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## **English-medium-instruction lectures: Tackling the issue of (dis)fluency and accuracy measures**

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More and more higher education institutions require certification of language proficiency in order to teach content in English, but countries assess proficiency differently. Moreover, fluency and pronunciation accuracy are just two aspects in determining proficiency.

A group of researchers from five European universities collected data from interviews and classroom recordings of six lecturers per university in 2018-2019, to compare the realities of English Medium Instruction in these contexts and, later, to improve training for EMI lecturers. A sub-group of researchers conducted a CEFR classification of the 30 lecturers. Another sub-group carried out a (dis)fluency analysis of two, 3-minute monologic stretches of 10 lectures, from 2 different lecturers in each country. To measure fluency, Mean Syllables per Run, Rate of Speech Time and Time Ratios were considered, while for disfluency the number of repetitions and false-starts/self-corrections per 100 syllables was determined.

This chapter reflects upon the complexity that surrounds the concept of pronunciation accuracy by narrowing in on a specific case: one Italian lecturer's use of epenthetic vowels after final consonants. This case triggered a lengthy discussion among the researchers as to whether this was a pronunciation error, a feature of an Italian accent, or a filled pause. Assessing lecturers' proficiency is revealed as a complex process which is subject to broader norms.

**Keywords:** EMI, fluency, pronunciation accuracy, accent, higher education



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## 1 Introduction

English Medium Instruction is defined by Macaro (2018) as “the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language of the majority of the population is not English” (p. 19). Normally coupled with the idea of internationalisation, this phenomenon has been gaining ground across European universities. Wächter and Maiworm (2014) differentiated six regions within Europe and argued that there is a north-south divide when it comes to the number of English-Taught programs. According to the authors, the Nordic and Central-West regions have the highest number of such programs, even though recent increases are below the average because they have a high percentage of existing programs in English (e.g., 30% in the Netherlands and 38% in Denmark). Conversely, the South-West and South-East regions have seen impressive growth rates, although the overall numbers are still low (1.2% for Croatia, 2.3% in Spain, and 2.9% in Italy).

A group of researchers from five European universities received an Erasmus+ grant in order to compare the EMI realities in their five countries, to determine whether this north-south divide was confirmed, and to develop tools for improving EMI lectures. These countries cover four of the six regions identified by Wächter and Maiworm (2014): Denmark represents the Nordic region, the Netherlands the Central-West, Spain and Italy represent the South-West, and the South-East is represented by Croatia. The project, entitled "Transnational Alignment of English Competences for University Lectures" (TAEC henceforth), ran from September 2017 to April 2021.

## 2 The TAEC project: Sub-groups and actions

There were seven transnational meetings in TAEC, and the objective to collect data was adopted at the first one held in Copenhagen, October 2017. The TAEC research group consisted of researchers from the following universities: University of Copenhagen, in Denmark (UCPH), Universitat de Lleida, in Spain (UdL), Maastricht University, in the Netherlands (UM), Università degli Studi di Torino, in Italy (UNITO) and the Faculty of Humanities and Social Sciences of the University of Rijeka, in Croatia (FHSS). Six EMI lectures were collected and six interviews were conducted per university. Table 1 provides a visual summary of the sub-groups and their actions.

**Table 1**

*TAEC Project Sub-groups and Actions*

Sub-group	Members	Actions
A	6 TOEPAS experts 6 CEFR experts	<ul style="list-style-type: none"> <li>aligning TOEPAS (test used in UCPH) with CEFR</li> </ul>
B	8 raters (TAEC members)	<ul style="list-style-type: none"> <li>rating 10–15 minutes of the 30 lectures using the CEFR scale</li> <li>calculating (dis)fluency measures of two, 3-minute stretches for 10 of the lectures</li> </ul>
C	2 TAEC members	<ul style="list-style-type: none"> <li>identifying mismatches between CEFR ratings and measures</li> </ul>
D	7 TAEC members	<ul style="list-style-type: none"> <li>setting-up of transcription guidelines and corpus annotation criteria</li> </ul>

