

A Consideration of Students' Proficiency in Discriminating Phonetic Symbols

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Abstract

This study investigates university English majors' competency in decoding phonetic symbols by analyzing the results of a written test from a phonetics course. The students tried acquiring basic knowledge of vowels, consonants, and suprasegmental phonemes by several strategies including: learning the mechanism of phonetics based on the technical terms; practicing reading phonetic symbols; investigating the pronunciation of loanwords in Japanese and English; pair speaking practice; and recording monologue shadowing throughout the semester. At the end of the course, students took a final examination consisting of various types of questions. The examinations were held in January from 2016 to 2019 with 172 students participating over the four years. This study considers examinees' answers from four sections of the test: differentiating phonemes in minimal pairs by listening, identifying a common phoneme in a group of three words, understanding alliteration and rhyme, and transcribing phonetic symbols into the English alphabet. The test results show the students' comprehension and tendencies, namely, their strengths and weaknesses. These can be analyzed according to the phonemes themselves, including such elements as places or manners of articulation. This research also offers suggestions as to what students should pay careful attention to while learning English and what effective strategies they can use.

Keywords: alliteration, CALL, consonants, listening, minimal pairs, phonemes, phonics, pronunciation, recording, rhyme, self-analysis, shadowing, vowels

The aim of this research

In present day Japan, English education is considered a significant part of globalization. Early-childhood English education is being promoted, and according to the Ministry of Education, Culture, Sports, Science and

Technology (MEXT 2018), “The latest 2016 revision to the Courses of Study, revised once every decade, will be fully implemented from 2020. The revisions include implementing English language activities in 3rd and 4th grade, and adding English language as a subject in 5th and 6th grade.” Children study English at school as well as many taking private lessons at language schools or cram schools. Language teaching in early childhood tends to focus on oral communication namely speaking and listening. Young children are often good at learning through their aural sense and many show great interest in imitating people. After entering school, the focus of their study turns to reading and writing. When they have the ability to learn letters in their first language, they can start to learn the English alphabet. The alphabet is taught in Japanese class, “In Grade 3, to read roman characters describing simple daily words and to write them” (MEXT 2011a, p.8). Then at junior high school, they start to use glossaries or dictionaries.

In the past, paper dictionaries were common and students needed to read phonetic symbols when they wanted to know the pronunciation of words. Nowadays however, students tend to have electronic dictionaries, which have become inexpensive and are convenient to carry whether at school or at home. Many students have smart phones or tablets, which allow them to use dictionary applications or search online. These devices are equipped with speakers and at the press of a button, students can access sound files, where they can hear the word’s pronunciation. This is a useful function for younger learners, but it takes a long time to look up each word individually in the dictionary. Older learners can make more effective use of their study time once they learn how to read phonetic symbols and understand the fundamentals of phonetics. The pronunciation of words can be learned through sound files, but learners need to understand the principles of rhythm and intonation in phrases, clauses and sentences.

University students today started to learn English in accordance with the MEXT curriculum stated as follows: “The new Courses of Study enrich the content of education and increase the number of classes, with an emphasis on the balance between acquiring basic and fundamental knowledge and skills and fostering the ability to think, make decisions, and express oneself.” When the latest curriculum was implemented, current university students were nine to twelve years old which means they started to learn English at school. MEXT (2011b, p.1) also aims, “To develop

students' basic communication abilities such as listening, speaking, reading and writing, deepening their understanding of language and culture and fostering a positive attitude toward communication through foreign languages." MEXT (2011b, pp.1-2) further introduces language activities for each skill and focuses on "the basic characteristics of English sounds such as stress, intonation and pauses" to enable students to identify "English sounds correctly" in speaking and listening. This study considers how many students have attained these targets and to what level, by examining university students' actual abilities.

Method

Participants

This research, that ran consecutively over four years, aimed to measure how well phonetic symbols were understood by university students. The English Phonetics course for second-year English majors and above, runs for ninety minutes, once a week, for a fifteen-week semester. The class size varied; 34 students in 2015, 53 students in 2016, 37 students in 2017, and 47 students in 2018. All students were native Japanese speakers, with the exception of one Vietnamese student in 2018. Most are planning to obtain a teaching certification for junior-high or senior-high school or to complete a course in teaching English to children. Some students have studied abroad for between two weeks and a year; others are getting ready to go to English-speaking countries in the near future. Students also have a choice to take an intensive course on campus instead of studying abroad. Various English classes are offered with both native English speaking teachers and Japanese teachers, and learners have ample opportunity to develop their English communication skills. In the first-year, all students take the TOEIC Bridge® IP test as a placement test in April, and again as an achievement test in the following January. The test has two sections, listening and reading, with each section worth 90 points, for 180 points in total. Their average scores on the achievement test were as follows: 155.8 (L:76.7/R:79.1) in 2015; 151.7 (L:74.1/R:77.5) in 2016; 149.7 (L:70.9/R:78.8) in 2017; and 151.0 (L:72.8/R:78.2) in 2018. According to The Institution for International Business Communication (2018, p.22), the national average score of 50,309 first-year university students in 2017 was 124.0 (L:61.1/R:62.9). These scores were achieved eight months or more before they started to learn phonetics. Through various English classes

and the study abroad program, students have been cultivating their English skills. It is interesting, therefore, to find out the range and scope of their knowledge of phonetics, and how this helps or hinders them in their aim to become good speakers of English.

Materials and procedure

This class is implemented in a computer assisted language learning (CALL) system, with each student seated at a desktop computer with a headset. Pairs of students also share another monitor enabling them to look at materials including videos, pictures through an overhead projector, and other data or websites by mirroring the teacher's computer screen. The capacity of the room is thirty although as approximately forty students participate in this course every year, two rooms are combined to enlarge the capacity. The teacher's control center is in the front of the room, but students' activities can be observed through the teacher monitor at all times. Thus, two monitors are set up for the teacher, one as a normal computer screen for controlling the computer system and the other for monitoring students. The latter shows students' names once they log in, and their progress of study as well as acting as a record of their attendance.

