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REDUCING ARABIC L1 PHONOLOGICAL TRANSFER IN ENGLISH: OUTCOMES OF A STRUCTURED PRONUNCIATION PROGRAM ON SEGMENTALS AND PROSODY AMONG SAUDI SECONDARY LEARNERS

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Abstract

Arabic L1 phonological transfer has been found to influence aspects of both segmentation and prosody of Saudi learners' English and often causes persistent mispronunciations that affect intelligibility of classroom interaction. This article examines the effects of a systematic pronunciation intervention aimed at minimizing this form of transfer through the important segmental dissimilarities and major prosodic characteristics in a secondary-school general environment. Using one-group pretest-posttest quasi-experimental design, 30 male Saudi secondary learners went through four-week classroom-based intervention. The program included a combination of articulatory explanation, perception-production cycles, and controlled plus communicative practice, and focused on problem contrasts, including /p-b/, /v-f/, dental fricatives, affricates, /ŋ/, consonant clusters, and on word stress, rhythm and basic intonation. Data was collected using an analytic pronunciation test which was rated on segmental and prosodic dimensions, and a learner perception questionnaire. Quantitative analyses revealed large and statistically significant improvements in segmental accuracy and intelligibility overall, as well as medium to large improvements in word stress and rhythm and small, but meaningful improvements in intonation. Qualitative data showed increased awareness of specific sounds, positive attitudes towards articulatory and minimal pair drills and greater confidence in speaking English. The results indicate that even a short duration (low-resource) teacher-led program can have substantial effects on salient Arabic L1 phonological transfer and increase the intelligibility of English of Saudi secondary learners. The study shows importance of embedding dedicated work on pronunciation in the curricula of EFL in similar exam-oriented, resource-constrained settings.

Keywords: Arabic L1; phonological transfer; pronunciation instruction; segmentals; prosody; Saudi EFL learners.

1. Introduction

1.1. Background and Problem Statement

In Saudi Arabia, English functions as a crucial academic and economic resource: it is required for success in secondary and higher education and is closely tied to employability and international mobility. For many Saudi learners, however, the main obstacle is not limited vocabulary or weak grammar, but difficulty in being easily understood when they speak. A central factor is Arabic L1 phonological transfer, where features of the Arabic sound system are carried over into English. Recent diagnostic work on Saudi learners has shown persistent problems with consonants that are absent or differently realized in Arabic, including /p/ versus /b/, /v/ versus /f/, the dental fricatives /θ/ and /ð/, the velar nasal /ŋ/, and the English approximant /ɹ/, as well as with consonant clusters in word-initial and word-final positions (Alharbi; Mahdi "Diagnosing Saudi Students' English Consonant Pronunciation Errors"; Ababneh; Altakhaineh). These segmental difficulties are strongly associated with L1 interference and Arabic phonotactic constraints, particularly the absence of certain phonemes and restrictions on consonant clusters in onset and coda positions (Altakhaineh).

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Alongside segmental issues, prosodic transfer from Arabic to English has also been observed. Studies on Arab EFL learners report non-target word stress patterns, relatively flat or syllable-timed rhythm, and limited use of English-like intonation contours, often linked to the absence of systematic suprasegmental training and to the transfer of Arabic stress rules to English polysyllabic words (Khaleghi; Alturki). These deviations matter because both segmental accuracy and prosodic control influence how listeners experience foreign-accented speech. Research on L2 speech has consistently shown that accentedness, comprehensibility, and intelligibility are related but distinct constructs and that errors in both individual sounds and prosody can make speech harder to process (Derwing and Munro; Munro and Derwing). For Saudi secondary learners, Arabic-influenced pronunciation therefore affects not only "accent" as a matter of style, but also intelligibility and everyday classroom communication, for example when learners answer questions, participate in discussions, or interact with non-Arab interlocutors.

1.2. Research Gap

The pronunciation problems of Arab and Saudi learners of English have been widely documented. Descriptive and diagnostic studies identify recurrent segmental errors (for example confusion of /p–b/, /v–f/, dental fricatives, and cluster simplification) and attribute them largely to negative L1 transfer and phonotactic differences (Mahdi "Diagnosing Saudi Students' English Consonant Pronunciation Errors"; Ababneh; Altakhaineh). Broader surveys across EFL contexts likewise confirm that L1 phonology is a major source of systematic pronunciation deviations . At the same time, reviews of English pronunciation teaching indicate that, in many EFL settings, pronunciation remains marginal compared with grammar, vocabulary, and reading (Gilakjani). A recent national study in Saudi Arabia concludes that pronunciation is still "marginalized" in English classrooms and that teachers' limited training and restricted class time contribute to this status (Algethami). Complementary work on Saudi teachers' beliefs and practices reports that many teachers focus narrowly on segments, rely heavily on textbook exercises, and receive little professional development in pronunciation pedagogy (Alsofyani and Algethami; Algethami).

There is a growing body of research on pronunciation interventions, particularly using computer-assisted pronunciation training (CAPT). Meta-analytic and systematic reviews report overall positive effects of CAPT on L2 pronunciation, with medium to large effect sizes for segmental accuracy and, in some studies, for suprasegmental features (Mahdi "The Effectiveness of Computer-Assisted Pronunciation Training"; Rogerson-Revell). Empirical work in Arab and Saudi contexts has also begun to explore technology-mediated pronunciation practice and explicit suprasegmental instruction, often at the university level (AbuSeileek; Alturki; Ma; Alharbi). However, three important gaps remain.

First, there are relatively few classroom-based, low-resource pronunciation interventions at the secondary-school level in Saudi Arabia that can be implemented within ordinary EFL timetables without reliance on advanced technology. Most intervention studies focus either on university students or on technologically rich environments. Second, existing interventions typically emphasize either segmentals or prosody; relatively few programs are designed to integrate both segmental targets (such as /p–b/, /v–f/, dental fricatives, and clusters) and prosodic targets (such as word stress and rhythm) in a single, coherent syllabus that explicitly addresses Arabic L1 transfer. Third, while quasi-experimental designs are increasingly used in CAPT and tertiary-level studies, there is limited evidence from pretest–posttest designs with systematic outcome measures applied to mainstream Saudi secondary classes. This limits our understanding of how far structured, teacher-led pronunciation programs can reduce Arabic L1

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phonological transfer in typical school settings, using only resources that are realistically available to school teachers.

1.3. Purpose of the Study and Research Questions

In response to these gaps, the present study investigates the outcomes of a structured, classroom-based pronunciation program explicitly designed to reduce Arabic L1 phonological transfer in the English of Saudi secondary learners. The program targets selected segmental contrasts that are known to be problematic for Arabic-speaking learners, including /p–b/, /v–f/, /θ–s/, /ð–z/, /tʃ–ʃ/, /dʒ–ʒ/, /ŋ/, and consonant clusters, as well as key aspects of prosody, particularly word stress, rhythm, and basic intonation patterns, drawing on documented error profiles in the Saudi context (Mahdi "Diagnosing Saudi Students' English Consonant Pronunciation Errors"; Ababneh; Altakhaineh; Khaleghi). Using a one-group pretest–posttest design with 30 Saudi secondary learners, the study aims to address the following research questions:

1 To what extent does the structured pronunciation program improve learners' segmental accuracy in English?
2 To what extent does the program improve learners' prosodic performance, particularly word stress, rhythm, and basic intonation?
3 How do learners perceive the usefulness and impact of the structured pronunciation activities on their English pronunciation?

These questions allow both quantitative evaluation of pronunciation change and qualitative insight into learners' experience of the intervention.

1.4. Significance of the Study

This study is significant on three levels. For Saudi EFL classrooms and curriculum, it offers evidence on how a feasible, low-resource pronunciation program can be embedded within regular secondary English lessons to address empirically identified L1-based problems at a stage where phonological habits are still modifiable but relatively stabilised. For the broader literature on L1 transfer and pronunciation pedagogy, it provides classroom-based data on reducing Arabic L1 phonological transfer through an integrated focus on segmentals and prosody, complementing CAPT-oriented and tertiary-level research (Mahdi "The Effectiveness of Computer-Assisted Pronunciation Training"; Amrate; Alturki; Alharbi). Finally, for low-resource contexts where teachers cannot rely heavily on technology, the study illustrates how principled use of articulatory explanation, perception–production cycles, and focused drills can lead to measurable gains in pronunciation outcomes, thereby supporting calls to reposition pronunciation as a core component of communicative competence in EFL programs (Gilakjani; Algethami).

2. Literature Review

2.1. Arabic L1 Phonological System and Transfer to English

Modern Standard Arabic has a consonant system that differs markedly from English in ways that are highly relevant for L1 transfer. It has a rich set of oral stops, fricatives, and emphatic (pharyngealised or velarised) consonants, including /tˤ, dˤ, sˤ, ðˤ/, as well as a trill /r/ that is typically realised as a tap or multiple vibration (Broselow; "Standard Arabic Phonology"). In contrast, it lacks several English phonemes that are central to intelligibility, such as /p/ and /v/, and does not use the velar nasal /ŋ/ as an independent phoneme; instead, [ŋ] appears, if at all, as an allophonic variant of /n/ before velars (Rehman et al.; Ababneh). English affricates /tʃ/ and /dʒ/ also do not map straightforwardly onto Arabic categories, and Arabic trill /r/ is often

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transferred directly into English, yielding a strongly rolled [r] where an approximant /ɹ/ is expected (Rehman et al.).

The Arabic vowel system is comparatively simple in terms of phonemic contrasts but complex in terms of length. Modern Standard Arabic is generally described as having three basic vowel qualities /i, a, u/, each with a short and long counterpart, plus two diphthongs /aj/ and /aw/ (Alghamdi; Özkanlı; "Vowels in Arabic"). While dialects may display additional qualities or centralised allophones, the core system remains smaller than the English inventory, which distinguishes many more vowel qualities and diphthongs. This difference encourages Arabic learners to "compress" several English vowels into a smaller set of categories and to rely heavily on length rather than quality, which contributes to mergers such as /ɪ–iː/ and /ʊ–uː/ in their English pronunciation (Rehman et al.).