Sub-group	Members	Actions
E	all members	<ul style="list-style-type: none"><li>• organising the revision of the transcriptions</li><li>• transcribing and revising the transcriptions of the lectures</li><li>• deciding how to annotate (mis)pronunciations</li><li>• deciding whether an epenthetic vowel constitutes a filled pause rather than an error</li></ul>

In the third meeting (Maastricht, May 2018), it was agreed that each university would audio and video-record six lectures by six different lecturers from different disciplines and academic levels, and that the lectures would be transcribed. The lecturers were also to be interviewed. Thus, a total of 30 interviews and 30 lectures would be gathered altogether. It was also agreed that insights from the analyses of the videos would be used to create a handbook that could then be used to train EMI lecturers.

The research team was organised into different overlapping sub-groups. One of them was in charge of rating the English level of the lecturers. Eight raters were asked to pay attention to eight aspects of oral production and to provide a holistic assessment as well. Each rater was asked to rate the videos independently, without discussing the results with other raters and/or colleagues. Ten to 15 minutes of each lecture that included both monologue and (when possible) interaction were to be selected by each evaluator. A small sub-group of just two researchers carried out a (dis)fluency analysis of two, 3-minute monologic stretches of 10 lectures, from 2 different lectures in each country. The chosen fluency measures were: Mean Syllables per Run; Rate of Speech Time; and Time Ratios. For disfluency, the number of repetitions and false-starts/self-corrections per 100 syllables was determined. Finally, another sub-group of seven members managed the transcription of the lectures, tagging grammatical and pronunciation errors in the transcription. Initially, this was done with the intention of calculating (pronunciation) accuracy measures of the lecturers, but the validation process for the transcriptions revealed great discrepancies in relation to what constituted an error, so the transcriptions were finally cleared of these tags.

### 3 Lecturer proficiency levels: TOEPAS and TAEC ratings

A content lecturer in higher education needs an adequate level of the language of instruction to effectively implement the different tasks they must carry out. However, what this adequate level should be remains a controversial matter.

In the last two decades, a number of tests have appeared, specifically to address this issue in relation to EMI lecturers. The Test of Oral English Proficiency for Academic Staff<sup>1</sup> (TOEPAS henceforth) is the test used by the Center for Internationalisation and Parallel Language Use, University of Copenhagen. TOEPAS only focuses on oral production. The test, which is taken by three lecturers in a single session, is structured into three sections: a warm-up section, a 20-minute lecture simulation, and a final part for questions. As part of TAEC (see above), the TOEPAS test was aligned to CEFR. The alignment took place over a three-day standardisation event in October 2018 (see Dimova, 2018). There were 12 participants in the event, six of whom were familiar with TOEPAS, whereas the other six had expertise in rating using the CEFR (Council of Europe, 2018) scale.

The TOEPAS is a performance-based speaking test, and the maximum number of points is 60. A 30-point rating corresponds to a pass: "the lecturer has demonstrated sufficient English

<sup>1</sup> [https://cip.ku.dk/english/documents/TOEPAS\\_2.0\\_A4\\_final.pdf](https://cip.ku.dk/english/documents/TOEPAS_2.0_A4_final.pdf)

language proficiency for university teaching. No training is required but is strongly recommended". The alignment established that the B2+ level corresponded to this 30-point score, i.e., the minimum level that guaranteed an adequate level for teaching in English. Crucially, the B2 range is the widest one in the CEFR scale. In these discussions, B2 thus covered both 20-point and 30-point scores, and it was the difference between B2- and B2+ levels that determined whether the minimum level had been attained. A minimum acceptable level of B2+ agreed during the alignment discussions reflects the tendency of European universities, as data from O'Dowd (2018) shows. In his study, 44% of the European university representatives surveyed required their lecturers to demonstrate a C1 level, 43% a B2, and only 13% a C2. Spain has one of the most lenient language requirements, as more than 50% of universities required a B2 level (or less) to teach in English-Taught Programs (Halbach & Lázaro, 2015). The overall ratings by the TAEC sub-group in charge of this endeavour rated only four lecturers as having a B2 level (L14 and L15 from Spain, and L25 and L30 from Italy). The remaining 26 lecturers obtained ratings of B2+ or higher.