There are several ways to communicate with each other in class: Students can be set in pairs or groups randomly to practice speaking through the CALL system. The teacher can communicate through headsets and microphones, or can circulate among students to give individual direction. The CALL system works automatically, but in order not to be too impersonal, multiple approaches using different ways of interacting and various types of activities are employed. The teacher's explanations are heard via a microphone through speakers in the classroom ceiling. Students' seats are arranged with four people facing each other and are within the teacher's watchful eye. If the students have any trouble with their computer system, they can raise their hand to ask for help.

The series of lectures consists of three parts: teaching phonetic knowledge, practicing by reading aloud, and recording students' speech. Initially, the start of the movie *My Fair Lady* (1960) was introduced as an orientation. The story describes a British flower girl who speaks Cockney English and masters Received Pronunciation under a phonetician's tutorage. The first half of the movie shows what phonetics is and features some unique training. Most students had never seen this film while those

who had, enjoyed it as a comedy without considering the technical phonetic aspects. Watching it, the students were motivated and inspired to start the course as they identified with the flower girl who aimed to improve her poor pronunciation skills.

In the second week, the students studied the basic phonetic system through phonics and romaji to learn how to describe speech sounds. Phonics is a method of teaching how to read by correlating sounds with symbols in an alphabetic writing system. Romaji is a system of spelling used to transliterate Japanese. Through this, students can see the gap between spelling and pronunciation. Each letter or phoneme has some variations of pronunciation or spelling. For instance, 'g' can be pronounced as /g/ in 'go' and /dʒ/ in 'age' while /k/ can be spelt with 'c' in 'cow', 'ch' in 'school', 'k' in 'king', or 'q' in 'queen'. It is important to begin with romaji as although students had been introduced to it at elementary school, some hadn't mastered it perfectly. Students could appreciate comparing *tsu/tu*, *shi/si*, or *zu/du*, the latter of which doesn't occur in Japanese. /o/, /zu/, and /ji/ each have two ways of spelling in the Japanese syllabaries, but romaji depends on sound. By introducing proper nouns such as place-names and people's names, students could appreciate the difference between Japanese letters and romaji. Furthermore, they learned that spelling Japanese names using the Hepburn system leads foreigners to the correct pronunciation of Japanese words. Additionally, the amateur singer Yoshiko Nakada's works were introduced as an example of observing phonemes. She sings and plays the keyboard on her YouTube channel online, and calls herself 'a reverse singer'. When she films herself, she reads the music score backward, turns on a recorder and starts to perform. The viewers aren't sure what song she is playing during the recording because the melody is unfamiliar and the lyrics are senseless. When she finishes performing, she stops the recorder and plays back the sound data backwards. Only then can the audience understand which song she played. Before her performance, she reads the score carefully, and rewrites the melody and lyrics in reverse. Nakada is a music teacher and is skilled in reading scores, but used to struggle reading lyrics backwards. After a great deal of trial and error, she finally succeeded in parsing phonemes and rewriting them backwards. When she sings "Amazing Grace", she pronounces /s e:r gi zi e ma/ which only sounds like 'amazing grace' when played backwards. Her English pronunciation skills are not native-like, and she often performs Japanese pop songs, yet her technique shows that she

has a great command of phonetics.

Following this, students started to learn in earnest about phonetic mechanisms through the textbook *New Phonetic Bases for International English* (Shimaoka, T. 2005, Nan'un-do). The textbook is currently out of print, but a digital copy is available. The hard copy was scanned and its attached CD's were downloaded into a shared file. The data is available to students who can use it in class and take it home to study themselves. Vowels were learned in the first month, consonants in the second month, and suprasegmental phonemes including rhythm and intonation in the third month. Explanations were given how to articulate each phoneme by showing a picture of the oral cavity and using a hand in a red glove to describe the position of the tongue. Comparisons were made between the pronunciation of English and that of Japanese. Technical terms were also introduced such as places or manners of articulation. These activities while generally passive were where paired with more active methods in order to help students to solve quizzes and participate in class enthusiastically. From the CD's students listened to model readings and learned to distinguish between phonemes or English variations such as General American and Received Pronunciation.

Concrete examples were introduced not only through the textbook, but also in additional materials. Using tongue twisters, students can focus on phonemes individually, such as /s, ʃ/ in 'She sells seashells on the seashore.' And nursery rhymes are effective for learning rhythm, for instance using 'This is the house that Jack built' to read long sentences by chunk-reading and distinguishing function words from content words. Lyrics of popular songs can teach prosody including alliteration and rhyme. Songs from musical plays and English or Japanese pop music are familiar to students, so they are interesting, stimulating and effective teaching materials. Comedians' TV performances or commercial messages can also work as good examples. Jokes and catch phrases are often produced based on phonetics by using similar phonemes or changing intonation. These materials are not always particularly educational, but are intriguing and motivational for students. Students learned that they are exposed to phonetics constantly, and that their daily lives are full of elements related to phonetic principles.

In order to improve pronunciation skills through speaking and listening, two methods were adopted; students repeated after the teacher or they worked in pairs. Sometimes they were paired randomly by the

CALL system, and were seated far from each other. They communicated through headsets without being face to face. They were shown a list of minimal pairs from the textbook *English Pronunciation for Communication* (Koizumi, S. and Sugimori, M. 1988, Nan'un-do) on a shared monitor. One student read a word carefully while the other listened and identified which word was read; pairs such as feel/fill, hat/hot, correct/collect, and cars/cards were used. They practiced repeatedly and learned how to pronounce and distinguish phonemes without depending on context. Another pair training activity focused on rhythm and intonation. Several conversation scenes from the movie *Roman Holiday* (1953) were watched with Japanese subtitles. The two main characters speak different variations of English; the princess speaks British English and the journalist speaks American English. Through this, students learned the different patterns of intonation. They also compared the princess in this movie with the flower girl in *My Fair Lady*, as both characters were played by the same actress, Audrey Hepburn. In each movie she spoke in a different accent, which surprised students as they saw the effect of language variations. Then they were given the English script, and practiced some phrases that included liaison, weak forms and sound changes. Lastly they practiced role-playing the dialogues in pairs.

