

Pronunciation Improvement for Science and Engineering Students: Promoting Autonomy in External Learning

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Overview

- Background
 - Autonomy and External Learning
 - Science and Engineering Students
 - Pronunciation needs
 - Learning styles
- Course Description
- Sample Work
- Discussion



Learner Autonomy

- "Autonomy is ... the ability to take charge of one's own learning." (Holec, 1981, p. 3)
- Crucially involves ...
 - Determining goals
 - Deciding how to reach the goals
 - Measuring progress
- Cf., Learner Strategies (Wenden & Ruben, 1987; Wenden, 1991)

Autonomy and External Learning

- Emphasis on collaboration and negotiation in autonomy research in 1990s (Benson, 2001)
 - Focus on autonomy in the educational context
- In 2000s, call for more attention on autonomy outside the educational context.
 - "Continuing learning" (Harmer, 2001)
 - "External learning" (Field, 2007)

S&E Students: Pronunciation Needs

- Large proportion become engineers and managers.
- Will use English as lingua franca.
- Need speech comprehensibility (for int'l audience)
 - Consistent, recognizable speech accent
 - Mastery of pronunciation of technical jargon

S&E Students: Learning Styles

- High math and physics aptitude
- S&E learning style research (Felder and Brent, 2005; Felder and Silverman, 1988)
- S&E students prefer active, visual, and sensory learning (Kolmos and Holgaard, 2008).

Course Description

- Determining (pronunciation) goals
- Deciding how to reach the goals
- Measuring progress

Autonomy in
Pronunciation
Development

STFE:
The Sound System
of English

Learning
Style

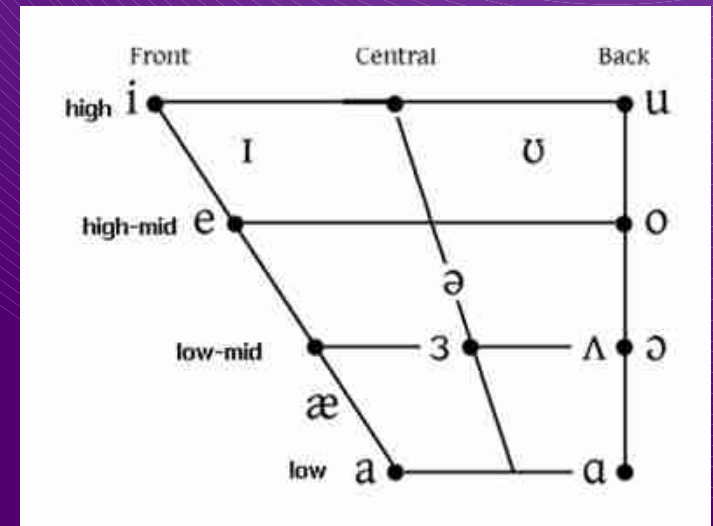
Pronunciation
Needs

Course Objectives

- Understand and be able to talk about the fundamental concepts of (acoustic) phonetics and phonology in English.
- Understand and be able to describe some of the key phonological and phonetic features of the English language in English.
- Use specialized software to measure and analyze acoustic recordings of English speech.
- Design and carry out a small-scale experiment looking at some phenomenon of the English sound system.
- Present findings from the above experiment in English in both oral and written forms.

