ESP[1] within ESP: the design and implementation of a pronunciation module in a technical English course

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Abstract

This paper focuses on the design and implementation of a ten-week pronunciation module within a university technical English course as part of a broader study that investigates the efficacy of explicit rhythm instruction to improve engineering students' prosody in English. Sessions were adapted to the course contents and followed Celce-Murcia, Brinton & Goodwin's (1996) steps to teach communicatively. The participants were 298 Spanish/Catalan-speaking first-year undergraduate engineering students divided into three experimental groups and three control groups. The experimental groups received explicit rhythm instruction while the control groups did not. They all were recorded before and after the training. Ten sentences were analyzed acoustically and measures of rhythm (VarcoV) were obtained. Preliminary results revealed that students who took rhythm instruction tended to increase their VarcoV values, approaching English rhythm, while the control group showed a volatile behavior. The comparison of the effect sizes of each group's differences in performance before and after instruction was statistically significant. Findings suggest that rhythm instruction can be beneficial to enhance EFL students' prosody and that pronunciation can be effectively introduced within an ESP course.

Keywords: English for specific purposes (ESP); English as a foreign language (EFL); pronunciation teaching; rhythm instruction; VarcoV.

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1   ESP stands for English for specific purposes.

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1. Introduction

Pronunciation could be considered the *ugly duckling* of the English as a foreign language teaching (EFLT) field. Although many researchers and teachers agree with the significant role that pronunciation plays when trying to communicate in the second language, learning and practicing pronunciation within the classroom is very rare and, sometimes, even inexistent. Among the main reasons why pronunciation is generally ignored when teaching English as a foreign language, many professionals claim that they have not received the proper training to teach pronunciation (Henderson et al., 2012). As a consequence, many teachers rely on the pronunciation section within textbooks and try to strictly follow the instructions provided to carry out the exercises. However, improvement among students is highly questionable, so many times teachers find these exercises pointless and a waste of time. For this reason, a lot of them decide to skip the section and use that time to teach other competences, which seems to be more rewarding since improvement is more obvious.

Indeed, time plays against the language learning process. Language instructors are expected to teach several skills (speaking, writing, reading and listening) in a very limited amount of time. Besides, other external factors, such as overcrowded classes, disparity of levels or classroom arrangement, also affect the learning pace. Among all the skills, speaking is usually the most challenging one for both teachers and students because its practice is more difficult to manage. Speaking activities imply a certain degree of classroom disruption, which is time-consuming and difficult to monitor. Moreover, pronunciation, in spite of being a feature at the foundations of the speaking competence, is often pushed into the background since a correct use of content and grammar tends to be prioritized when assessing conversational interaction in English (Frost & Picavet, 2014).

However, pronunciation is a key factor to guarantee successful oral communication. It is not uncommon to have students in class who might have an advanced command of vocabulary and grammar in the target language but fail to be understood and transmit the message because their pronunciation is poor. However, many times students are not conscious of their own pronunciation mistakes or, if they are, they do not know how to correct them. As a result, students get frustrated when realizing that it is difficult to understand them, and they can even end up being afraid of speaking. In addition, students in general tend to feel stressed when they are placed on the spot, which accentuates when they have to communicate in a language they do not completely master, as they do not have the native speaker strategies and techniques to address the situation (Walker & White, 2013).

The introduction of suitable pronunciation teaching within the EFL classroom, hence, becomes an alternative to tackle communication problems in the target language because the teacher can help students overthrow their fears and frustrations. Teachers have to evalu-

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ate which pronunciation features are important to acquire in order to avoid communication breakdowns and assure that students get the message through. Therefore, it is not a question of sounding like native speakers, but that students apply and acquire certain tools to become more intelligible, understandable and fluent (Gilbert, 2008).

For this purpose, it is essential that teachers are aware of the elements that can help students reach this communicative goal and work on the best way to teach and practice them. This is a challenging task to deal with in the foreign language classroom, but it can become even worse when working with English for specific purposes (ESP) students. In this particular case, the language instructor has to bear in mind not only linguistic aims but also conceptual ones: language is directly connected to content in the sense that language teaching has to meet the demands of real authentic situations related to a specific field, such as engineering or tourism (Tzoannopoulou, 2015). Generally, ESP students are exposed to speaking situations where they have to solve a problem they are expected to face in their professional career. Nevertheless, pronunciation tends to be set aside. In fact, very few studies have been conducted to investigate how effective pronunciation teaching could be within the ESP classroom, although outcomes are encouraging (Chela-Flores, 1993).