As another method to improve pronunciation skills, shadowing was introduced. Students were given an assignment of recording their speech every four weeks. First, students received a script and listened to a model reading. After practicing reading it aloud for a couple of minutes, they made the first recording as a pretest. Most students didn't succeed in reading fluently. Shadowing requires that they speak simultaneously with the model reading, but some couldn't follow the speed, or couldn't read each word clearly. Others stopped in the middle of sentences, or omitted words. Even if they could read it without any errors, their intonation wasn't natural and tended to be flat. This pretest served to help students realize their level of competence, and all became determined to practice hard before the next recording. Students can always make use of the computer system on campus to practice model reading. Additionally, they can keep the data on a flash memory to take home to practice. In this way, students listened and practiced shadowing repeatedly in their free time. Four weeks later, they recorded the same script as a posttest and compared it to the initial speech. Subsequently, students were given another script to record as a pretest, which they repeated practicing and

recording until the end of the semester. In total they made six recordings, three pairs of pretests and posttests. It was hoped that their pronunciation skills would be improved through this training and the knowledge of phonetics they learned in class. Practicing different scripts would help students to notice the patterns of English rhythm and intonation. The details of this approach can be found in Kido (2013, 2016).

The scripts used were interview test cards from the Eiken Grade 2 test. Some students were planning to take this test while others had already passed it. While the former could use it to practice for the test, the latter could improve their skills through shadowing, which is a different approach from the interview test. While the three scripts were different, qualities such as difficulty and length were almost the same. Using this approach, it would be possible to see how much students had improved their pronunciation skills over the course. In the final lesson, they assessed their recorded data by comparing the three pairs of tests and writing their comments and thoughts. Through this, students found out what their strengths and weaknesses were: Some of their weaknesses were corrected over the course, while others remained. Consequently, students could see how they could improve the pronunciation of certain phonemes and rhythm patterns with a little effort over a short time. They also realized the need to continue training to address their more ingrained habits.

As part of the study, students were required to submit a written assignment about loanwords. The Japanese language includes a considerable number of borrowed words drawn from foreign languages. People rely on them for words ranging from popular vocabulary to technical terms. The students collected seventy loanwords from their daily communication or from the media. They examined their spellings in katakana and English with phonetic symbols, and analyzed the way to describe loanwords systematically in Japanese by comparing with the original English pronunciation. They discovered some differences between Japanese and English pronunciation, for example, the Japanese language uses only five vowels while English has more. Japanese vowels tend to be combined into one such as /a/ for /æ/ in 'bag', /ɑ/ in 'arm', /ʌ/ in 'bus', or /ə/ in 'girl'. There are some differences in consonants, too. For instance, the Japanese language doesn't distinguish /l/ and /r/. 'Oar' and 'all' are both spelt and pronounced in the same way, as [o:ru]. Consequently, students wrote suggestions about how to make good use of loanwords in learning English, and noticed how convenient but misleading loanwords

can be. This was also a good opportunity to practice writing phonetic symbols themselves because tasks in class were more commonly reading based.

At the end of the course, a written test was given as their biggest assignment. The test included two sections of listening and reading. The listening section measured how well they could differentiate phonemes and intonation. Although speaking and listening skills are mutually related, some students are better at listening than speaking. A high level of competence in listening but an inability to pronounce words clearly could be due to the fact that listening is passive while speaking is active. Those who have sufficient skills in a passive category can improve their skills in an active category with some additional effort. Contrarily, those who have poor listening skills tend to rely on their intuition, which is not always an effective strategy. Once these students master phonetical knowledge for observing and analyzing speech sounds, their abilities will improve greatly. Thus, it is important for both listening and reading to be evaluated in this course. Moreover, the reading section includes several quizzes to uncover how appropriately students can identify phonetic symbols by differentiating phonemes or spelling phonetic symbols into general alphabets, and vice versa. The written test functioned as a barometer to measure students' competency in phonetical knowledge.

Analysis

In 2015, the phonetics course was started for second-year students or older. This is an investigation of the results of sections of the course's written test, given over four years from 2016 to 2019.

Listening quiz

The listening section consisted of twenty minimal pairs printed on the test-paper without phonetic symbols, with one word of each pair being read. The students answered by choosing which word they heard. The test site was a regular classroom with speakers in the ceiling, rather than a CALL room, and the teacher stood in front of the students and spoke through a microphone. Students could look at the teacher's face if they wanted to see her mouth moving. Over the four years, the same minimal pairs were introduced; different words from the pairs however, were read out alternatively in the test over the years.

Table 1 shows how many and the percentage of students who answered correctly.