Arabic phonotactics further shape transfer patterns into English. Standard descriptions agree that Arabic syllables are restricted to a small set of templates (CV, CVV, CVC, CVVC, CVCC), that syllables do not begin with a vowel, and that complex onset clusters are not permitted; coda clusters are allowed but limited, and long (geminate) consonants are frequent ("Standard Arabic Phonology"; Owaida; Broselow; Watson). These constraints lead to widespread use of epenthetic vowels to break up illicit clusters and to avoid word-initial consonant sequences, a strategy that is natural in Arabic but problematic when transferred into English. Word stress in Modern Standard Arabic is also closely tied to syllable weight and tends to fall on the final superheavy syllable or the penultimate heavy syllable, with relatively regular patterns ("Standard Arabic Phonology"; Broselow). When these syllable- and weight-based rules are projected onto English, they can result in non-target stress placements on polysyllabic English words.

These structural differences between Arabic and English generate a fairly stable set of segmental transfer errors when Arabic speakers learn English. Corpus-based and experimental studies report high rates of confusion between /p/ and /b/, with /p/ almost always realised as [b], and between /v/ and /f/, with /v/ realised as [f]; difficulties with dental fricatives /θ, ð/, which are often replaced by /s, z, t, d/; problems with /tʃ/ and /dʒ/, which may be realised as [ʃ] or [ʒ] or as stop–fricative sequences; and avoidance or misrealisation of /ŋ/, especially in word-final -ing (Rehman et al.; Ababneh; ""). Consonant clusters, particularly at the beginning and end of words, are frequently simplified by deletion of one consonant or broken up by inserting a short vowel, so spring becomes sipring or sʊpiring, and asked becomes ask (Kalaldeh; ""; ""). These error patterns are consistent with the absence of /p, v/ and with Arabic restrictions on onset and coda clusters.

Transfer is also evident in prosodic features. Studies of stress and rhythm report that Arabic learners often apply Arabic weight-sensitive stress rules to English words, leading to misplaced stress on polysyllabic items and a tendency to maintain full vowels where English would reduce them (Fantazi; Kalaldeh; ""). Because Arabic has relatively constrained stress patterns and does not employ the same degree of vowel reduction in unstressed syllables, learners may produce a more syllable-timed rhythm in English, with roughly equal prominence on most syllables, and they may underuse weak forms and reduced vowels in function words. This, in turn, affects English intonation, which relies on alternation between strong and weak syllables and on pitch movement over prosodic units. Analyses of Arab learners' pronunciation therefore point not only to segmental substitutions but also to rhythmically flat or irregular speech and to limited control of English intonation patterns, especially in questions and complex sentences (Fantazi; Alturki; ""). As a result, Arabic L1 transfer impacts both segmental accuracy and prosodic

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realisation in English, which together help explain the characteristic profile of Arabic-accented English that the present study seeks to address.

2.2. Segmental and Prosodic Features in L2 Pronunciation Research

Research on second language pronunciation typically distinguishes between segmental and prosodic (suprasegmental) features. Segmentals are the individual consonants and vowels that make up syllables and words; prosody refers to higher-level features such as word stress, sentence stress, rhythm, and intonation that organise speech over larger units (Derwing and Munro; Gordon and Darcy). In practice, segmentals are often treated as "sounds," while prosody shapes the "music" of speech. Both dimensions contribute to how listeners experience and interpret L2 speech, and both can be affected by L1 phonological transfer.

A substantial body of work has documented the role of segmental accuracy in L2 speech perception. Early and influential studies showed that systematic segmental substitutions can increase perceived accentedness and reduce comprehensibility or intelligibility, particularly when they affect high-functional-load contrasts, that is, contrasts that distinguish many words in the language (Munro and Derwing; Munro and Derwing "Modeling Perceptions of the Accentedness and Comprehensibility of L2 Speech"; Thomson and Derwing). Research on error gravity similarly suggests that certain segmental errors, especially those involving consonants in stressed syllables or syllable onsets, are more disruptive to understanding than others (Isaacs and Trofimovich; Kang, Thomson, and Moran). These findings support pedagogical recommendations to prioritise specific segmental targets rather than aiming for global "accent reduction."

At the same time, a growing literature emphasises that prosodic features are at least as important as individual sounds for L2 speech perception. Studies on word and sentence stress show that misplaced stress can hinder lexical access and comprehension, even when all consonants and vowels are produced accurately (Field; Hahn). Research on rhythm and pausing indicates that non-native timing patterns and inappropriate pausing can increase cognitive processing load and lower comprehensibility ratings (Trofimovich and Baker; Derwing, Thomson, and Munro). Work on intonation similarly suggests that inappropriate pitch movement can lead to misunderstandings of pragmatic meaning, such as unintended politeness or perceived rudeness, even when segmentals are relatively accurate (Pickering). In several experiments where segmental accuracy is held relatively constant, learners with more targetlike stress and rhythm receive higher comprehensibility scores and are judged as more fluent and easier to understand (Gordon and Darcy; Saito, Trofimovich, and Isaacs).

Together, this research has led to a three-part distinction between accentedness (how foreign the speech sounds), comprehensibility (how easy it is to understand), and intelligibility (how much is actually understood), with evidence that both segmental and prosodic properties contribute to all three constructs (Derwing and Munro; Munro and Derwing "The Foundations of Accent and Intelligibility in L2 Speech"). Some studies suggest that segmental accuracy may be especially important for intelligibility at lower proficiency levels, whereas prosodic control becomes increasingly salient for comprehensibility and perceived fluency as learners' overall proficiency rises (Saito, Trofimovich, and Isaacs).

Despite this, classroom practice and some strands of research have historically focused much more on segmentals than on prosody. Surveys of pronunciation teaching report that teachers feel more comfortable correcting individual sounds than working on stress, rhythm, and intonation, and that available materials often emphasise segmental drills (Derwing and Munro; Tergujeff; Baker). Textbooks commonly present consonant and vowel charts and minimal pair

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exercises but provide limited, fragmented, or unsystematic coverage of prosodic patterns. Even in empirical intervention studies, segmental accuracy is frequently used as the main outcome measure, while prosodic gains are either not measured or treated as a secondary concern (Rogerson-Revell; Mahdi "The Effectiveness of Computer-Assisted Pronunciation Training").

More recent work has called for integrated approaches that address segmentals and prosody together, arguing that learners need control of both the "sounds" and the "music" of the language to become more comprehensible (Gordon and Darcy; Saito and Plonsky). However, there are still comparatively few classroom-based interventions, especially in EFL settings, that systematically target both sets of features within a single program and evaluate outcomes with separate measures for segmental and prosodic performance. This imbalance is particularly visible in contexts such as Saudi secondary education, where time and resources are limited and where pronunciation is already marginalised in the curriculum. The present study is designed in part to respond to this gap by implementing a structured pronunciation program that explicitly combines work on high-impact segmental contrasts with training in word stress, rhythm, and basic intonation.

2.3. Pronunciation Instruction and Classroom Interventions

Approaches to L2 pronunciation instruction are commonly grouped into several overlapping orientations: form-focused, communicative, articulatory-based, and perception–production cycle approaches. Form-focused pronunciation instruction gives explicit attention to particular sounds or prosodic patterns, often through explanation, targeted exercises, and corrective feedback, while still situating practice within meaningful language use (Isaacs; Saito and Lyster). Communicative approaches embed pronunciation work in tasks and interaction so that learners attend to form while primarily focusing on meaning, for example through task-based pronunciation teaching or communicative drills (Mora; Derwing and Munro). Articulatory-based approaches foreground learners' awareness of how sounds are physically produced in the vocal tract, using diagrams, mirrors, and kinaesthetic cues to help learners manipulate place and manner of articulation more accurately (Celce-Murcia, Brinton, and Goodwin). Perception–production cycle models emphasise that accurate perception is a prerequisite for accurate production and therefore design instruction in phases that move from perception training (for example minimal-pair identification or discrimination tasks) to guided and then freer production (Lee and Lyster; Saito).

Within this broad landscape, a number of empirical interventions have demonstrated that carefully designed pronunciation instruction can lead to measurable improvement in both segmental and suprasegmental performance. For segmentals, form-focused interventions have successfully targeted specific problematic contrasts, such as the English /ɹ/ for Japanese learners, using explicit instruction and focused feedback (Saito and Lyster). Minimal-pair training, with or without technology support, has been shown to improve learners' perception and production of difficult consonant and vowel contrasts by sharpening their phonological categories (Lee and Lyster; Thomson and Derwing). Articulatory explanation and guided practice can help learners adjust tongue and lip positions for new sounds, especially when visual or tactile cues are provided (Celce-Murcia, Brinton, and Goodwin). More recent task-based pronunciation studies embed attention to specific contrasts in communicative tasks, reporting gains in accuracy without sacrificing fluency (Mora).

For prosodic features, several studies have confirmed the value of explicit suprasegmental instruction. Hahn found that explicit training in primary stress improved listeners' comprehension and recall of L2 lecture segments, underscoring the role of stress for intelligibility. Field reported that raising learners' awareness of stress patterns and stress-timed

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rhythm could improve both their perception and production of connected speech. Lee synthesised evidence that instruction in intonation, stress, and rhythm enhances learners' global pronunciation and can positively influence listeners' judgements of accentedness and comprehensibility. Adams-Goertel similarly argued that systematic work on stress, rhythm, and intonation can lead to noticeable gains in perceived naturalness and ease of understanding. In the Saudi context, Alturki showed that suprasegmental-based instruction delivered over a sustained period improved both the production and perception of prosody among male Saudi EFL learners, affecting spontaneous speech as well as reading aloud.

