TEACHING TIP

PERSONALIZING PEAK VOWEL TRAINING IN STRESSED SYLLABLES: A SNEAK PEEK AT *BLUE CANOE* FOR PERCEPTION AND PRODUCTION

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Placing stress on a different syllable or using a different vowel can momentarily confuse listeners or lead to listeners' miscomprehension. Because there are nearly three times the number of vowel sounds as letters for writing vowels in English, learning these sounds can be challenging. To distinguish between them, the Color Vowel Chart gives us a name for each vowel sound so that learners can understand, for example, that the peak vowel is pronounced "purple shirt" CIRcular, not "red pepper" SECular. Placing lexical stress accurately and reducing such vowel errors that may be of high functional load can help ELLs speak more intelligibly. In this teaching tip, we will have a look at a method for identifying lexical stress and peak vowel quality, then training learners' perceptions of vowel quality and practicing their production in context. This multimodal method is based on a communicative framework and utilizes the Color Vowel Chart and some of the features of *Blue Canoe*, an app that has been designed around the Color Vowel Chart.

INTRODUCTION

For English Language Learners (ELLs) to communicate effectively, their speech must be intelligible (Derwing & Munro, 1997). Having an accent is not necessarily linked with noncomprehension (Munro & Derwing, 1999); rather, when speakers misplace the stress on a syllable, listeners can be confused, and this act leads to possible miscomprehension (Bond, 1999; Cutler & Clifton, 1984). This kind of mistake can damage the understanding between individuals, and even though pronunciation errors can be mitigated by context, listeners must be able to understand what the speaker tries to convey (Field, 2005).

One key to understanding speakers is their clear pronunciation of stress as a suprasodic feature. Stressing part of a word or phrase "causes it to stand out from other unstressed elements" (Derwing & Munro, 2015, p. 59). As Gilbert (2008) explains, in each word, there is one syllable that is stressed more than the others, the peak syllable; she adds that the vowel quality of the peak syllable must be recognizable at the word level and the phrase (or thought group) level. Research on listeners' perceptions of intelligibility of lexical stress supports this notion (Cutler & Clifton, 1984; Field, 2005), encouraging the teaching of lexical stress patterns due to their communicative value (Field, 2005). In the following example from Gilbert's (1993) *Clear Speech,* we can see the potential for misunderstanding the word "committee" if someone stresses the first syllable instead of the second syllable, which also changes the vowel quality: "What did you think of the com**mit**tee? What did you think of the **co**medy?" (p. 69). In order to pronounce these words (and phrases) intelligibly, one's stress placement should be clear and the stressed vowel should be a bit longer than the other vowels. Thus, there is value in teaching English Language Learners (ELLs) lexical stress patterns (Field, 2005), and vowel quality of peak vowels where needed for successful communication.

In terms of vowel quality, ELLs might have a doubly difficult time identifying the quality of the peak vowel, however, since some segmentals will be absent from their L1's vowel inventory and since the many vowel sounds are represented differently in English orthography. Referring back to the previous example, the letter "o" is pronounced differently in the words "committee," "comedy," and "comb." Similarly, the letter "i" is pronounced in a number of ways, and will sound different whether full or reduced, as in the "i" in "live" in the instances of "to live" and "a live show." Thus, there is a need to help ELLs to train their perception, and research suggests that teaching segmentals can help learners address these potential barriers to intelligibility (Derwing, Munro, & Wiebe, 1998). One way to train ELLs' perceptions of vowel quality is by using the Color Vowel Approach (Taylor, Thompson, & Barr, 2016).

In this approach, colors are superimposed onto the IPA vowel quadrilateral so that each color represents a vowel sound. In this Color Vowel Chart, the phonetic symbol /ɪ/ is "silver pin" and /aɪ/ is "white tie," for example (Taylor, Thompson, & Barr, 2016, p. 5). In this way, ELLs have more than just an IPA symbol to help them understand the vowel quality—they also can begin associating vowel quality with color when they hear the sound repeated in the color vowel sound name and symbol. So, returning to the previous examples of the letters "i" and "o" above, instead of learning that the vowels are /ɪ/ live and /aɪ/ live, or /ə/ committee, /a/ comedy, /o/ comb, ELLs can perhaps gain a more concrete understanding of the differences in vowel quality both visually and aurally using the Color Vowel Chart. In these words, the "colors" of the "i" vowels are "silver pin" to live and "white tie" live, whereas those "o" vowels are "cup of mustard" committee, "olive sock" comedy, "rose boat" comb.

