processed using Cool Edit Pro 2.0 for noise reduction and amplitude normalization. Processed files were saved in WAV format (44.1kHz/16bit) for subsequent analysis. To ensure analytical validity, a multi-method verification approach was implemented: (1) repeated auditory perceptual analysis by trained raters, and (2) systematic comparison with standardized pronunciations from Youdao Dictionary's text-to-speech system (employed as reference material in the absence of native speaker recordings).

4. Results

4.1 Quantitative Analysis of English Learning Difficulties Among Yi Ethnic Secondary Students: Vocabulary Memorization and Grammar Acquisition Patterns

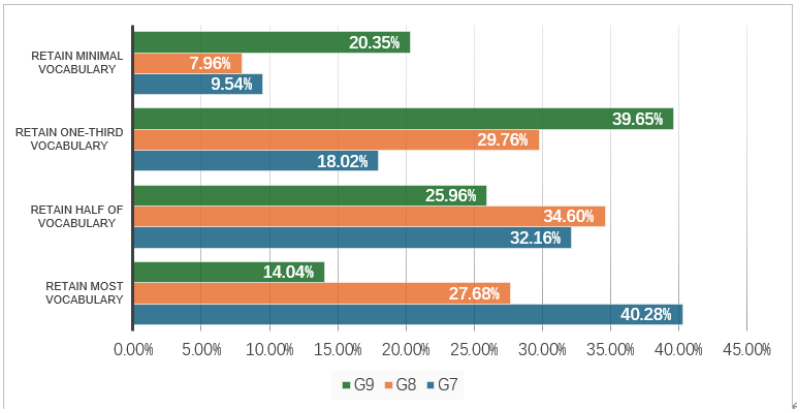


Figure 1.Vocabulary Retention Patterns of Yi Secondary Students: Quantitative Analysis

In Grade 7, the proportion of students who could retain most vocabulary (14.04%) nearly equaled those retaining almost nothing (20.35%), while those mastering over one-third of words (39.65%) doubled the former groups combined. Grade 8 demonstrated relative stability - students retaining most words (27.68%), half (34.6%), and over one-third (39.65%) reached equilibrium, with the lowest proportion reporting minimal retention (7.96%) across all grades. This suggests Grade 8 students developed methodological approaches with stabilized learning efficacy. Grade 9 showed the highest proportion mastering most vocabulary (≈40%), indicating accumulated lexical competence and growing confidence. However, a significant gap emerged between students retaining over half (32.16%) and one-third (18.02%) of

words, revealing a fragmentation phenomenon.

This lexical retention fragmentation stems from intertwined factors:

◊ External: high-stakes testing pressure and instructional pacing

◊ Internal: cognitive-affective interplay in language processing

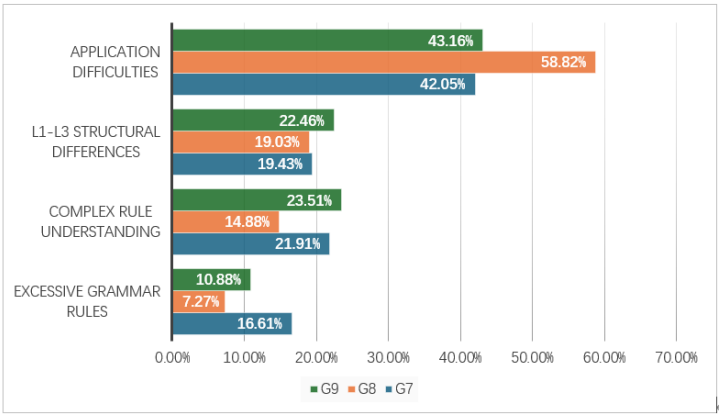


Figure 2. Identifying Key Obstacles in English Language Learning for Yi Middle School Students

Findings on Perceived Grammar Learning Difficulties Across Grades:

Grade 8 Students: Demonstrated the most severe challenges in grammar application among all reported difficulties (≈60%, the highest proportion across all grades) Reported significantly lower recognition of other three obstacles compared to Grades 7 & 9:

Excessive grammar rules: Only 7.27% (lowest among all grades)

Complex rule understanding

L1-L3 structural differences

Grades 7 & 9 Students:

Showed consistent perceptions across all four difficulty dimensions: Comparable recognition rates for "excessive grammar rules" (slightly higher in Grade 9) : Nearly identical perceptions regarding: Linguistic rule comprehension: L1-L3 typological differences: Practical application challenges.

The high grammar difficulty in G8 results from curriculum complexity, cognitive development, language differences, learning methods, and psychological factors. To address this, teaching should provide systematic grammar instruction, integrate native language features, develop effective learning strategies, and support students' mental health to boost interest and confidence.

G7 and G9 students show high consistency in perceiving English learning difficulties due to similarities in content, cognitive stages, psychological states, and language comprehension. For example, G7 students begin systematic English learning with simpler grammar and lighter cognitive loads, while G9 students have a stable linguistic framework and mature understanding of challenges. Though content differs, both focus on basic grammar and exams, leading to similar grammar perceptions. Psychologically, G7 students are motivated by novelty, G9 by academic pressure, creating shared focus on difficulties. Also, as students progress, their awareness of native-English language differences stabilizes; G9 students have well-developed comparative knowledge, and G7 students have initial but steady awareness, resulting in consistent views on language rules.

