




# Project Report – Interactive web-based review units for phonetics and phonology

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## Abstract

This report provides a summary of the E-learning project titled “Interactive web-based review units for phonetics and phonology” conducted from April 1, 2022, to June 30, 2023. This initiative was funded by the E-Learning Förderfonds at Heinrich Heine University Düsseldorf, Germany.

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## 1 Initial Situation

**Problems:** Foundational skills in phonetics and phonology are covered in the basic module. Phonetics and phonology skills build progressively, but students often forget skills from the basic module and other early courses by the time they need them again for later courses and projects. At present, these courses are required to spend a substantial portion at the beginning of the course reviewing foundational material.

**Concepts:** We propose the creation of a new set of web-based interactive learning units in phonetics and phonology.

**Added values for students:** With the proposed units, instructors will have a resource for flipped classroom teaching or self-paced learning by assigning them to students to complete outside of limited contact hours. Students will be able to review their most needed topics, and spend as much time as necessary. With less class-time spent on review, courses will be able to more efficiently focus on new material.

## 2 Goals and target groups

**The target groups:** students in the English Linguistics basic module ( $\approx 300$  students per semester), and intermediate/advanced-level courses ( $\approx 120$  students per semester) in English Linguistics or other institutes/faculties where phonetics and phonology are taught.

**What goals do you want to achieve with the measure?**

- Students will be able to name parts of the vocal tract that are relevant for speech production and relate them to speech sounds and articulation.
- Students will be able to categorize English consonant sounds based on the relevant consonant characteristics: place of articulation, manner of articulation, and voicing.
- Students will be able to categorize English vowel sounds based on the relevant vowel characteristics: tongue height, tongue backness, lip rounding, and tenseness/length.
- Students will revise basic knowledge about phonetic transcription.
- Students will be able to define phonemes and allophones, apply the minimal pair test, and revise the difference between complementary distribution and free variation.
- Students will be able to name the parts of the syllable and their characteristics, revise the syllabification of words based on the Sonority Sequencing Principle, the Maximal Onset Principle, and English phonotactics.
- Students will be able to understand the purpose of feature theory, the application of feature theory, and have a general overview of natural classes.

## 3 Implementation

The project was implemented entirely in Moodle. We utilised a range of Moodle HP5 plugins for all three components of the project (intro and outro

quizzes and content reviews). The course consists of multiple units which cover different basic topics related to phonetics and phonology. Each unit is self-contained and is set up as follows: An intro quiz, interactive and/or explanatory content, and an outro quiz. The intro quizzes serve as an estimation of student's prior knowledge before working through the content part provided in the units. Depending on the achieved score in the intro quizzes, students can fill their individual gaps in knowledge by working through the interactive content parts. The outro quizzes, which should be taken at the end, are supposed to provide a final evaluation of the student's knowledge of the topic. The extent of the interactive content parts varies depending on the complexity of the topic. Figures 1, 2 and 3 illustrate our use of different HP5 content types with varying levels of complexity. In general, technical terms, theories, and applications of common methods and analyses are introduced, explained, and illustrated with the help of examples and practice tasks.

It was used in the basis module of English Language and Linguistics (Part I and II) as well as the intermediate module phonetics and phonology in Winter semester 2023. In the basis module, it was offered as a optional revision tool for the course prior to the quiz and the final exam that covers phonetics and phonology. In the intermediate module, it was used as the students first official assignment. Their task was to complete all the quizzes on the phonetics topic (1-4). For each unit: if they do not pass the intro quiz, then they were instructed to go through the interactive materials and review their notes from the basis module and then do the outro quiz. It was also used in two other advanced seminars at the Department of English Language and Linguistics: Laboratory Phonology and Singing in an Accent, and by one lecturer in the Institute of General Linguistics (Phonologische Prozesse des Deutschen). Feedback from these lecturers indicated that they were used as a reviewing tool and not as part of their class assessment.

## 4 Results and Outlook

**Challenges:** One of the problems we faced was to keep all the materials we used open source. We found that a lot of legacy materials being used by the lecturers at Heinrich Heine University Düsseldorf and abroad often lack any licensing information or references. The team had to identify open source textbooks and if they do not cover what we needed, the content creators of

Click on the place of articulation of the sounds /k/ and /g/.