This article will present some preliminary results of an ongoing study focused on the design and implementation of a pronunciation module within an existing technical English course taken by Catalan/Spanish engineering students at Rovira i Virgili University in Tarragona, Spain. The module was based on the explicit instruction of language rhythm as a mechanism to foster communication in English. As it was designed for an ESP course in particular, not any type of teaching resources were valid: materials and activities used were directly linked to the existing course content, creating a little ESP speaking section within a larger ESP program. Results investigated how explicit rhythm training improved students' acquisition of English rhythm and, consequently, how it enhanced their prosody.

2. Theoretical framework

In order to provide efficient instruction, it is essential to observe what the main problems are that students face when interacting in the target language. Unlike ESL students, EFL learners are not surrounded by the English language in their everyday lives and they do not normally have to use it on a daily basis. It is true that nowadays learners have access to more input thanks to the Internet. However, language production is still mainly reduced to the classroom practice. Besides, although they have the opportunity to listen to the target language often, their perception is inevitably affected by their mother tongue (L1) (MacWhinney, 2005). When students perceive a feature that is different in the target language (L2), they look for a similar version in their L1, assume it works similarly in both languages and apply it when speaking in the L2. With nobody guiding them, learners find their interpretation suitable and, consequently, they can make mistakes difficult to self-correct. For this reason, bringing these errors

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into the classroom and looking for techniques and practice that help learners recognize and rectify them becomes a key issue.

As far as pronunciation is concerned, learners' first attempt to perceive and produce a second language is based on their first language phonological system (Chela de Rodríguez, 1976). According to Flege's theory on error prevention (1991), the more alike the L1 and the L2 sounds are, the more difficult the L2 sound is to acquire due to an unconscious assimilation of the L1 sound into the second language discourse. This phenomenon causes a negative transfer (Celce-Murcia, Brinton & Goodwin, 1996) that can lead to communication difficulties. In fact, it does not only affect pronunciation at the sound level (segmentals), but also at the prosody level (suprasegmentals). Listeners can misinterpret or even completely fail to understand a message if the speaker does not use intonation, rhythm and stress properly. As a consequence, teaching suprasegmentals to improve communication skills becomes beneficial for EFL students as they obtain resources to solve misunderstandings that go beyond the meaning of single words (Gilbert, 2008). Several studies support the introduction of pronunciation in the English classroom to tackle production issues, and many of them encourage suprasegmentals teaching because it can help learners improve their intelligibility and comprehensibility in terms of global communication (for a review, see Derwing & Munro, 2015).

2.1. Language rhythm in the EFL classroom

Language rhythm is a pronunciation aspect that establishes the base of the speech (Gilbert, 2008). It relates to the perception of patterns within long utterances that communicate meaning by reflecting how speakers organize their thoughts (Celce-Murcia, Brinton & Goodwin, 1996). In fact, it anticipates lexical and syntactic information that becomes vital for a complete understanding of a message (Derwing & Munro, 2015), so the use of the wrong rhythm when speaking a language can lead to misinterpretations and even a complete loss of the thread of the conversation.

In 1940 Lloyd James attempted to describe differences between the rhythms of two languages, Spanish and English. He argued that Spanish sounds like a sequence of machine gun shots while English evokes morse-code messages. These two different perceptible patterns established the traditional classification of stress-timed and syllable-timed languages, coined by Pike (1945) and later supported by Abercrombie (1967). On the one hand, the organization of rhythm in Spanish is subjected to syllables pronounced following a repetitive and constant temporal pattern; English rhythm, on the other hand, is based on stress, distinguishing two different beats, a strong one and a weak one (stressed and unstressed syllables respectively), creating regular interstress intervals. Hence, depending on the rhythmic feature that gets repeated and its duration, a language could be classified into one of these two main groups. Nonetheless, it is true that there are languages which do not fit completely in one rhythmic group. In fact, different rhythmic cues play a role on classification. Catalan, for example, is

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considered a syllable-timed language due to a simple syllable structure and a weak contrast between stressed and unstressed syllables. However, vowels are reduced in unstressed position, which is typical of stress-timed languages (Nespor, 1990). For this reason, the main patterns should be interpreted as extreme poles of a continuum in which languages are placed closer or further from them depending on the amount of rhythmic cues they share.

