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Citation:

Setter, J and Knight, R-A and Whitworth, N (2023) Re-evaluating the assessment of phonetic skills: what we learned during the pandemic. In: The 20th International Congress of Phonetic Sciences (ICPhS), 07 August 2023 - 11 August 2023, Prague.

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Document Version:

Conference or Workshop Item (Published Version)

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## RE-EVALUATING THE ASSESSMENT OF PHONETIC SKILLS: WHAT WE LEARNED DURING THE PANDEMIC

Jane Setter<sup>1</sup>, Rachael-Anne Knight<sup>2</sup> and Nicole Whitworth<sup>3</sup>

<sup>1</sup>University of Reading; <sup>2</sup>City, University of London; <sup>3</sup>Leeds Beckett University  
j.e.setter@reading.ac.uk; r.knight-1@city.ac.uk; n.whitworth@leedsbeckett.ac.uk

### ABSTRACT

The sudden move to online teaching and assessment during the pandemic proved a challenge for many subjects; this was no less the case for phonetics. This paper describes how we endeavoured to devise comparable online assessment tasks for the evaluation of two aspects, articulatory phonetic skills and understanding of phonetics theory, and our evaluation of the success of the online tasks.

Normally assessed under exam conditions with no access to external resources, we altered and developed our assessments so that students could complete the tasks online. Scores from the outcomes of these assessments are compared with pre-pandemic scores. We discuss what we have learned from moving these assessments online, implications for students, and consider whether we will continue with these methods of assessment outside of lockdown conditions.

**Keywords:** Assessment, pedagogy, articulatory phonetics, phonetics theory

### 1. INTRODUCTION

E-assessment is not a new phenomenon. The use of computers in automatic assessment dates back as far as the 1920s [1], with assessment using web-based interfaces emerging in the 1990s [2]. Llamas-Nistal et al. [2] indicate that successful e-assessment and evaluation was becoming increasingly common pre-pandemic.

Where teaching is concerned, virtual learning environments (VLEs) such as Blackboard or Moodle, which are used to provide content to support teaching, learning and assessment, were pressed into greater service during the COVID-19 pandemic when it was no longer possible to teach or assess students face to face. Online interfaces such Blackboard Collaborate enabled live, interactive classes, with video technologies

such as Microsoft Stream or YouTube presenting lecture content which would normally have been delivered in real time. This is not dissimilar to the flipped classroom approach (see, e.g., [3]; [4]), in which students watch video lecture material prior to coming to class in order to focus class time on the rehearsal of practical skills. The capability to set up online tests and provide areas for students to upload assessments electronically via VLEs also came much more to the fore during the pandemic, as it was not desirable to submit assignments in hardcopy or meet students face to face for oral assessments such as presentations.

Kearns [5] examined the online assessment in 24 courses taught entirely online at a University in the United States. Of the 63 assessments she identified, five categories emerged: written assignments (22 = 35%); online discussion using a discussion board (19 = 30%); fieldwork reports (9 = 14%); quizzes and exams (8 = 13%); and presentations (5 = 8%), for which students used wikis, discussion boards and synchronous webinar sessions to respond to questions posed by their peers, although it is unclear from the paper whether students uploaded video content of the presentation or documents in the form of slides or a poster. At the time of her research, published in 2012, written assignments and online discussion far outstripped the other three categories in terms of frequency of use.

Phonetics skills are traditionally assessed in three ways: oral production, transcription and the examination of theoretical concepts. In this paper, we look at the assessment of oral production skills and the examination of theoretical concepts using online tools in two UK universities and examine whether grade inflation occurred when assessments moved online. In Kearns's [5] categories, oral production comes under presentations, whereas transcription and the examination of theoretical concepts fit best under quizzes and exams, depending on how the material is assessed. In some areas – e.g.,

sociophonetics, acoustic phonetics, or observation of speech in clinical contexts – more holistic assessments which fall into Kearns’s categories of written assignments or fieldwork reports are likely to be appropriate, depending on the intended learning outcomes of the module; we do not cover assessments of this kind here.

## 2. ASSESSING STUDENTS’ ORAL SKILLS

In the assessment of phonetics production skills, students typically carry out three in-person tasks individually:

- Production of sounds selected at random from the IPA chart;
- Substitutions, in which students provide a voice, place, manner (VPM) label for consonants substituted into existing words;
- The description of intonation patterns.

This assessment typically takes up to 15 minutes per student.

While some universities in the UK had done away with phonetics orals even before the pandemic, we are committed to ensuring our students have the opportunity to demonstrate production skills, not least because it is useful in work environments such as speech and language therapy. However, research has shown that in-person oral skills tests can be anxiety-provoking among students [6, 7]. The necessity to move to online assessment of oral production skills enabled us to re-think the assessment in terms of what might work better as an online test and how students might be supported in completing it.