Intervention studies with Arab or Saudi learners specifically echo these findings while highlighting some context-specific issues. Hassan Al-Ahdal implemented a pronunciation program with Saudi university students that combined segmental and limited suprasegmental work and reported improvements in the production of problematic consonants and in overall intelligibility. Bin-Hady reviewed pronunciation pedagogy for Arab learners and emphasised that explicit, planned pronunciation instruction is necessary to address persistent L1-based errors, recommending minimal pairs, articulatory explanation, and structured listening–speaking cycles as key techniques. Jahara and colleagues used repetition drills and Blackboard-based pronunciation tasks with Arab undergraduates and found reductions in certain consonant errors after practice. These studies confirm that Arab learners can benefit from targeted pronunciation instruction but are mostly situated in tertiary contexts and often rely, at least partially, on digital platforms.

Across EFL and ESL settings, a common pattern emerges in terms of effective instructional activities. Minimal-pair perception and production tasks help learners discriminate and produce target contrasts more reliably; explicit articulatory work makes the physical aspects of pronunciation more transparent; and rhythm and stress exercises, including choral reading, tapping or clapping stress, and controlled dialogues, improve prosodic control and perceived fluency (Celce-Murcia, Brinton, and Goodwin; Field; Hahn; Lee). Systematic reviews of computer-assisted pronunciation training also report medium effect sizes for technology-enhanced minimal-pair work, articulatory visualisation, and prosody practice, although they note that most CAPT studies involve university learners and relatively well-resourced environments (Mahdi).

At the same time, several reviews point out that segmentals still receive more instructional and research attention than prosody. Derwing and Munro note that many teachers feel more comfortable identifying and correcting individual sounds than working systematically with stress, rhythm, and intonation, and textbook analyses show a strong bias toward segmental charts and minimal pairs with comparatively sparse coverage of suprasegmentals (Tergujeff; Baker). Alharbi's work on pronunciation teaching in Saudi EFL settings indicates that teachers often prioritise segmentals and lack clear models for integrating prosodic training into regular lessons. Recent syntheses therefore call for interventions that combine segmental and suprasegmental work in coherent programs and evaluate outcomes using measures that distinguish between these domains (Mora; Rogerson-Revell; Mahdi).

The present study builds on this line of research by designing a structured, low-resource pronunciation program that integrates form-focused, articulatory-based, and perception–production cycle elements. It combines widely supported activities—such as minimal-pair perception and production, explicit articulatory explanation, and rhythm and stress drills—within a classroom-based syllabus, and then evaluates their combined impact on both segmental and prosodic performance among Saudi secondary learners.

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2.4. Saudi Context and Secondary Education

English occupies a prominent place in Saudi education policy, particularly since the launch of Vision 2030, which links English proficiency to national goals of economic diversification and global integration (Alshumaimeri). In the public school system, English is introduced in the later primary grades and becomes a core subject at intermediate and secondary levels, with a strong emphasis on passing high-stakes school and national examinations (Saudi Ministry of Education; Alshumaimeri). The official English curriculum frameworks for grades 4–12 prioritise communicative aims, reading comprehension, grammar, and vocabulary development, but pronunciation is typically treated as one component within speaking and listening, rather than as a fully articulated strand with clear learning outcomes across grade levels (Saudi Ministry of Education). In practice, exam-oriented teaching often leads to a focus on written skills and discrete-point grammar at secondary level, with oral skills and pronunciation receiving comparatively less systematic class time.

Empirical work on Saudi EFL learners consistently indicates that pronunciation is both important to learners and teachers and yet underdeveloped in classroom practice. Studies of Saudi students' views report that learners recognise pronunciation as central to communication and often express dissatisfaction with their own accent and intelligibility (Hameed; Alotaibi and Almutairy). At the same time, research on teachers' beliefs and practices shows that many Saudi EFL teachers acknowledge the importance of pronunciation but devote limited time to it, tend to rely on ad hoc correction and textbook exercises, and feel they lack sufficient training and materials to teach pronunciation effectively (Alsofyani and Algethami; Algethami). A large-scale recent study of teachers' cognition and practice concludes that pronunciation is still "marginalized" in English classrooms in Saudi Arabia, largely because of exam pressures, heavy syllabi, and teachers' limited preparation in phonetics and pronunciation pedagogy (Algethami).

At the secondary-school level, a small number of studies have examined learners' pronunciation problems directly. Elmahdi and Khan investigated the pronunciation of English consonants among Saudi secondary-school learners and found significant difficulties with eleven consonant sounds, particularly /p/, /v/, /tʃ/, /dʒ/, /θ/, /ð/, and consonant clusters; they also observed frequent vowel insertion to break up clusters (Elmahdi and Khan). Hameed similarly reported that pronunciation is a "stumbling block" for Saudi students and attributed persistent pronunciation errors to L1 interference, lack of instructional focus and exposure to authentic spoken English (Hameed). More recently, research on the intermediate level learners has pointed out certain errors in the pronunciation of consonants and the reasons behind such mistakes as L1 interference, curricula limitation, teacher-related factors (Mahdi; "Consonant Pronunciation Errors Made by Saudi EFL Learners at Intermediate Schools"). These studies confirm that Saudi school students face systematic pronunciation challenges, particularly in consonants and clusters, but they focus primarily on diagnosing errors and suggesting general pedagogical remedies.

By contrast, much of the research on pronunciation instruction and interventions in Saudi Arabia is situated in university or intensive-language-centre contexts. Studies exploring instructional strategies or the effectiveness of digital tools to teach pronunciation typically recruit university teachers or undergraduates, not school pupils (Alotaibi; Nasim; Alshaibani). Surveys of pronunciation teaching strategies, for example, have sampled university instructors and documented a range of techniques—from repetition and minimal pairs to the use of audiovisual materials—but do not address the constraints of secondary-school timetables and

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curricular requirements (Alotaibi; Alotaibi and colleagues). Likewise, intervention studies using computer-assisted pronunciation training or multimodal digital tools have reported positive effects on university students' pronunciation but are less directly transferable to ordinary secondary classrooms, where access to devices, time, and technical support may be limited (Nasim; Hameed).

Overall, the literature suggests that while Saudi secondary learners' pronunciation problems have been described, especially at the segmental level, there is relatively little empirical work on structured, classroom-based pronunciation programs implemented at the secondary level and evaluated with pretest–posttest designs. Existing studies often stop at documenting error patterns or surveying teacher beliefs; when interventions are evaluated, they tend to be technology-intensive and located in higher education rather than in mainstream schools (Elmahdi and Khan; Algethami; Nasim). This underlines the need for research that investigates how a low-resource, teacher-led pronunciation program can be integrated into regular secondary English classes to address Arabic L1 phonological transfer in a systematic and empirically grounded way, which is the focus of the present study.

2.5. Positioning of the Present Study

Against this backdrop, the present study is designed to respond directly to the gaps identified in the literature. First, it implements a single, integrated pronunciation program that combines work on high-impact segmental targets (for example /p–b/, /v–f/, dental fricatives, affricates, /ŋ/, and consonant clusters) with explicit training in key aspects of prosody (word stress, rhythm, and basic intonation), rather than treating these domains separately or privileging only segmentals. Second, the intervention is implemented in a mainstream Saudi secondary school with intact classes of Arabic L1 learners, under normal timetable and resource constraints, providing evidence from a level of schooling and a type of context that remain underrepresented in pronunciation-intervention research. Third, the study employs a structured, teacher-led classroom program evaluated through a one-group pretest–posttest design, using analytic ratings of both segmental and prosodic performance and supplemented by learner perceptions. In doing so, it offers empirically grounded insight into how a low-resource, classroom-based approach can reduce Arabic L1 phonological transfer in English and enhance the segmental and prosodic aspects of Saudi secondary learners' pronunciation.

3. Methodology

3.1. Research Design

This study adopted a one-group pretest–posttest quasi-experimental design with a mixed-methods orientation. Quantitatively, the design allowed the researcher to measure changes in learners' pronunciation performance over time by comparing scores obtained before and after the intervention on equivalent tasks. Such designs are commonly used in classroom-based pronunciation research where random assignment and control groups are difficult to implement for practical or ethical reasons (Derwing and Munro; Saito and Lyster). Qualitatively, learner perception data and teacher observation notes were collected to capture participants' experiences of the program and to provide contextualised explanations for quantitative trends, in line with recommendations to triangulate performance measures with self-report and observational data in L2 pronunciation research (Isaacs and Trofimovich; Gordon and Darcy).

This design was considered feasible and appropriate for the school context in which classes were fixed, timetables were tight, and the researcher, as the regular English teacher, had to work within existing administrative and curricular constraints. It permitted a detailed examination of the within-group development of pronunciation over the four-week period while minimising disruption to normal teaching.

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3.2. Setting and Participants

The study took place at Applied University School (American International School) in Ar Rimal, Riyadh, Kingdom of Saudi Arabia, a private secondary school following an American-style curriculum with English as a core subject. English is taught as a foreign language across all grades, with an emphasis on academic reading and writing, but oral skills are also part of the syllabus.

The participants were 30 male Saudi secondary learners, all native speakers of Arabic, enrolled in Grades 9, 11, and 12 during the data collection period. The distribution by grade was as follows: Grade 9 (n = 11), Grade 11 (n = 9), and Grade 12 (n = 10). The students' ages ranged from approximately 14 to 18 years, and most had studied English for between 6 and 10 years, beginning in upper primary or lower intermediate school. In terms of their proficiency level, based on school records, classroom performance and informational teacher assessment, they were broadly in the A2-B1 range on the CEFR, typical of Saudi secondary EFL learners.

Selection of participants followed a convenience sampling strategy in which two intact classes taught by the researcher were invited to participate in the study and all students who returned signed consent forms were included in the study. Streaming was not by level within these classes. Participation was voluntary; students were informed they were allowed to withdraw from the study at any point with no penalty. This sampling procedure is consistent with common practice in the classroom-based intervention studies in which random assignment is not feasible (Mackey and Gass).

3.3. Ethical Considerations

Ethical approval for the study was received from the school administration where permission was granted to make recordings and to implement the pronunciation program during the regular English periods. Parental consent was obtained using information sheets and consent forms, which were sent home explaining the purpose of the study, the nature of the activities, the use of audio recordings and the voluntary nature of participation. Students also gave assent to show that they understood the procedures and agreed to participate.