The thing that all of these patterns have been traditionally thought to have in common is a sense of isochrony: the rhythmic division is based on the equality of the fragments. Nevertheless, some experts have challenged the concept of rhythmic isochrony, postulating that the length of the repeated features varies depending on rhythmic nuances such as syllable structure or vowel quality (Dauer, 1983; Nespor, Shukla & Mehler, 2011). In fact, several studies have objectively proved that the same duration of repeated features cannot be fully guaranteed. However, there are others that continue to believe in a perceivable tendency towards isochrony (see Lehiste, 1977; Dauer, 1983, for a review). Regarding EFL teaching, the instruction and practice of isochrony can help L2 learners adjust their speech in a more intelligible way, especially when a stress- and a syllable-timed languages are implied. Knowing how to lengthen stressed syllables and to reduce unstressed ones when speaking English can help Spanish students of English not to sound monotonous and highlight meaningful information found in content words, for instance. The fact that interstress intervals do not last exactly the same does not affect the correct interpretation of a message, but a lack of a tendency to use longer and shorter syllables when speaking English could affect perception and, consequently, damage comprehension.

Some studies have brought rhythm into the classroom, obtaining encouraging results that support its teaching for communicative purposes. Hahn (2004) investigated the role of primary stress in an international teaching assistant's (ITA) speech. Three versions of the speech were assessed by ninety North American English college freshmen: in the first version, stress was correctly place; in the second one, it was incorrectly placed; and in the third one, it was omitted. When primary stress was used correctly, the speech was considered more intelligible and comprehensible than the rest. Chela de Rodríguez (1981) designed 10 sessions on word-decontextualized rhythmic patterns taught to Spanish students of English from a teacher-training program at the University of Zulia, Venezuela, for a semester (as cited in Chela-Flores, 1997: 122). Students practiced to recognize them and use them in long utterances and speeches. Results revealed a noticeable improvement in perception and recognition under controlled circumstances. Tsiartsioni (2011) worked with three age groups of EFL Greek students (6, 12 and 16 years old respectively). Each age group was divided into two subgroups, one that received rhythm instruction (experimental) and another one that did not (control). Vocalic and consonant pairwise variability index (PVI) values for recordings before and after the instruction were obtained and results showed that the rhythm of the experimental group improved while the control group performance remained the same.

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3. Methodology

3.1. Hypotheses

Along these lines, the present study focuses on the investigation of the effectiveness of explicit rhythm instruction on Spanish/Catalan EFL learners to improve their global prosody in English. For this purpose, the following hypotheses were outlined:

1. By applying Celce-Murcia, Brinton & Goodwin's steps to teach communicatively (1996) within pronunciation instruction students will improve their L2 global prosody.

2. Students' L1 negative transfer (Celce-Murcia, Brinton & Goodwin, 1996) will decrease more when receiving explicit rhythm instruction.

3. Students receiving continuous rhythm instruction will become more intelligible, comprehensible and fluent.

This paper focuses on the first two hypotheses, leaving the third one for forthcoming research.

3.2. Context

The experiment was performed as part of a technical English course, compulsory for first-year engineering students of all the disciplines instructed, i.e. industrial and electronics, electrical, computers, telematics, telecommunication and biotechnology. Students were randomly distributed into six different groups according to their individual preferences and schedules. The course took place from February to May and it consisted in two weekly two-hour sessions during sixteen weeks. As for the English level, the teaching target was a B 2.1 of the Common European Framework of Reference for Languages (CEFR).

3.3. Participants

The module was designed for an initial amount of 298 students divided into groups of approximately 30 students each. However, only those students who attended at least 90% of the sessions were counted as participants, owing to the longitudinal nature of the study. Unfortunately, a lot of students dropped out or skipped sessions; university students in Spain are free to decide whether they attend classes or not. Recordings before an after the sessions were counted as part of the final grade and students were strongly advised to attend the sessions in order to improve their oral skills for the day of the final oral presentation. Still absenteeism could not be completely controlled. In the end, 42 learners, 21 per treatment group, were included in the study. Table 1 shows the profiles of the final participants:

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TABLE 1

Participants' profiles

GROUP	AGE		MOTHER TONGUE			ENGLISH LEVEL (CEFR)		
	18	18+	Sp/Cat	Sp	Other	A2-B1	B1-B2	B2-C1
Experimental	21	0	20	1	0	10	6	5
Control	16	5	17	1	3	4	11	6

Note. Sp = Spanish. Cat = Catalan. CEFR = Common European Framework of References for Languages.
Source: Compiled by author.