Table 1. The results of listening quiz

minimal pairs	2016 (34)	2017 (53)	2018 (37)	2019 (47)	Total (171)
cut / cute	34	53	37	47	100% (171)
not / note	33	53	37	47	99.4% (170)
feel / fell	33	51	37	47	98.2% (168)
my / may	33	53	37	46	98.8% (169)
air / ear	33	53	37	47	99.4% (170)
peak / pick	34	53	37	47	100% (171)
walk / work	30	49	33	45	91.8% (157)
bag / bug	33	44	32	38	86.0% (147)
hall / hole	23	29	33	42	74.3% (127)
simple / symbol	34	53	37	47	100 % (171)
horse / force	33	52	35	46	97.1% (166)
berry / very	28	44	30	36	80.7% (138)
close / clothe	23	43	13	35	66.7% (114)
size / sides	28	26	28	34	67.8% (116)
sheet / seat	27	36	33	44	81.9% (140)
pledger / pleasure	36	47	29	30	83.0% (142)
race / lace	34	47	11	29	70.8% (121)
sun / sung	28	53	37	8	73.7% (126)
queen / keen	33	53	37	47	99.4% (170)
yen / N	33	53	37	47	99.4% (170)

In general, the rate of correct answers is quite high. The students have good competency in distinguishing phonemes by listening. The rate was then analyzed by sorting the pairs into different groups. All the students answered three minimal pairs perfectly, /ʌ, u:/ in 'cut/cute', /i:, ɪ/ in 'peak/pick' and /p, b/ in 'simple/symbol'. The second highest group with percentages in the high nineties, were extremely close to perfect too; one to five students failed in six of the pairs, /ɑ, ɒs/ in 'not/note', /i:, e/ in 'feel/fell', /ɑr, ɛr/ in 'my/may', /éə, iə/ in 'air/ear', /h, f/ in 'horse/force', /kw, k/ in 'queen/keen', and /j, ø/ in 'yen/N'. The third highest group also scored over ninety percent; fourteen failed in the pair, /ɔ:, ə:/ in 'walk/work'. These pairs look much easier to identify the phonemes.

Some types of pairs scored in the higher rates; in vowels, the contrast

of short and long vowels or a diphthong such as /ʌ, u:/, /ɪ, i:/, /e, i:/, or /ɑ, ɔʊ/. The length of vowels helps to distinguish the difference. These example words are one-syllabic, so each vowel is stressed, and the vowel differences are easy to notice; Murata (1990, p.261) mentions that “long vowels are stronger than short vowels in the English Vowel Hierarchy”. Another high scoring type has a feature in the place of articulation. Two pairs include a high front vowel /iə/, mid front vowels /eɪ, éə/ and a low central vowel /áɪ/. The front half of the mouth is close to the audience or the microphone. These sonorous vowels seem easy to identify because they spread forward. As can be seen, the lower rates of correct answers are highlighted in grey in Table 1. Twenty-four or forty-four students failed in the two pairs of /æ, ʌ/ in ‘bag/bug’ and /ɔ:, óʊ/ in ‘hall/hole’. These pairs include mid back vowels /óʊ, ʌ/ and a low back vowel /ɔ:/. Back vowels are articulated near the throat far from the audience or the microphone so the sounds seem difficult to identify because they are muffled. Regarding ‘bag/bug’, the result in 2019 was the lowest of the four years (33/34: 97% in 2016; 44/53: 83% in 2017; 32/37: 86% in 2018; 38/47: 80% in 2019). In the first three years ‘bag’ was read while ‘bug’ was read in 2019, indicating that /ʌ/ seems less easy to recognize than /æ/.

The next point of consideration was /ɔ:, ə:/ in ‘walk/work’ which includes a low back vowel and a mid central vowel of a schwa. This pair scored higher although sharing similar features with a lower rating group. One possible reason is the consonant preceding the vowels. /w/ is a bilabial semivowel, which is articulated by lips at the front part of the mouth. The sonorous consonant can emphasize the back or central vowel effectively. It can be considered as an example of the combination of a vowel and a consonant working mutually. Another possible reason is students’ diligence. Students wrote a comment for their study objective in this course at the beginning of the semester. Some referred to ‘walk/work’ as one of their weak points in listening or pronunciation skills. Students therefore, could have been motivated by the awareness that these vowels were difficult and had focused on practicing to master these phonemes. It is important to cultivate motivation and a positive mental attitude in advance.

The consonant groups highlighted in grey in Table 1 show those that were rated the lowest numbers of correct answers, with the darkest tones representing the lowest rates. Fifty-seven or five students failed in the pairs of /z, ð/ in ‘close/clothe’ and /z, dz/ in ‘size/sides’. In the second lowest group, fifty or forty-five students failed in the pairs of /r, l/ in ‘race/

lace' and /n, ŋ/ in 'sun/sung'. In the third lowest group, thirty-three to twenty-nine students failed in the pairs of /b, v/ in 'berry/very', /ʃ, s/ in 'sheet/seat' and /dʒ, ʒ/ in 'pledger/pleasure'. These pairs share some common features, one of which is that the consonants, /v, ð, dz, ʒ, l, n, ŋ, r/ don't occur in the Japanese language. This indicates how much students rely on their own language when dealing with foreign sounds. Abercrombie (1956, p.90) says; "'Imitated pronunciation' gives approximate equivalents of the sounds of the language being learnt in the spelling conventions of the learner's mother tongue." Students often analyze phonemes by comparing those in the foreign language with those in their own language. Thus, when they encounter something different or new, they have no criterion to analyze it and have difficulty in categorizing it.

Another difficulty for students, involved pairs of consonants that are articulated in the same place or share the same manner of articulation; due to these features, the consonants sound similar. Both of /ð, z/ are fricatives, the former is an inter-dental while the latter is an alveolar. /z, dz/ are alveolar, the former is a fricative while the latter is a mixture of a plosive and fricative. /l, r/ are categorized as alveolar approximants or liquids, the former is a lateral while the latter is a semivowel. /n, ŋ/ are nasal, the former is alveolar while the latter is velar. /s, ʃ/ are fricatives, the former is alveolar while the latter is alveo-palatal. /ʒ, dʒ/ are alveo-palatal, the former is a fricative while the latter is an affricate. As can be seen, these pairs share either the place or the manner of articulation, and while different, can sound quite similar. Consequently, many students experience difficulties in distinguishing the phonemes in these pairs. As for /b, v/, the former is a bilabial plosive while the latter is a labio-dental fricative. Technically speaking, they are different, but they can be categorized as similar consonants because both are labial obstruents. Contrarily, /h, f/ in 'horse/force' is easier because both are fricative but the places of articulation are extremely opposite: /f/ is labio-dental while /h/ is glottal.