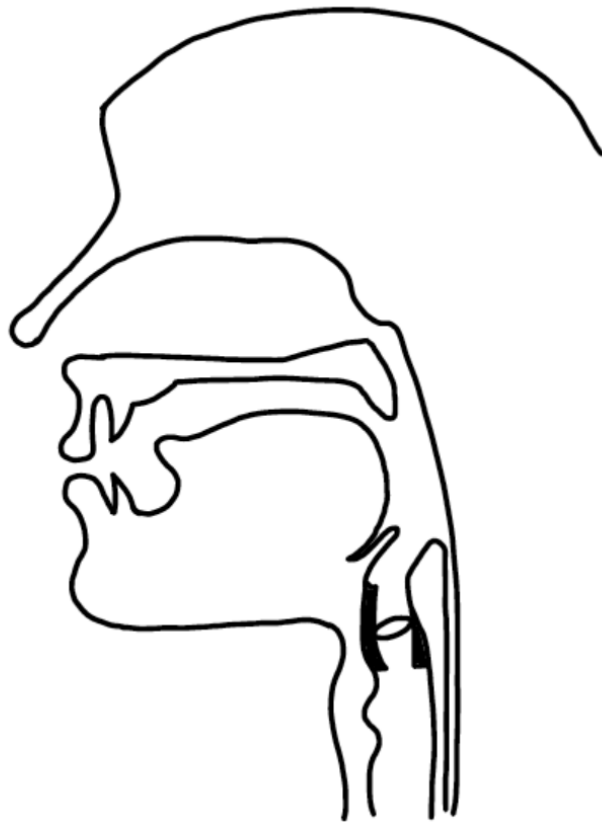


Figure 1: An example quiz using HP5's 'Find the Hotspot' content type

**Across**

2 the concrete realization of a phoneme is called: (5)

5 [l] (at the beginning of syllable) and [t] (at the end of syllable) are in... (13,12)

7 A subfield of linguistics that deals with sound patterns is... (9)

**Down**

1 aspirated [pʰ] like in "pin" and unreleased [p̚] like in "clap" are... (10)

3 You can choose to say [clap] while your friend says [clap] because [p] and [p̚] are in... (4,9)

4 pair /pe:/ and chair /tʃe:/ form a ... pair. (7)

6 The minimal pair tail [teɪl] - fail [feɪl] shows that /t/ and /f/ are different... (8)

Check Show solution Retry

Figure 2: An example quiz using HP5's 'Crossword' content type

Move the IPA transcriptions to their counterparts written with letters! Try to read the text out loud without a mistake.

Beware of heard \_\_\_\_\_, a dreadful word  
 That looks like beard \_\_\_\_\_ and sounds like bird \_\_\_\_\_.  
 And dead \_\_\_\_\_; it's said like bed \_\_\_\_\_, not bead \_\_\_\_\_.  
 For goodness sake, don't call it deed \_\_\_\_\_!  
 Watch out for meat \_\_\_\_\_ and great \_\_\_\_\_ and threat \_\_\_\_\_  
 They rhyme with beat \_\_\_\_\_ and straight \_\_\_\_\_ and debt \_\_\_\_\_.

/det/  
 /bi:d/  
 /bærd/  
 /streɪt/  
 /hærd/  
 /bi:t/  
 /di:d/  
 /mi:t/  
 /dɛd/  
 /bed/  
 /greɪt/  
 /bɪ(ə)rð/  
 /θreɪt/

Check

Figure 3: An example quiz using HP5's 'Drag and Drop' content type

our team created many images from scratch – hand-drawn or using drawing softwares.

**Summary of evaluation results:** User satisfactions were evaluated in two forms: (1) The initial evaluation surveys by the students during the pilot phase and (2) subsequent evaluation surveys of courses in which the resource was used.

For (1), we had only 9 responses. We received positive evaluations over all (see Figures 4 and 5). They rated 1.7/5 for “I would recommend the e-learning offering to other students.” However, the usefulness of the intro and outro quizzes can be improved, with a rating of 2.3/5 for “The quizzes at the beginning and end of each unit helped identify what to focus on.” In the open responses, they suggested that we integrate it as a mandatory exercise in our courses and that they like the e-learning offering for the reasons that match our goal: “Self paced reviewing of material, catch up on the things you need to and being able to focus on individual weaknesses”, and “Easy to use, accessible at any time, gave a good and quick review of contents from the basic module that I needed for this course”

For (2), as part of the basis module evaluation survey, one student commented the following for what makes learning complicated: “Eventuell mehr Zusatzmaterial. Es gibt für Phonetics and Phonology zwar aud Moodle etwas, allerdings nicht für Morphology oder Syntax.” This suggests that the E-learning self-review module is attractive enough for the students to ask for more in other subject areas.