Taking it a step further, ELLs can organize words by vowel quality/color; for words with more than one syllable, the word can be classified by the quality/color of its peak vowel. To do so, ELLs can work with a dictionary to identify the syllables that receive primary stress in words, and use the Color Vowel Chart to identify the quality—or color—of the peak vowel. In the case of the word "committee," the stress is on the second syllable, so the color of the word is "silver pin" committee, whereas in "comedy," the stress is on the first syllable with the vowel /a/; therefore, its color is "olive sock /a/" comedy. Other "silver pin /ɪ/" words include "minute," "forgive," and "different," and other "olive sock /a/" words include "college" and "compartment." Thus, ELLs can learn peak vowel quality and perhaps even some word stress patterns when they learn "to speak in color" (Taylor, Thompson, & Barr, 2016, p. 7).

Learning the color vowel approach can be particularly helpful for ELLs who use different stress patterns in their speech than with what their audience may be familiar. After all, there is variation in the vowel inventory and lexical stress patterns from dialect to dialect. The latter is what can cause potential confusion. Take for example NAE's (North American English) "garAGE" versus British English's "GARage" or NAE's "ROtate" versus British English's "roTATE" (Celce-Murcia et al., 2010, p. 455). When a different stress pattern is used, it can be difficult for listeners to understand what was said, especially when the peak vowel's quality is different, as in "committee" and "comedy" (Cutler & Clifton, 1984; Field, 2005). Returning to the Color Vowel Approach to highlight the difference in vowel quality, the colors of each word respectively are "silver pin" committee and "olive sock" comedy. One such misunderstanding took place in an oral communication class at Ohio University where ELLs interact with domestic students. The domestic student was quite confused about what the ELL was explaining since she thought that he had said "CIRcumstance" when he had actually said "circumference." It seemed that the confusion arose because instead of stressing the

second syllable (cirCUMference), he stressed the first: "CIRcumference." Once we had worked out what happened, the student found that he had to stress (what is known on the Color Vowel Chart as) "cup of mustard /ə/ cirCUMference" instead of placing the stress on the first syllable. With this explanation, he was easily able to adjust the stress pattern. Working on the pronunciation of certain words or sets of words that follow a pattern should help ELLs to speak more intelligibly since "the more words the listener is able to accurately identify, the more intelligible the speaker is" (Isaacs, 2008, p. 557). Thus, following lexical stress patterns assists in listener comprehension.

Part of intelligibility, as Kang and Moran's (2014) research suggests, requires these speakers to have few vowel errors that are of high functional load. Functional load refers to "the importance of linguistic phenomena in distinguishing meanings in a language" (Derwing & Munro, 2015, p. 74). For example, Kang and Moran (2014) illustrate low functional load as when speakers pronounce "adventure" as "advunture" (p. 180). In this case, they explain, the listener would likely understand the speaker's intention. By contrast, with a word that carries a higher functional load, as in the case of /ɪ/ vs. /i/ "live" instead of "leeve" (leave) (Kang & Moran, 2014, p. 179), the authors imply that listeners might have a more difficult time interpreting the message. In the case of word stress more specifically, they explain, intelligibility may be compromised if ELLs stress the second syllable instead of the first as in "visITing" instead of "VISiting" (Kang & Moran, 2014, p. 180), even though the vowel quality of the stressed syllable is the same (both syllables can be pronounced as "silver pin" /ɪ/). This difficulty in understanding a word when the stress shifts to the right is also evidenced in Cutler and Clifton's (1984) study on word recognition where they experimented with listeners' perceptions of words where lexical stress was shifted.