#### 4 (Dis)fluency and (pronunciation) accuracy annotation

A sub-group of seven TAEC members was constituted in the fourth meeting (Rijeka, September 2018) to set up the transcription guidelines and corpus annotation criteria to be used in the transcription process. These guidelines were piloted on a lecture and revised in the fifth (Copenhagen, October 2018) and sixth (Lleida, February 2019) meetings. One of the most contested aspects in the guidelines was the annotation of mispronunciations, which this section explains.

The transcription guidelines (TAEC, 2020) which were adopted had proposed using: "standard orthography, even when words are *pronounced with a foreign accent* [emphasis added]" (p. 14). To tag what was referred to as mispronounced words, these words were supposed to be "transcribed in the standard form (when it is possible to understand the intended word)" (p. 15) with the <PRON> tag added before the mispronounced words and the </PRON> tag after it. Some TAEC members had proposed transcribing in a way that more accurately reflected the actual pronunciation, thus leaving the transcription reader to judge the accuracy of that pronunciation. If the lecturer produced a vowel before <s-> in *students*, for example, pronouncing three rather than two syllables, one could transcribe it as *\*estudents*, thus signalling the non-standard pronunciation, but without judging whether it is accented or inaccurate English. Another possibility was to transcribe it as <PRON> students </PRON>, tagging this as a mispronunciation. The final sub-group decision was to tag mispronunciations with <PRON> and ignore accented speech. However, there was no alignment training to better identify and agree on what falls within the realm of accent or within that of mispronunciation. The individual transcribers were given the responsibility to decide upon these aspects, and due to this lack of criteria unification, the results were inconsistent.

This issue was discussed at length in the seventh meeting (Torino, October 2019), using specific examples from the transcriptions of some lectures, and it was decided that the transcriptions would have to be revised by two more TAEC members, so these discrepancies could be reduced to the minimum. Three sections of each transcript were revised by these two TAEC members, who modified the transcript when they disagreed with what had been transcribed. In some cases, this entailed changing what had been transcribed, and on other occasions it meant adding new content to the transcript. It turned out that whereas there were few changes and additions when it came to content in general or pauses, there were numerous changes and additions when it came to the tagging of grammatical and pronunciation errors. The TAEC Corpus Report (TAEC, 2020) suggests that a "more fine-grained definition of

'pronunciation mistake'" (p. 6) would have made it easier for the taggers to carry out their task. Although the amount of changes and additions did not go over the minimum standards established, it was finally agreed to remove the tags from the transcriptions.

In relation to the rating of the lecturers, it was stated in the instructions that each rater would rate all the videos individually without discussing the results with other raters and/or colleagues. Raters were asked to individually select 10–15 minutes of each lecture, contemplating both monologic and dialogic parts of the lecture, and to provide a holistic assessment, as well as to look at the following items, as defined by the sub-group: range, accuracy, fluency, interaction, addressing audiences, coherence, phonology, and mediation.