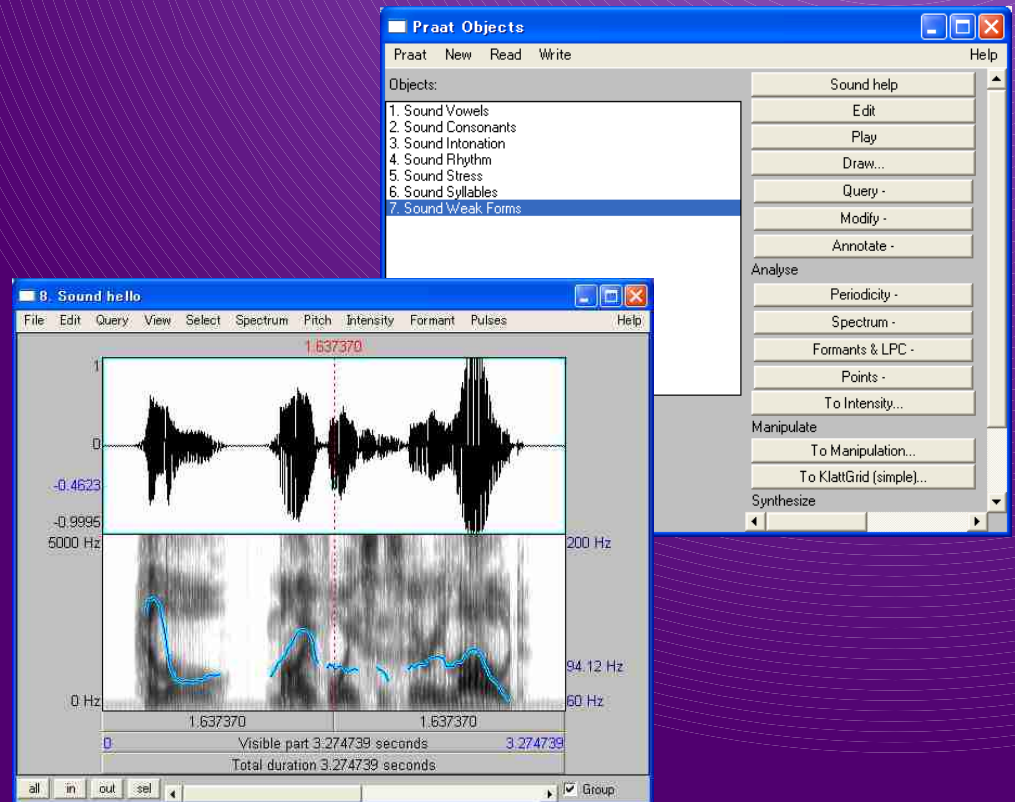
Course Content

- International Phonetic Alphabet
- Fundamentals of acoustic phonetics (e.g., waves, formants, tube model of speech)
- Sound system of English
 - Vowels and Consonants
 - Syllables & Words
 - Stress & Rhythm
 - Intonation



Course Tools

- Praat (www.praat.org)
 - Tool for waveform and spectrographic analysis
 - Freeware
 - Cross-platform
 - Portable
- Provides *electronic visual feedback* (Anderson-Hsieh, 1992)



Course Tools

- Speech Accent Archive at George Mason University (accent.gmu.edu)



The screenshot shows the website for the Speech Accent Archive. At the top left is an illustration of a human ear and mouth. The main title is "the speech *accent* archive". Below the title are navigation links: "how to", "browse", "search", "resources", and "about".

On the left side, there is a "new search" button and a "Biographical Data" section. The biographical data includes:

- birth place: brooklyn, new york, usa (map)
- native language: english (eng)
- other language(s): french, spanish
- age, sex: 45, female
- age of english onset: 0
- english learning method: naturalistic
- english residence: usa
- length of english residence: 45 years

The main content area is titled "english6 Elicitation Paragraph:" and contains a text block with a play button icon above it. The text reads: "Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station."

Below the text is a "Key:" section with two items:

- blue = potential areas for this generalization
- red = actual areas for this generalization

On the right side, there is a "Phonetic Transcription:" section with the following text: "[pʰɪz kəl stɛlə æːsk ə rə baɪŋ ðəʊz θɪŋz wɪθ hɜː fɪrɪn ðə stɔː sɪks spuːnz ə ʃ fɪʃ snəʊ piːz fɪv θɪk slæbz əv blʊː tʃiːz æn meɪbi ə snæk fɔː hɜː brʌðə rɪ bʌb wɪ əlsoʊ nɪd ə smɔːl pˌlæstɪk sneɪk æn ə bɪg tɔɪ frɔːg fɔː ðə kɪdz ʃɪ kʰɪn skuːp ðɪz θɪŋz ɪntə θɪ rɛd bægz ə wɪ wɪl ɡoʊ mɪt hɜː wɛnzdeɪ æt ðə tɹeɪn steɪʃən]

