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Raising self-consciousness: phonetic education as embodied language learning

Abstract. Phonetic education is presented in this contribution as a pedagogical approach and didactic method for teaching and acquiring phonetic-phonological competence in the foreign language classroom at school. To develop such competence, we should overcome the school practice that still today does not seem to deviate from the listen-and-repeat method: the teaching of articulatory phonetics is proposed as a method and tool for learning based on self-consciousness. By discovering the sound dimension of language, and the bodily reality through which it is realised, the student undergoes an educational experience based on perception. The formative value of a phonetic education is framed in the perspective of body pedagogy, in line with an inclusive and democratic approach to language education.

Keywords: phonetic education, body pedagogy, perception, democratic language education.

1. INTRODUCTION

This contribution reflects on the opportunity of bringing phonetic education into foreign language teaching at school, affirming the formative value of developing a phonetic-phonological competence through the experience of self-consciousness¹.

The aim of this study is twofold. On the one hand, it addresses the school community, suggesting we rethink the learning of the sound dimension of language by teaching the fundamental mechanisms of articulatory phonetics. On the other hand, it addresses the academic community of linguists, suggesting the teaching of linguistics be applied to teacher training, both a continuous training

¹ Two preliminary terminological clarifications are necessary. Firstly, by 'phonetic education' we mean a pedagogical approach that recognises a primary role for the didactics of phonetics in foreign language learning. This is in contrast to terms such as 'phonetics didactics' or 'teaching of phonetics', whereby actual teaching practices are meant, regardless of their pedagogical orientation. Secondly, 'competence' does not refer to the values that the label may bear in the field of linguistics, but rather to its widespread use in the field of education both in research (Castoldi 2011) and in the relevant legislation (PD 2010a, 2010b) in the Italian context taken into consideration in this study.

for teachers in service, and training for future ones. Overall, the intention is to contribute to the general reflection on the educational role of linguistics.

In the relationship between linguistics and education, the role of phonetics has hardly been considered. The relevant literature in Italy offers a good example of how little attention the field of educational linguistics pays to phonetics. On the one hand, in a perspective inspired by the principles of democracy (De Mauro 2018), "hot topics" (Vedovelli & Casini 2016) such as language rights, literacy and multilingualism are focused on. On the other hand, in approaches that are more strictly epistemological and less oriented towards a civic and social reflection (Daloiso 2015), topics of wide generality and theoretical scope have been investigated, such as which model of grammar or which role of sociolinguistic variation are to be reported on in language teaching. Particular attention has been paid to certain branches of linguistics, such as acquisitional or text linguistics, and to certain levels of analysis, such as semantics or pragmatics.

The reflection on the educational role of phonetics therefore appears rather marginal, even in the epistemological syntheses of educational linguistics (*cf.* Catford 1999). Contributions in various encyclopaedias and textbooks (*cf.* Ashby 2005; Ashby & Ashby 2013) are mostly oriented towards the teaching of phonetics *per se,* lacking a pedagogical vision. Nonetheless, the literature on phonetics teaching is vast (*cf.* Low 2015 [for a wide and reasoned bibliography]), and research in the topic has been increasing (*cf.* Jenner 1987; [and more recently] Derwing & Munro 2015). In line with the studies directed at the reality of school practices (*cf.* Bartels 2005; [in particular] Gregory 2005; Gregersen & MacIntyre 2017), this contribution proposes phonetic education as a pedagogical intervention.

Phonetic education is firstly introduced as a formative necessity for EFL (English as a Foreign Language) in high school (§2). It is then presented as a method of teaching articulatory phonetics, which raises self-consciousness through the experience of perception (§3). Finally, it is framed in a perspective of body pedagogy, as inclusive and democratic language education (§4).