Most of the participants (aged between 18 and 20 years old) were bilingual speakers of Spanish and Catalan. In spite of the fact that some of them were balanced bilinguals while others showed dominance in one of the languages, all of them pursued primary and secondary education in Catalonia, so they knew both Spanish and Catalan. Their command of English varied considerably, although most of them had a preintermediate/intermediate level and just a third of them started out with an advanced level. Despite the observed variability, language level was not initially considered a decisive factor.

3.4. Procedure

A longitudinal classroom-based study was performed based on the implementation of a pronunciation module within regular lectures. Bearing in mind the length of the semester, breaks, days off and unexpected events such as absences due to illness, the pronunciation module was designed to last ten weeks. Each week students participated in a pronunciation session that lasted thirty minutes. The six groups were randomly labelled as either experimental or control, giving rise to three experimental groups and three control groups. The difference and focus of study between groups was explicit rhythm training: experimental groups received explicit rhythm instruction while control groups did not.

The module was designed taking into account the course content. Consequently, sessions not only took into consideration the linguistic notions and the technical context of the course to arrange materials and activities that met students' needs and enhanced motivation (Anderson-Hsieh, 1990), but also they were scheduled after regular lectures so that the vocabulary and grammar used were already taught in class and familiar to the learners. Figure 1 presents an example of how the module was structured according to the course syllabus. On the left, the first two units of the course are displayed. As highlighted, in unit one students were expected to review verbal tenses and in unit two they would work on physical and function description. As a consequence, the first pronunciation sessions, shown on the right, included the pronunciation of the regular past tense (i.e. *-ed* ending) together with some technical

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words already used in class whose pronunciation differs depending on derivational morphemes or their compound nature.

UNIT 1: HISTORICAL FACTS IN ENGINEERING
· 1.1 Chronological description: narrative texts
· 1.2 Review of verb tenses: ways to express time sequence
· 1.3 Genres: Encyclopaedias

UNIT 2: A COMPUTERIZED WORLD
· 2.1 Physical and function description: ways to describe the physical properties, the function and parts of a device, and how something works.
· 2.2 Review of prepositions and Phrasal Verbs.
· 2.3 Genres: focus on audience and purpose.

MODULE OF SPEAKING SKILLS: PRONUNCIATION IN CONTEXT
1. Introduction
2. Words
   2.2. Present vs. Past
   2.3. Technical terms
      2.3.1. derivational morphemes (-tion, -an, -ly, etc.)
      2.3.2. compound nous vs. adjective + noun
3. Sentences
   3.1. Process description
   3.2. Graph description
4. Speech
   4.1. Talk
   4.2. Debate
   4.3. Oral Presentation

Note. Source: Figure on the left, extracted from the course syllabus (Rueda, 2017).
Figure on the right compiled by author

The pronunciation module was further organized according to the complexity of the speech units to be practiced, starting from simple, short ones (words) to more complex and longer utterances (sentences and speech) in order to scaffold learning. Therefore, experimental students were expected to get familiar with word stress first, then they were to upgrade their knowledge of stress by applying it to sentences and, finally, they were to use it at the speech level, together with rhythmic features like sentence focus.

To guarantee the communicative purpose of the sessions, these were outlined according to Celce-Murcia, Brinton & Goodwin's steps to teach communicatively (1996: 36). This teaching approach is based on form-focused instruction within a communicative context, focusing both on meaning and form. Sessions, hence, started with an introduction and description of the feature to practice. Then, students listened to the feature in order to get familiar with it and distinguish it in context. Finally, they practiced it progressively, from simple and controlled situations to more complex and extemporaneous ones. A wide range of activities such as video and audio recordings, reading aloud exercises, guessing games and picture narratives, among others, were carried out at the different teaching stages. Both experimental and control sessions were designed according to this communicative framework. Thus, sessions of both groups were outlined to look as similar as possible despite the slight variations that the instruction of rhythm could imply. Figure 2 displays the teaching plan for session seven on graph description, where it can be observed how Celce-Murcia, Brinton & Goodwin's (1996) steps were applied and the difference in treatment, highlighted in bold:

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FIGURE 2

Sample session 7 on graph description

Control group	Experimental group
Graph description video: students watch a video on graph description expressions.	*Graph description video:* students watch a video on graph description expressions.
Graph description podcasts and fill in the gaps: students listen to the descriptions and draw the corresponding graph. Then, they listen to it again and fill in the descriptions with the corresponding expression.	*Graph description podcasts and **rhythmic units identification**:* students listen to the descriptions and draw the corresponding graph. **Then, they listen to it again and divide the sentences into rhythmic units. Correction is made by clapping**.
Read aloud: students read the descriptions aloud to their partner trying to imitate the speaker.	*Read aloud:* students read the descriptions aloud to **their partner bearing in mind rhythmic units. They can clap if needed.**
Complete the graph: In pairs, each student has to describe the half of the graph they have to their partner while the later draws the missing part.	*Complete the graph:* In pairs, each student has to describe the half of the graph they have to their partner while the later draws the missing part. **They need to bear rhythmic units in mind, so clapping while reading is allowed.**
Describe your own graph: In pairs, students describe a graph that they invent and their partner draws it.	*Describe your own graph:* In pairs, students describe a graph that they invent and their partner draws it.