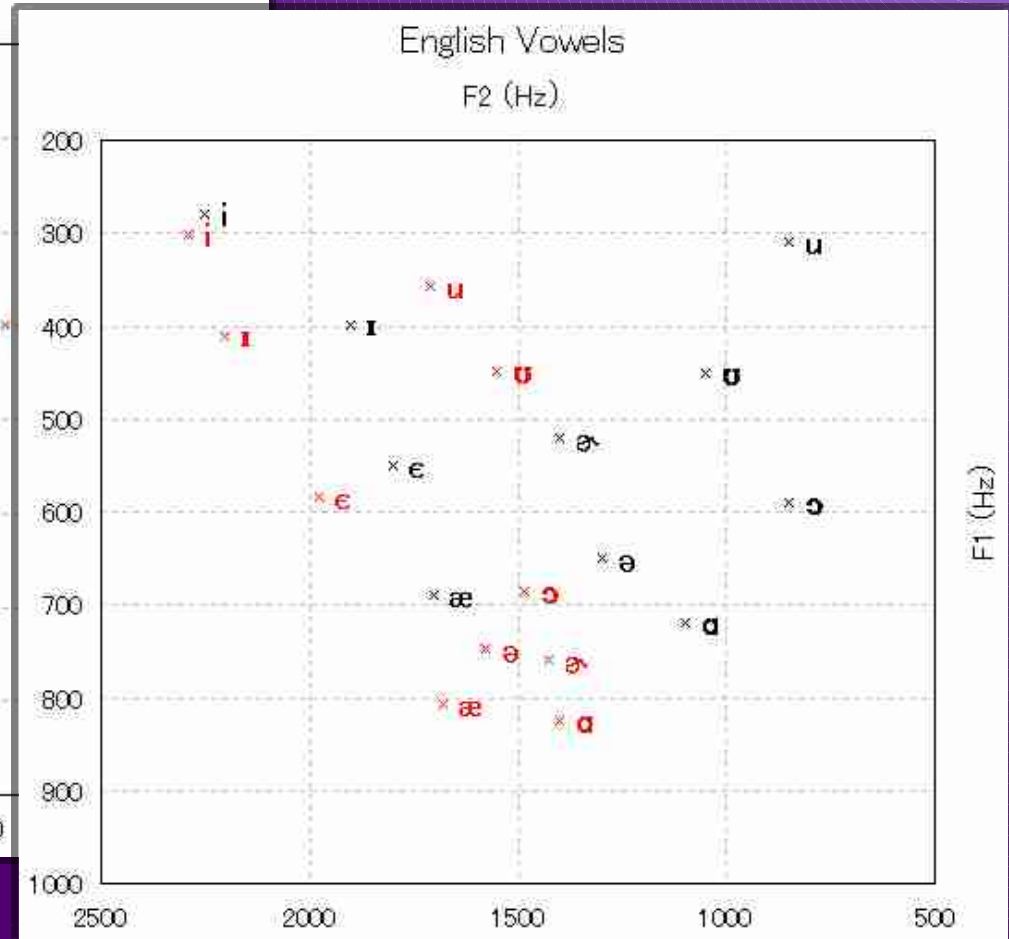