4.2 Analysis of Vowel Errors

Diphthong /aɪ/

Test Words: fine[faɪn]--- [fɛn] like[laɪk]---[lak]

five[faɪv]---[fæv] right[raɪt]---[rɛt]

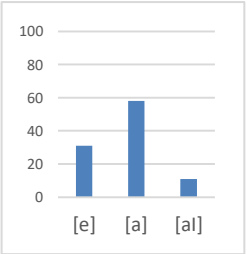


Figure 3. Yi Learners' Realization of English vowel /aɪ/

As shown in the figure3, approximately 30% of Yi students pronounce the English diphthong /aɪ/ as the monophthong /e/, while about 60% realize it as /a/. This tendency can be attributed to the absence of diphthongs in the Yi vowel system, leading students to substitute /aɪ/ with either /e/ or /a/, both of which are native Yi vowels. This pattern aligns with Chen's (2010) description of the Yi six-vowel system, which lacks diphthongs, providing a foundation for understanding the frequent monophthongization of English diphthongs among Yi learners. A minority of students do produce the diphthong /aɪ/, likely due to positive phonetic transfer from L2 Mandarin Pinyin, where the diphthong /ai/ closely resembles the English /aɪ/.

Diphthong /eɪ/

Test Words: play[pleɪ]---[plɪ] population['pɔpjuleɪʃn]---['pɔpjulɪʃn]

communicate[kə'mju:nɪkeɪt]---[kə'mju:nɪkɪt]

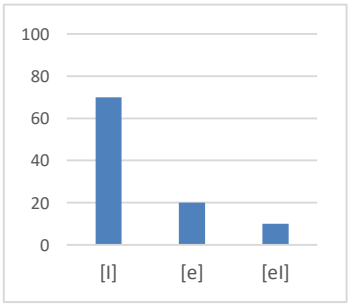


Figure 4. Yi Learners' Realization of English vowel/eɪ/

As shown in figure 4, the prevalent substitution of English /eɪ/ with [ɪ] among Yi learners (70%) stems primarily from L1 phonotactic constraints—specifically, the absence of diphthongs in Yi and the high frequency of [ɪ]-final syllables (Su, 2017). This pattern strongly aligns with the category assimilation hypothesis of the Perceptual Assimilation Model (Best & Tyler, 2007), wherein learners perceptually map /eɪ/ onto the Yi [ɪ] category due to shared [+front, +high] phonological features.

Diphthong /au/

Test Words: right now [raɪtˈnau]---[rɛtˈnəu]

however[haueˈvə]---[hɔˈevə]

thousand ['θauznd]---['θɔzndz]

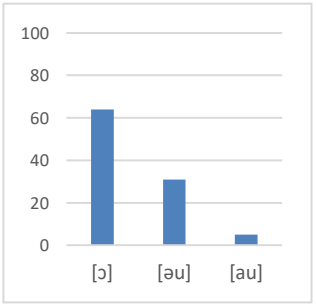


Figure 5. Yi Learners' Realization of English vowel /au/

The acoustic analysis of Yi bilingual learners' English diphthong /aʊ/ production reveals a tripartite distribution pattern: 62.3% exhibited L1-induced substitution as [ɔ] (a tense back vowel in Yi phonology), 29.7% demonstrated L2-mediated production of [əʊ] (reflecting Mandarin Pinyin transfer), while only 8% achieved target-like /aʊ/ pronunciation. This pattern substantiates the Dynamic Model of Multilingualism (Jessner, 2006), illustrating how L1 structural constraints, L2 facilitative transfer, and L3 target acquisition interact asymmetrically during third language phonological development, with markedness reduction and cross-linguistic awareness mediating these transfer processes.

Long vowel /i:/

Test Words: key [ki:]---[kɪ] eat [i:t]---[ɪt]

leave[li:v]---[lɪv] we [wi:]---[wɪ]

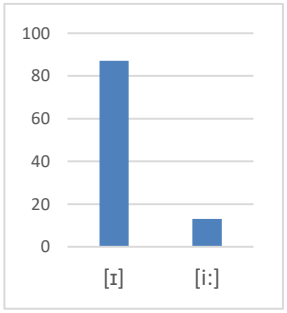


Figure 6. Yi Learners' Realization of English vowel /iː/

The study reveals that 85% of Yi students pronounced the English long vowel /iː/ as [ɪ], demonstrating L1 negative transfer from the Yi language (particularly the Liangshan dialect) which lacks phonological length distinctions. This systematic substitution of phonemically distinctive vowels (/iː/ vs. /ɪ/) in English substantiates the impact of L1 phonological gaps in third language acquisition (Odlin, 1989) and provides empirical validation for the Markedness Differential Hypothesis (Eckman, 1977).

Long vowel /aː/

Test Words: father['faː ðə(r)]---['fazə]---['fʌzə]---['fʌzə]

clsssroom['klaːsruːm]---['klʌsrum]---['klʌsrum]

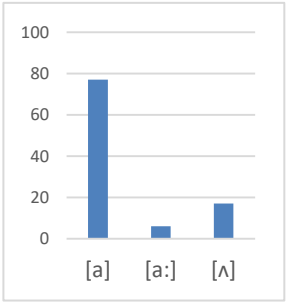


Figure 7. Yi Learners' Realization of English vowel /aː/

The error distribution for English /aː/ production among Yi learners reveals a hierarchical pattern: approximately 78% substitute it with [a], while 15% produce [ʌ], a vowel characterized by a relatively fronted tongue position and acoustic qualities similar to the front low vowel /a/. This [ʌ] sound represents a newly acquired phoneme for Yi learners in their English acquisition process, leading to potential confusion. Around 5% of students demonstrate awareness of the distinctive length and quality of the English long vowel /aː/ and attempt to approximate this phoneme, indicating intra-L2 interference. This systematic pattern of substitution aligns with Odlin's (1989) transfer hierarchy hypothesis, which posits that L1-based phonological substitutions tend to dominate over confusions arising solely within the L2 system.