Note. Source: Compiled by author.

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For this session, students watched a video where graph description expressions, already seen in class, were pronounced and used to describe a real graph. Then, they listened to several descriptions and they had to draw the corresponding graph. When listening to it a second time, control groups had to fill in the transcripts of the descriptions with the right expression while experimental groups, which had already worked on stress within thought groups in the previous session, had to divide the descriptions into rhythmic units. In addition, correction was carried out using clapping, a technique to practice the distinction between stressed and unstressed syllables in English. Next, students practiced how to describe graphs orally in pairs. First, they had to read aloud the transcripts of the descriptions to their partner trying to imitate the speaker. Second, the couple shared a graph, but each member had just half of it; they had to describe their half to their partner to complete the graph. Finally, students created their own graphs and described them to their partners. At the practice stage, both groups participated in the same activities, but the experimental one trained rhythmic units while doing them, clapping if necessary.

Students were recorded the first week of class after the course presentation and then right after the module instruction, just one week before the final oral presentations. They were recorded individually in three isolated rooms at the university library. Two Sony PCM-M10 and a Zoom H4nsp recorders were used. Students had to read ten sentences and a paragraph aloud, introduced themselves, and give their opinion on a topic of discussion (*Are social networks useful or dangerous?*). Recordings were estimated to last five minutes each. For this study only the sentences were analyzed. The nature of the sentences was uncontrolled, i.e. rhythmic cues such as syllable structure were not considered. However, they were chosen to represent a wide range of sentence structures and include technical jargon that students were expected to use during the course and their professional career.

3.5. Materials

The materials used were either taken from existing pronunciation sources and adapted to the technical context or taken from other sources and modified to meet the aims of the sessions. Three pronunciation books were used to collect rhythm materials: Beisbier (1994), Gilbert (2005a, 2005b) and Earle-Carlin (2011). Also, resources from research studies were adapted and used. For instance, Chela-Flores (1997) rhythmic patterns were used in a guessing game where students had to recognize the technical word missing by listening to its rhythmic pattern used within a sentence (see appendix I). On the other hand, several images, videos and podcasts available online were also used to create activities. For example, images on the operation of different power plants were used to design communicative activities in which students had to describe how the plant works.

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3.6. Assessment

As mentioned before, recordings before and after the instruction were part of the course evaluation. By completing the exercises, they obtained a small percentage of the overall grade. However, their oral skills where assessed by means of the final oral presentation; the recordings, hence, were mainly used to gather data for the study.

3.7. Data analysis

Sentences were segmented using PRAAT (www.praat.org) and manually divided based on Ordin & Polyanskaya's criteria (2014, 2015). Besides, Olive, Greenwood & Coleman's (1993) guidelines for sound identification were taken into account. An example of sentence segmentation is shown in Figure 3:

FIGURE 3

Example of a segmented sentence using PRAAT
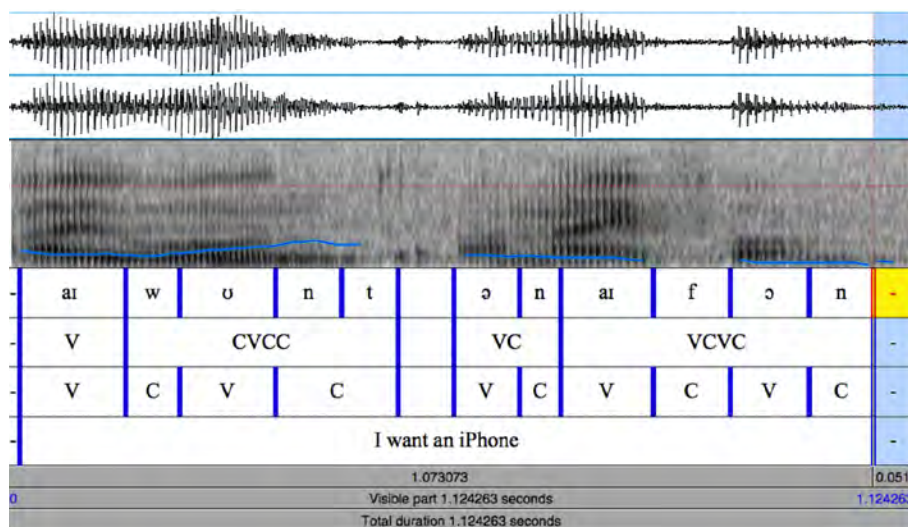
Note. Source: Compiled by author.