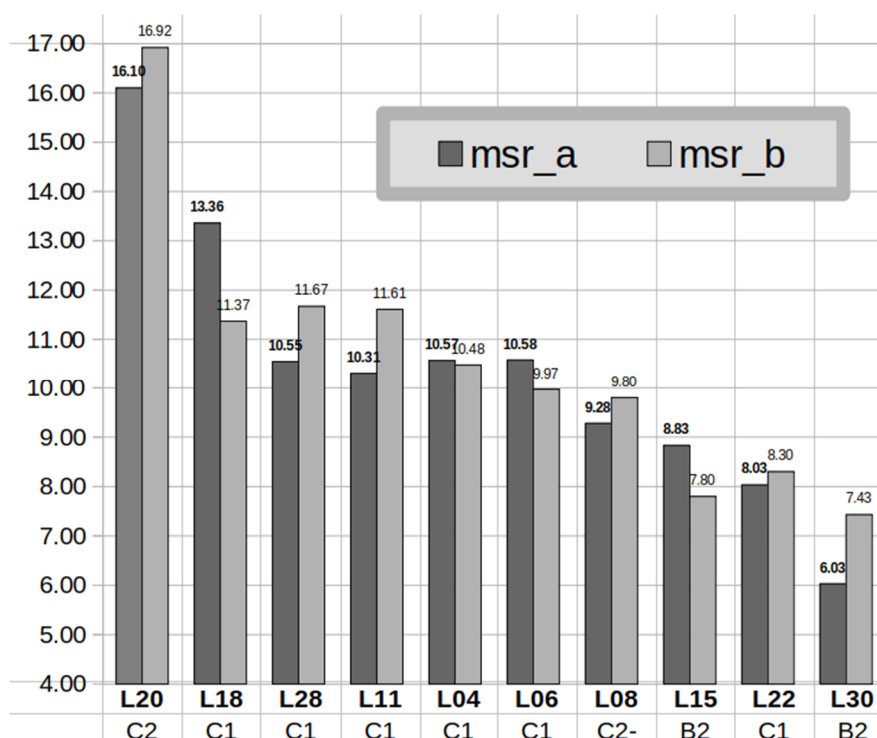
## 5 (Dis)fluency measures

As stated above, one sub-group of researchers selected portions of ten lectures on which to carry out (dis)fluency analyses. The speech samples used for analysis were taken from two parts of each lecture and each sample lasted 180 seconds. The first part (A moments) occurred within the first 10 minutes of the lecture, whereas the second part (B moments) occurred between minute 25 and minute 45 of the lecture. Only moments when lecturers were in lecturing mode were selected, defined as moments when lecturers were providing explanations, examples or definitions, rather than interacting with students.

In line with Martin-Rubió (2021), the (dis)fluency measures were calculated as follows. The two 180-second audio files from each lecture were opened in the software Audacity, and three kinds of chunks were identified: 1) between-pauses units (bp-units), i.e., stretches of syllables between pauses often referred to as runs in the literature; 2) filled pauses, i.e., sounds employed as hesitation elements irrespective of length; and 3) silent pauses, i.e., silent gaps of 0.25 seconds or longer.