In order to help ELLs pronounce key words effectively in spontaneous and planned speech where word stress is a barrier to intelligibility, we propose the utilization of a multimodal method based on a communicative framework (Celce-Murcia et al., 2010) that uses the Color Vowel Chart and its Blue Canoe app to help ELLs improve their pronunciation. *Blue Canoe* is an app that utilizes the color vowel approach to practice listening discrimination and production of peak vowel quality. The app contains an introduction to the color vowel system along with instructional videos, several games, and its own dictionary that ELLs can use to look up the vowel quality of the syllable that receives primary stress—or as we will call it for the remainder of this paper, the color of a given word's peak vowel [i] For the purposes of this teaching tip, we will use the app's dictionary and Merriam Webster for help with analysis.

PROCESS

Step 1: Identify target words

The first step to personalized peak vowel training is to conduct a needs analysis in order to generate a word list for students to practice. These words should be a part of the students' regular lexicon and should consist of words and short phrases that may be difficult for the native listener to understand.

Generating the list is a two-fold process. The first step is to perform an initial assessment, and the second is an ongoing assessment. In this first assessment, ELLs answer a variety of Test of Spoken English-like speaking prompts[ii]. Since the end goal is for ELLs to communicate effectively in spontaneous speech, the needs assessment should therefore include free speech rather than merely

reading a text or a word list (Levis & Barriuso, 2012). The rater (most likely the instructor) will listen to the speaking samples and make note of words and phrases that are difficult to understand due to a different word stress pattern (for example, if the speaker stressed the last syllable of "determine" instead of the second syllable). A careful listening of these words should give the rater an idea of whether the difficulty in understanding can be attributed to the consonant (probably not word stress), the number of syllables, which syllable receives the stress (if any), and the vowel quality of the stressed syllable. The level of detail provided in the feedback from the analysis would be up to the instructor, but at the very least, the analysis should generate a list of words for students to learn. This early assessment forms the basis of each learner's list but is just an initial snapshot that necessitates ongoing monitoring for other words and phrases.

The instructor and learners should add to each individual list throughout the semester. This means that the instructor takes notes any time learners give a presentation and speak up in class. The learners, in turn, should monitor their everyday speech interactions. For example, when listeners stop and ask for clarification or seem confused, learners make note of their particularly confusing pronunciation. To generate and maintain this list, instructors and ELLs can collaborate on a Google doc (or something similar that both parties can add to). In keeping with the focus of this activity, the words and phrases that we will highlight are those with lexical stress and vowel quality that need to be clear in order to avoid misunderstandings, such as cirCUMference, which can be confused with CIRcumstance if the stress placement is placed on the first syllable, or CIRcular, which can be confused with SECular if the vowel quality is not sufficiently distinct. Figure 1 below is part of a sample list.
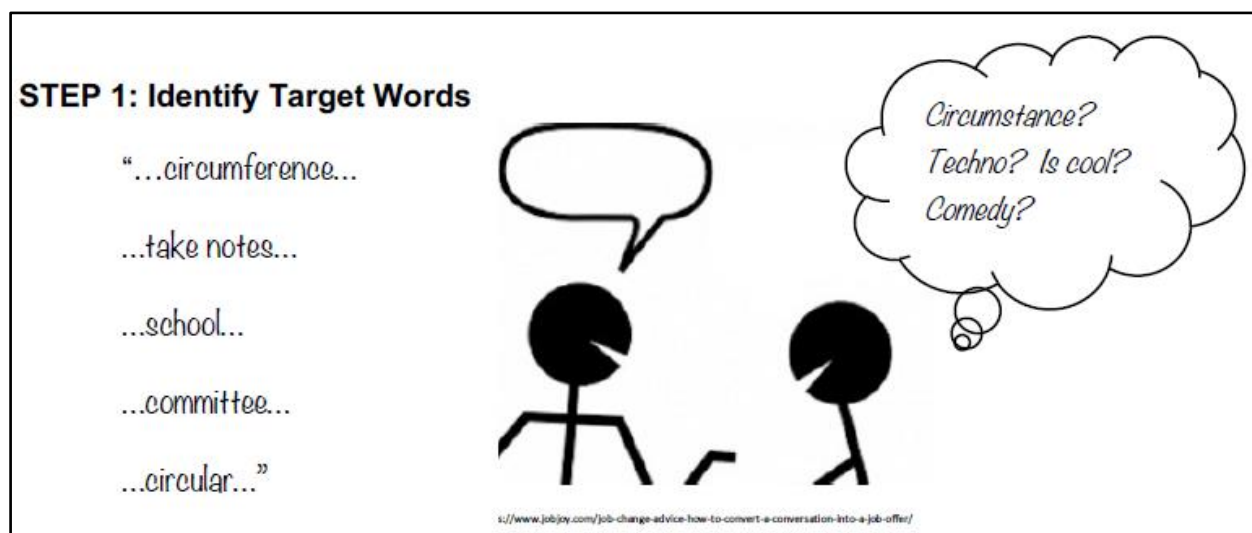