2. PHONETIC EDUCATION AS A NECESSITY

While admitting there are divergent views on the teaching of languages, the role of phonetic-phonological competence in the teaching of a second language (L2) must be recognised, as indicated by national school legislation and the relevant European policies. Considering Italian legislation (reference is made to Presidential Decrees: PD 2010a, 2010b), foreign language knowledge includes "basic grammatical structures, phonological system, rhythm and intonation of a sentence, spelling and punctuation" for vocational secondary schools (PD

2010a: 8.6 and 8.3); and among the specific learning objectives of L2 teaching in lyceums, the student should "reflect on the system (phonology, morphology, syntax, lexis, etc)" (PD 2010b: 10.3). While reference to phonetic-phonological competence is rather vague in ministerial legislation, it is instead meticulous in the European model to which it refers: phonological competence involves the knowledge and skill to perceive and produce sound-units, even in their contextual realisations, and the phonetic features that compose and distingish them, as well as suprasegmental phenomena (Council of Europe 2020: 133–135). The idea of teaching articulatory phonetics, therefore takes its cue from European linguistic policies and becomes part of a coherent national regulatory framework. But what are the common phonetics teaching practices in second-language teaching at school? And in what relationship can the idea of phonetic education be placed?

The sound dimension of language has been neglected in the traditional grammar-translation teaching method, focusing on a formal learning of language as a system. This negligence, on the other hand, could be justified by the lack of technological tools. But today, despite the widespread use of multimedia support in classrooms and textbooks, alongside with the main theoretical tools such as the international phonetic alphabet, school second-language teaching does not yet seem to fully fulfil the task of developing students' phonetic-phonological competence. The present-day teaching practice appears similar to old-fashioned language teaching, one still linked to the listen-and-repeat technique. In reaction to the grammar-translation method, today's dominant communicative approach proposes a conception of language as use and insists on functional methods, ending up excluding pronunciation from reflection and from teaching practice: "techniques and materials for teaching pronunciation at the segmental level were flatly rejected on theoretical and practical grounds as being incompatible with teaching language as communication" (Celce-Murcia, Brinton & Goodwin 1996: 10)². A conflict then is created between the teaching of articulatory phonetics, which by definition requires a focus on form, and the communicative approach, oriented towards a focus on function. This does not result so much in the exclsuion of pronunciation from learning objectives, but rather in the failure to develop a teaching methodology.

Considering textbooks, we will take some examples from an EFL coursebook for the first two years of high school: 'Cult [smart] essential' (Greenwood *et al.* 2016). The listening exercise "Pronunciation > /fi/" contains the instruction "Listen and repeat", and lists sentences in which the sound /h/ occurs; the student should listen to these sentences on the audio track and notice the sound being learned. But assuming that the learner notices the sound, what does the learning development consist of? How does the teacher intervene to teach this

² Such a tendency had been criticised already in the eighties: cf. Leather (1983) and Wong (1986).

pronunciation? Above all, the sound may not necessarily be noticed: learners in fact tend not to distinguish non-native sounds, connecting them to native phonemes (Grimaldi 2017) or combining two of them into one category (Eger, Mitterer & Reinisch 2019). For example, in the exercise "Pronunciation > -ing", listening does not ensure the student notices the phoneme $/\eta/$ in the suffix -ing; on the model of the graphic form, instead, they suppose an occlusive [g] at the end of the word. The recognition of sounds is facilitated instead by tasks that are tacked onto lexical oppositions, like in "Pronunciation > /i:/ or /I/": you listen to minimal pairs and place each word in a two-column table according to the distinctive vowel sound.

These teaching methods overlook the transition from reception (listen) to production (repeat), which is the critical point of phonetics teaching: providing the audio tracks for listening or at most tacking the analysis of sounds onto the lexical domain is not enough; the input must be turned into intake and give rise to output. This process is ignored by textbooks, and implicitly delegated to the teacher's professionalism. But it is also reasonable to believe that even teachers "do not devote sufficient attention (or do not devote any at all) to the construction of phonological competence, as they consider it the result of an unconscious acquisition" (Torresan 2010: 69). In fact, teachers admit to lack specific training and wish they had one, as shown by a survey of English pronunciation teaching in Europe (Henderson *et al.* 2012) as well as by research in Southamerican contexts (*cf.* Couper 2016). Teacher training programs provide adequate preparation in how to teach pronunciation: nothing but a myth, as explained by Murphy (2014).

As mere practice does not suffice for learning L2 sounds (*cf.* Grant 2014), specific phonetics istruction is crucial for perceiving (*cf.* da Rosa 2016) and producing (*cf.* Kissling 2015) non-native sounds. If explicitly guided and taught, learners can in fact perceive and produce new phonological categories (*cf.* Grenon, Kubota & Sheppard 2019) required in the L2, both in earlier (Zielinski & Yates 2014) and later (Derwing & Munro 2014) stages of learning (*cf.* Shinohara & Iverson 2021 [on age as a factor in phonetics training]). The model of phonetic education proposed here aims to fill the methodological gap in phonetics teaching in the foreing language classroom.