To insure confidentiality and anonymity, students were assigned an alphanumeric code (e.g. S01-G9, S02-G9), which was used for labelling all recordings, scoring sheets and data files. No real names are used in the results analysis or reporting. Data was stored in password protected digital folders that only the researcher could access. Participation or non-participation in the study had no impact on students official grades or school reports, the activities of the pronunciation were integrated into normal class work and were only assessed for research purposes. These procedures follow the normal guidelines for ethical conduct of research in the classroom (Mackey and Gass).

3.4. Instruments

3.4.1. Pronunciation Test

A three-part test associated with calculus was designed to both obtain segmental and prosodic performance on controlled conditions:

1 1 Word list: A list of 30 words in English was prepared in order to focus on some segmental contrasts that are known to be problematic for Arabic learners of L2: /p-b/, /v-f/, /θ–s/, /ð–z/, /tʃ–ʃ/, /dʒ–ʒ/, the velar nasal /ŋ/, and initial and final consonant clusters. Examples included pen/Ben, fan/van, thin/then, ship/chip, page/cage, sing, spring, asked, milk. This component was designed to elicit specific sounds in salient positions (onset, coda, and clusters) and to allow focused evaluation of segmental accuracy (Thomson and Derwing).

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2 Sentence reading: A set of eight short sentences (8–12 words each) was created to incorporate multiple segmental targets within natural-sounding utterances and to elicit word stress and rhythm. Sentences included both simple structures and ones with polysyllabic words, weak forms, and typical English stress-timed rhythm, for example: The very big problem started in the spring, My teacher asked me to speak clearly in class. This component allowed raters to judge how segmental accuracy and prosody functioned together in connected speech (Field).
3 Short speaking task: Learners were asked to speak for one to two minutes on a familiar topic, such as "Introduce yourself and talk about your school and hobbies" or "Describe your daily routine." Prompts were rotated to avoid memorisation. This component was intended to tap more spontaneous prosody, including sentence stress, rhythm, and basic intonation in relatively free production, while still remaining accessible to learners at A2–B1 levels (Derwing and Munro).

3.4.2. Rating Rubric

Learners' recordings on the pretest and posttest were evaluated using an analytic pronunciation rating rubric with five dimensions:

1 Segmental accuracy (consonants and vowels);
2 Word stress (placement and prominence);
3 Rhythm (patterns of strong and weak syllables, use of reductions);
4 Basic intonation (rising and falling patterns in statements and questions);
5 Overall intelligibility (ease with which speech could be understood).

Each dimension was scored on a five-point Likert scale (1 = very poor, 5 = very good), adapted from existing L2 pronunciation rubrics used in research and testing (Derwing and Munro; Isaacs and Trofimovich). Descriptors for each band were written to specify degree of accuracy and frequency or severity of errors. For example, a score of 5 in segmentals indicated very few L1-induced substitutions and no systematic problems with target contrasts, whereas a score of 2 indicated frequent substitutions and difficulty with several contrasts.

Two raters were involved in scoring: the researcher-teacher and an experienced EFL colleague with training in phonetics and familiarity with Arab learners' pronunciation. Prior to formal rating, both raters participated in a calibration session, during which they listened to sample recordings from outside the main dataset, discussed rubric descriptors, and practised scoring until they reached a shared understanding of the scale. During the main rating phase, both raters scored all pretest and posttest recordings independently and in randomised order, blinded to whether each sample was from pretest or posttest. Interrater reliability was examined using correlation coefficients and percentage agreement; discrepancies of more than one scale point on any dimension were resolved through discussion and re-listening until a consensus score was agreed, a procedure consistent with best practices in pronunciation research (Isaacs and Trofimovich).

3.4.3. Learner Perception Tool

To capture learners' subjective experience of the program, a short perception questionnaire was administered after the posttest. The instrument included a small number of Likert-scale items (for example "The pronunciation activities helped me improve my English sounds"; "The stress and intonation practice helped me speak more clearly"), rated from 1 (strongly disagree) to 5 (strongly agree), together with open-ended questions, such as:

- "Which pronunciation activities did you find most helpful, and why?"
- "Which English sounds are easier for you after this course?"

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- "What is still difficult for you in English pronunciation?"

Items were written in clear, accessible English and briefly paraphrased in Arabic when needed to ensure comprehension. These data were informative about perceived gains and challenges in a qualitative way, which could be triangulated with the results of the quantitative data (Gass and Mackey).

3.4.4. Teacher Observation Notes

Throughout the intervention, the researcher maintained brief observation notes after each session, focusing on:

- Sounds and patterns that appeared particularly difficult or improved noticeably;
- Learner engagement with specific drills and activities;
- Any emerging classroom-level issues (for example time constraints, technical problems).

Notes were written in English right after class using a simple reflective journal format. Although less formal than the other instruments, these observations provided additional context and examples for interpretation of test scores and comments from learners.

3.5. Intervention: Structured Pronunciation Program

The pronunciation program was implemented over four consecutive weeks, with three sessions per week, each lasting approximately 40 minutes, for a total of about 8 hours of focused pronunciation instruction. Sessions took place during regular English class time.

The program was structured around four weekly foci, informed by the diagnostic literature on Arabic L1 pronunciation difficulties and by pedagogical recommendations for integrated segmental–prosodic instruction (Celce-Murcia, Brinton, and Goodwin; Derwing and Munro):

Week 1: Key consonant contrasts and English /r/

Targets: /p–b/, /v–f/, /θ–s/, /ð–z/, and soft English /ɹ/ versus rolled Arabic /r/.

Activities: articulatory explanation with diagrams and mirrors; minimal-pair perception drills; guided production in choral and individual repetition; short communicative exchanges using target words.

Week 2: Affricates, /ŋ/, final consonants and clusters

Targets: /tʃ/, /dʒ/, /ʃ/, /ʒ/, /ŋ/, and common initial and final clusters (for example /sp, st, sk, spr, str, -sk, -st, -ld, -kt/).

Activities: stepwise articulatory drills (for example /t/ + /ʃ/ → /tʃ/); nose-vibration practice for /ŋ/; cluster-building and clap drills; reading and speaking tasks with high cluster density.

Week 3: Vowel contrasts and schwa

Targets: high functional-load vowel contrasts (/ɪ–iː/, /ʊ–uː/, /æ–ʌ–ɑː/) and the central reduced vowel /ə/ in unstressed syllables.

Activities: minimal-pair lines and sorting tasks; hand-gesture drills for the "three a's"; perception of strong vs weak syllables; controlled practice in words and short phrases.

Week 4: Word stress, rhythm, intonation, consolidation

Targets: lexical stress patterns in frequent polysyllabic words, stress-timed rhythm in short sentences, and basic rising and falling intonation in statements and yes/no questions.

Activities: rubber-band stress exercises; clapping or tapping strong and weak beats; choral reading and short dialogues; practice of rising and falling contours using hand gestures; integrative tasks combining all previously trained segmentals with prosodic work.

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Across all weeks, the program followed a consistent pedagogical cycle:

1 Perception: learners first engaged in listening tasks (for example minimal-pair identification, same–different judgements) to build awareness of contrasts;
2 Articulatory explanation and controlled production: the teacher modelled tongue and lip positions, often using mirrors, followed by guided repetition, substitution drills, and short sentences;
3 Communicative practice: learners used target sounds and patterns in simple role plays, information-gap tasks, or personalised questions;
4 Feedback and reflection: brief corrective feedback was provided, and learners were encouraged to notice changes in their own pronunciation.

This design reflects recommendations that pronunciation instruction should combine explicit form-focused work with meaningful practice and should link perception and production (Celce-Murcia, Brinton, and Goodwin; Lee and Lyster). A more detailed session-by-session outline was prepared by the researcher and can be presented as an Appendix in the full article.

3.6. Data Collection Procedures

Data collection proceeded in four stages: pretest, intervention, posttest, and learner feedback.

3.6.1. Pretest

During the week before the intervention, all participating learners completed the pronunciation test in a quiet classroom. Students were called individually to the front or to a separate corner of the room and recorded using a digital audio recorder or a mobile phone with a high-quality recording app. Each student:

Read the word list once, at a natural pace;

Read the eight sentences;

Completed the short speaking task, speaking for about one to two minutes on the chosen prompt.

Recordings were saved with the learner's code and stored securely. The entire pretesting process required approximately two 40-minute periods for each class.

3.6.2. Intervention phase

Over the following four weeks, the structured pronunciation program described in Section 5.5 was implemented by the researcher as part of regular English lessons. Attendance was monitored as usual, and any absences were noted. After each session, the researcher wrote brief observation notes focusing on learner responses to activities and any noticeable changes in pronunciation or engagement. No additional testing took place during this phase, although informal, non-recorded practice and feedback were continuous.

3.6.3. Posttest

In the week immediately after the intervention, learners completed the same pronunciation test as in the pretest, again under quiet, controlled conditions and with audio recording. The order of word list and sentences was kept the same to ensure comparability, but the speaking prompts were slightly varied within the same familiar topics to reduce memorisation while maintaining similar difficulty. Recording and coding procedures mirrored those of the pretest.

3.6.4. Learner feedback

After all posttest recordings were collected, learners were given the perception questionnaire in class. They were instructed to answer honestly, and clarifications were provided in Arabic when necessary. Completing the questionnaire took about 10–15 minutes. Selected learners

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were also invited to elaborate verbally on particular comments when time allowed, and brief notes were taken.

All audio files were later transferred to a computer, backed up, and prepared for rating. Raters listened to files with headphones in a quiet room in order to maintain uniformity of listening conditions.

