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SOFTWARE REVIEW

Reading Assistant™

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It is not always the case of medical science where the side effect of a product becomes a new innovation with an effect that was not intended to be developed. The online English learning program *Reading Assistant*™, developed by Scientific Learning Corporation, is advertised to help native speakers of English learners to acquire phonics skills, which help to learn correspondence between sounds and the spelling patterns, and eventually to improve oral reading ability (Beattie & Chevalier, 2012). However, the product is also reported to be used in an English as a foreign language (EFL) context to help non-native speakers of English learners to acquire pronunciation of English words and to improve English pronunciation and speaking (Jeong, 2010). Those EFL learners use phonics method not only for oral reading ability improvement, but also for pronunciation practice (Kim, 2005; Kuo, 2011). Even though *Reading Assistant*™ is not specifically developed for non-native speakers of English learners, it is reported that there are increasing numbers of English learners who use the product to improve their oral language skills (Neuro Science Learning, 2015).

Reading Assistant™ consists of three main components: reading materials, automatic English speech recognition system, and the reading fluency review with pronunciation error records. First, the online program has four levels of reading materials, which are modified from famous novels, news magazines, and other materials with familiar topics to learners; thus, the program seems to be suitable to anyone from elementary school students to adult English learners. Second, an English speech recognition system, which uses PocketSphinx speech recognizer (Walker et al, 2004), is applied to *Reading Assistant*™ and it helps decide whether the readers, or the language learners, pronounce the given words appropriately. This speech recognition engine phonetically compares the learner's reading pronunciation against a pronunciation dictionary in the program. As illustrated in Figure 1 and Figure 2, students can record and listen to their oral readings and get feedback from the evaluation engine in *Reading Assistant*™. Finally, there is a review session that provides feedback to the students who read aloud given texts in the program. When the reading activities are done, every word of which learners mispronounced or had difficulties in pronouncing are presented with different diagnostic symbols depending on the types of errors. The overall study flow of *Reading Assistant*™ is shown in Figure 2.

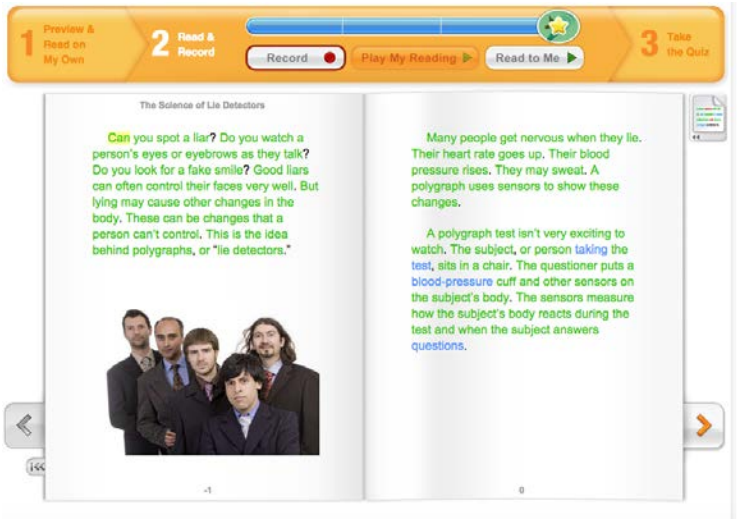

Figure 1. Reading Assistant™ software, read & record stage screenshot. Words in blue fonts are the expressions that students mispronounced.

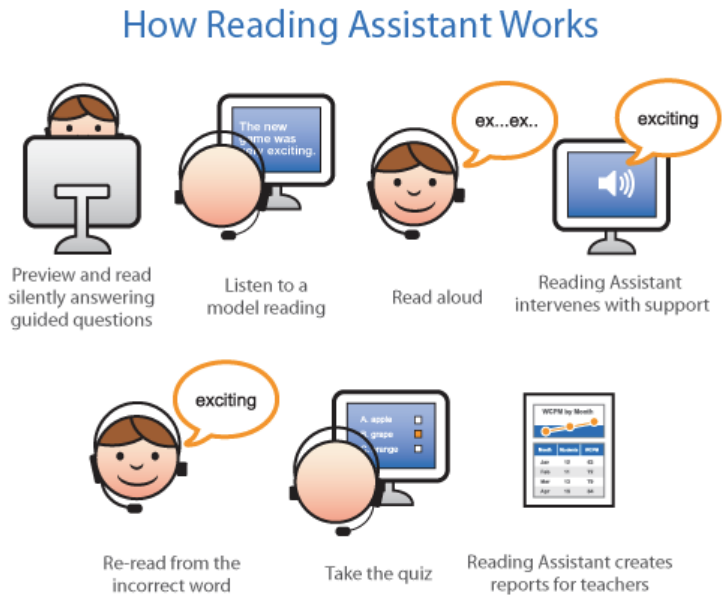

Figure 2. Reading Assistant™ software, study flow (http://www.scilearn.com/products/reading-assistant)

Each component of *Reading Assistant*™ seems to have the following three main merits for EFL learners. First, the reading materials provided in the program help EFL learners not to lose their motivation when they are doing pronunciation practice. As teachers in an EFL context are reluctant to give regular pronunciation instruction (Derwing & Munro,

2015), pronunciation practices in EFL context are usually done by the learners themselves with drill-based pronunciation learning materials. These repeated drill exercises without any assistance could make learners easily feel exhausted and lose their motivation to continue practicing. Thus, the reading materials with audio files in *Reading Assistant*™ could be complementary to the drill-based language training. Furthermore, the reading contents in *Reading Assistant*™ simply can be replaced or customized with other reading materials when requested by other language learning materials developers or users, thus making the reading contents provided to learners without limits. This adaptation of content materials seems to be one of the merits of this type of module-based program. To increase the flexibility of the materials, however, the chances of applying speech recognition systems to supra-segmental level seems to be decreased, because the currently employed dictionary-based pronunciation rules are better for word-level than for sentence-level speech recognition.