3. PHONETIC EDUCATION AS A METHOD

The implicit teaching / learning of phonetics corresponds to a lack of method that weighs on the possibilities for students to develop, and it is therefore necessary to reflect on the possibilities of phonetics teaching. As discussed above

(§ 2), in the practice of *listen and repeat* the learners' alleged spontaneous skills are appealed to: not only are they supposed to be able to discern non-native sounds, but also to transform their understanding into production. Phonetic learning is entrusted to a wild imitation, that is, to an imitative effort that is ineffective because it lacks techniques and tools. And the immediate oral production of a second language – that is, one without the mediation of a method – is the cause of strong linguistic anxiety. A further effect of a non-method based on spontaneous abilities is the increase in the range between levels. It is true, in fact, that some students engage in such spontaneous learning, especially if they have a strong aptitude for second-language learning and in particular, good phonetic-phonological discrimination skills. Yet can the school rely on the autonomous and pre-existing skills of individuals? Obviously not. With the aim of a democratic linguistic education, phonetic education can provide a methodology that puts all students in a position to learn, albeit with different starting levels and final results.

Phonetic education therefore aims to renew the traditional teaching of pronunciation, making it effective and educational: to fill the gap between 'listen' and 'repeat', it is necessary to act on an intermediate phase of the learning process, that is to say, provide the students with support in the leap from reception to production. This method consists precisely of the didacticization of the features and mechanisms of articulatory phonetics as tools to understand the sound dimension of the second language: the subject of learning is not the mere pronunciation ('x is said like this') but the concrete articulation of the sound ('to say x you do this'). The mechanisms of articulatory phonetics become the tools for an imitative process that is no longer senseless, as in 'listen and repeat', but based on a conscious and intersubjective bodily experience: a mirror imitation. By 'mirror imitation' we are referring to the discovery of the mirror neuron system (cf. Rizzolatti & Buccino 2005). On the basis of the visuo-motor connections that link the observation of a motor act to the understanding and production of the act itself, neuroscience has demonstrated the interdependence between the action of an individual and understanding the action of others, or, in a nutshell, the link between perception and action. The same neuronal circuits responsible for the accomplishment of a given action, in fact, are activated to the recognition of this action in behaviour – also linguistic³ – of others. Therefore, by understanding the value of imitative process, also by virtue of these acquisitions in the neuroscientific field, we can rethink the role

³ With regard to linguistic behaviour, echo mirror neurons have been discovered, capable of ensuring the transformation of verbal sounds into the motor representation of the corresponding articulatory gestures (Rizzolatti & Buccino 2005).

of imitation in language learning (cf. Messum & Howard 2015). The model of phonetic education presented below suggests imitation as the central moment in the experience of perception⁴, renewing the pedagogical approach to second-language teaching and recognising a formative value hitherto neglected in the sound and articulatory dimension of language.

3.1. A perception-based model

Based on the author's school teaching experience, here is a model for the phonetic education of EFL in the middle and high school. Founded on the experience of perception, it should be understood as an open model, that is: flexible, offering itself to teaching design as an intervention that can fit into the curriculum at different times and in different ways; bottom-up, because it must develop starting from the experiences and educational needs that emerge in the class context; recreational, because the emotional dimension strengthens learning, not only lightening the focus on form, but also rendering the idea it is a new experience that shatters student expectations about second-language learning; inclusive, on the one hand by enhancing the characteristic linguistic diversity of today's multicultural classrooms, and on the other by reducing the burden of read-write tasks for students with specific learning difficulties.

Learning object		Phase 1 (presentation)	Phase 2 (analysis)		Phase 3 (synthesis)
element of pronounciation in EFL (target)	phonetic mechanism and features (tool)	presentation of the learning object		e of bodily a of sounds (reproduce)	reflection and systematisation
vowels: [I], [Ø], [Ə], [3], [A], [Æ], [a], [D]	vowel quality: height, backness, roundedness, lenght	from the lexicon: alleged homophonies and minimal pairs (e.g. dysphemism)	teachers stimulate reception:	students experience proprioception: they explore	lexical expansion; graphical representation of the vocal trapeze
consonants: [h], [ŋ], [θ], [ð]	consonant features: manner and place of articulation, voicing	from the spelling: graphemic sequences peculiar to English	they perform and show articulatory traits and mechanisms	phonetic traits and mechanisms, playfully and intersubjectively	and of the oral cavity

Table 1. A teaching model for phonetic education

⁴ On the role of sound perception in pronunciation teaching *cf.* already the idea of 'kinesthetic monitoring' by Acton (1984). See also Smotrova (2017) for a general account of gesture in the teaching pronunciation.