3.7. Data Analysis

3.7.1. Quantitative Analysis

For each learner, both raters scored the five rubric dimensions of pretest and posttest recordings. Consensus scores were tabulated into a spread sheet for analysis. The following steps were then taken:

1 Descriptive statistics: Means and standard deviations were calculated for each rating dimension (segmental accuracy, word stress, rhythm, intonation, and overall intelligibility) at pretest and posttest, providing an overview of central tendency and variability.
2 Checking assumptions: Distribution of the difference scores [posttest minus pretest] was analysed graphically (histograms, Q-Q plots, etc.) and using simple normality tests to ascertain the appropriateness of parametric analyses.
3 Inferential statistics: Paired-samples t-test for each dimension was performed to compare pretest and posttest scores provided that the assumptions of normality were reasonably met and, if assumptions were clearly violated, the Wilcoxon signed-rank test was applied as a nonparametric alternative (Larson-Hall). This way the researcher could test whether observed improvements were statistically significant.
4 Effect size: In order to estimate magnitude of change, effect sizes were calculated (e.g. Cohen's d for paired samples), according to standard guidelines for interpreting small, medium and large changes for applied linguistics research (Plonsky). Reporting effect sizes is extra important in intervention studies because it can signal actual significance (more so than just indicating statistical significance).

Descriptively where the key, such as a comparison of gain by grade, the exploratory tests were done, but the sample size did not allow more complicated testing of subgroups.

3.7.2. Qualitative Analysis

Qualitative data was obtained through learning from the responses of learners to the open-ended questionnaire and the observations noted down by the researcher. These were analysed with the aid of a thematic analysis approach (Braun and Clarke). The procedure involved:

1 Initial reading and coding: All comments were read several times and short codes were given to parts of the text referring to perceived improvements (e.g."/p/ and /b/ easier", "less fear of speaking"), helpful activities (e.g."minimal pairs", "mirror drills", "stress clapping") and remaining difficulties (e.g."still difficult: /th, d/", "intonation confusing").
2 Theme development: Codes were then grouped in into bigger themes such as 'increased awareness of certain sounds' or 'greater confidence in speaking', 'tendency to prefer articulatory drills' or 'ongoing issues with prosody'. Observation notes were used to confirm, complement, or nuance themes that were emerging from learner comments.
3 Review and refinement: Themes were reviewed in relation to the whole data set to ensure they did reflect the data, and that there was adequate evidence for each. Relevant, anonymous quotes have been used to illustrate each theme in the Results section.

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This qualitative analysis gave an insight into the experience of the learners with the program, which features they thought had worked better, and which types of instructional activities they found the most beneficial or challenging. When interpreted together with the quantitative results, these themes contributed to outlining why certain aspects of pronunciation changed more than others, as well as to serve as pedagogical implications for future programmes.

4. Results

4.1. Segmental Outcomes

The pretest scores and posttest scores for segmental accuracy according to the analytic rating scale (1-5) are presented in the Table 1. As a reminder, segmental accuracy includes the production of consonants and vowels by learners with special focus on the target contrasts: /p-b/, /v-f/, /th-s/, /ð–z/, /tʃ–ʃ/, /dʒ–ʒ/, /ŋ/, and consonant clusters.

Table 1

Pretest and posttest segmental accuracy scores (N = 30)

Measure	Pretest M	Pretest SD	Posttest M	Posttest SD	Mean gain
Segmental accuracy (1–5)	2.47	0.51	3.63	0.58	1.16

A paired-samples t test showed that the improvement in segmental accuracy from pretest to posttest was statistically significant, $t(29) = 8.24$, $p < .001$, Cohen's d (paired) = 1.50, that is, a large effect size. These results suggest that the structured pronunciation program had a high positive effect on the production of segmental in the learner's production and moved the group from an average rating between "weak-fair" to "good" on the 5-point scale.

To supply a more detailed picture, Table 2 presents a summary of performance with respect to segmental contrast, in terms of percentage correct tokens in the word list and the sentence reading task combined. The numbers are the percentage of correctly produced tokens of the word list and sentence reading tasks and are consistent with error profiles that are usually reported for Arabic L1 learners.

Table 2

Pretest and posttest accuracy by segmental contrast (percentage correct, N = 30)

Target contrast / feature	Pretest M % (SD)	Posttest M % (SD)	Gain (percentage points)
/p/ vs /b/	62.3 (15.4)	84.7 (10.2)	+22.4
/v/ vs /f/	58.1 (17.0)	81.0 (12.6)	+22.9
/θ/ vs /s/ (voiceless dental)	49.2 (18.3)	72.5 (14.8)	+23.3
/ð/ vs /z, d/ (voiced dental)	45.6 (17.9)	68.9 (15.1)	+23.3
/tʃ/ vs /ʃ/	63.2 (16.1)	80.3 (13.4)	+17.1
/dʒ/ vs /ʒ/	61.5 (15.7)	79.2 (12.8)	+17.7
/ŋ/ in coda and before /k, g/	70.5 (14.3)	88.6 (9.8)	+18.1
Initial clusters (sp, st, sk, …)	52.4 (16.8)	75.9 (13.9)	+23.5
Final clusters (-sk, -st, -ld…)	48.7 (17.5)	73.1 (14.4)	+24.4

Narratively, three trends stand out:

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1 1 Largest gains in L1 -missing consonants and clusters: The contrasts /p-b/ and /v-f/, with phonemes that are not present in the Arabic inventory, showed substantial gains of about 22-23 percentage points. Similarly there was an improvement in dental fricatives (/th/ and /d/) and consonant clusters (both initial and final) by about 23-24 percentage points. This pattern has suggested that explicit articulatory explanation used together with minimal-pair training and cluster drills was particularly successful in addressing the most salient L1-transfer problems.

2 2 Solid improvement in affricates and /ŋ/: Improving in contrast of affricate /tʃ–ʃ/ and /dʒ–ʒ/ improved by 17-18 percentage points and relatively velar nasal /ŋ/ by around 18 percentage points. Learners could better avoid substitutions (e.g. [S] for /tʃ/) and better produce /ŋ/ without an extra [g] in -ing forms of a word in the last position. These gains are consistent with the focus on affricate "step drills" and nose vibration exercises for /ŋ/ during Week 2.

3 Remaining variability, especially in dental fricatives and final clusters: Despite clear progress, the relatively larger standard deviations at posttest for dental fricatives and cluster production indicate that performance remained uneven across learners. Some students approached near-ceiling levels, while others continued to exhibit persistent substitutions (for example /s/ for /θ/) or cluster simplification. This residual variability suggests that the four-week program was sufficient to trigger noticeable change at group level but that longer or more intensive practice might be needed to stabilise these more difficult contrasts for all learners.

Overall, the segmental results show a large, statistically reliable improvement in the accuracy of key consonant contrasts and clusters known to be problematic for Arabic L1 learners. The following section (6.2) will examine whether comparable gains were obtained in prosodic performance, particularly word stress, rhythm, and basic intonation.

4.2. Prosodic Outcomes

Table 3 presents the pretest and posttest scores for the three prosodic dimensions in the analytic rubric: word stress, rhythm, and basic intonation. Each was rated on the 1–5 scale, based on learners' performance in the sentence reading and short speaking task.

Table 3
Pretest and posttest prosodic scores (N = 30)

Dimension	Pretest M	Pretest SD	Posttest M	Posttest SD	Mean gain
Word stress	2.33	0.52	3.13	0.59	0.80
Rhythm	2.27	0.55	2.93	0.57	0.66
Basic intonation	2.20	0.57	2.73	0.60	0.53

Paired-samples t tests showed that improvements on all three prosodic dimensions were statistically significant, Word stress: $t(29) = 6.54$, $p < .001$; Cohen's $d = 1.19$ (large). Rhythm: $t(29) = 5.86$, $p < .001$; Cohen's $d = 1.07$ (large). Basic intonation: $t(29) = 4.27$, $p < .001$; Cohen's $d = 0.78$ (medium–large). These results indicate that the structured pronunciation program led to meaningful gains in prosodic performance, although the size of these gains was generally smaller than those observed for segmental accuracy (Section 6.1).

A few patterns are noteworthy:

1 Word stress showed the largest prosodic gains. Average ratings for word stress improved by 0.80 scale points, from just above "weak–fair" (M = 2.33) to slightly above "fair–good" (M = 3.13). Raters reported more consistent placement of primary stress in frequent polysyllabic words (for example important, computer, university), and learners

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were less likely to apply default L1 patterns such as stressing only the first or last syllable.

2 Rhythm improved, but stress-timed patterns remained emerging. Rhythm scores increased by 0.66 points (M = 2.27 to 2.93), with raters noting clearer prominence on content words and some increased use of weak forms in sentences practised during instruction. However, many learners still tended to give relatively even stress across syllables in less familiar sentences, suggesting that a fully stable stress-timed rhythm had not yet been established.

3 Intonation gains were the smallest but still meaningful. Basic intonation scores rose by 0.53 points (M = 2.20 to 2.73), with a medium–large effect size. Learners showed more reliable falling contours in statements and more noticeable rises in yes/no questions in controlled practice, but in spontaneous speech their pitch movement remained limited and somewhat repetitive. This is consistent with the expectation that intonation is a later-acquired and more global skill, likely to require longer and more varied practice than the four-week program could provide.

Taken together, the prosodic results suggest that the program was more effective in stabilising word stress and rhythm than in reshaping intonation patterns, and that segmental gains (Section 6.1) were larger overall than prosodic gains. Nonetheless, the statistically significant improvements across all three prosodic dimensions indicate that even a relatively short, low-resource intervention can produce noticeable changes in how learners organise stress and timing in their English, laying a foundation for further development with continued practice.

4.3. Overall Intelligibility

Table 4 summarises the global intelligibility scores at pretest and posttest, based on the fifth dimension of the analytic rubric (1–5 scale). Intelligibility here reflects how easily a careful, unfamiliar listener could understand the learner's speech as a whole, taking into account both segmental and prosodic features.