**Figure 1**

*MSR in A Moments and B Moments of the Ten Lectures*

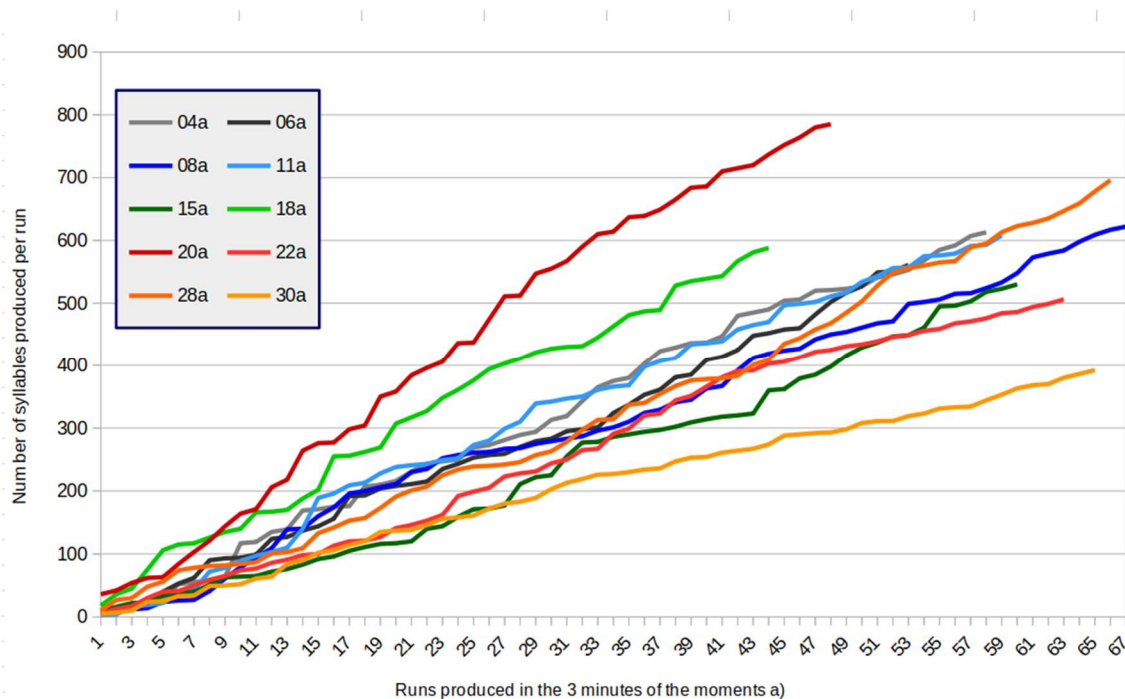


The measures used in the current analysis were taken from Ginther et al. (2010), and fall within three categories. The first category is Total Response Time, which is normally an important quantity measure. It is always 180 seconds in this case, so the focus is rather on the total number of syllables produced in those 180 seconds (see Appendix). The second category of measures includes three fluency measures: 1) Mean Syllables per Run (MSR) represents the average numbers of syllables produced between pauses (both filled and silent) and is calculated by dividing the total number of syllables by the number of runs; 2) Rate of Speech Time (ROST) measures the speed at which syllables are delivered and is calculated by dividing the number of syllables by the Speech Time; and 3) fluency ratio measures: Speech Time Ratio (STR), Silent Pause Time Ratio (SPTR), and Filled Pause Time Ratio (FPTR) indicate the proportion of time (in percentages) which the lecturer spends delivering meaningful syllables, silent-pausing or filled-pausing. Finally, the third category of measures includes two disfluency measures, x/100 syllables: 1) repetitions; and 2) false-starts and self-corrections (see Appendix for the main fluency and disfluency measures, together with the CEFR level and total number of syllables). This paper will now focus on the MSR measures, to show how one fluency measure is not sufficient to determine proficiency level.

The distribution of MSR in moments A and B, based on the CEFR level of the 10 lecturers, is shown in Figure 1 above. Lecturer 20 (L20), who is at C2 level according to the TAEC group's rating, has the highest MSR score (stretches of more than 16 syllables on average). He is followed by five lecturers at C1 level, and L15 and L30, who are at B2 level. Only L08 and L22 seem to diverge from the general alignment because, although L08 is at C2- level, his MSR's are lower than most lecturers at C1 level. L22's MSR's, on the other hand, are lower than one of the B2 level performances although he is at a C1 level.