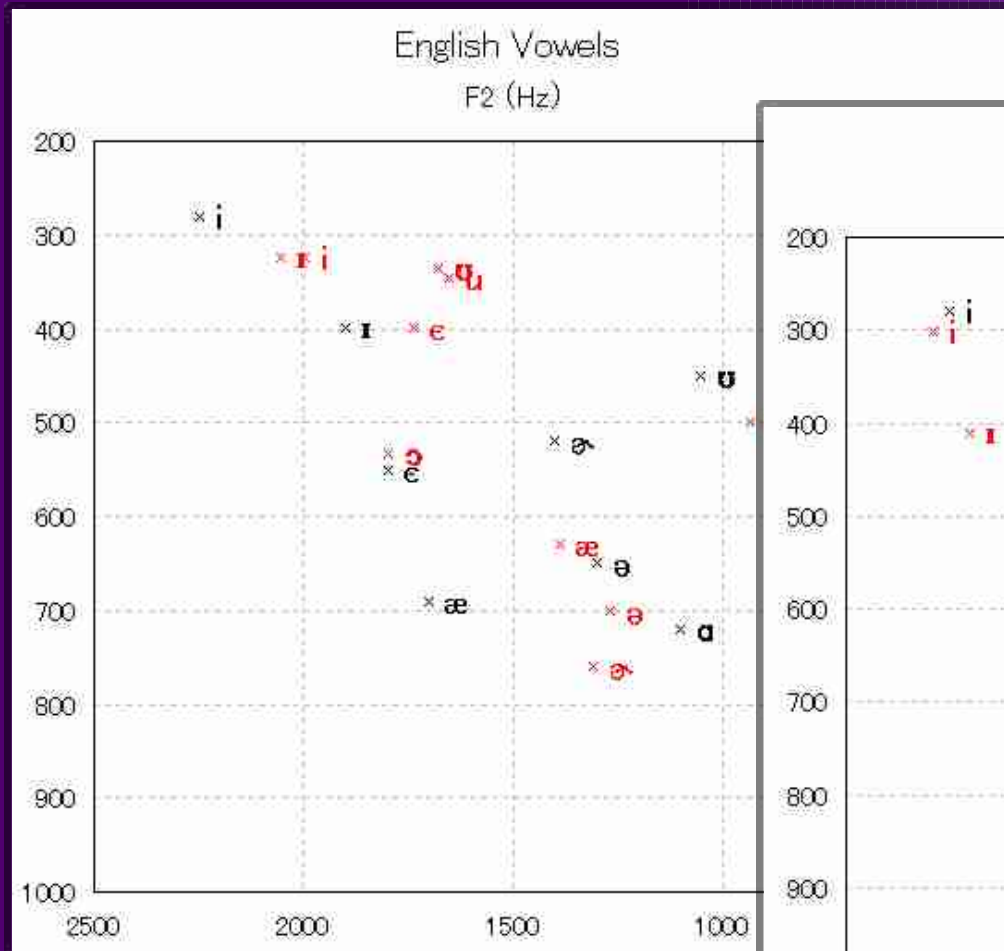
Classroom Activities