## 5 Data availability

We commit to making our work openly available beyond Heinrich Heine University Düsseldorf. We published the content on the Open Science Framework and ORCA.nrw.

This work is licensed under a Creative Commons “Attribution-NonCommercial-NoDerivatives 4.0 International” license.



The content is available at:

- Open Science Framework: <https://osf.io/kjnad/>

## Histogramme zu den Skalafragen

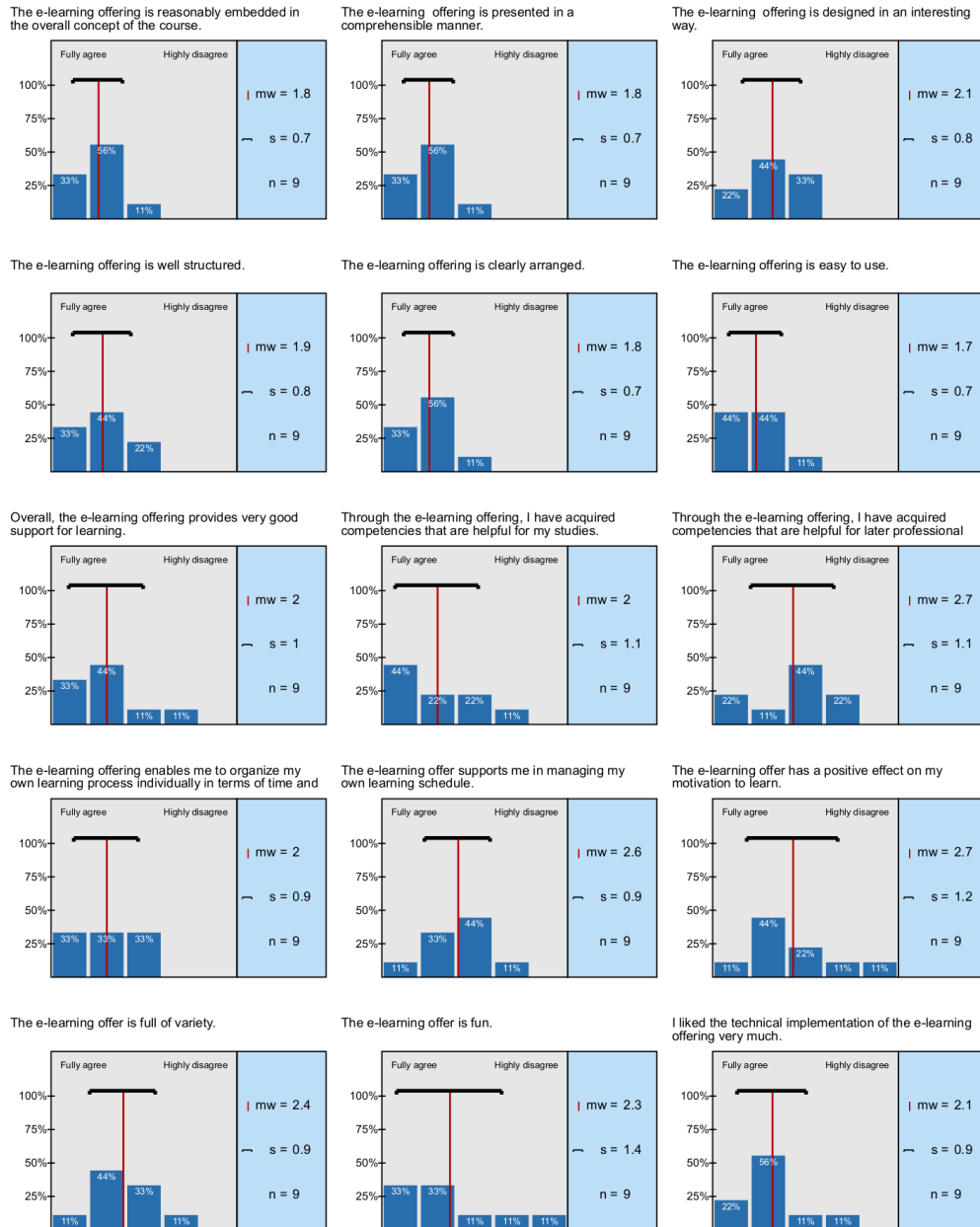


Figure 4: Course evaluation responses visualised using histograms (Part 1)