Figure 1. Identify target words to create the word list.

Step 2: Learning word stress patterns and identifying peak vowel quality: Analysis, exploration, and exercises in perception

Once the learners' target words have been identified, they should then listen to the word to determine the number of syllables and the vowel quality/color of the peak vowel in the target dialect. Focusing on such characteristics can lead to improved intelligibility (Derwing, Munro, & Wiebe, 1998). Two

options for doing so include: 1) as a class activity where the instructor or classmates model the word; or 2) as self-study by looking it up in the Blue Canoe app's Color Vowel Dictionary; or if they do not have the app, by listening to how the word is pronounced and seeing how it is transcribed in Merriam Webster's dictionary online.

To help students understand the number of syllables, instructors can use Judy Gilbert's kinesthetic technique of tapping out the syllables to check the number of syllables (Gilbert, 1993, p. 1). This activity lends itself well to full class participation since students can often be reluctant to tap out syllables when working on their own. To help students understand counting syllables visually, they can mark the stressed syllable with a large circle, and unstressed syllables with smaller dots (see Figure 2 for an illustration).

Target Words		How they were misunderstood (optional)	
Mark # of syllables	*Color of peak vowel* Use Blue C. Color Vowel Dict.	*Mark # of syllables*	*Color of peak vowel* Use Blue C. Color Vowel Dict.
• ○ • • Circumference	a cup of mustard	○ • • Circumstance	purple shirt
Committee	silver pin	Comedy	_____
Circular	_____	Secular	_____
Take notes	_____	Techno	_____

Figure 2. Analyze word stress patterns and identify the color of the peak vowel.

To identify the peak vowel, students must first become aware of the qualities of a stressed syllable. These stressed syllables are typically longer in length, often are higher in pitch, and are perceived as louder (Fry, 1958). When there are multisyllabic words that exhibit secondary stress, these syllables are often longer in length but not necessarily higher in pitch. To simplify this analysis for the students, focus on the syllable with primary stress and have students underline the peak vowel.

To figure out the vowel quality of the stressed syllable, students should match the sound to the color vowel. For instance, the peak vowel in "circumference" is "cup of mustard /ʌ/" cirCUMference, and the peak vowel in "CIRcumstance" is "purple shirt /ɚ/" CIRcumstance. If the student has the Blue Canoe app[iii], students can use the dictionary in the app (see Figure 3) to check their work. They can also listen to the recording of the word in this dictionary to determine the number of syllables.
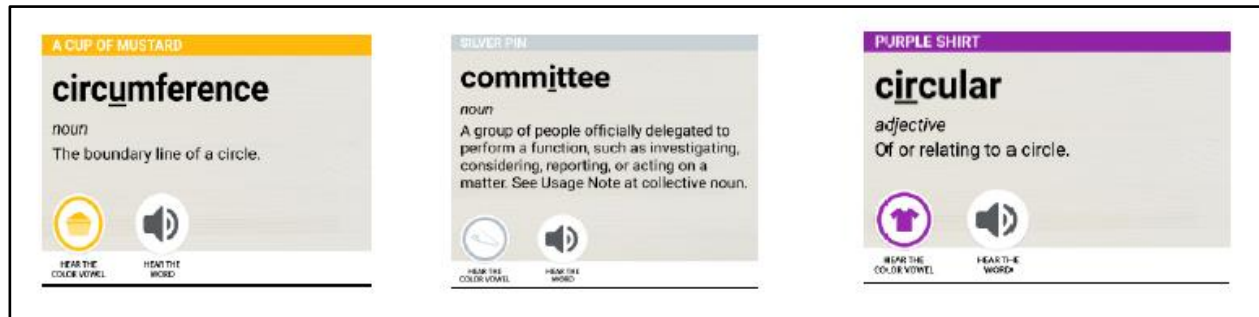
Figure 3. Screenshots from the color vowel dictionary in the Blue Canoe App.