Second, the English speech recognition system in *Reading Assistant*™ are reported to work well to recognize the pronunciation of English learners as well as that of English native speakers and to catch the mispronunciation of both speaker groups (Beattie & Chevalier, 2012). The speech recognition engine does not evaluate the proficiency level of the reader's pronunciation, and it only needs to decide whether the pronunciation is acceptable or not. The reported false negative error rates, which give warnings when there are no real pronunciation errors, are less than 3% when tested with audio files of middle school students including both English native speakers and English language learning students, and around 1% with the audio files of children and adults of native English speakers in the United States (Beattie & Chevalier, 2012). For this reason, even though *Reading Assistant*™ was originally developed for native speakers of English who struggle with reading texts, its speech recognition engine seems to be used in judging the pronunciation quality of English language learners as well. Being said that, readers should be cautioned not to consider low false negative rates as the accuracy of the speech recognition system. There could be still higher possibilities of not providing feedback to students, or false positives, when they make pronunciation errors.

Finally, the last beneficial function of *Reading Assistant*™ is the review of students' pronunciation accuracy. The ASR system not only provides immediate feedback when learners mispronounce the given words in the reading texts, but also gives a summary page of the correct and incorrect pronunciation with different color fonts for each error type (see Figure 1 for the mispronounced words in the given context and see Figure 3 for the summary of overall performance). The fluency report page provides the overall picture of the learner's pronunciation patterns by looking at what types of words were mispronounced and guides learners where to put more attention. Even though the online program is developed to provide self-directed learning, human assistance with the summary page would increase the effectiveness of the training. Because young learners, or novice learners, cannot easily find the patterns of their pronunciation errors, it would be more efficient to have pronunciation tutoring together with self-practice of the program.

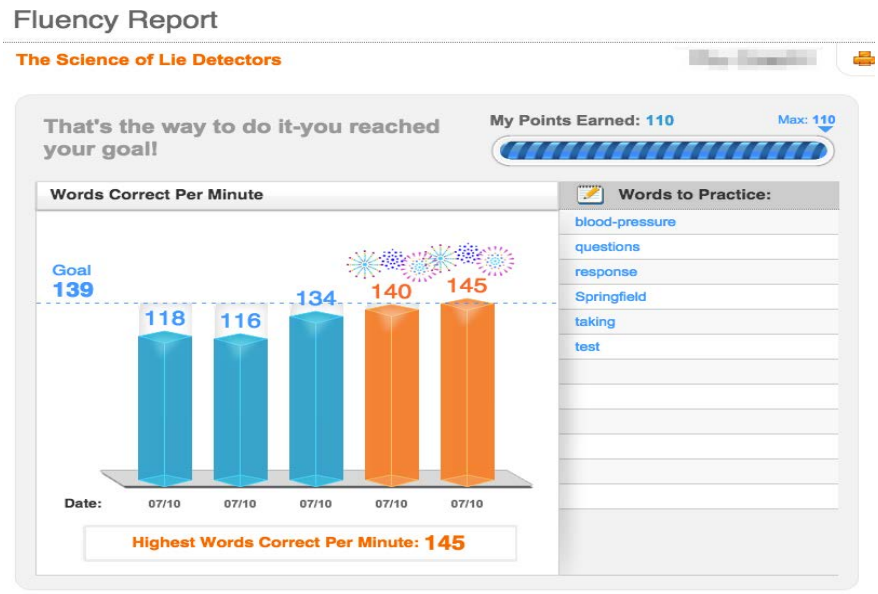

Figure 3. *Reading Assistant*™ software, fluency report screenshot

As is often the case with computer assisted language learning (CALL) programs, one overarching criticism of *Reading Assistant*™ is that there is less interaction in the language learning and learners do not have immediate help from human teachers. Although the program provides immediate feedback for every single mispronunciation, it may not be as adaptive as human teachers in adjusting the contents to learners' current speaking status and providing an adequate level of study materials. In addition, the pronunciation in spoken communication may not be practiced with *Reading Assistant*™, because the program only provides pronunciation practice with reading texts and pronouncing words by reading them are different from the pronunciation in an oral communication (Swerts et al., 1996). In addition, *Reading Assistant*™ may not provide enough input to the learners who generally needs huge amount of aural inputs before they produce oral outputs, because the English native speaker's pronunciation is only given when learners make pronunciation mistakes or choose the text listening option.

Despite the aforementioned limitations, however, this automated reading assistant program seems to make a valuable contribution to the field of speaking as well as reading education for EFL learners in that it provides opportunities to the learners to autonomously study spoken language which was usually practiced only with the help of human teachers or tutors. This individualized learning environment is believed to reduce the anxiety level of learners which they usually have when they are in public or in front of other human beings, such as teachers or friends. In addition, the immediate feedback of the mispronunciation may reduce the burden of looking up dictionaries when students encounter unfamiliar words. This reading program may provide good chances to improve pronunciation quality of the EFL learners, especially of those who are in an EFL context and who generally learn written English before spoken English.

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