**Figure 2**

*Syllables and Runs for A Moments in the Lecture*

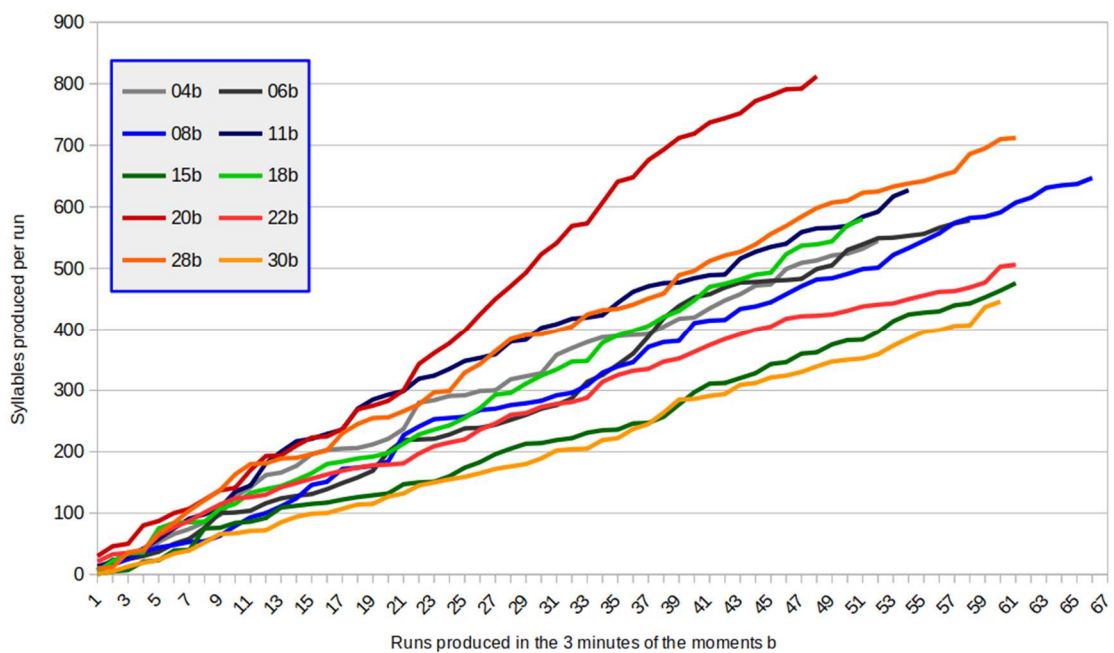


Figures 2 (above) and 3 (blow) represent the progression of the production of syllables throughout the 180 seconds in each of the two speech samples (A and B moments). In these figures, the cumulative number of syllables appear on the y-axis, whereas the runs appear on the x-axis. For instance, the A moments of lecturers L15 and L30 (Figure 2) start with a similar pattern. However, between runs 27 and 32, L15's production of syllable increases more rapidly (see Figure 2; the dark green line 15a and the light orange line 30a). The production flattens out for a few runs, but it goes up again in runs 44–45 and in runs 56–57.

In the end, L15 produces 530 syllables in 60 runs (MSR of 8.83 syllables/run), whereas L30 maintains the same pace and ends up producing 392 syllables in 65 runs (MSR of 6.03 syllables per run). In the B moments of these two lecturers (see Figure 3), though, both follow a very similar pace and in fact end up producing almost the same number of syllables in the same number of runs, L15 produces 476 syllables in 61 runs (7.80 syllables per run) and L30 produces 446 syllables in 60 runs (7.43 syllables per run).

**Figure 3**

*Syllables and Runs for B Moments in the Lecture*



Overall, the three fluency measures align well with the CEFR ratings. The results suggest that one fluency measure may not be sufficient to understand the role of fluency in lecturers' proficiency. For example, MSR is considered an important indicator of proficiency because of the assumption that lower proficiency level speakers cannot produce many syllables between two pauses, because their speech production is not automatized. In other words, they need to pause often in order to retrieve and articulate the necessary linguistic structures. If only MSR is taken into consideration, then L08's assessment at C2 level seems inconsistent with his MSR, which seems lower than most lecturers rated at C1 level. However, when ROST is considered, then it becomes apparent that he is able to produce more utterances within the same time slot than the lecturers at C1 level. The speed of his production suggests that his speech is automatized, and he does not need time to retrieve the linguistic structures he needs to express himself. One may hypothesise that he uses frequent pauses to allow the