Students can then organize their words and phrases by vowel quality of the peak vowels using the Color Vowel Organizer (see Figure 4)[iv]. This Organizer uses the corresponding vowel colors and icons, serving as a visual reminder to the students of what the vowel sounds like.
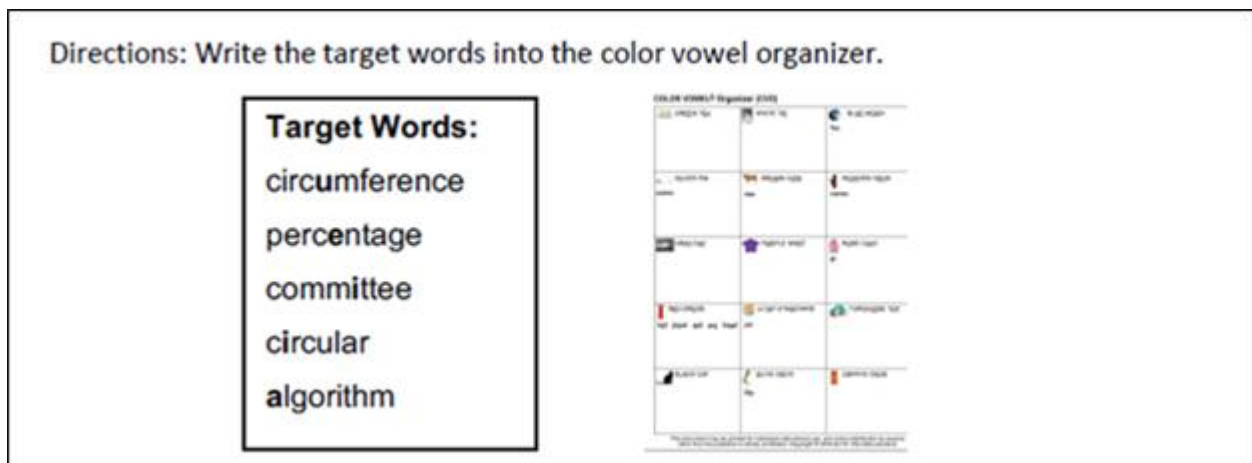

Figure 4. Target words & color vowel organizer.

For more perception practice, learners can plug each word into YouGlish to hear how the word is pronounced in the target dialect (as the site broadly classifies videos into US, UK, or Australian English) by slowing down the video. Students can also scroll down to look at the "nearby words" and make note of any similar sounding words to their target words; minimal pairs are particularly useful for helping students understand the need for pronouncing each word in the pair in a distinct way (for example, "committee" and "comedy").[v]

Step 3: Controlled production practice with the color vowel organizer

Once the Organizer is filled out, students should check their classification by color/vowel quality (with others or alone) by saying the color, sound, then the word as illustrated in Figure 5. If the pronunciation of the peak vowel is different from the color and sound, the student should reconsider the pronunciation or the placement of the word on the Organizer. To facilitate and perhaps strengthen students' self-monitoring skills, the students should record themselves and listen back. They can

compare their pronunciation to that of Merriam Webster's dictionary. The instructor or another perceptive individual can also provide feedback.