### 2.1. Design of the online oral production skills test

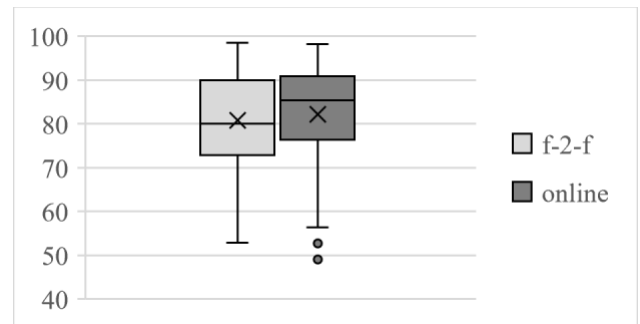
Rather than simply videoing the same kind of test students would do face to face, we decided to do the following:

1. Students were given a series of sounds to produce.
2. They made a video of themselves producing the sounds.
3. They gave spoken labels for the sounds, using VPM for consonants or tongue height/backness/lip rounding for vowels.
4. They were asked to produce a sentence with two different intonation patterns.
5. They provided a spoken analysis of the two different intonation patterns.
6. They gave reflections on the experience.

This differed from the face-to-face test in a number of ways: sounds are usually selected at random for students to produce during the test, not provided in advance (1); the sentence for intonation is also not provided in advance, and students describe their own and the examiner’s intonation patterns (4, 5); substitutions were not tested, so we asked students to provide labels for the sounds we gave them (3); we do not usually ask for reflections immediately afterwards.

In addition to 1-6 above, we gave students a model video so that they could see the kind of thing we wanted and to help alleviate anxiety. We also gave them clear instructions in PDF format and encouraged them to make the video in one take without editing it, enlisting a family member to help if needed. They could produce the video using any technology they wished (many used their mobile phone) and we allowed them to upload and view a practice video. We had no issues with any of the assessed videos, which were all clear enough in sound and vision and straightforward to mark. Students were given a 24-hour period to produce and upload the video to the VLE. The tests were marked out of 100 and a sample was moderated.

### 2.2. Results and comparison with face-to-face test



**Figure 1:** Box and whisker plot comparing face-to-face (f-2-f) and online oral assessment scores.

	f-2-f	online
<b>N</b>	82	91
<b>Min score</b>	52.86	49.09
<b>Max score</b>	98.57	98.18
<b>Mean score</b>	80.78	82.18
<b>Range</b>	45.71	49.09
<b>StDev</b>	10.77	11.71

**Table 1:** Descriptive statistics for face-to-face (f-2-f) and online oral assessment scores.

While it might be assumed that giving students 24 hours to produce and upload their video meant they had greater access to external resources and therefore should perform better, and that by removing substitutions we had eliminated a challenging task, we did not see a large difference in attainment between face-to-face and online orals, as shown in Figure 1 and Table 1. A simple two-tailed t-test indicated that the difference was non-significant at  $p > 0.05$ .

We observed that students still made errors in labelling. For example, “lateral” was used by some as a place of articulation (PoA) rather than part of a manner of articulation (MoA), incorrect combination PoAs were given such as “dental alveolar” or “retroflex alveolar”, and the MoA of velaric egressive consonants (clicks) was not identified fully. This, and the fact that the mean scores are highly similar, indicates to us that this method of assessing phonetics oral skills was successful and provided a suitable alternative to the face-to-face test.

### 3. ASSESSING KNOWLEDGE OF PHONETICS THEORY

Phonetics theory can be assessed in a number of different ways. One method which appears in the Examination for the Certificate of Proficiency in the Phonetics of English offered by the International Phonetic Association is an articulatory description of a phrase [8]. This detailed description, however, assumes comprehensive knowledge of the processes of articulation which may not be suitable for students operating at a more introductory level.

#### 3.1. Initial and subsequent design of the online quiz

In order to assess more basic understanding of the articulation of English speech sounds and intonation in a course mainly focussed on Roach [9], prior to the pandemic we had developed a class test in quiz form with these sections:

1. Ten multiple-choice questions on segmental features referring to a list of items;
2. Ten true/false statements drawn from any aspect of the module materials;
3. One question on intonation in which students had to suggest a pattern on a phrase in context by annotating the phrase

with diacritics and describing the pattern in terms of pre-head, head, tonic syllable (nucleus) and tail;

4. One diagram question in which students, e.g., completed and labelled a partially drawn mid-sagittal section;
5. One question on vowels which contained multiple sub-questions involving placing three vowels from the vowel system on a vowel chart, describing them and providing an example word for each;
6. One question on any other aspect we had covered in the module (e.g., assimilation; weak form words; etc.).

This worked well as a one-hour paper-based test under exam conditions (with extra time for students with reasonable adjustments), allowing us to examine a range of knowledge and skills.

When it became evident that the test would have to be moved online during the pandemic, we first gave consideration to whether it could be sent to students as a document for them to complete electronically or by hand and upload in e.g. a 23-hour period. To preserve comparability with a one-hour test period and test knowledge students had learned in the course of the module rather than their ability to refer to external sources, it was decided to commute the test to a timed, one-hour online quiz.