The scheme in Tabele 1 summarises the model, which indicates the learning content and the task phases. Within the first (i.e., in the first column from the left in Tabele 1) are the learning objects, namely the pronunciation rules of the foreign language to conform to as a final result, and the tool, namely the phonetic machanisms and features that allow us to understand and produce the sounds. The specific learning objects pronunciation are some English vowel and consonant sounds that are absent from the L1, Italian. To achieve these goals, it is necessary to acquire the tools, the heart of phoentic education, that is, the quality of the vowel sounds and the articulation of the consonant sounds.

The first phase of the task (second column from the left in Tabele 1) is the presentation of the learning object that emerges from the didactic context. The vowel sound objectives emerge from the lexis, i.e., from alleged homophones (as can be seen in the second example exercise above, § 2). The case of dysphemisms is extremely useful⁵: many English 'bad' words form minimal pairs with commonly used words, such as shit / sheet, bitch / beach, piss / peace ([i] / [i:]); cock / *coke* ([a] / [av]); and *cunt* / *can't* ([A] / [a]). The use of dysphemisms increases the recreational and emotional component: the bad words are a source of hilarity, when not one of embarrassment, and the breaking of the linguistic taboo accompanies the more general breaking of expectations of school second-language learning: students go beyond the boundaries of 'good' language, approaching linguistic use that is immediately relevant to adolescent experience. The consonant sounds objectives emerge mostly from spelling, being connected to peculiar graphemes or graphemic sequences⁶, like (h) and (th)⁷. Moreover, the realisation of $\langle th \rangle$ allows us not only to distinguish the phones $[\theta]$ and $[\delta]$ but to present the general criterion of voicing, which is useful for other phonological distinctions (e.g., [s] and [z] in ice / eyes).

The presentation phase is short, and is transformed seamlessly into the analysis phase (third column from the left in Tabele 1), which consists of the experiential moment of bodily perception through which one can first recognise and then produce the articulation of the sounds. Revealed in speech, from alleged homophonies, or in writing, from particular graphemic sequences, the learning objects are illustrated by the teacher as phonetic articulations that the student begins to observe and recognise. The pronunciation is revealed in its concrete

 $^{^{5}}$ The dysphemism, it goes without saying, lends itself to teaching in proportion to the maturity of the students.

⁶ The presence of a specific graphic element associates with (some level of) awareness of a given sound, and it can help learners in explicit tasks (*cf.* Eger *et al.* 2019).silisef fne be solved by mirrorendexpoiltede levvel ski / Yates 2014) and also in apparently fossilisef fne be solved by mirrore.

 $^{^{7}}$ As mentioned above (§ 2), the case of the velar nasal requires instead, an intervention from above by the teacher.

reality: a sound reality, first and foremost, to be listened to ('listen'), but which before being turned into production ('repeat') must be bodily perceived. In other words, before reaching the goal of the pronunciation rule, the teaching activity focuses on the discovery of the physical realisation of a sound. The articulatory mechanisms, the tool for achieving the pronunciation goal, are key to developing phonetic competence.

In the analysis phase, the teacher performs these functions of the phonatory apparatus, indicating its bodily traits. For example, to understand the nasality trait, the students will be asked to pronounce a nasal phone while holding their own noses: the result will be a different sound (like when you have a cold, you pronounce something sounding like bubby instead of mummy), and they will feel their noses filling with air. Or again, to understand voicing students will be asked to pronounce the hiss a snake makes ([s]) and the the buzz of a bee ([z]) by touching their necks under their chins: only in the second case will they feel their throats vibrate. When learning vowel qualities, it is useful not only to indicate the role the position of the tongue plays but also to help discover (that is, to perceive) the possibility of a non-discrete modulation. That is, students can discover how, by modulating quality (opening and closing) a single sound 'thread' is obtained, along which the relevant phonemes are recognised: for example, opening and lowering [i] you get to [ɪ], like opening and lowering [a] you get to [a]8. Rather than listening to the non-native sound and imitating it without any criterion, the student can trace the element with the newly-acquired tool. For the learning of consonant sounds, the teacher stimulates student perception of the manners and places of articulation and, as already mentioned, of voicing. When teaching, for example, the interdental fricatives, we can say with a smile that teachers really do stick their tongue out: not only do they explain the sound functioning of the linguistic system, but they actually display their tongue as an organ of the phonatory apparatus.