Long vowel /ɝ/or/ɜː/

Test Words: bird[bɜːrd]--- [bɯd] girl[gɜːrl]---[[gɯl]

earnest[ˊɜːrnɪst]--- [ɯnɪst]

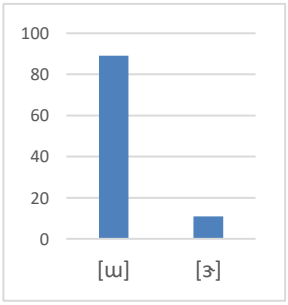


Figure 8. Yi Learners' Realization of English vowel /ɜː/

The data reveals that 82% of Yi learners substitute English /ɝ/ with the native Yi vowel [ɯ], attributable to the absence of retroflex vowels in Yi phonology. This dominant L1 transfer pattern (vs. 18% approximating English /ɝ/) aligns with Eckman's (1977) Markedness Differential Hypothesis, where unmarked L1 features systematically replace marked L2 segments lacking phonological counterparts.

Long vowel / ɔ:/

Test Words: uniform[ju:nɪfɔ:m]---[ju:nɪfɔm]

story [’stɔ:ri]---[’stɔri] more[mɔ:(r)]----[mɔə]

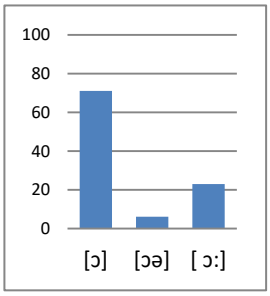


Figure 9. Yi Learners' Realization of English vowel / ɔ:/

The pronunciation of English /ɔ:/ among Yi secondary students shows a tripartite distribution: approximately 70% reduce it to the Yi back-low vowel [ɔ], 10% hypercorrect by producing an intermediate diphthong [ɔə], and 20% successfully distinguish the target /ɔ:/ from /ɔ/. This distribution supports Eckman’s (1977) Markedness Differential Hypothesis, illustrating a preference for substitution with unmarked L1 vowels alongside evidence of dynamic interlanguage development through the intermediate [ɔə] form.

Long vowel /u:/

Test Words: tooth[t u: θ]---[tuθ] good[gu:d]---[gu̱d]

cook food [ku:k , fu:d]---[ku̱k, fud]

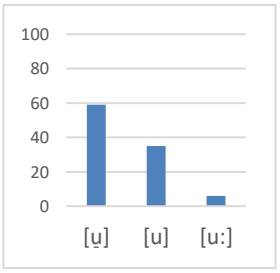


Figure 10. Yi Learners' Realization of English vowel / u:/

This bar chart depicts the pronunciation patterns of English /uː/ among Yi learners, with the majority (60%) producing the Yi tense vowel [u̱], especially following velar consonants /k/ and /g/. This is followed by the short vowel [u] at 35%, while accurate production of the long vowel [uː] is comparatively rare. The dentalization effect inherent in Yi phonology, which perceptually shifts [u] toward [v], systematically influences these substitutions, supporting Su’s (2017) findings on first language transfer. These results highlight the importance of targeted pronunciation practice focusing on /uː/ in velar contexts within ESL instruction.

The tongue-front, near-open, rounded vowel /æ/

Test Words: thank you [ˈθæŋˈk ju]---[sɛnˈkju] africa[ˈæfrɪkə]---[ˈanfrɪkɤ]

jacket[ˈdʒækɪt]---[ˈdʒʌkɪt] apple[ˈæpl]---[ˈanpl]

natural[ˈnætʃrəl]---[ˈnAtʃrəl]

language[ˈlæŋgwɪdʒ]---[ˈlɛŋgwɪdʒ]

imagine[ɪˈmædʒn]---[ɪˈmandʒn]

understand[ʌndəˈstænd]---[ʌndəˈstAnd]

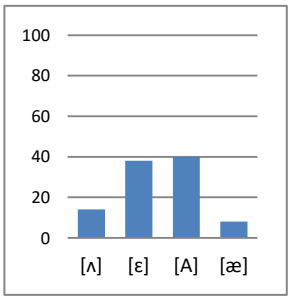


Figure 11. Yi Learners' Realization of English vowel /æ /

The bar chart indicates that approximately 40% of students mispronounce the English near-open front rounded vowel /æ/ as either the open-mid front unrounded vowel [ɛ] or the open-mid central unrounded vowel [ɐ], while 15% substitute it with the open-mid back unrounded vowel [ʌ]. Additionally, about 20% produce nasalized variants. The retracted tongue position characteristic of [ʌ] often leads to articulation errors when Yi learners attempt the English /æ/. Influenced by their native phonology and dialectal exposure to Chinese nasalized vowels, Yi students frequently append a nasal consonant [n] following /æ/ or [a], resulting in pronunciations such as /æn/ or [an]. This pattern exemplifies L1 phonetic transfer in the acquisition of English pronunciation.