- Lectures on content
 - Interspersed with ...
- Tasks
 - Practical confirmation of content
 - Pronunciation diagnostic

Sample Activities

- Stress-timing of English
 - Record poems and look for constancy of stress.
 - Record sentences with additional unstressed syllables and check for constancy of time.
 - CATS EAT MICE.
 - The CAT will EAT the MICE.
 - The CAT will have EATen the MICE.
- Measure and plot vowels in vowel space

Sample Activities



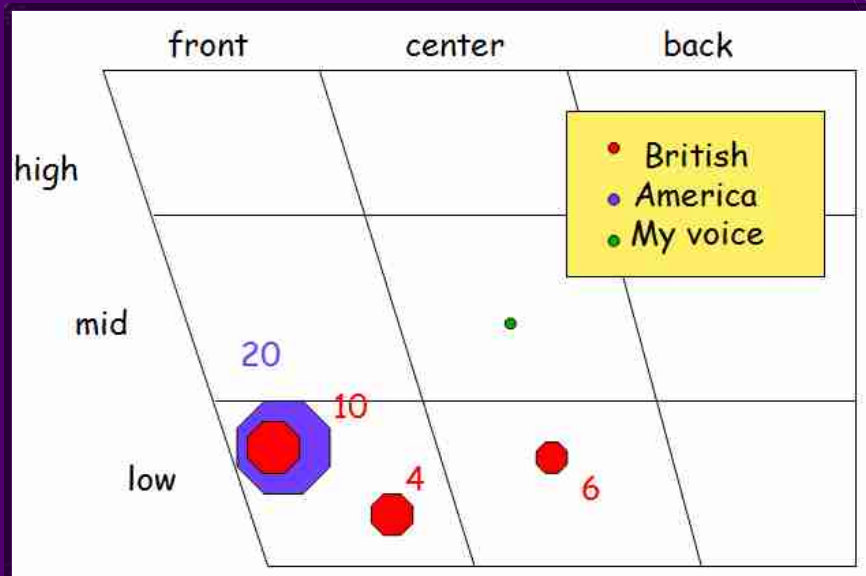
Final Project

- Small-scale research project
 - Interesting feature of English pronunciation
 - Comparative study of English-Japanese pronunciation
- Creation of an individualized program of pronunciation development
- Projects reinforce diagnostic techniques
 - Foundation for future pronunciation development

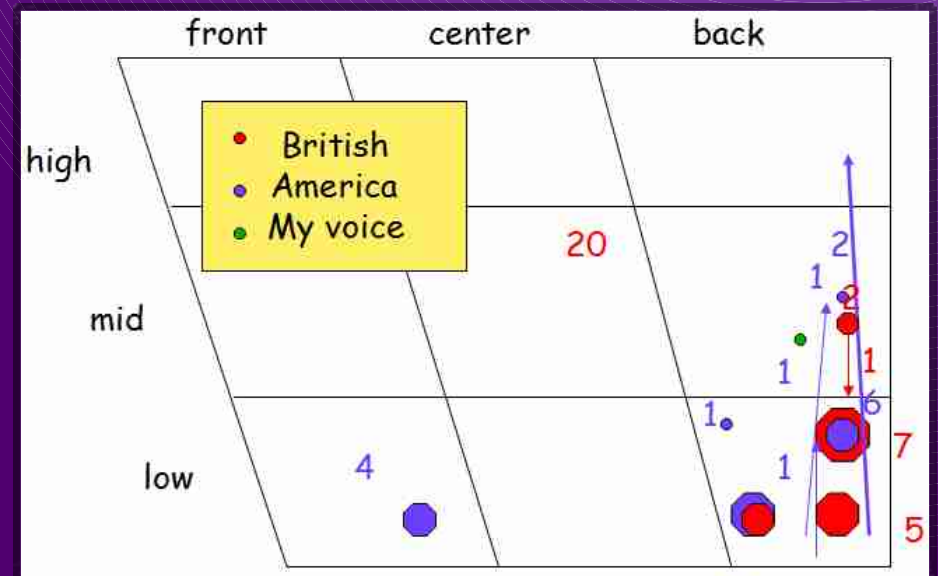
Sample Final Project 1

- Comparison of vowels in British and American English.

“plastic”