The conclusion of the analysis phase consists in proprioception: having perceived the sounds, that is, not only listened to and observed them in the teacher's articulation but also touched them (such as when touching their throats or holding their noses), the students launch themselves into their own attempts and articulatory hypotheses, with the aim not of reproducing the pronunciation goal but of making the tool, that is, the mechanisms and articulatory features, their own. This gives life to a recreational and liberating experiential moment among the students. To give some examples, the realisation of $[\theta]$ will be seized as an opportunity for students to stick their tongues out and blow raspberries,

⁸ A certain approximation in dealing with phonetic articulation is considered necessary for effective school teaching, in the light of the "intelligibility principle" (Levis 2005; *cf.* McAndrews & Thomson 2017).

while the realisation of [h] will be a way of pretending to collect spit with one's throat, and the exploration of vowel quality will be a carnival of voices, moans, screams and singing⁹. The learning object is explored through the body and in an intersubjective way¹⁰: the proprioceptive experience is shared with the rest of the class, creating that mixture of embarrassment and hilarity – mentioned above in relation to dysphemisms for breaking taboos – that characterises activities that reveal the body.

The final summary phase (fourth and last column from the left in Tabele 1) provides for reflection on the learning experience and content. Phonetic competence can be systematised on the one hand through lexical development work, presenting additional lexical items that reinforce the learning of phonetic items (both orally, through *brainstorming*, and in writing, through detailed study cards), and on the other by summarising the knowledge acquired with pictures or diagrams of the oral cavity and the vowel trapeze.

4. PHONETIC EDUCATION AS A PEDAGOGICAL INTERVENTION

Phonetic education, which is based on raising self-consciousness through the bodily perception of language, is first of all an educational experience in the classic sense of Dewey (1938), with reference to the two criteria of continuity and interaction with objective conditions. With regard to the first, the discovery of articulatory mechanisms does not limit its educational scope to the learning of a few rules of pronunciation: it informs former and future linguistic experience, allowing students to look at the development of their competence – both in their mother tongue and in foreign languages – from a brand-new perspective. With regard to the second criterion, becoming self-conscious of phonetic articulation involves interaction with objective conditions: discovering the functioning of one's phonatory apparatus means transforming one's own bodily reality – i.e., the objective condition – into a conscious tool for language learning.

The means and goal – to quote Dewey again (1938: § 8) – of phonetic education is therefore self-consciousness through proprioceptive experience. Self-consciousness and perception need to be acknowledged as crucial in language education, in line with a philosophical and pedagogical tradition stemming

⁹ The formative value of "acceptance of the vocal explosion" (Gemelli 2011: 66) is to be understood in the perspective of the pedagogy of the body (§ 4).

¹⁰ On the centrality of the concept of intersubjectivity (*cf.* Duranti 2010), it is interesting to compare the neuroscientific perspective of research on mirror neurons (Rizzolatti & Buccino 2005) with the pedagogical one that requalifies the bodily dimension in education (*cf.* Contini, Fabbri & Manuzzi, 2006; Watkins 2012).

from the phenomenological reflection of Merleau-Ponty (1945). Perception is not passive reception (like listening in the listen-and-repeat method) but rather a specific sphere of cognition. Perceiving one's own ability of phonetic articulation in fact means understanding language in a new perspective, i.e., no longer through reasoning alone but also physically through the body. This radically changes the approach to language learning, which is traditionally understood as a completely intellectual process. The presence and action of the Husserlian *Leib* is thus recognised: the body experiences language learning, as the subject of a perceptive and cognitive experience. Thus, phonetic education, by placing language education in the perspective of body pedagogy, adopts a vision of cognition as embodied mind (Varela, Rosch & Thompson 1991): the Cartesian dichotomy of *res cogitans* and *res extensa* is overcome, as well as that between cognitive and motor systems (*cf.* Rizzolatti & Buccino 2005).