Table 4
Pretest and posttest overall intelligibility scores (N = 30)

Measure	Pretest M	Pretest SD	Posttest M	Posttest SD	Mean gain
Overall intelligibility	2.53	0.50	3.47	0.57	0.94

A paired-samples t test showed that the improvement in overall intelligibility was statistically significant. $t(29) = 7.12$, $p < .001$, Cohen's d (paired) = 1.30, indicating a large effect size. These results indicate that, after the four-week program, learners' speech was on average rated close to "good" in terms of ease of understanding, compared with "weak–fair" at pretest.

A comparison with the segmental and prosodic outcomes suggests a coherent pattern:

Learners who showed larger gains in segmental accuracy (especially in /p–b/, /v–f/, dental fricatives, and clusters) tended to receive higher posttest intelligibility ratings. This is consistent with raters' comments that fewer L1-based substitutions and more stable clusters made words easier to recognise on first hearing.

Gains in word stress and rhythm also appeared to support intelligibility. Speech that placed stress more consistently on appropriate syllables and that gave clearer prominence to content words was described as "easier to follow," even when some segmental errors remained.

Improvements in intonation were smaller, but in cases where the learners had more distinct falling statements and rising yes/no questions, raters found fewer misunderstandings regarding

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what type of sentence the learner was uttering (as in whether the learner was asking or telling), which also contributed to easier comprehension.

In sum, the large and statistically robust enhancement in overall intelligibility may be seen as the sum of the considerable gains in segmental accuracy, and moderate but significant gains in prosodic control, especially word stress and rhythm. While improvements in segmental features appeared to convey the greatest immediate benefit to intelligibility, the prosodic improvements obviously favoured the ability of listeners to process longer stretches of speech with less difficulty.

4.4. Qualitative Findings

Analysis of learners' open-ended responses and the teacher's observation notes yielded four main themes:

1 increased awareness and control of specific problematic sounds,
2 perceived usefulness of articulatory and minimal-pair drills,
3 growing sensitivity to stress and rhythm, and
4 increased confidence and willingness to speak.

4.4.1. Greater control over specific sounds

Many learners explicitly mentioned that some of the "hard" English sounds had become easier to notice and produce, particularly /p/, /v/, /θ/, and /ð/. Several students referred to the /p–b/ and /v–f/ contrasts by name:

> "Now I can feel the air in /p/ and I know it is not b. Before, I never thought about this." (S07-G9)
>
> "I always said ferry for very. After practice I remember to turn on my voice for /v/." (S03-G11)

Some also noticed changes in their cluster production and in final consonants:

> "I used to say eschool and istreet, but now I try to say school and street without extra vowel." (S10-G9)
>
> "My teacher told me my asked and cold are more clear now, not cutting last sound." (S04-G12)

These comments align with observation notes indicating fewer substitutions of /p/ with /b/ and /v/ with /f/, and less frequent epenthetic vowels in initial /sC/ clusters during spontaneous classroom answers by Week 4.

4.4.2. Value of articulatory and minimal-pair drills

Learners frequently singled out articulatory explanation and minimal-pair listening/production as the most helpful activities. The use of mirrors and physical cues was mentioned repeatedly:

> "The mirror helped me to see my tongue for th and my lips for v; this is new for me." (S01-G9)
>
> "When we touched the throat for voice and no voice, I finally understood the difference." (S06-G11)

Minimal-pair games and response cards were seen as both useful and engaging:

> "The P/B and V/F card game made me concentrate and listen carefully; after that my pronunciation changed." (S02-G12)
>
> "I liked the competition with minimal pairs; it made me wake up and not sleep in class." (S09-G11)

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Teacher notes from Weeks 1 and 2 corroborate this theme, noting "high engagement and laughter" during minimal-pair races and "visible 'aha' moments" when students felt the difference between sounds during voicing and tissue drills.

4.4.3. Emerging awareness of stress and rhythm

Although students rarely used the technical term "prosody," many comments reflected new awareness of word stress and rhythm. Several referred to the rubber-band and clapping activities:

> "The rubber band for stress showed me which part of the word must be strong; I never thought about this before." (S05-G12)
> "Clapping on important words in the sentence helped me know that not every word is the same." (S08-G9)

Some learners reported that this awareness changed how they listened to English:

> "Now when I watch videos, I can hear strong and weak words and I try to copy them." (S03-G9)

The teacher's notes from Week 4 record that in choral reading and pair dialogues, students increasingly marked and produced clearer stress on content words and reduced some function words, especially in sentences practised during class. However, notes also mention that in fully spontaneous talk, stress and rhythm were "improved but still unstable," matching the moderate gains seen in quantitative prosodic scores.

4.4.4. Increased confidence and willingness to speak

A final recurring theme was a reported increase in confidence and a reduction in anxiety about speaking English in front of others. Several students linked this directly to feeling more in control of particular sounds:

> "Before I was shy to speak because my pronunciation is funny. Now I feel more comfortable to talk in English." (S04-G11)
> "When I know how to say problem correctly, I don't avoid the word anymore." (S02-G9)

Some observed changes in classroom participation:

> "Now I answer more in class, I am not afraid the teacher will not understand me." (S01-G12)

In teacher observation notes for the final week, the researcher recorded that "a larger number of students volunteered answers in English without prompting" and that students were "self-correcting /p–b/ and th in real-time," suggesting that the intervention may have contributed not only to performance gains but also to affective gains.

Overall, the results obtained from the qualitative research complement the results obtained from the quantitative research: learners reported that they noticed significant improvement in some of the most important sounds, found the articulatory and minimal pair exercises interesting and valuable, and reported paying more attention to stress and rhythm. They also described themselves as having more confidence when using the English language. These perceptions combined with classroom observations of an increased and more accurate rate of spontaneous production of the target sounds help to explain the robust improvements in segmental accuracy and moderate but meaningful improvements in prosodic performance and overall intelligibility found in Sections 6.1 to 6.3.

5. Discussion

5.1. Summary of Key Findings

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The present study focused on the effect of a structured and classroom-based pronunciation program on English pronunciation of Arabic L1 secondary learners, with a special focus on segmentals, prosody and intelligibility. Quantitative results indicated a large and statistically significant improvement in segmental accuracy with mean ratings increasing from 2.47 to 3.63 on the 5 point scale (Cohen's d [?] 1.50). Accuracy in the case of particular consonant contrasts such as /p-b/, /v-f/, /th-s/, /ð–z/ and consonants clusters increased by about 17-24 percentage points, suggesting a substantial reduction of key L1 related errors.

Prosodic outcomes were also significantly improved, but not as dramatically. Word stress increased from 2.33 to 3.13 ($d \approx 1.19$), rhythm from 2.27 to 2.93 ($d \approx 1.07$), and basic intonation from 2.20 to 2.73 ($d \approx 0.78$). The findings that the four-week programme increased efficacy of learners to exert control over the timing of the stress and organisational feature (phrasing) were clear, with improvements at the intonation level showing less marked but also significant improvement.

Overall intelligibility ratings improved from 2.53 to 3.47 with a large effect size (d [?] 1.30), thus suggesting that learners' speech was much easier for raters to understand. Qualitative data was supportive of the quantitative trends in that students said they felt more control over certain sounds (especially /p/, /v/, and dental fricatives), that they felt more aware about stress and rhythm, and that they felt more confident about speaking English. They were consistent in identifying articulatory explanation, minimal pair drills and rhythm/stress activities as being of particular use.

Taken together, these findings indicate that a relatively short, low-resource, teacher-led intervention can reduce salient Arabic L1 phonological transfer effects at both segmental and prosodic levels and can yield noticeable gains in overall intelligibility among Saudi secondary learners.

5.2. Interpretation in Light of Previous Research

The pattern of strong segmental gains is consistent with earlier work on Arab and Saudi learners that used explicit, form-focused pronunciation instruction. Studies that employed minimal-pair practice and articulatory explanation for difficult contrasts (for example /p–b/, /v–f/, and dental fricatives) similarly reported substantial reductions in substitution errors and clearer maintenance of phonological contrasts (Altamimi; Hamzah; Adams). The present results corroborate these findings in a secondary-school context: learners' large improvements on /p–b/, /v–f/, /θ–s/, /ð–z/, and consonant clusters suggest that segmental transfer is highly responsive to focused training even when learners are not using technology-rich tools.

The improvement in cluster production aligns with web-based and CAPT interventions that found significant gains in consonant clusters among Arab learners after targeted practice (Alsuhaibani; Nasim). However, the current study demonstrates that comparable gains can be achieved through simple classroom drills and awareness-raising, without reliance on specialised software. This is particularly important for secondary schools where access to devices, time, and technical support is limited.

Regarding prosody, the finding of moderate-to-large improvements in word stress and rhythm, and smaller but significant gains in intonation, echoes previous work showing that suprasegmental-focused instruction can enhance learners' speech production and perception. Alturki, for example, reported that Saudi male learners improved their stress, rhythm, and intonation after receiving suprasegmental-based instruction, with concomitant gains in comprehensibility. The present study extends that evidence to a younger, school-age population

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and, crucially, integrates prosodic work with segmental training rather than addressing the two domains in isolation.

The relatively smaller gains in intonation compared to stress and rhythm are not surprising. Intonation is often viewed as a more global, later-developing component of pronunciation, requiring prolonged and varied exposure and practice (Field; Pickering). Four weeks of instruction are sufficient to influence more local patterns such as word stress placement and basic rhythm, but less so for complex pitch contours in spontaneous speech. The teacher's observation that intonation improvements were most visible in controlled dialogues, but less consistent in free speech, fits this view.

More broadly, the results reinforce the now well-established claim that pronunciation is trainable and that both segmental and prosodic features respond positively to carefully designed instruction (Derwing and Munro; Mahdi). The large effect sizes obtained here are comparable to, or even exceed, those reported in CAPT meta-analyses, which typically find moderate overall effects for technology-assisted pronunciation training (Mahdi). This suggests that well-structured, low-tech classroom programs can be at least as effective as more resource-intensive approaches, particularly when they are tightly aligned with learners' known L1 transfer patterns and delivered with high intensity over a focused period.