The central vowel /ə/

Test Words: stomach[ˈstʌmək]--[ˈstʌmɤk] island[ˈaɪlənd]--[ˈaɪlɤnd] nervous[ˈnɜ˞vəs]---[ˈnɜ˞vɤs]

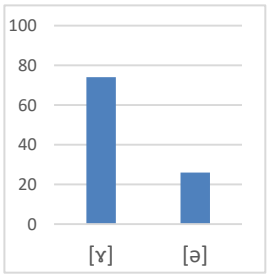


Figure 12. Yi Learners' Realization of English vowel /ə /

The figure illustrates that over 70% of Yi learners substitute the English central vowel /ə/ with the back mid-high rounded vowel [ɤ]. This systematic substitution arises from the absence of central vowels in the Yi phonological system, leading learners to approximate /ə/ with the closest native vowel [ɤ]. These findings offer empirical support for the L1 phonemic gap effect in L2 vowel acquisition.

The rhoticized vowel /ə(r)/

Test Words: teacher[ˈti: tʃə(r)]---[ˈti:tɕˈə]

together[təˈgɛðə(r)]---[təˈgɛðɤ]

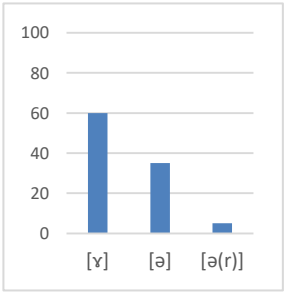


Figure 13. Yi Learners' Realization of English vowel /ə(r)/

The bar chart reveals that approximately 60% of Yi learners substitute the English rhoticized vowel /ə(r)/ with the Yi back vowel [ɤ], while 30% replace it with the central vowel [ə]. This pattern reflects substantial L1 phonetic transfer, wherein the learners' native phonological system influences their acquisition of English rhotic sounds. Additionally, the data indicate that many Yi students struggle to distinguish between the English /I/ and /r/ sounds, suggesting that difficulties with /ə(r)/ production may be part of broader challenges in perceiving and articulating English liquid consonants.

5. Conclusion and Implications

5.1 Research Findings and Discussion

This study reveals systematic influences of the Yi monophthongic vowel system on the acquisition of English diphthongs, evidenced by consistent patterns of monophthongization (e.g., /aɪ/→[a]). These findings closely align with Chen's (2010) phonological documentation of the Yi language, while also extending Ellis' (1994) Selective Transfer Theory to a triglossic context involving Yi (L1), Mandarin (L2), and English (L3). Empirical data demonstrate that learners tend to preferentially activate phonological features shared between L1 and L3, alongside a systematic simplification of unfamiliar phonological categories.

The transfer mechanism operates through dual pathways: cognitively, dominated by L1 perceptual filtering, and socio-affectively, influenced by moderating factors such as classroom anxiety. Jessner's (1999) Nonlinear Multilingual Model offers a comprehensive theoretical framework to explain how learners dynamically allocate linguistic resources during trilingual processing based on metalinguistic awareness. Importantly, standardized pedagogical approaches that overlook learners' L1 phonological backgrounds (Brumfit, 2013) tend to exacerbate negative transfer effects, underscoring the necessity of context-sensitive teaching methods.

5.2 Pedagogical Implications and Intervention Strategies

Phonemic Awareness Development

Implement a 4-stage perceptual training protocol:

Articulatory video modeling comparing Yi/English vocal tract configurations

Contextualized production in meaningful discourse

Contrastive Pedagogy

Develop tri-lingual vowel maps highlighting:

Articulatory positions (Yi [a] vs. English /aɪ/ tongue trajectories)

Functional load differences (phonemic vs. allophonic status across languages)

Acoustic signatures (formant frequency comparisons via Praat software)

Following Cenoz and Gorter's (2011) multilingual education framework, the integration of tri-lingual vowel maps and contrastive pedagogy leverages cross-linguistic transfer and promotes metalinguistic awareness. Their work underscores the importance of recognizing and utilizing the interplay among multiple languages, which supports learners' phonological development by connecting their L1 (Yi) and L3 (English) phonetic systems.

Affective-Motivational Strategies

Design "Phonological Storytelling" modules where:

Traditional Yi narratives are adapted to highlight target diphthongs

Elder-youth dialogue projects record oral histories with pronunciation focus

Digital avatars using Yi archetypes provide corrective feedback

This approach aligns with Cenoz and Gorter's (2011) emphasis on incorporating learners' cultural identities within multilingual education. By embedding Yi cultural capital into phonological instruction, the pedagogy not only enhances motivation but also fosters a sense of linguistic and cultural belonging, which is crucial for sustainable language learning.

Anxiety-Reduction Protocols

Establish "safe mistake" classrooms through:

Error normalization exercises (comparing L1 transfer patterns across languages)

Progress visualization dashboards showing incremental gains

Peer-mentoring systems pairing advanced/accented learners

Feng and Adamson (2015) highlight the critical role of institutional support and affective factors in trilingual education, especially within ethnic minority contexts. Their analysis suggests that reducing learner anxiety through supportive classroom environments and peer collaboration is essential for effective language acquisition, particularly in complex multilingual settings like those involving Yi learners.

Implementation Considerations

The proposed interventions require:

Temporal Sequencing - Initial perceptual training (Weeks 1-4) before production practice

Differentiated Intensity - Tiered interventions based on diagnostic profiling

Technological Hybridization - Blending smart classroom tools with traditional oral practices

Echoing Feng and Adamson's (2015) recommendations on educational policy and practice, the integration of technological tools with

culturally responsive pedagogy provides a balanced, contextually relevant framework. This expanded approach bridges psycholinguistic theory with culturally-grounded practice, transforming potential learning barriers into pedagogical resources. Systematic scaffolding ensures sustainable phonological development. Future implementation should adopt design-based research methodologies to iteratively refine these strategies in authentic classroom contexts.