For each sentence, three tiers were created: the first tier represents an approximate transcription of the sounds uttered; the second tier shows the combination of vocalic and consonant sounds per word; and the third tier displays vocalic and consonant intervals in the sentence, which are grouped within the same cluster when the sounds are pronounced without pauses. Hesitations, repetitions and pauses are represented by blanks and they were not counted when analyzing the rhythm of the sentences. While the two first tiers were used for visual purposes, Ordin & Polyanskaya's script (2015) was run to the third tier to calculate VarcoV values [i.e. "the standard deviation of vocalic interval duration divided by mean vocalic du-

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ration, multiplied by 100" (White & Mattys, 2007: 508)]. VarcoV has been suggested to be an effective measure to calculate rhythm within second language acquisition (White & Mattys, 2007). Besides, a difference in VarcoV values between English and Spanish/Catalan has been found, showing that English has higher values than Spanish/Catalan (Prieto et al., 2012). For this reason, this study aims to investigate whether VarcoV values increase after pronunciation training.

3.8. Statistical analysis

In order to test the effect of explicit rhythm instruction on students' command of English rhythm, several mixed ANOVAs and t-tests were performed. First, we studied the general impact on learners' speaking competence. For this purpose, a mixed ANOVA was carried out with time (before and after training) and sentence as within-subjects factors, and group (experimental or control) as a between-subjects factor; VarcoV values were the dependent variable. Next, we wanted to investigate the magnitude of the difference between production before and after instruction, so another mixed ANOVA was run with the difference between each sentence performance before and after the instruction as the dependent variable, sentence as the within-subjects factor and the group as the between-subjects factor. In addition, t-tests were also performed to examine the importance of the difference depending on the type of instruction received. For each of the sentences, four t-tests were completed: two paired-samples t-tests comparing the groups' learning progress, and two independent-samples t-tests comparing the groups' starting and final performance. Finally, a further independent-samples t-test comparing the two groups' effect sizes for the ten sentences was also carried out. For all the tests, the alpha value was set at .05.

4. Results

As shown in Table 2, the control group increases VarcoV mean values in half of the sentences while the experimental group's figures rise in 8 out of 10. Therefore, it seems that, initially, rhythm instruction positively influences students' English rhythm acquisition.

To further prove the validity of rhythm instruction, the first mixed ANOVA was run with time and sentence as within-subjects variables and group as a between-subjects factor. Results reveal non-significant effects for either time, $F(1,40) = 2.006$, $p = .164$, or group, $F(1,40) = .267$, $p = .608$, but a significant effect for sentence, $F(9,32) = 29.172$, $p = .01$. However, a look at the time*sentence interaction reveals a non-significant result, $F(9,32) = 1.185$, $p = .313$, probably due to the uncontrolled nature of the sentences used in the study.

A closer look at the results, however, shows that, overall, VarcoV values of both groups rose, but the experimental group values increased sharply while the control group ones remained

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TABLE 2

VarcoV means for each sentence before and after the instruction: bold figures represent an increase in VarcoV values after instruction