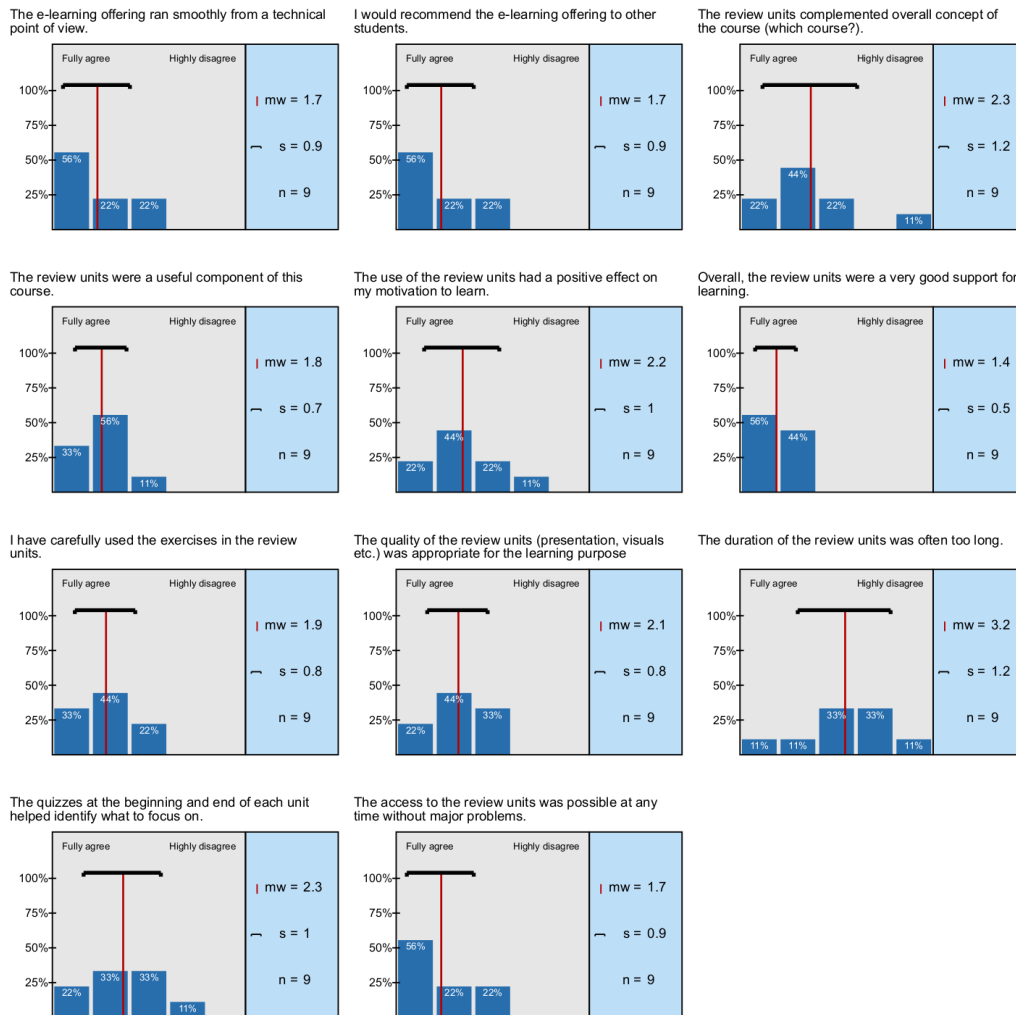


Figure 5: Course evaluation responses visualised using histograms (Part 2)

- ORCA.nrw: <https://www.twillo.de/edu-sharing/components/renderer/139c131a-a8a5-4b2e-852c-3f6b8a7b57a4>

If used, please cite:

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  note = {Available also at \url{https://www.twillo.de/},
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## 6 Authorship contribution statement

LR and JW contributed equally to this work. KT and CG served as the senior and corresponding authors in this project. We follow the CRediT taxonomy.

Conceptualization: KT, CG, LR, JW; Data curation: JW, LR, CG, KT; Funding acquisition: KT, CG, AKR; Investigation: LR, JW; Methodology: JW, LR, CG, KT; Project administration: JW, LR; Supervision: CG, KT; Visualization: LR, JW; Writing – original draft: JW, LR; Writing – review & editing: LR, JW, CG, KT

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