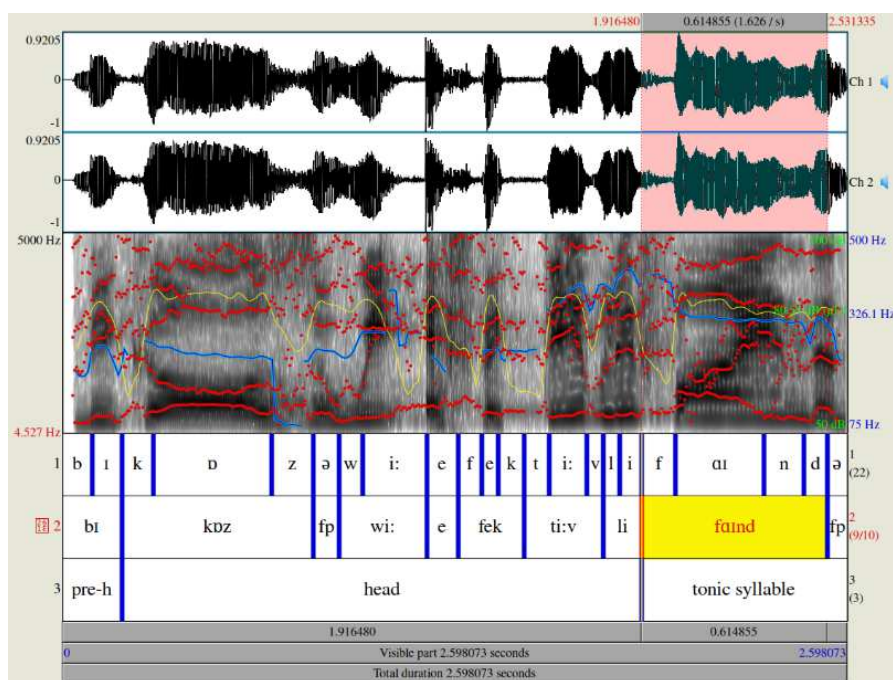
listeners to process information before he proceeds. Therefore, it is recommended that fluency analyses of EMI lecturers include more than one fluency variable.

## 6 Lecturer 28 and epenthetic vowels

In this section, the A and B moments of L28 are looked at in greater detail. Excerpts from this transcription were discussed in the seventh TAEC meeting. It had been agreed that the TAEC members of one institution would transcribe the lectures from the same university, which meant that researchers would transcribe lecturers with accents that are familiar to them. Lecturer 28 was rated with a C1 level, and she had the second highest ROST, only behind the lecturer rated C2. However, there was a feature of her speech that had an impact on how these measures were to be calculated. She very often produced epenthetic vowels after final consonants. Figure 6 shows these two extra sounds after the consonants /z/ and /d/ in the words /bɪ'kɒz.ə/ and /'fɑːn.də/. As Duguid (2001) explains, final consonants are rare in Italian, so they are often given “a following vowel, usually a *schwa*” (p. 76). More generally, “the stress-timed patterns of English cause great difficulty to Italian learners”; as a result, “[Italian] learners will expect full value to be given to all syllables” (p. 77).

**Figure 4**

*Extra Vocalic Sounds in L28's Lecture*



When this feature was brought up in the seventh TAEC meeting, and it was suggested that this could be considered a mispronunciation, the Italian TAEC members objected. This was simply a feature of the Italian accent when speaking English, they argued. However, not all Italians add vocalic sounds in this fashion when speaking English, for example the Italian TAEC members present in the meeting. These extra vowels, irrespective of the reason why the Italian speaker was resorting to them, were de facto acting as filled pauses. Once it was agreed this could never be considered an error, it was decided that they could, however, be

regarded as filled pauses. The measures provided in the Appendix were calculated with this criterion in mind — filled pauses, not errors. To summarise, data coding was impacted by different ideas of how to categorise this epenthetic vowel — whether as an error or as a feature of accented speech. This in turn reflects the influence of listener background (see Cutler, 2000; Kang et al., 2019).

## 7 Discussion

The goal of this study was to analyse the use and interpretation of (dis)fluency measures for ten EMI lecturers across Europe, as well as to examine the pronunciation accuracy of one lecturer. The (dis)fluency analysis shows that, overall, all three fluency measures (MSR, Ratios and ROST) align only partially with the CEFR proficiency levels assigned by the raters, who assessed the EMI lecturers' performance based on ten items, including fluency and language accuracy. Accent was not supposed to be an item in the rating, but L28 is categorised as B2 level in the phonology item, whereas she is rated C1 or C2 for all the other items. She shows some deviations in vowel and consonant pronunciation, and many filled-pauses. Her pronunciation is a crucial aspect of her teaching, given that 20% of her students were international, (from Eastern European, Asian and African countries); her Italian-accented English will need to be intelligible to these students, not just to her Italian students.