The higher rate of /w/ in 'queen/keen' can also be explained by the above. These words have one syllable and /w/ in 'queen' emphasizes the following vowel. Students also practiced phonics in class every week. They read aloud the phrase "Q says, /kw/, /kw/, queen" repeatedly. This indicates that this practice helped them to acquire the ability to pronounce it.

Interestingly, the success rate of /j, ø/ in 'yen/N' is unexpectedly high. /j/ is a semivowel too and can support a following vowel. If the test had

included the pair of 'year/ear', it may have been more difficult and scored lower. In fact, these words are used as loanwords in Japanese and spelt in the same way in katakana. The following vowel /ɪ/ is similar to /j/ which glides from a position of "approximately /i:/ (with spread or neutral lips) . . . e.g. in *year* . . ." (Gimson 2001, p.210). Vowels frequently effect the impression of consonants.

The position of the consonants in the words is also significant. The initial position is much easier while the medial or final positions are more difficult. In the Japanese language, most consonants are followed by a vowel, which makes consonants sonorous and impressive. According to this principle, 'simple/symbol' should have scored lower because /p, b/ are plosive bilabials which both appear in the medial position of the words. However, both consonants are familiar to Japanese speakers, which makes them easily recognizable. Having familiar phonemes to their mother tongue, and comparing one to the other, supports the learning of the foreign language.

Reading quiz (1)

The reading section of the test included different types of questions: For example, some questions involved describing phonetic symbols, while in others students had to identify a common phoneme shared by a set of three words. In the first section of the reading quizzes, the first five sets share a vowel while the last seven sets share a consonant. The results can be seen in Table 2. In 2018, the number of students was thirty-eight and the total number is 172, an increase of one compared with Table 1. This was due to a late student who missed the listening section and joined the reading section. Compared with Table 1, the rate of correct answers is much lower. This indicates how much students rely on auditory information and how poor they are at pronouncing in their brain and transforming it into phonetic symbols. There were several types of errors in the way of describing phonetic symbols.

Generally speaking, more questions about vowels were answered correctly than about consonants. The highest number of correct answers was with /ʊ/ although 40 of the 172 students didn't answer correctly. The next highest was /e/, /i:/, and /æ/. A diphthong /ɔɪ/ and a long vowel /i:/ are prominent in length. /e/ and /æ/ are front vowels. These sounds are more sonorous than the others and seem to create a stronger impression. It is unsurprising, therefore, that most students can describe them

Table 2. The results of quiz for analyzing phonetic symbols

words sharing a phoneme	2016 (34)	2017 (53)	2018 (38)	2019 (47)	Total (172)
any, friend, sweat: /e/	26	38	24	33	70.3% (121)
apple, hand, Japan: /æ/	25	32	24	29	64.0% (110)
each, chief, ski: /i:/	27	37	26	26	67.4% (116)
only, coat, go: /óʊ/	31	40	26	35	76.7% (132)
earn, girl, prefer: /ə/	18	25	21	18	46.5% (80)
zero, thousand, teens: /z/	17	21	17	17	41.9% (72)
chair, future, catch: /tʃ/	19	26	17	18	46.5% (80)
sugar, delicious, fresh: /ʃ/	23	31	16	25	55.2% (95)
win, quiet, language: /w/	20	29	15	16	46.5% (80)
country, school, unique: /k/	21	34	23	28	61.6% (106)
use, yes, nephew: /j/	12	22	8	8	29.1% (50)
juice, magic, college: /dʒ/	9	22	16	19	38.4% (66)

properly. Some students might have recognized the phonemes, but made spelling errors such as: /o/ for /óʊ/, /ɪ, i/ for /i:/, and /a, a:/ for /æ/. As for consonants, /k/ and /ʃ/ have a slightly higher rate of success than the others. These phonemes were highlighted with pronunciation practice. /ʃ/ was focused by reading ‘She sells seashells on the seashore’ to differentiate /s/ and /ʃ/. /k/ was introduced by phonic alphabet as ‘C says /k/, /k/, cat’ and ‘K says /k/, /k/, king’. Students had opportunities to discuss and practice these consonants so that they could master them. Doff (1988) suggests teachers should be “more aware of their students’ pronunciation difficulties” (p.112) in teaching pronunciation. He also states “there may be particular sounds or sound combinations which students find difficult, or students may simply make mistakes in pronunciation without being aware of it. In such cases, it is useful to focus on the sound or group of sounds which is causing the difficulty” (p.113). Teachers need to observe students’ weaknesses carefully and make the best use of the knowledge students already have.

Regarding the other results, the lower rates are shaded in grey in Table 2. Out of the vowels, /ə/ had the lowest rate of success. There are various right answers; those with a schwa were considered correct, such as /ə/, /ə:/, /ə:(r)/, or /ə/. These are more difficult to identify because the phonetic symbols of the other vowels in questions /e, i, æ, óʊ/ consist of normal alphabet letters. For example, /æ/ is a combination of ‘a’ and ‘e’. In

actuality, it is pronounced as the intermediate, a low front vowel between a low central vowel /a/ and a mid front vowel /e/. It is easier to obtain a clear image of the sound. /ə/ however, seems to be made by turning /e/ upside-down but it's difficult to imagine what kind of phoneme is the opposite of /e/. Additionally, /ə/ doesn't occur in the Japanese language. Schwa can be explained as an obscure vowel, and can appear as a phoneme for a, e, i, o, or u. This causes confusion as students try in vain to discover a regular pattern.