Acknowledgments

I would like to express my sincere gratitude to the three ethnic middle schools in Liangshan Prefecture for their strong support and cooperation throughout this study. I am deeply thankful to all the Yi students who participated in the fieldwork, their sincerity and eagerness for knowledge greatly encouraged and inspired me. I am especially grateful to my academic supervisor, whose insightful guidance and valuable suggestions were instrumental throughout the research and writing process.

Authors' contributions

As the sole author of this manuscript, I was solely responsible for the conception and design of the study, data collection, analysis, interpretation, as well as drafting and revising the manuscript. I gratefully acknowledge the guidance and constructive suggestions provided by my supervisor and colleagues during the course of this research. Any remaining errors or omissions are my own responsibility. I have read and approved the final version of the manuscript.

Competing interests

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data sharing statement

No additional data are available.

References

Best, C. T., & Tyler, M. D. (2007). Nonnative and second-language speech perception: Commonalities and complementarities. In O.-S. Bohn & M. J. Munro (Eds.), Language experience in second language speech learning:In honor of James Emil Flege (pp.13-34). *Amsterdam, The Netherlands: John Benjamins.* https://doi.org/10.1075/lllt.17.07bes

Brumfit, C. (2013). Language education in the national curriculum. *Wiley-Blackwell.*

Cenoz, J. (2003). The additive effect of bilingualism on third language acquisition: A review. *International Journal of Bilingualism, 7*(1), 71-87. https://doi.org/10.1177/13670069030070010501

Cenoz, J., & Gorter, D. (2011). Focus on Multilingualism: A Study of Trilingual Writing. *Modern Language Journal, 95(3), 356-369.* https://doi.org/10.1111/j.1540-4781.2011.01206.x

Chen, K. (2010). A study of Yi dialects. *Central University for Nationalities Press.*

Chen, X. (2017). Current status, problems, and causes of trilingual acquisition among Yi middle school students in Yuxi. *Journal of Yuxi Normal University, 33*(7), 85-91. Retrieved from https://www.xueshu.com.cn/yxsfxyxb/201707/38479478.html

Cook, V. J. (1992). Evidence for multi-competence. *Language Learning, 42*(4), 557-591. https://doi.org/10.1111/j.1467-1770.1992.tb01044.x

Corder, S. P. (1967). The significance of learners' errors. *International Review of Applied Linguistics, 5*(2), 161-170. https://doi.org/10.1515/iral.1967.5.1-4.161

Duan, L. (2013). A study on English reading motivation of Yi ethnic high school students: A case study of ethnic high schools Master's thesis, *Southwest Jiaotong University*. *CNKI.* Retrieved from https://www.cnki.net/

Eckman, F. R. (1977). Markedness and the Contrastive Analysis Hypothesis. *Language Learning, 27*(2), 315-330. https://doi.org/10.1111/j.1467-1770.1977.tb00297.x

Ellis, R. (1994). The study of second language acquisition. *Oxford University Press.*

Fang, J. (2018). A case study on the application of mind mapping in English reading teaching in junior high schools in Liangshan Yi Autonomous Prefecture Master's thesis, *Sichuan Normal University. CNKI.* Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&filename=1018821908.nh

Feng, A., & Adamson, B. (2015). Trilingualism in education in China: Models and challenges. *Springer.* https://doi.org/10.1007/9789401793521

Han, Z. H. (2004). Fossilization in adult second language acquisition. Clevedon: Multilingual Matters. https://doi.org/10.21832/9781853596868

Jarvis, S., & Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. New York, NY: Routledge. https://doi.org/10.4324/9780203935927

Jessner, U. (1999). Metalinguistic awareness in multilinguals: *Cognitive aspects of third language learning. Language Awareness, 8*(3-4), 201-209. https://doi.org/10.1080/09658419908667129

Jessner, U. (2006). Linguistic awareness in multilinguals: English as a third language. *Edinburgh University Press.* https://doi.org/10.1515/9780748626540

Long, M. H. (2003). Stabilization and fossilization in interlanguage development. In C. J. Doughty & M. H. Long (Eds.), The handbook of second language acquisition (pp.487-535). Malden, MA: Blackwell Publishing. https://doi.org/10.1002/9780470756492.ch16

Luo, L. (2017). English phonetics teaching for Yi junior high students under the "Internet + Education" model. *Overseas English, 2017*(10), 24-25. https://journal.wf.pub/article:hwyy-z201710120

Odlin, T. (1989). Language Transfer: Cross-Linguistic Influence in Language Learning. *Cambridge University Press*. https://doi.org/10.1017/CBO9781139524537

Phillipson, R. (1992). Linguistic imperialism. *Oxford University Press.*

Selinker, L. (1972). Interlanguage. *International Review of Applied Linguistics in Language Teaching, 10*(3), 209-231. https://doi.org/10.1515/iral.1972.10.1-4.209

Shi, S. Y. (2018). The negative transfer effect of Yi language on English phonetics learning: A case study of Puge Ethnic Junior High School in Liangshan Prefecture, Sichuan Province Master's thesis, *Chongqing Normal University. CNKI.* Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&filename=1018821907.nh

Skinner, B. F. (1957). Verbal behavior. *Appleton-Century-Crofts.* https://doi.org/10.1037/11256-000

Su, L. K. (2017). Research on the theoretical foundation of voiced Yi language and its digitalization methods. *Ethnic Publishing House*.