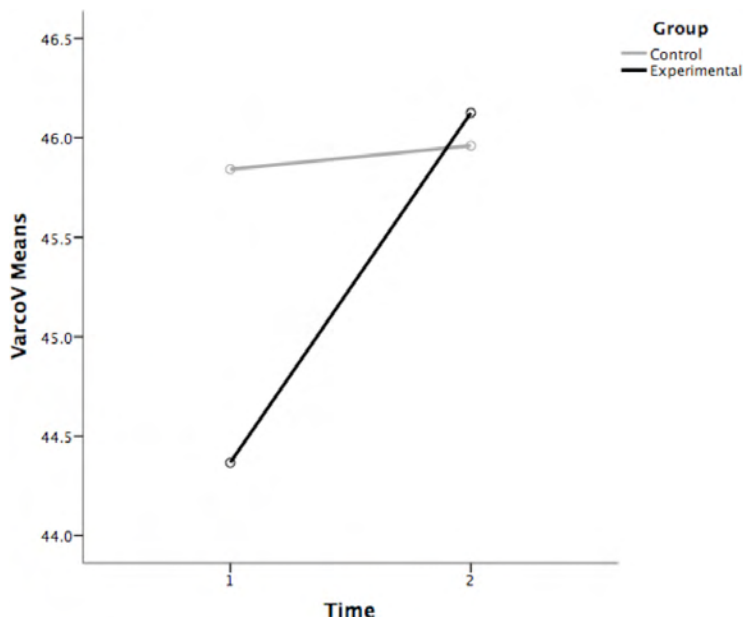| MEAN VARCOV VALUES				
	CONTROL		EXPERIMENTAL	
Sentence	*Pretest*	*Posttest*	*Pretest*	*Posttest*
1	0,37	0,36	**0,39**	**0,40**
2	0,40	0,40	**0,38**	**0,39**
3	0,39	0,38	**0,38**	**0,39**
4	0,54	0,52	**0,50**	**0,51**
5	**0,45**	**0,47**	**0,41**	**0,50**
6	**0,48**	**0,49**	0,45	0,45
7	0,55	0,53	**0,53**	**0,56**
8	**0,42**	**0,43**	**0,41**	**0,43**
9	**0,49**	**0,51**	0,52	0,48
10	**0,48**	**0,52**	**0,48**	**0,51**

Note. Source: Compiled by author.

almost stable (see Figure 4). In addition, the experimental group values were much lower for the pretest, which suggests that the control group was better at adopting English rhythm at the beginning of the course (possibly a consequence of initial level variation). Nevertheless, the experimental group outperformed the control group at the end of the course, showing a higher degree of improvement.

In order to test the differences between the pre- and post-test results depending on the training received, the second mixed ANOVA was carried out. This time we took into account the difference between the VarcoV values before and after the instruction as the dependent variable, sentence as the within-subjects factor and group as the between-subjects factor. This time, results show no significance for either group, $F(1,40) = 1.532$, $p = .223$, or sentence, $F(9,32) = 1.185$, $p = .313$; the group*sentence interaction was also non-significant $F(9,32) = .961$, $p = .456$.

T-tests were run to examine variations within each sentence. Four t-tests were performed per sentence: two paired-samples t-tests comparing each group before and after training, and two independent-samples t-tests comparing both groups before and after instruction (see appendix II for results). No significance was found for most of the t-tests ($p > .05$). Nevertheless, a discernible difference between the experimental and the control group effect sizes when examining paired-samples t-tests was obvious. In fact, the experimental group showed a tendency

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FIGURE 4

VarcoV progress before and after the instruction

Note. Source: Compiled by author.

towards a positive difference while the control group showed many incongruities and, what is more, when the differences of both groups were positive, the experimental group' ones were always higher. To investigate the relevance of the effect sizes, a further independent-samples t-test comparing those was performed and the results show significance $T(18) = -2.102$, $p = .05$. Therefore, results suggest that VarcoV values tend to increase more when rhythm is explicitly taught, but more investigation needs to be conducted to reach conclusive findings.

5. Discussion

Despite the fact that further research needs to be conducted, findings revealed that rhythm instruction helps students increase their VarcoV values and, hence, adopt a more English-like rhythm (hypothesis 2). The experimental group showed a steady tendency towards an increase while the control group was inconsistent. Also, when both groups showed positive improvement, the experimental group outscored the control group since their difference in values was always higher. Therefore, the decrease of the negative transfer from the L1 in terms of rhythm is more noticeable when rhythm is explicitly taught and, consequently, prosody improves. These results go along the lines of Tsiartsioni (2011). However, the lack of significance in most of the tests performed questions the use of VarcoV as a strong indicator of rhythm for L2 teaching studies, so other rhythmic measures such as PVI should be tested as well to make findings more conclusive.

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On the other hand, both groups showed some degree of improvement. Therefore, the use of a communicative framework or, at least, the introduction of pronunciation teaching within the course is revealed to foster L2 students' prosody (hypothesis 1). This study, hence, seems to concur with those studies which claim that explicit pronunciation teaching, especially suprasegmental instruction, is beneficial for EFL students. However, more research needs to be conducted to reach decisive conclusions.