From a more strictly pedagogical point of view, the teaching and learning of phonetic-phonological competence fits into the framework of a body pedagogy (cf. Evans, Rich & Davies 2009; Gemelli 2011; Ivinson 2012; Watkins 2012). In such a perspective, language pedagogy recognises the cognitive role of the body, relieving it from the educational interdict and from the urgent demand for listening that have long weighed upon it (cf. Contini et al. 2006: 65). Body-oriented glottodidactics also has a set of positive effects for a democratic and inclusive education. Firstly, a different way to approach language - i.e., by means of the body, and not through the usual cognitive styles - gives the students an opportunity to re-evaluate their own failure self-scheme. In other words, a new way of experiencing language can free students from their status (or self-image) of bad learners: even the least brilliant or witty pupil can turn out to be excellent at producing voiced buzzes and voiceless hisses, at closing and opening vowels, and so on. In addition, such an approach is centred on the body, that is, on an element that is shared by and common to all students: this allows us to minimise the threat of inter-individual confrontation, both with the teacher and with peers.

Phonetic education not only reacts to the body's educational interdict and demand for listening, but also responds to another inescapable need in schools nowadays: inclusion. Working on phonetics is a very inclusive activity in relation to the issue of learning disorders (*cf.* Costenaro, Daloiso & Favaro 2014; Gronchi 2018) and also to that of multilingualism: the complexity of pupils' individual repertoires is a valuable resource in phonetic education, insofar as the comparison with the sounds of other languages offers cues and evidence for the general understanding of articulatory mechanisms.

The inclusive value of phonetic education is attested by the opinions of the students themselves. In (1), a dialogue is reported that took place in a school in

Italy in early 2019. Sixteen-year-old students have just been shown the articulation of [h], so they comment:

(1) CLASSROOM DISCUSSION AFTER AN ACTIVITY OF PHONETIC EDUCATION

Francesco: mondiale questa cosa!

'this thing is worldwide [cool]!'

Teacher: come hai detto?

'What did you say?'

Francesco: mondiale questa cosa, bella!

'this thing is worldwide, nice!'

Filippo: mondiale perché riguarda tutto il mondo, perché siamo tutti uguali

'worldwide because it concerns the whole world, because we

are all equal'

In (1), Francesco wants to say that he enjoyed the activity of phonetic education, so he describes it as *mondiale* (lit. 'worldwide, global'), meaning 'cool'. The teacher, curious about the pupil's feedback, pretends he has not understood, so asks him to repeat and thus elaborate on the comment. The student only repeats his comment and replaces the word *mondiale* with the functionally equivalent *bella* (lit. 'beautiful'). What turns out to be very significant is how the other pupil, Filippo, enters the discussion. Filippo paraphrases the first comment, 'cool', by retrieving the literal meaning of the word 'worldwide': the activity has been worldwide (cool) since it is about the whole world, in that we are all equal.

Filippo's universalist interpretation, so to speak, with the immature words of adolescence, points out the formative value of phonetic education. By relating reception and production, body and reasoning, teacher and students, and more generally the self with the others, an educational equality emerges. This equality is based on the sharing of bodily reality as a common concrete resource and as a method in the learning process. Such an educational experience is therefore carried out in compliance with the first principle of the eighth of the so-called *Ten theses for a democratic language education*¹¹, according to which language learning should be promoted in a close reciprocal relationship with correct socialisation, with psychomotor development, and with the maturation and expression of all expressive and symbolic abilities. To conclude, it is also within such an approach

¹¹ The *Ten theses* are a collective document edited in 1975 by GISCEL ("Gruppo di Intervento e Studio nel Campo dell'Educazione Linguistica", 'Group of study and intervention in the field of linguistic education'), one of the most important linguistics societies in Italy, "Società di Linguistica Italiana" ('Italian Society of Linguistics'). The text can be read online on the GISCEL website (https://giscel.it/dieci-tesi-per-leducazione-linguistica-democratica/ [access: 04.09.2021].

that the pedagogical intervention and teaching method based on raising phonetic self-consciousness should be seen: phonetic education as a body pedagogy for a democratic language education.

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