The lowest rates of success for consonants were in /j/ and /dʒ/. Students had difficulty in describing them individually. Some students mistook /j/ and /dʒ/. In ordinary spelling, 'j' appears for /dʒ/ in words such as 'jeans', 'jet', 'jam', 'joy', and 'juice'. Some students failed by answering /j/ for 'juice, magic, college' while others answered /y/ for 'use, yes, nephew' due to learning 'Y says /j/, /j/, yard' in phonics. /j/ has some variations of spelling, and it is too difficult to notice the common phoneme. It also functions as a semivowel, which acts as an intermediate between a vowel and a consonant. The quiz featured this question categorized as a consonant, and some students may have wondered if a semivowel was a consonant. Actually some students answered a vowel for this question like /u:/ which is fine for 'use' and 'nephew' but doesn't fit 'yes'. The question of 'yen/N' in the listening section had a considerably high rate of success, showing students could recognize the phoneme auditively, but were poor at identifying it as /j/.

As for /z/, it doesn't appear to be a confusing question. One possible explanation for the low success rate could have been connected to the question order. The first five questions are related to vowels, and the last seven are related to consonants. This is the first question of consonants. Some students didn't change their approach and failed by answering /i:/ which is the correct vowel for 'zero' and 'teens'. /tʃ/ also looks easy to identify, but most of the errors made were /ch/. This indicates that students conceived how to pronounce the phoneme correctly, but need to pay attention to the phonetic symbols more carefully. /w/ is also a simple phoneme due to being spelt in the same way as in the ordinary alphabet. In spelling, 'win' begins with 'w' while 'quiet' and 'language' don't include 'w' in the spelling. Additionally, it is categorized as a semivowel, so it could be confusing for the same reason as /j/ above. These are possible features that could account for the lower rates of success in these questions.

Reading quiz (2)

For the practical use of phonemes, students were tested on alliteration and rhyme. Several proper nouns were shown such as movie titles, shop names, place names, personal names, group names, and brand names. For the first two years, the questions on alliteration required students to identify names that featured alliteration, which is defined as, “the repetition of the initial CONSONANTS in a series of words” (Myers & Simms 1989, p.260) “for the sake of melody (EUPHONY or CACOPHONY) and RHYTHM” (Myers & Simms 1989, p.9). For the last two years, questions on alliteration and rhyme were combined with students marking [A] for alliteration and [R] for rhyme. Rhyme can include alliteration, but here it is defined as end rhyme which is “a RHYME occurring at the ends of lines” that serves to “unify rhythm and idea, add emphasis and melody, and at times are used to produce a tension through the opposition of meaning and sound” (Myers & Simms 1989, p.97). Some of the answer choices were distracters and weren’t related to either alliteration or rhyme, for example, ‘Harry Potter’, ‘Hello Kitty’ or ‘Chip ‘n’ Dale’. Students needed to analyze these names carefully before choosing appropriately. Students didn’t know how many of the questions were distracters in this section. The rate of correct answers concerning alliteration is shown in Table 3. In 2018, 37 rather than 38 students participated in this part of the test; this was due to one student only partially completing the test.

Table 3. The results of alliteration quiz

Alliteration	2016 (34)	2017 (53)	2018 (37)	2019 (47)	Total
Peter Pan	23	31	32	38	72.1% (124)
Beauty and the Beast	28	41	33	29	76.2% (131)
Tokyo Tower	–	34	31	37	73.9% (102)
Donald Duck	27	31	–	–	66.7% (58)
Clear Clean	–	–	27	32	70.2% (59)
Krispy Kreme Doughnuts	27	–	–	–	79.4% (27)
Solaria Stage	–	–	30	28	69.0% (58)
Hakata Hankyu	–	–	28	35	75.0% (63)
Charlie and the Chocolate Factory	19	32	–	–	58.6% (51)
Marine Messe Fukuoka	13	16	–	13	31.3% (42)
Canal City	–	–	4	10	16.7% (14)
Gold’s Gym	19	20	4	15	33.7% (58)
Utsunomiya University	–	–	8	19	32.1% (27)

As seen in Table 3, ten of the names featured alliteration. Not all of the names were used every year; the names showing results were used for that year's test. The highest rates of correct answers reaching over 70%, were: *Krispy Kreme Doughnuts*, *Beauty and the Beast*, *Hakata Hankyu*, *Tokyo Tower*, *Peter Pan*, and *Clear Clean*. Three more names scored between 58% and 69%: *Solaria Stage*, *Donald Duck*, and *Charlie and the Chocolate Factory*. The lowest percentage of correct answers was *Marine Messe Fukuoka* with 31%. Some of the names consist of two words such as *Hakata Hankyu*, *Tokyo Tower*, *Peter Pan*, *Clear Clean*, *Solaria Stage*, and *Donald Duck* and these appeared simpler than the other longer names. In some examples, not only the initial phoneme but the first two phonemes feature alliteration, for example; /kr/ in *Krispy Kreme Doughnuts*, /kl/ in *Clear Clean*, and /ha/ in *Hakata Hankyu*. The longer names have some variation in the position where the alliteration occurs. *Beauty and the Beast* includes /b/ in the first and final word of the phrase while *Krispy Kreme Doughnuts* shares the same phonemes /kr/ in the first two words. In *Charlie and the Chocolate Factory*, /tʃ/ appears in the first and medial words, which may serve to weaken the impression of the phoneme and lower the rate of correct answers.