"Red pepper /E/perCENtage"
"Black cat /ae/ Algorithm"
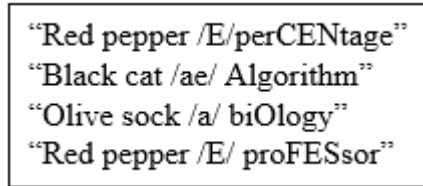"Olive sock /a/ biOlogy"
"Red pepper /E/ proFESsor"

Figure 5. Peak vowel classification and how to read the words in the context of their color.

Once the student confirms the correct classification of the words, in that all peak vowels should have the same vowel quality, it is time to practice. This can be done as a class or individually. The students will work vowel by vowel, again saying the color, sound, and word or phrase. This technique is known as "flooding" and is encouraged by Taylor, Thompson, and Barr (2016) for the purpose of helping the students to "notice the vowel quality" (p. 9). Through these controlled practice activities, students can gain a better understanding of vowel quality and number of syllables.

Step 4: Guided production practice

For this step, students create their own Color It Out game (which is both a physical card game and a game in the Blue Canoe app) to play with their classmates by writing the words from their personalized word list onto color vowel-coded index cards. They can do this at home or in class, or if necessary, the instructor can make this set (putting each student's name on the bottom of each of their cards). See Figure 6 for what each card might look like.
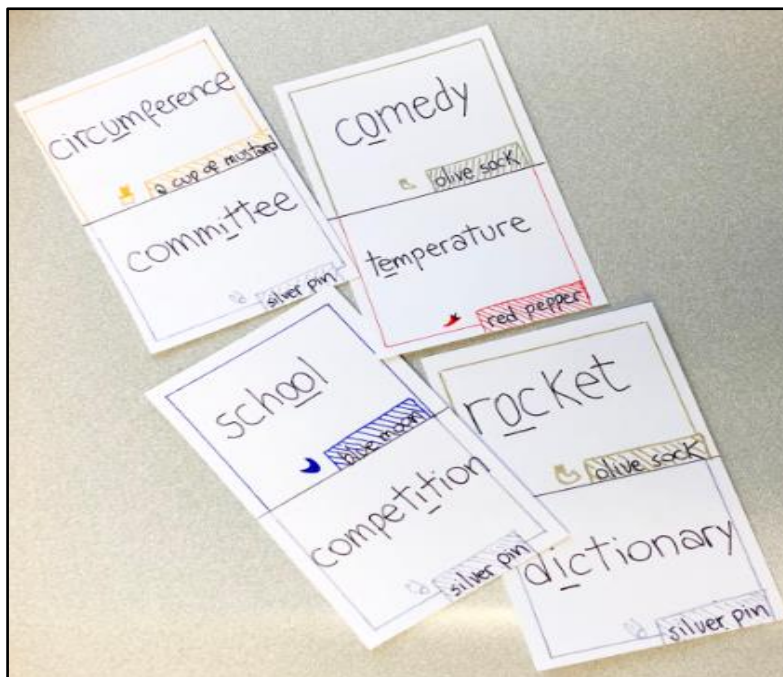

Figure 6. Personalized Color It Out cards.

Once the cards are created, the students can play the game in pairs or small groups after the instructor models the rules. If the students are using the Blue Canoe app, they may have already played the game and will know how to play. If not, here is how to play a short game. Pair up the students, dealing out four cards per player, then designate the rest of the cards as a draw pile. Turn a card from the draw pile face up. Of the two colors listed on the card, the first player looks at their hand and finds a card with one of the matching colors, places it next to the face-up card, and reads the color pair, listening for whether they are saying the vowel in the same way and stressing the word accurately. For example (see Fig. 7), they would say "green tea TEAcher, green tea Even." (Please note that Figure 7 illustrates Color it Out as it looks in the app, but learners will use their own cards for this step.) The next player will look at the top card and find a matching color, and this will continue. If a player does not have a matching color in their hand, they can draw a card. The game is over when a person runs out of cards. Instructors might stress to the students that the goal is not to win, per se; rather, the goal is to practice.

