The Design and Implementation of the English Pronunciation Education Device

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Abstract
The English learning issue is always a problem for students who are not coming from native English countries. Among the problems of English learning, such as spelling, reading, writing, the most significant barrier could be English pronunciation. To improve this issue, we design and implement the English pronunciation education device. This device could help students to improve their English pronunciation with 3D printed blocks and real person voice.

INTRODUCTION

In the modern world, the ability to use multiple languages could be essential. Among all languages, English could be the primary language across the globe. However, English learning could be a struggle process. Due to the learning student might not live and grow in native-English countries, the environment of English using is hard to be created. Moreover, the nonstandard accent leads to more problem in English pronunciation.

For the issue of English pronunciation, the most common approach is the use of phonetics. There are many phonetics systems used, such as International Phonetic Alphabet (IPA), Kenyon and Knott Phonetic, Daniel Jones Phonetic Symbol. These phonetics systems are a least long time from English learning. However, these phonetic symbol systems are different from each other. Students have to choose one or try to correspond them with the table 1 and lead to more confusedness and trouble.

Recent studies already show that the use of phonics approach could be a better way to learn English pronunciation than traditional phonetics systems (Diaz-Plaza, 1995). To increase the performance

Table 1. The vowels and diphthongs with IPA, John, and K.K.

Vowels and diphthongs

IPA Jones	IPA K. K.	Example
iː	i	see /siː; si/
ɪ	ɪ	sit /sɪt; sɪt/
e	ɛ	ten /ten; tɛn/
æ	æ	hat /hæt; hæt/
ɑː	ɑ	palm /pɑːm; pɑm/
	æ	ask /ɑːsk; æsk/
ɒ	ɑ	watch /wɒtʃ; watʃ/
	ɔ	long /lɒŋ; lɔŋ/
ɔː	ɔ	saw /sɔː; sɔ/
ʊ	u	put /pʊt; put/
uː	u	too /tuː; tu/
ʌ	ʌ	cup /kʌp; kʌp/

IPA Jones	IPA K. K.	Example
ɜː	ɝ	fur /fɜː(r); fɝ/
ə	ə	ago /əˈgəʊ; əˈgo/
	ɚ	never /ˈnevə(r); ˈnevɚ/
ei	e	page /peidʒ; pedʒ/
əʊ	o	home /həʊm; hom/
aɪ	aɪ	five /faɪv; faɪv/
aʊ	au	now /naʊ; nau/
ɔɪ	ɔɪ	join /dʒɔɪn; dʒɔɪn/
ɪə	ɪr	near /nɪə(r); nɪr/
eə	ɛr	hair /heə(r); hɛr/
ʊə	ur	tour /tʊə; tur/

phonics learning for younger students, an English pronunciation education device is designed and implemented in this paper.

LITERATURE REVIEW

The issue of English pronunciation is a trendy study area, especially in non-native English countries. Such as in Asia, Huang, Guimin give his study in Chinese students learning English pronunciation (Huang et al., 2017). Jayapalan, Kamalashine also has the study of teaching and learning English pronunciation in Malaysia (Jayapalan & Pillai, 2016). These studies both indicate the problems of the using of phonetic symbols (Hameed & Aslam, 2015). On the other hand, some researches show the mobile app might help students to learn English pronunciation (Cavus, 2016; James, 2017).

However, the use of mobile apps might lead to bad eyesight since there are already a lot of mobile devices around students (Schaefer, 2015). Therefore, the requestions of the teaching device to improve the ability of English pronunciation still existed (Huang et al., 2017; Black et al. 2015).

METHODOLOGY

To avoid the modern 3C devices interference, such as iPad, mobile phones, and then reduce the learning performance of English teaching, the English pronunciation education device should be designed without apps and mobile devices. Therefore, the education device is designed as follows.

Figure 1. The outlook of the English pronunciation education device.

There are two major parts for this device, the alpha buttons, and the central station. Students put the alpha buttons which could spell a word on the central station, and then the main station will read this word with phonics. With this approach, any word could be read by each pronunciation to reach the goal of learning.

To recognize 26 different letters of the alphabet, we design the letters buttons of the alphabet with 3D printing technology. Each letters buttons is including an electrical resistor. With the measurement of the particular value of each electrical resistor, the alphabet could be recognized.

Figure 2. The electric resistor and alphabet buttons

With 3D printing technology, all alphabet buttons could be printed as follows. Each alphabet button contains various electric resistors from one Ohm to 10K Ohm. With the measurement approach, the values of electrical resistors could be detected when the alphabet button is attached to the teaching device. Therefore, various amounts of electrical resistors could be considered as a tag, and let teaching device have the sequence of alphabet sequence as a word.

With the use of electrical resistors, 26 alphabet buttons could be easily detected. The cost of electric resistors is better than other approaches such as RFID, IR sensors, bar codes. Therefore, the value of the proposed teaching device could be reduced significantly.

Figure 3. The alphabet buttons

RESULT AND DISCUSSION

The English pronunciation education device is designed by 3D modeling technology; we created the shape as a school bus to indicate the learning goal. The windows of the school bus for ready for alphabet buttons placing.
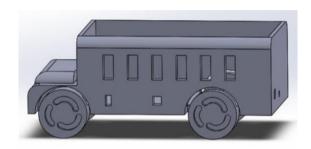

Figure 4. The English pronunciation education device 3D model

The students could place the word, for example, CAT, with the alphabet buttons. The order of alphabet buttons could be used to present the word as follows.

Figure 5. The sequence of alphabet buttons on the pronunciation education device

Since the sequence of alphabet buttons could be detected by the device, therefore, the sound of phonics could be played by a microcontroller. Thus students could hear the sound of phonics and learn pronunciation as well.

CONCLUSION

In this paper, we propose a design of English pronunciation education device. This device is presented as two major parts, the equipment, and alphabet buttons. With the use of electrical resistors, the cost of the device could be reduced significantly. Without the LCD, the students could focus on more on learning and reach the goal of English pronunciation learning with fun.

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