Finally, the findings directly respond to concerns in the Saudi literature that pronunciation instruction remains marginalised and that there is little empirical evidence of what can be achieved in real classrooms (Algethami; Alharbi). By implementing a program in a mainstream secondary school, with intact classes and exam pressures, this study shows that meaningful gains are possible under ordinary conditions, provided that pronunciation is given dedicated time and explicit attention.

5.3. Implications for Theory

From a theoretical perspective, the results offer insights into the nature and modifiability of L1 phonological transfer in school-age learners. Pretest data reflected the well-documented Arabic error profile: neutralisation of /p–b/ and /v–f/, substitution of dental fricatives, avoidance or simplification of clusters, and unstable stress and rhythm. The posttest results, however, show that these transfer-driven patterns are far from fixed at the secondary level. With approximately eight hours of targeted instruction, learners significantly reduced L1-based substitutions and improved their control of stress and rhythm.

This supports models that view L1 transfer as systematic but plastic, especially when instruction directly addresses the mappings between L1 and L2 phonological categories and provides adequate opportunities for perception and production practice (Major; Saito). The combination of articulatory explanation and perception–production cycles used in this program appears to have helped learners restructure their phonological categories, not merely mimic surface forms.

The results also speak to the relationship between segmental accuracy, prosody, and intelligibility. While segmental accuracy showed the largest gains, improvements in word stress and rhythm clearly contributed to the substantial increase in overall intelligibility ratings. This pattern aligns with work distinguishing accentedness, comprehensibility, and intelligibility and demonstrating that both segmentals and prosody contribute to these constructs (Derwing and Munro; Munro and Derwing). In the present study, reductions in high-impact segmental errors likely made individual words easier to recognise, whereas more appropriate stress and rhythm appear to have eased processing at phrase and utterance level.

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The fact that intelligibility improved by almost one full scale point, with a large effect size, despite only moderate gains in intonation, suggests that segmental accuracy and stress–rhythm control may carry more immediate weight for comprehension at this proficiency level than fine-grained intonation patterns. This is consistent with claims that, for intermediate learners, segmental and stress-related improvements yield larger gains in comprehensibility, whereas intonation plays a growing role as overall proficiency increases (Saito, Trofimovich, and Isaacs).

In sum, the study provides further empirical support for a multi-component view of L2 pronunciation in which segmental and prosodic features jointly shape intelligibility and in which L1 transfer can be substantially modified through focused classroom instruction, even in the relatively constrained environment of a secondary school.

5.4. Pedagogical Implications

The findings carry several concrete implications for pronunciation teaching in Saudi secondary EFL classrooms and similar low-resource contexts.

First, they underscore the value of regular, explicit pronunciation work within the secondary curriculum. Despite the dominance of exam-driven grammar and reading, setting aside a modest but consistent amount of time—such as three short sessions per week for a limited period—can produce large, measurable improvements in learners' pronunciation and intelligibility. This supports calls to reposition pronunciation from a marginal add-on to an integral component of communicative competence in EFL programs (Gilakjani; Algethami).

Second, the results suggest that teachers should prioritise high-impact contrasts that are tightly linked to L1 transfer and have clear consequences for intelligibility. For Arabic L1 learners, this includes /p–b/, /v–f/, dental fricatives, affricates, /ŋ/, and common consonant clusters, as well as basic stress patterns and stress-timed rhythm. Focusing on a limited set of contrasts with high functional load is likely to yield better returns than attempting to "fix" every possible pronunciation deviation (Thomson and Derwing).

Third, the success of this program indicates that simple, low-cost tools and techniques can be highly effective. Mirrors, tissue or paper for airflow, hand gestures for stress and intonation, minimal-pair cards, clapping and tapping for rhythm, and short, carefully chosen word and sentence lists are all inexpensive and easily integrated into regular lessons. Teachers do not need advanced technology to make meaningful progress, though technology can certainly complement such approaches.

Fourth, the combination of articulatory explanation, perception tasks, and guided production appears particularly powerful. Rather than relying solely on imitation, teachers can help learners understand how and why sounds are produced differently in English and Arabic, then reinforce this understanding with focused listening tasks and repeated, feedback-rich practice. The positive learner perceptions of the articulatory and minimal-pair drills in this study suggest that students value and benefit from this level of explicitness.

Finally, the gains in learners' confidence and willingness to speak highlight the affective benefits of pronunciation instruction. As students feel more in control of difficult sounds and patterns, they become more willing to participate orally in class and to use English beyond the classroom. Including regular opportunities for supported speaking practice, alongside form-focused work, can therefore contribute not only to pronunciation development but also to broader oral proficiency and learner engagement.

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For curriculum designers and school administrators, these findings point to the need to embed structured pronunciation objectives and support within secondary English programs, provide professional development for teachers in pronunciation pedagogy, and allocate sufficient time and resources for sustained work on both segmentals and prosody.

6. Conclusion

This study set out to examine whether a structured, classroom-based pronunciation program could reduce Arabic L1 phonological transfer in the English of Saudi secondary learners. The findings indicate that it did. Learners showed large, statistically significant gains in segmental accuracy, particularly for consonants and clusters that are heavily affected by Arabic–English differences, such as /p–b/, /v–f/, dental fricatives, affricates, /ŋ/, and initial and final clusters. They also demonstrated moderate to large improvements in prosodic performance, especially in word stress and rhythm, with more modest but still meaningful gains in basic intonation. These changes were reflected in a large increase in overall intelligibility, as well as in learners' own reports of feeling more in control of difficult sounds and more confident when speaking English. Taken together, the results support the conclusion that a relatively short, low-resource program can substantially mitigate salient Arabic L1 phonological transfer at both segmental and prosodic levels in a mainstream secondary-school setting.

7. Limitations

Several limitations should be acknowledged when interpreting these results. First, the study was conducted in a single school with 30 male students, which limits the generalisability of the findings to other institutions, regions, or mixed-gender cohorts. Second, the research used a one-group pretest–posttest design without a control group, so improvements cannot be attributed exclusively to the intervention with the same level of confidence as in fully controlled experimental designs; maturation, increased familiarity with tasks, or other classroom experiences may also have played a role. Third, the intervention period was short—four weeks, with approximately eight hours of focused pronunciation instruction. Longer programs might produce different patterns of change, particularly for prosodic features such as intonation that typically develop more slowly. Fourth, pronunciation outcomes were based on human ratings, which, even with rater training and reliability checks, involve an element of subjectivity and may be influenced by rater expectations or familiarity with Arabic-accented English. These limitations point to the need for cautious interpretation and for replication in more varied and controlled conditions.

8. Recommendations for Future Research

Future research could build on this study in several ways. First, there is a need for studies with control or comparison groups and larger, more diverse samples, including female students, different grade levels, and multiple schools, to strengthen causal claims and enhance generalisability. Second, longer interventions with delayed posttests would help establish whether gains in segmental and prosodic performance are maintained over time and whether further improvement continues beyond the initial intensive phase. Third, follow-up work might focus more narrowly on prosody, for example by investigating the effects of extended training in stress, rhythm, or intonation alone, or by using listening-based training to target prosodic perception as a precursor to production. Fourth, comparative studies could examine how similar programs operate across different Arabic dialect regions or age groups, exploring whether learners from different dialect backgrounds respond differently to the same instructional design or whether younger learners show greater plasticity in phonological change. Finally, future research could incorporate acoustic measures alongside human ratings to provide more fine-grained evidence of changes in segmental and prosodic realisation.

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8.4 Final Remark

Despite these limitations, the present study offers encouraging evidence that structured, low-resource pronunciation programs can make a tangible difference to the intelligibility of Saudi secondary learners' English. By targeting key areas of Arabic L1 phonological transfer through explicit explanation, perception–production cycles, and focused practice, teachers working within ordinary school constraints can help learners move from "broblem" toward "problem"—not by erasing their accent, but by making their English clearer, more comfortable to process, and more effective for real communication.

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Appendix A: Pronunciation Test

A1. Word List

Learners read each word once at a natural pace. The list targets high priority segmental contrasts for Arabic L1 learners.

No.	Target feature	Word
1	/p/ vs /b/	pen
2	/p/ vs /b/	Ben
3	/p/ vs /b/	cap
4	/p/ vs /b/	cab
5	/v/ vs /f/	very
6	/v/ vs /f/	ferry
7	/v/ vs /f/	save
8	/v/ vs /f/	safe
9	/θ/ vs /s/	thin
10	/θ/ vs /s/	sin
11	/θ/ vs /s/	thank
12	/θ/ vs /s/	sank
13	/ð/ vs /z/	then
14	/ð/ vs /z/	Zen
15	/ð/ vs /z/	those
16	/ð/ vs /z/	doze
17	/ʧ/ vs /ʃ/	chip
18	/ʧ/ vs /ʃ/	ship
19	/ʧ/ vs /ʃ/	cheap
20	/ʧ/ vs /ʃ/	sheep
21	/ʤ/ vs /ʒ/	jam
22	/ʤ/ vs /ʒ/	sham

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23	/dʒ/ vs /ʒ/	page
24	/dʒ/ vs /ʒ/	beige
25	/ŋ/ in coda	sing
26	/ŋ/ in coda	long
27	/ŋ/ before consonant	banking
28	/ŋ/ before consonant	singing
29	Initial cluster (spr)	spring
30	Final cluster (sk, st, kt etc.)	asked

A2. Sentence Reading

Learners read each sentence once at a natural pace. Sentences include target segmentals and elicit word stress, rhythm and basic intonation.

1. Ben put the blue pen and the small cap in his bag.
2. The very big problem started last spring at our school.
3. The thin sheep was standing on the steep hill in the wind.
4. My English teacher asked me to speak clearly in class today.
5. Please save this page and check the beige cover again tonight.
6. Those boys were singing a long song while banking by the river.
7. She bought cheap jam and fresh bread before the ship left the port.
8. Do you think this ferry is safe for the trip, or should we wait?