Figure 7. Screenshots from Blue Canoe's Color It Out game set up.

There are a few ways for students to add to their perceptual practice. One is by recording their turns. Students can record their turns to listen back and/or send it to the instructor to check. This is slightly different than the app where students cannot listen to their own speech afterwards[vi]; instead, the voice recognition technology in the app decides if the vowel quality of the stressed syllable was sufficiently accurate. The other way is listening to a model speak their turn first. With the personalized handmade game that we describe here, students can ask someone else--like their partner or an instructor--to say the turn first. This is similar to a feature in the app where the player can click "Help Me Say My Turn" to hear what it should sound like (as shown in Figure 7 on the top-right).

Step 5: Communicative production practice

This last step prompts learners to practice their words in focused free speech. In other words, they will intentionally use the words in context. The first way they can do so is to define and explain each term, making sure to emphasize it when using it as in the following example:

> "CirCUMference is the distance around a circle. Let's take for example a cake. A cake is usually round, so if we know the cirCUMference of the cake, we will have a good idea of how many servings there are. To find the cirCUMference of the cake, simply…"

Another way to practice these words in context is to create a short dialogue that uses the word as illustrated below.

> CirCUMference
> A: How do you find the cirCUMference of this table?
> B: To get the cirCUMmference of the table, multiply Pi by the diameter of the circle.
> A: Under what CIRcumstances do we need to calculate the cirCUMference of something...?

Regardless of the ways that the words are put into practice, learners should record their production so that they can listen back, notice their peak vowel production of the word in question, and analyze their speech, then try again if the peak vowel or stress placement is unintelligible. Once they understand how to produce the words intelligibly, it is important to continue to practice mindfully and to self-monitor. With enough mindful application and repetition, it should be possible for the ELL to move from conscious to unconscious competence.

LEARNERS' FEEDBACK, CONCLUSION

After piloting this teaching tip and the use of *Blue Canoe* as part of improving peak vowel production and stress placement with a small number of graduate student ELLs, we discovered through one-on-one interviews a number of benefits and a few areas of caution. ELLs consistently reported the usefulness of being able to think of the words on their lists as a color. One person illustrated this when she noted that she thinks of words as colors; she explained that "disease is green tea--I can see the underline [of the stressed syllable], the color, and the image of green tea." From the instructor's end as well, this color vowel approach helps to give clear feedback on ELLs' production. For example, instructors are able to point out when something is a "silver pin" word rather than a "green tea" word.

Another useful item of note to the ELLs was the color vowel dictionary. Although the voice is computer generated, they reported that it was useful to look up a word ("algorithm," for example) and see what color the peak vowel was (e.g., "black cat /æ/" algorithm). As a potential solution in response to the artificial voice and to hear it in connected speech, ELLs were also encouraged to use YouGlish (US search) to listen to these words in context.

It is our hope that through this multimodal process, instructors will have a clear and engaging way to help ELLs improve their peak vowel pronunciation.

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[i] Interested educators can contact Blue Canoe (partners@bluecanoelearning.com) about accessing the app since at the time of publication, the teacher is integral to the successful use of the app; thus, it is not for individual download.

[ii] For sample questions, see pp. 7-11 of the pdf here https://www.ets.org/s/toeic/pdf/speaking-writing-sample-tests.pdf

[iii] Again, interested educators can contact Blue Canoe (partners@bluecanoelearning.com) about accessing the app.

[iv] The Color Vowel Chart and Color Vowel Organizer are available for purchase on the Color Vowel Launchpad, and available at https://elts.solutions/product/cv-launch-pad/ .

[v] For more on how to use YouGlish, see Wallace, L. (2018, March). Using YouGlish with ITAs to increase input and speaking opportunities. *ITAIS Newsletter*. Retrieved from: http://newsmanager.commpartners.com/tesolitais/issues/2018-03-07/4.html

[vi] It is possible for players to listen and compare their speech to the model's speech in *Let's Talk*, another game in the Blue Canoe app that at the time of writing is in Beta mode.