5.1. Limitations of the study

Many external factors that affected the implementation of the experiment could have affected results. First, although sessions were designed to fit large classes, having more than thirty students per class affected feedback: the teacher could not always provide individual correction and students had to rely on their partners' criteria as well as their own to assess their everyday performance. Second, the traditional arrangement of the classroom made group work difficult and time-consuming. In fact, time was found tight to carry out the sessions. Rhythm is, in most of the cases, an unknown language feature for L2 students and, as such, its acquisition takes time. Hence, more than thirty minutes will be needed to ensure students' assimilation of the concepts taught. Third, absenteeism considerably reduced the number of subjects to be analyzed, so the statistical power of the experiment was limited. Finally, motivation and attitude varied depending on the student. ESP learners are not language-oriented. Thus, there were students who did not participate actively in class, while there were others who showed a lot of enthusiasm and worked really hard.

6. Conclusions

Despite not always being significant, findings were found enlightening. The positive tendencies towards an improvement after instruction not only suggest that L2 students can benefit from explicit rhythm instruction, but also that pronunciation can be successfully taught within an ESP context. However, the impact of these benefits needs to be further tested. It will be interesting to see the extent to which this improvement in the students' prosody affects their comprehensibility and fluency (hypothesis 3). This study has to be seen, hence, as an initial approach. As mentioned at the beginning of this article, it is part of a broader ongoing research project, which aims to analyze more data and, hopefully, obtain more conclusive results.

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8. Appendixes

8.1. Appendix I: Example of Chela-Flore's (1997) rhythm activity adapted to a technical context

Student A: Which word is missing?

Read the sentences to your partner until he/she guesses the missing word.

1. A **la LA la** suggested to Tina that it was time to have her truck battery removed and replaced. **(MECHANIC)**

8.2. Appendix II: Results t-tests per sentence

VarcoV	SENTENCE	T-TEST	T-TEST (*p*)	T-TEST (*t*)	EFFECT SIZE
	1	Cnt. pre vs. Exp. pre	.637	.475	
		Cnt. post vs. Cnt. pre	.565	-.584	-1.2753
		Exp. post vs. Exp. pre	.428	.810	1.7669
		Cont. post vs. Exp. post	.132	1.538	
	2	Cnt. pre vs. Exp. pre	.511	-.663	
		Cnt. post vs. Cnt. pre	.794	.265	.0578
		Exp. post vs. Exp. pre	.702	.389	.0848
		Cont. post vs. Exp. post	.565	-.580	
	3	Cnt. pre vs. Exp. pre	.672	-.272	
		Cnt. post vs. Cnt. pre	.582	-.559	-.1221
		Exp. post vs. Exp. pre	.789	.271	.0592
		Cont. post vs. Exp. post	.787	.427	

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4	Cnt. pre vs. Exp. pre	.114	-1.615	
	Cnt. post vs. Cnt. pre	.303	-1.056	-.2305
	Exp. post vs. Exp. pre	.440	.787	.1718
	Cont. post vs. Exp. post	.928	-.091	
5	Cnt. pre vs. Exp. pre	.120	-1.588	
	Cnt. post vs. Cnt. pre	.550	.608	.1327
	Exp. post vs. Exp. pre	*.007	2.988	.6521
	Cont. post vs. Exp. post	.515	.657	
6	Cnt. pre vs. Exp. pre	.386	-.877	
	Cnt. post vs. Cnt. pre	.858	.181	.0394
	Exp. post vs. Exp. pre	.823	-.226	-.0494
	Cont. post vs. Exp. post	.164	-1.417	
7	Cnt. pre vs. Exp. pre	.432	.794	
	Cnt. post vs. Cnt. pre	.437	-.793	-1.7303
	Exp. post vs. Exp. pre	.284	1.102	.2404
	Cont. post vs. Exp. post	.426	-.804	
8	Cnt. pre vs. Exp. pre	.692	-.399	
	Cnt. post vs. Cnt. pre	.582	.559	.1221
	Exp. post vs. Exp. pre	.274	1.125	.2455
	Cont. post vs. Exp. post	.925	-.094	
9	Cnt. pre vs. Exp. pre	.378	-.891	
	Cnt. post vs. Cnt. pre	.607	.523	.1141
	Exp. post vs. Exp. pre	.233	-1.230	-.2684
	Cont. post vs. Exp. post	.479	.715	
10	Cnt. pre vs. Exp. pre	.842	.201	
	Cnt. post vs. Cnt. pre	.170	1.422	.3104
	Exp. post vs. Exp. pre	.093	1.764	.3850
	Cont. post vs. Exp. post	.742	.332	

Note. * $p < .05$