Why was *Marine Messe Fukuoka* not considered as alliteration by many students? The first two words begin with the same phoneme in the same way as *Krispy Kreme Doughnuts*. *Krispy Kreme Doughnuts* starts with two consonants /kr/ which are followed vowels are /ɪ/ and /i/. The combination of /krɪ/ and /kri:/ is much more prominent than *Marine Messe Fukuoka* with /m/ followed by /ə/ and /e/. The former is a mid central vowel and the latter is a mid front vowel which are articulated closely in the mouth. This quality is similar to that of *Krispy Kreme Doughnuts*, but the schwa seems to offer a less noticeable feature than the other vowels. Moreover, familiarity may be important for noticing features. *Solaria Stage*, the shopping center in the downtown area popular with the younger generation was recognized more readily than the venue named *Marine Messe Fukuoka*, which they may not have been to. Furthermore, the shorter name with two words is simpler than a three-word name. In addition to the length of the names and positions where alliteration occurs, the place of articulation also has an affect. The first six names in Table 3 from *Peter Pan* to *Krispy Kreme Doughnuts* include plosives such as /p, b, t, d, k/. *Solaria Stage* and *Hakata Hankyu* begin with fricatives /s, h/. These consonants need to be pronounced with more energy. It means they are

obstruent and more impressive. *Charlie and the Chocolate Factory* includes an affricate /tʃ/ and *Marine Messe Fukuoka* starts with a nasal /m/. These consonants are resonant, and milder. This is one possible reason to explain the lower rate of correct answers.

Concerning the three distracters at the bottom of Table 3, the total shows how many students answered correctly, that is, they regarded these choices as fakes and so didn't choose them. 'Canal City', 'Gold's Gym' and 'Utsunomiya University' are local facilities; a shopping center, a sports club, and a school respectively. Their initial letters are the same, but their pronunciation is different; /k, s/ in 'Canal City', /g, dʒ/ in 'Gold's Gym', and /u, ju:/ in 'Utsunomiya University'. These names consist of two words each with the initial letters looking significant: Without thinking carefully, students might consider them as alliteration.

In the last two years, rhyme was added to alliteration in this quiz, with students needing to sort the names into two groups. Seven names were prepared for rhyme as shown in Table 4.

Table 4. The results of rhyme quiz

Rhyme	2018 (37)	2019 (47)	Total (84)
Ogi Yahagi	31	34	77.4% (65)
Thermae Romae	32	33	77.4% (65)
Masuda Okada	30	30	71.4% (60)
Hotto Motto	32	34	78.6% (66)
Seven Eleven	33	37	83.3% (70)
Anpanman	18	18	42.9% (36)
Taro Aso	23	23	54.8% (46)

The questions can be categorized into two groups, high scoring and low scoring. The top five correct answers scored over 70%: *Seven Eleven*, *Hotto Motto*, *Ogi Yahagi*, *Thermae Romae*, and *Masuda Okada*. The two lowest scoring items were *Taro Aso* and *Anpanman*. As can be seen, there is a big difference between the two groups. A possible reason for this could be that the top five include a set of phonemes with endings of /-gi/ in *Ogi Yahagi*, /-mae/ in *Thermae Romae*, /-da/ in *Masuda Okada*, /-oQto/ in *Hotto Motto*, and /-évn/ in *Seven Eleven*, whereas *Taro Aso* shares only one vowel in each syllable. Furthermore, the /a/ in the first syllable and the /o:/ in the second one are preceded by the different consonants /t, ø/ and /r, s/. This may have changed the visual impression of the words,

compared with the top five. *Anpanman* repeats /-an/ three times, but has the fewest correct answers of all. As it is a whole word and not split into different parts, perhaps some people thought it impossible to make a rhyme within one word. If it had been spelt as 'An-Pan-Man', it could have garnered more correct answers. It is important to understand that spelling has an influential visual effect.

Reading quiz (3)

A third reading quiz focused on the reading of phonetic symbols. A dialogue was introduced in phonetic symbols, which students had to transcribe into the alphabet. The sentences were based on Shimaoka (2005, pp. 61-62, 73-74), and combined with selections from the textbook. These included conversations for exercising rhythm and intonation. The phonetic symbols used on the test sheet were as follows:

A: [ɪkskjú:z mi. dəz ðis bʌs góʊ tə ðə jù:nɪvɛ:rsəti?]

B: [jès, ɪt dʌz. à:r ju frəm ɪŋɡlənd?]

A: [jès, aɪ æm. aɪm frəm lʌndn. ɪts vɪzɪtɪd bɑ: mɛni p^hɪ:pl èvri dɛɪ.]

B: [hàʊ lɔ:ŋ hæv ju bɪn hɪə?]

A: [aɪ əraɪvd hɪə jéstədeɪ. nà:ɪs tə mí:tʃu.]

B: [hàʊ də ju dú:ʔ]

This dialogue can be transcribed into the alphabet as follows:

A: Excuse me. Does this bus go to the university?

B: Yes, it does. Are you from England?

A: Yes, I am. I'm from London. It's visited by many people every day.

B: How long have you been here?

A: I arrived here yesterday. Nice to meet you.

B: How do you do?

This quiz has been given repeatedly for four years, with a total of 171 students participating. The conversation is a simple two-person discourse with three turns each. The language is on the approximate level of junior high school English, and therefore all words and expressions should be familiar to the students. Despite students having practiced reading the phonetic symbols of these sentences in class, several types of errors were made. Discounting punctuation and capitalization errors, the most common

mistakes made on the test are discussed below:

The most frequent mistake was 'How did you do?' rather than 'How do you do?' and was made by twenty-five of the students. Additionally, one student answered 'does' and two answered 'are' instead of 'do'. This sentence is familiar to students as a greeting, but as [də] is unstressed students had difficulty in identifying it. In fact, schwa proved difficult for students in all the activities.

The second most common error was found in two words, 'England' and 'yesterday'. England had 18 students making a mistake, with 17 of them spelling it as 'Inglanđ'. Although they often use this word, it appears that the phonetic symbol [ɪ] influenced their spelling. The other student omitted the 'g' and misspelled it as 'enlanđ'. The joint second most frequent error was found in the word 'yesterday', all of which began with 'just'. 14 students answered 'just (a) day', two answered 'just today', one answered only 'just', and another answered 'just twelve'. Seeing [j] influenced them to answer 'just' for 'yesterday', but nobody made this mistake with 'Yes'. 'Yes' is shorter than 'yesterday' and is easier to understand from the context. It is logical that 'Yes' follows a yes/no question, but encountering it in the middle of a sentence caused confusion if they didn't consider the details such as the vowel [é].