Jensen and Thøgersen (2017) found that although accent has been shown to have little impact on intelligibility in simple tasks, accented-speech could pose difficulties for students attending an EMI lecture, as the cognitive load of lectures can already be quite high. Valcke and Pavón (2015) state that "the ability to pass on academic content effectively greatly depends on the use of proper communication strategies, among which adequate pronunciation for the achievement of comprehension" (p. 336). They support this claim by giving examples of students' comments who point out that they find it difficult to understand their lecturer and cannot focus on understanding the content of the lecture. Similar results were obtained by Yildiz et al. (2017), as students reported difficulty understanding their lecturer because of pronunciation issues.

The findings from this study highlight the tension between requiring pronunciation to be either intelligible or at least minimally accented — which could be interpreted as requiring nativelike pronunciation (see Levis, 2005). When deciding whether intelligibility is an appropriate goal in a specific EMI context, the circumstances surrounding interactions should be taken into account. As Hynninen and Solin (2018) explained, scenarios in which English is used as a lingua franca differ. Tourists ordering a meal in a restaurant abroad differs significantly from an EMI context: in the latter, English is being employed by a content lecturer specialised in a field who is providing students with complex explanations, definitions and using terminology that is new for the students, who sometimes have different L1s and English levels. In this regard, Mauranen (2011) distinguished 'users' from 'learners', and although it is obvious that all learners are users and that learning is a lifelong process, the distinction can be helpful to separate these two realities. If one's priority is to successfully complete a transaction (say, agree on what to have for dinner), then using a variety of ways to refer to a type of food might suffice/be effective. However, when one's goal is to learn a new disciplinary concept for future use, then the type of pronunciation through which one accesses the concept might be highly significant. The insights provided here about how lecturers' pronunciation is assessed, should inform training courses, always bearing in mind that this is just one of the many elements lecturers must bring to their teaching.

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## Appendix

### *The Main (Dis)fluency Measures per Lecturer, at A Moments and B Moments*

L	syllables		level	MSR		ROST		STR		repetitions		FS/SCs	
	A	B		A	B	A	B	A	B	A	B	A	B
L04	613	545	C1	10.57	10.48	4.40	3.93	77.10	76.21	1.14	2.02	1.47	2.02
L06	561	578	C1	10.58	9.97	3.75	3.94	82.30	79.82	0.18	0.35	0.53	0.52
L08	622	647	C2-	9.28	9.80	4.41	4.71	78.14	81.88	0.80	0.93	0.48	0.46
L11	608	627	C1	10.31	11.61	4.12	4.39	81.23	78.23	0.66	0.48	1.32	1.12
L15	530	476	B2	8.83	7.80	3.81	3.52	76.21	73.71	2.26	2.73	2.08	1.47
L18	588	580	C1	13.36	11.37	3.88	4.13	82.98	77.96	1.87	1.55	0.85	1.72
L20	773	812	C2	16.10	16.92	4.96	5.14	86.40	87.37	0.78	0.99	0.52	0.37
L22	506	506	C1	8.03	8.30	4.28	4.13	65.65	67.64	0.40	0	1.13	0.40
L28	696	712	C1	10.55	11.67	4.57	4.66	83.34	84.20	1.01	0.28	0.86	0.98
L30	392	446	B2	6.03	7.43	2.92	3.31	74.12	74.64	1.28	1.12	1.79	2.02

*Note.* L = Lecturer

### About the author

**Xavier Martin-Rubió** holds bachelor degrees in English Philology and Audiovisual Communication from Universitat de Lleida, and a Master's degree in European Studies from Maastricht Universiteit and University of Portsmouth. He defended his doctoral dissertation in April 2011. He worked as an English teacher in a high school, two official language academies and two private universities before moving back to Universitat de Lleida. He started working full-time at UdL in December 2014. He has been involved in four competitive projects as a member of CLA, and after a gap of several years, he is publishing again on EMI in higher education, beliefs and emotions in additional language learning, and fluency and accuracy measurements across tasks.

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