Sun, H. Z. (2011). A survey study on factors influencing English learning among Yi ethnic middle school students in Sichuan Province Master's thesis, Xihua University. *China National Knowledge Infrastructure*. Retrieved from https://wap.cnki.net/touch/web/Dissertation/Article/1011106293.nh.html

Sun, L. Y. (2015). Exploring English reading strategies among ethnic minority students in the first year of high school: A case study of Huili County Ethnic Middle School in Liangshan Yi Autonomous Prefecture Master's thesis, *Sichuan Normal University*. *CNKI.* Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&filename=1016043285.nh

Tong, L. D. (2015). A discussion on the positive role of emotional education in English learning among Yi ethnic students in Daliangshan. *Journal of Panzhihua University, 33*(1), 97-99. https://doi.org/10.3969/j.issn.1672-4569.2015.01.025

Tsung, L. T. H. (2014). Language power and hierarchy: Multilingual education in China. *Bloomsbury Academic.*

Wang, G. Y. (2009). A multifactor analysis of English learning among Yi ethnic students Master's thesis, *XihuaUniversity.CNKI*. Retrieved from https://kns.cnki.net/KCMS/detail/detail.aspx?dbcode=CMFD&filename=2009195547.nh

Weinreich, U. (1953). Languages in contact: Findings and problems. *Mouton Publishers.*

Xiao, X. (2003). A study on Yi-English bilingual teaching investigation in ethnic middle schools in Xichang city. *Research on Ethnic Education, 14*(2), 58-65. https://doi.org/10.3969/j.issn.1001-7178.2003.02.010

Yang, D. M. (2022). Social support for English learning among Yi ethnic students: A case study of a junior high school in Mabian, Sichuan Master's thesis, *Southwest Jiaotong University*. *Wanfang Data*. Retrieved from https://apps.wanfangdata.com.cn/thesis/article:D02816066

Yang, T. X. (2024). A comparative study of foreign language learning boredom between Yi and Han high school English learners: From the perspective of language transfer Doctoral dissertation, *Sichuan International Studies University.*

Appendix

****The questionnaire (upper half)****

Part One: Personal Basic Information

Students ID:

1. Your school's name: _____ (Full name of the school)
2. Your gender (check one):
   a. Male ☑ b. Female ☑
3. Your current grade (check one):
   a. Grade 7 ☑
   b. Grade 8 ☑
   c. Grade 9 ☑
4. Your educational mode belongs to (check one):
   a. "Type 1 Mode" ☑
   b. "Type 2 Mode" ☑
   c. Other ☐ (please specify: _____)

Part Two: Personal Language Background/Habits

1. At home, when your parents talk to you, they mainly use (multiple choices possible):

   _____
   a. Yi language (Shengzha dialect) ☑
   b. Yi language (Suodi dialect) ☑
   c. Yi language (Yinuo dialect) ☑
   d. Yi language (Adu dialect) ☑
   e. Yi language (Tianba dialect) ☑
   f. Mandarin Chinese (Standard) ☑
   g. Mandarin Chinese (Sichuan dialect) ☑
   h. English ☑
   i. Other (please specify: _____)
2. When you were in primary school, you studied English for _____.
   a. One semester ☑
   b. One year ☑
   c. Two years ☑
   d. Never studied ☑
3. If I meet a teacher or classmate on the street, I ___ greet him/her in English.
   a. Often ☑
   b. Occasionally ☑
   c. Never ☑

Part Three: Practical Difficulties in English Learning

(Please read each question and its accompanying questions carefully before selecting)

1. Whenever the teacher finishes teaching new vocabulary units, you often:
   a. Remember most of the words (pronunciation and meaning) ☑
   b. Remember half of the words ☑
   c. Only remember one-third of the words ☑
   d. Hardly remember any words ☑

2. What do you think is the biggest difficulty in learning English?

a. Too many grammar points ☑

b. Difficult to understand grammar rules ☑

c. English is too different from Yi language ☑

d. Unable to apply learned words, grammar to sentence construction, composition, etc. ☑

e. Other (please specify: _____)

3. If you were to give some suggestions to the English teacher, which of the following would express your views?(multiple choices possible) _____

a. Actively improve and enhance English teaching skills, such as pronunciation, grammar, etc. ☑

b. Prepare lessons well, list key contents and easily confused English words, sentences, grammar, etc., in advance, and explain them in detail during class ☑

c. Carefully correct students' English exercises and homework, and give detailed and targeted explanations according to students' actual situations during class ☑

d. Often encourage and affirm students' progress in class ☑

e. Willing to guide students to link English learning with their mother tongue learning; encourage students to discover the fun of learning a second language ☑

f. Other: _____ (You can also write down other good suggestions you think of).

**Part Four: Willingness to Learn English **

Please respond to the following statements regarding potential issues and attitudes towards learning English among Yi ethnic minority students by selecting a number from "1 to 5" (you may also check ✔) to indicate your level of agreement. A higher number indicates stronger agreement, while "0" indicates it's difficult to answer.