The fourth most common mistake was writing 'hear' instead of 'here'. 15 students used the incorrect form in 'How long have you been here?' and 14 in 'I arrived here yesterday.' In fact, 14 of the students repeated the same mistake in both sentences while one student made the error once. Another student wrote 'heer', so a total of 16 students had difficulties with 'here'. They recognized the pronunciation through the phonetic symbols but needed to think more carefully about homophones in terms of context and grammar.

The fifth most common mistake was made by 15 students with 'university'. All of them are misspellings, 13 spelling it as 'univercity', one as 'uiversality', and another as 'nniversity'. These errors were surprising, as they often use this word to introduce themselves. A joint fifth most frequent mistake was found in 'bus'. Eleven students spelt it as 'bas', one spelt 'bass', one spelt it as 'bag' and two spelt it as 'dus'. It's likely that students confused phonetic symbols with ordinary alphabet without considering that these are commonly used words.

The first of two errors tied for the seventh most common was 'It's'. 10 students answered 'It', one answered 'It is', and one answered 'I'. 'It is'

works grammatically, but doesn't match the phonetic symbols. 'It' or 'I' omitted the ending, perhaps due to careless reading. The second joint seventh most common mistake was made by 12 students in 'arrived'. There are two types of mistakes, misspellings such as 'arived' by seven students and 'arraived' by three, the other is replacing [r] with [l] resulting in 'alived' or 'lived' by two of the students. The former is a careless spelling mistake while the latter seems influenced by the context of the preceding question: 'How long have you been here?' is commonly followed by, 'I've lived here for/since...'. The word 'alived' could be a blend of 'lived' and 'alive' by the student. The ninth most common error was in 'to meet you'. Six students wrote 'me' instead of 'meet': For example writing 'me', 'me to' or 'me too'. One wrote 'meeet', another wrote 'met' and yet another wrote 'too meet'. In total, nine students made errors in this phrase. 'Nice to meet you' is a common greeting often used for a first meeting, and students have been using this since they started to learn English eight or more years ago. Even when reading familiar phrases in phonetic symbols, students make a variety of mistakes. A possible reason for this is due to the liaison in 'meet you': /t/ and /j/ are combined to sound like /tʃu:/. When they students read the ordinary alphabet, the spaces between the words enable them to be conscious of sentence structure. In phonetic symbols, however, there is no space and when liaison occurs, students mistakenly parse the sounds into words. Another possible reason for the mistakes with this phrase is that it's often followed by 'Nice to meet you, too' in a conversation. Students unconsciously use these phrases as a set and are too careless to distinguish between 'to' and 'too'. Learning this phrase as a chunk may prevent them from thinking about the sentence structure and the meaning.

There are various other errors of the same type, for example five of the students made the mistakes, 'I visited / visit / visitd / visted' for 'It's visited', and 'Haw / Hou / longe / often / Have you' for 'How long' and 'Haw / How you / Have a / What' for 'How do you do?'. Four made the mistakes of 'I am' for 'I'm', 'meny' for 'many', and 'dose' for 'does'. Three made the mistakes of 'Exquse / Excusu / Ask you to' for 'Excuse', 'day / bar' for 'by', 'mini plan / places / foreigner' for 'many people', and 'eary / very / each' for 'every day'. Two students made mistakes with 'Londong / Londont' for 'London', and 'there / this time' in 'How long have you been here?'. Some of these careless mistakes may have been made by students inadvertently confusing phonetic symbols with the ordinary alphabet. Such errors could be avoided if they remember to consider the grammar and

context as well as the phonetic symbols.

Conclusion

Through the analysis of the four types of questions about phonetic symbols, some general tendencies in student errors can be seen: Students often rely on their first language. It is essential for learners to compare the foreign language with their native tongue in order to observe and analyze it. However, this causes errors when the differences between the two languages prevent them from accurately substituting phonemes from their own language. Dale & Poms (1994, p.7) point out that learners soon discover, “there is a big difference between the way words are spelled in English and how they are pronounced”, and that, “English spelling patterns are inconsistent and are not always a reliable guide to pronunciation.” Once learners understand the differences between the languages, they need to accept the unfamiliar features and get used to them. They should also practice repeatedly to overcome their weaknesses. In practical terms, they can start to learn by pattern practice, following the rules of pronunciation after they gain the basic knowledge of the mechanisms. They also learn the four skills of the language in a well-rounded way. Pronunciation is related to grammar and context and learners need to understand the difference between function words and content words. Additionally, students need to be given practice in chunk reading. Learners need to widen their interests and cultivate their skills in a variety of mutually linked fields. Broadening their knowledge in this way, will lead students closer to language mastery. Young people often focus on the practical shortcuts to learning languages without realizing that a deeper learning would serve them better. Learners are sometimes careless trying to complete a task in a short time, when they need more focus and concentration. It is helpful if they are aware how inexperienced they are and remember to keep a spirit of inquiry as they progress. As MEXT says, education should nurture in students a “Zest for life”. Some learners will be teachers in the future, and as Abercrombie (1956, p.87) emphasizes, “all language teachers, willy-nilly, *are* phoneticians. It is not possible, for practical purposes, to teach a foreign language to any type of learner, for any purpose, by any method, without giving *some* attention to pronunciation. And any attention to pronunciation *is* phonetics.” Consequently, completing a course in phonetics is compulsory for prospective teachers in Japanese universities. In fact, all those working

with English will improve their skills and understanding if they continue learning about phonetics throughout their career.

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