The VLE we were using had options for multiple choice questions (MCQs) (1), true/false questions (2) and short answers (6) but did not allow students to draw diagrams (4) or annotate diagrams or phrases (3, 5).

To deal with the diagrams in (4) and (5), we made use of the “hotspot” function. This allows the test-writer to upload an image to the quiz and select an area on that image which shows the correct answer to the question. For example, in the case of mid-sagittal sections, one can upload an image of four similar diagrams and then ask the student to click on the correct one (see, e.g., Fig. 2). This can then be followed up with multiple-choice or short answer questions to check understanding. Similarly, hotspot questions can be used to identify the correct location of vowels on the IPA vowel chart.

For (3), students were given a phrase in context and asked to select a suitable intonation pattern using a MCQ. Using short answer questions, they identified the pre-head, head,

tonic syllable and tail and explained the communicative function of the placement of the tonic syllable.

Select (click on) which of these four diagrams represents a voiceless alveolar fricative.

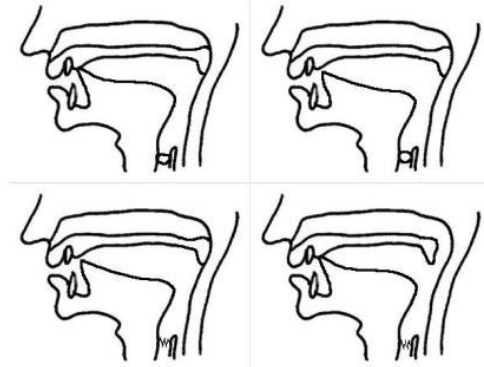


Figure 2: Sample “hotspot” question.

To mitigate possible collusion or extensive reference to external resources, questions and distractors were presented in random order for each student where possible and the test was set up with a one-hour timer (with extra time for students with reasonable adjustments); students could start the test any time within a 23-hour period. We provided an online demo test as a mock and went over it in class to check for any technical or practical issues. We avoided asking students to insert any phonetic symbols; separately they also undertook a dictation to broad phonetic transcription (not reported on here; see [10] for a proposed approach). Multiple choice, true/false and hotspot questions are marked automatically by the VLE.

### 3.2. Results and comparison, face-to-face and online quizzes

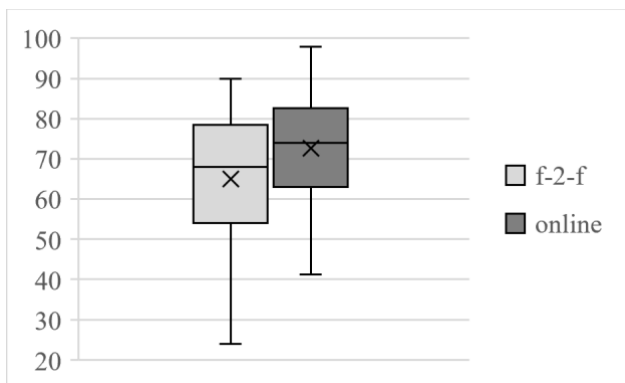


Figure 3: Box and whisker plot comparing percentage marks for f-2-f and online phonetics quiz scores.

Unlike the oral test, scores were higher for the online quiz than for the face-to-face version. The mean score rose from 60s-range to 70s-range with no score under 40% (the passing mark for undergraduate work in the UK). In addition, the Standard Deviation narrowed by three percentage points. A simple two-tailed t-test indicated that the difference was significant at  $p < 0.001$ . However, there was no evidence of collusion where the short answer questions were involved, but it is not possible to rule out reference to external sources.

	f-2-f	online
<b>N</b>	118	119
<b>Min score</b>	24	41.3
<b>Max score</b>	90	97.83
<b>Mean score</b>	64.97	72.65
<b>Range</b>	66	56.52
<b>StDev</b>	15.83	12.77

Table 2: Descriptive statistics for f-2-f and online phonetics quiz scores.

## 4. DISCUSSION AND CONCLUSIONS

Scores remained relatively similar in the online version of the oral test. We can, therefore, conclude that it is a comparably rigorous alternative to the face-to-face test. The online version of the quiz led to somewhat higher marks; if we kept one online variant and discarded the other, returning to a face-to-face quiz under exam conditions is the obvious recommendation. However, we are satisfied that the online quiz gave students the opportunity to demonstrate knowledge and understanding – as are our external examiners – which is surely the point of assessment. The improvement may also indicate that this approach helps to alleviate the stress experienced by some students taking normally paper-based exam-type assessments under traditional conditions, enabling them to perform better (but see the discussion in [11]).

In addition, and where both tests are concerned, time administering and marking the tests was considerably reduced. In the current days of increased student numbers and demands on academic staff, this cannot be a bad thing. We therefore conclude that, for the assessment types considered here, online assessment is a success, and we will continue to use it in some form.

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