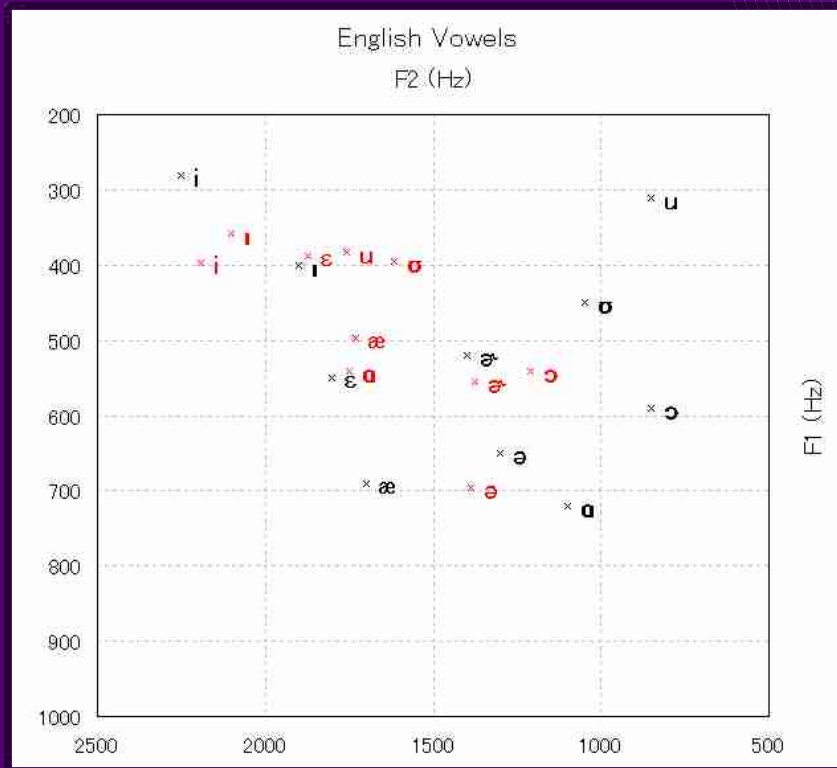
“frog”



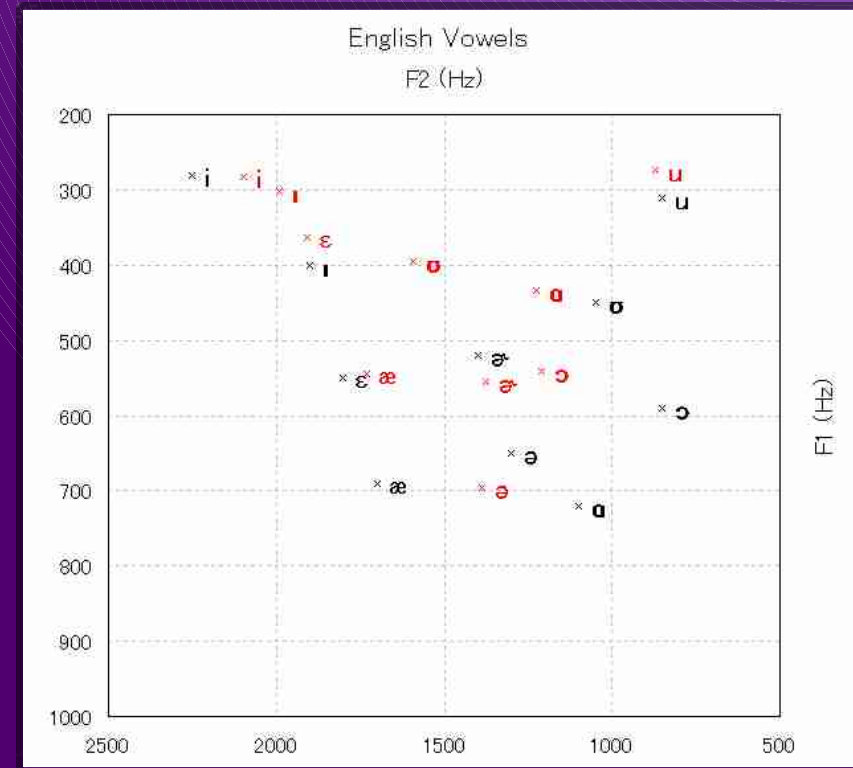
Sample Final Project 2

- "Method to improve my pronunciation"

Before



After



Discussion

- Student as (applied) linguist
 - "We can train them to be their own language researchers..." (Harmer, 2001, p. 343)
- Limitation: Difficult to adapt to other contexts
 - Computer laboratory
 - Specialist knowledge
- Effectiveness
 - Unknown, as yet
 - Difficult to measure

Summary

- STFE: The Sound System of English addresses S&E students' pronunciation needs by
 - Taking their active, visual, and sensory learning style into consideration
 - Preparing them for external learning
 - Diagnose pronunciation problems
 - Measure progress
- Future work involves measuring effectiveness and facilitating adaptability.

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