1	Learning English is important and necessary.
2	I believe that if I work harder, I can learn English well.
3	I usually pay attention and take notes actively in English class.
4	I enjoy watching English movies, cartoons, and listening to English songs.
5	I'm always afraid of being called on in English class.
6	As a Yi ethnic person, I won't need to speak English in my future job.
7	I always seek help from teachers when encountering difficulties in learning English.
8	I often disagree with the teacher's views and opinions in English class.
9	I can easily complete English homework exercises independently.
10	I feel a sense of competition in English class.
11	I like to ask questions to the English teacher and actively participate in discussions.
12	I can usually manage my English study schedule independently and reasonably.
13	I often do homework for other subjects during English class.
14	I always fall asleep in English class.
15	I never worry about making mistakes in English class.
16	I don't really like my English teacher.
17	I like to discuss opinions with classmates during English exercises.
18	I enjoy imitating the pronunciation of foreigners.
19	I feel the English teacher's pronunciation is not standard and the class is often off-topic.
20	Although I don't want to learn English, I still care about my English exam scores.
21	If conditions permit, I would very much like to attend an English tutoring class to catch up in English.
22	If my primary school systematically taught English, my English grades would definitely be much better than they are now.

The questionnaire survey results on "Practical Difficulties in English Learning" for Part 3

Table 1. English Vocabulary Retention Levels by School, Grade and Gender(%)

Retention Level		Dechang MZ			Xide MZ			Zhaojue MZ		
		G7	G8	G9	G7	G8	G9	G7	G8	G9
High retention										
(Retain >75% words)										
- Male	28.4	61.4	10.0	4.5	26.1	16.0	25.0	36.7	22.4	10.6
- Female	35.8	62.0	31.1	8.9	20.4	30.0	26.9	35.6	60.0	6.1
Moderate retention										
(Retain 40-75% words)										
- Male	27.3	11.4	32.0	18.2	30.4	40.0	27.1	28.6	32.7	19.1
- Female	31.7	24.0	35.6	28.9	65.3	46.0	34.6	31.1	20.0	26.5
Low retention										
(Retain <40% words)										
- Male	44.3	27.2	58.0	77.3	43.5	44.0	47.7	34.7	44.9	70.1
- Female	32.5	14.0	33.3	62.2	14.3	24.0	38.9	33.1	20.0	67.6

Note:

G7/G8/G9 = Grade 7/8/9; MZ = Minzu Zhongxue (Ethnic Middle School)

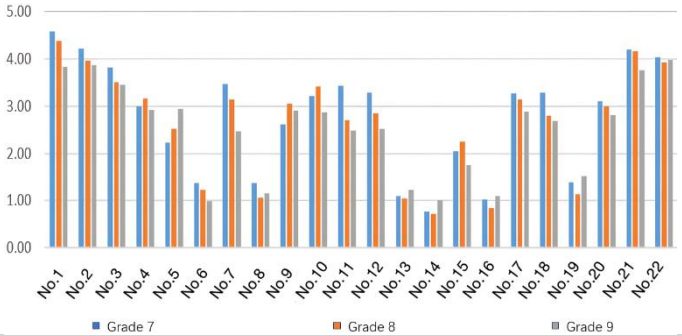
Percentages calculated by weighted average of gender subgroups

Retention thresholds based on Common European Framework (CEFR) vocabulary bands

Table 2. Perceived Grammar Learning Difficulties by School, Grade and Gender (%)

Difficulty Category	Dechang MZ			Xide MZ			Zhaojue MZ		
	G7	G 8	G9	G7	G8	G9	G7	G8	G9
Excessive Grammar Rules									
Male	11.4	2.0	9.1	13.0	8.0	6.3	20.4	12.2	19.1
Female	14.0	6.7	13.3	28.6	8.0	9.6	11.1	6.7	8.2
Complex Rule Understanding									
Male	6.8	4.0	27.3	34.8	22.0	16.7	20.4	22.4	27.7
Female	14.0	8.9	11.1	26.5	20.0	23.1	28.9	11.1	34.7
L1-L2 Structural Differences									
Male	25.0	12.0	25.0	19.6	26.0	20.8	20.4	26.5	17.0
Female	20.0	13.3	24.4	8.2	16.0	32.7	24.4	20.0	14.3
Application Difficulties									
Male	56.8	82.0	38.6	32.6	44.0	56.3	38.8	38.8	36.2
Female	52.0	71.1	51.1	36.7	56.0	34.6	35.6	62.2	42.9

The questionnaire survey results on "Willingness to Learn English" for Part 4



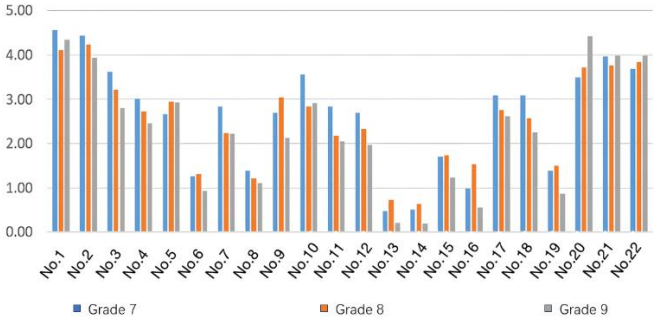
Chat 1. The average score of English Learning Willingness Survey Results for Xide MZ Middle School

Notes:

Xide MZ Middle School's Grade 7 has 88 valid questionnaires.

Xide MZ Middle School's Grade 8 has 100 valid questionnaires;

Xide MZ Middle School's Grade 9 has 100 valid questionnaires.