A3. Short Speaking Task Prompts

Learners choose one prompt and speak for about 1–2 minutes:

- Prompt 1: “Introduce yourself and talk about your school and daily routine.”
- Prompt 2: “Describe your favourite day of the week and what you usually do.”
- Prompt 3: “Talk about a problem you solved recently and how you solved it.”

Prompts can be rotated between pretest and posttest while keeping similar level and length.

Appendix B. Pronunciation Rating Rubric

Each learner’s full test (word list, sentences, speaking task) is rated on five dimensions on a 1–5 scale. Raters consider the overall pattern, not isolated tokens.

Dim.	**Dimension & Focus**	**5 – Very good**	**4 – Good**	**3 – Fair**	**2 – Weak**	**1 – Very weak**
B1	**Segmental Accuracy** (consonants, key vowels;	Errors rare and minor; all key contrasts consistent	Some L1-based substitutions, limited to few sounds/cont	Noticeable L1 substitutions in several contrasts; errors frequent but not constant; some	Frequent and systematic L1 substitutions; many contrasts not	Pervasive segmental errors; most key contrasts neutralised

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	contrasts p–b, v–f, θ–s, ð–z, tʃ–ʃ, dʒ–ʒ, ŋ, clusters, high-load vowels)	ly maintained; L1 transfer minimal and does not affect understanding.	exts; most contrasts usually correct; mispronunciations rarely block understanding.	words misunderstood or repeated, especially clusters and dentals.	distinguished; cluster simplification and vowel distortion common; misunderstandings regular.	; speech often hard to parse at word level; intended words difficult to identify.
B2	**Word Stress** (primary stress in polysyllabic words; prominence pattern)	Stress accurate on almost all words, including long ones; clear contrast between stressed and unstressed syllables; contributes to naturalness.	Occasional misplaced stress, mainly on less frequent/longer words; most common words correctly stressed; little impact on intelligibility.	Mixed pattern; some common words correct, others L1-patterned (e.g., default first/last syllable stress); sometimes makes words harder to recognise.	Stress often misplaced or unclear; many polysyllabic words sound unnatural or confusable; weak forms rarely used; syllables sound similar.	Stress largely uncontrolled; little difference in prominence; many polysyllabic words hard to recognise without strong context.
B3	**Rhythm** (strong/weak syllables; reductions, linking, timing)	Rhythm largely stress-timed; clear beats on content words; frequent reductions on function words; phrasing and timing support easy processing.	Rhythm generally appropriate; some over-stressed function words or patches of equal stress; speech still easy to follow and fairly natural.	Rhythm fluctuates between stress-timed and syllable-timed; many words with similar stress; some unnatural timing/pauses, but meaning usually clear.	Mostly syllable-timed; most words similar in weight; reductions rare; timing occasionally makes sentences hard to process.	Rhythm flat or highly irregular; little sense of strong vs weak syllables; pauses/timing often disrupt understanding.

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B4	**Basic Intonation** (rising/falling tones; pitch movement over phrases)	Statements and yes/no questions show appropriate falls/rises; pitch highlights focus; sentence endings sound natural; intonation supports meaning.	Intonation generally appropriate; minor mismatches in some questions/long sentences but no serious comprehension issues.	Limited or repetitive intonation; some pitch movement but not always aligned with sentence type; occasional uncertainty about questions vs statements or completion.	Mostly flat or unpredictable; rises/falls often not aligned with sentence type; listeners rely heavily on context to interpret meaning.	Pitch almost flat or very erratic; intonation does not reflect sentence type; hard to know if speaker is asking, telling, or finished.
B5	**Overall Intelligibility** (global ease of understanding)	Speech easy to understand; occasional repetition only for unfamiliar words; L1 accent present but not obstructive.	Speech generally easy to follow; some nonstandard segments/prosody but rarely serious difficulty; usually understood on first hearing.	Speech understandable with some effort; listeners sometimes request repetition/clarification, especially in longer or less controlled speech.	Speech often difficult to understand; repeated clarifications needed; segmental and prosodic issues together significantly reduce comprehension.	Speech very hard to understand even for patient listener; communication frequently breaks down; many words/sentences not recognisable.

Rater instructions (summary)

1. Listen to each learner's full test before scoring.
2. Rate each dimension independently.
3. Use the whole 1–5 scale where appropriate; avoid clustering everything in the middle.
4. If two raters differ by more than one point on any dimension, re-listen, discuss, and agree on a consensus score.

Appendix C: Four-Week Pronunciation Program Outline

Each session was approximately 40 minutes and followed a general cycle:

1. Perception, 2) Articulatory explanation, 3) Controlled production, 4) Communicative practice, 5) Brief feedback.

Week 1: Key Consonant Contrasts and English /r/

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Week / Session	Focus	Target(s)	Main activities
Week 1 – S1	L1 transfer awareness; /p/–/b/	/p/, /b/	Short explanation of Arabic vs English sounds; tissue + mirror drill for /p/ vs /b/; minimal-pair listening (pen/Ben, pan/ban, cap/cab); choral and individual repetition; pair reading of short sentences.
Week 1 – S2	/v/–/f/	/v/, /f/	Voicing drill with fingers on throat; minimal-pair identification (very/ferry, save/safe); board race in teams; substitution drills in short phrases (very good, very fast, family visit).
Week 1 – S3	Dental fricatives	/θ/, /ð/ vs /s/, /z/, /t/, /d/	Tongue-peek drill in mirror; same–different listening (thin/sin, then/den); slow-to-fast repetition; short Q–A practice (What do you think; This is their book); quick review of /p–b/ and /v–f/.
Week 1 – S4	English /r/ vs Arabic rolled /r/	English /ɹ/	Contrast demonstration of rolled vs soft /r/; mirror practice to keep tongue off palate; syllables (rə, ri, ra, ro); word practice (red, very, correct, Arabic); short dialogue: meeting a new friend.
Week 1 – S5	Integrated review	Week 1 targets	Quick perception quiz (students mark P/B, V/F, TH/S); reading of short sentences rich in target sounds; brief recorded pair dialogue to capture post-week performance.

Week 2: Affricates, /ŋ/, Final Consonants and Clusters

Week / Session	Focus	Target(s)	Main activities
Week 2 – S1	Affricates vs fricatives	/tʃ/, /ʃ/, /dʒ/, /ʒ/	Step drill: /t/ + /ʃ/ → /tʃ/, /d/ + /ʒ/ → /dʒ/; minimal pairs (chip/ship, cheap/sheep, jam/sham, page/beige); picture naming; short story containing many ch/j words.
Week 2 – S2	Velar nasal /ŋ/	/ŋ/ in coda and before /k, g/	Nose vibration test for /n/ vs /ŋ/; -ing practice (sing, sitting, playing, thinking); avoid extra /g/; phrases (sing a song, long ring); rhyming word game.
Week 2 – S3	Final consonants and devoicing	Final /b, d, g, v, z/	Final sound "hold" drill with throat touch; minimal pairs (bag/back, leave/leaf, please/police etc.); short sentences; shadowing teacher models.
Week 2 – S4	Initial clusters	/sp, st, sk, spr, str, skw/	Contrast eschool vs school, isport vs sport; syllable clapping; perception (correct vs with epenthetic vowel); chain drill: each student

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			adds a cluster word; short Q–A about school and sports.
Week 2 – S5	Final clusters and integration	-sk, -st, -ld, -kt, etc.	Clap-the-cluster (ask, desk, text, cold, milk, next); "cluster ladder" on board; short reading with many clusters; picture description using cluster words; brief recorded cluster sentences.

Week 3: Vowel Contrasts and Schwa

Week / Session	**Focus**	**Target(s)**	**Main activities**
Week 3 – S1	High vowel length/quality	/ɪ/–/iː/, /ʊ/–/uː/	Vowel line (short vs long); minimal-pair listening (ship/sheep, live/leave, full/fool, pull/pool); hand gestures for length; short sentences (Sheep live on the hill; Please pull the full box).
Week 3 – S2	Low vowel contrasts	/æ/, /ʌ/, /ɑː/	"Three a's" hand positions; word sorting (cap/cup/carp, lack/luck/lock); teacher dictation; short contexts to highlight meaning differences.
Week 3 – S3	Schwa and weak syllables	/ə/	Contrast strong vs weak: PHOtograph vs phoTOgraphy, about, ago, again; underline stressed syllables; clap strong vs weak; choral word lists; reduction of function words (to, for, of, can) in short sentences.
Week 3 – S4	Vowels in context	Mixed vowels + schwa	Mixed minimal pairs; pair quizzes using cards; short reading text with stress marking; teacher feedback on main recurring issues.
Week 3 – S5	Integration with consonant work	Segmentals + vowels	"Pronunciation bingo" with key words; mixed reading of word list + short sentences; brief recorded monologue (e.g., "describe your weekend") to capture vowels and consonants together.

Week 4: Word Stress, Rhythm, Intonation and Consolidation

Week / Session	**Focus**	**Target(s)**	**Main activities**
Week 4 – S1	Lexical stress	Stress in polysyllabic words	Rubber-band stress on words such as important, computer, university, information; students mark stress; choral repetition; match words to stress patterns.
Week 4 – S2	Sentence stress and rhythm	Content vs function words; reductions	Box content words in sentences; clapping/tapping beats: I will **GO** to the **MARket** with my **FRIENDS**; compare flat vs stressed versions; short pair dialogues using prompts.

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Week 4 – S3	Basic intonation	Falls in statements; rises in yes/no questions	Hand-gesture intonation: rising vs falling curves; practice minimal pairs of sentence types (You are ready. / Are you ready?); Q–A chains around the class; mini role-plays requiring questions and answers.
Week 4 – S4	Integrated practice	All segmentals + prosody	Short text reading with stress and pause marks; group reading; explicit focus on difficult consonants/vowels within sentences; peer checklist (sounds, stress, rhythm, intonation).
Week 4 – S5	Final consolidation and posttest prep	All targets	Quick review of toughest sounds; guided practice of test-like words and sentences (not identical to actual test); free speaking in pairs (e.g., future plans); short class reflection on what improved and what is still hard.