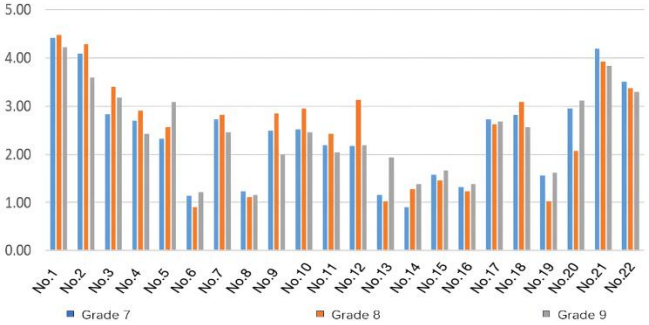
Chat 2. The average score of English Learning Willingness Survey Results for Dechang MZ Middle School

Notes:

Dechang MZ Middle School's Grade 7 has 93 valid questionnaires;

Dechang MZ Middle School's Grade 8 has 95 valid questionnaires;

Dechang MZ Middle School's Grade 9 has 89 valid questionnaires.



Chat3: The average score of English Learning Willingness Survey Results for Zhaojue MZ Middle School

Notes:

Zhaojue MZ Middle School's Grade 7 has 94 valid questionnaires;

Zhaojue MZ Middle School's Grade 8 has 91 valid questionnaires;

Zhaojue MZ Middle School's Grade 9 has 99 valid questionnaires.

**** Ponetic Test Section (lower half)****

The English Speaking Test Questionnaire

Grade 7

Section One:Vocabulary Part

1	English	11	busy	21	much light	31	an egg	41	guitar
2	teacher	12	That's all	22	classroom	32	jacket	42	draw
3	fine	13	leave	23	bird	33	good	43	join in the club
4	Thank you	14	cook food	24	go home	34	why not	44	tooth
5	key	15	a big bag	25	fifth	35	sometime	45	money
6	look like	16	a zoo	26	this	36	early	46	stomach
7	eat	17	how to spell	27	apple	37	tell a story		
8	five	18	we	28	an orange	38	brush		
9	right now	19	like what	29	school	39	people		
10	It's cool	20	father	30	night	40	play the piano		

Section Two:Sentence Part

-----Good morning , class ! ----- What's this in English ?

-----Good morning , teacher ! ----- It's an orange

------Who they are? ------Jim , What fruit do you like?

------They are my brothers . ------I like apples .

--------Where is my key?

--------It is in my schoolbag.

Section There:Short passage

Dear Mike,

How's it going? I'm having a good time visiting my aunt in China. She's working here and I'm going to summer school. I'm studying English and I'm learning a lot. I'm also visiting some of my friends. I'm so happy to see them again. It's afternoon right now, and I'm sitting by the pool and drinking orange juice .It's warm and sunny, and it's very relaxing here .

See you soon

Yours Lily

Grade 8

Section One: Vocabulary Part

1	anyone	11	on the screen	21	ride a bike	31	young	41	special
2	wonderful	12	discussion	22	village	32	delicious	42	a cute baby
3	something	13	relationship	23	between	33	along the street	43	language
4	quite a few	14	refuse	24	in a year	34	turn right	44	journey
5	enough	15	experience	25	bring	35	get popular	45	narural
6	junk food	16	chocolate	26	uniform	36	so expensive	46	follow the rules
7	on vacation	17	stomach	27	drive a car	37	elephant	47	understand
8	together	18	as usual	28	dirty	38	sunshine		
9	watch	19	imagine	29	kitchen	39	around the worle		
10	competition	20	take the subway	30	police station	40	potato		

Section Two:Sentence Part

----- Did anyone go on vacation with you last month?

------ Yes, my family went to the countryside with me.

------- What do you plan to watch tonight?

-------- I plan to watch Days of Our Past.

------If you go to the party, you will have a great time!

Section There:Short passage

An education program in Chengdu teaches children about pandas and other endangered wild animals.They send people to schools to tell children about the importance of saving these animals. And the Chinese government is trying hard to help save the pandas. Scientists are doing research to better understand the habits of pandas. We all hope that in the future there will be a lot more pandas.

Grade 9

Section One: Vocabulary Part

1	passage	11	childhood	21	typical	31	strong	41	million
2	achieve	12	patient	22	flashlight	32	make a decision	42	social
3	endangered	13	espression	23	completely	33	nervous	43	thousands of
4	technology	14	pay attention to	24	in one's opinion	34	communicate	44	performance
5	actually	15	review	25	stupid	35	cheer up	45	Japanese
6	spring	16	shyness	26	challenge	36	push away	46	whether
7	treasure	17	environment	27	even though	37	match with	47	earnest
8	research	18	take out the rubbish	28	junior igh school	38	alarm		
9	island	19	education	29	cenrury	39	population		
10	especially	20	pressure	30	truthful	40	stepmother		

Section Two:Sentence Part

-----They made the children work 12 hours a day.

----- Have you ever pay attention to the book Treasure Island yet?

------ Yes, I have. Actually, I have already finished reading it. It was really good.

----- It was really good.

Section There:Short passage

Most people today are only worried about getting good jobs to make lots of money. In their free time, they think about what to do for fun. However, few people think about what they can do to help others. There are many people who are less lucky than us. Volunteering our time to help these people is a good way to spend our free time. For example, we can make plans to visit sick children in the hospital or raise money for homeless people. Some people even stop doing their jobs for a few months to a year to move to another place, like one of the countries in Africa, and help people there.