

Developing Native-Like Listening Comprehension Materials: Teachers' and Pupils' Perceptions of a Digital Approach

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This paper reported the attempt teachers did in developing native-like (NLS) listening materials for their EFL learners using a text-to-speech (TTS) technology. Observation was carried out to record teachers' procedures for developing NLS materials. Interview with teachers were undertaken to explore their' perceptions towards the NLS listening materials and the benefits they gained from developing instructional media using technology. In addition, a questionnaire was distributed to 65 eight-grade pupils to gather information related to their opinions regarding the listening materials developed and used by their teachers. The findings show that teachers and pupils responded positively towards the NLS materials for listening comprehension. In addition, teachers were found to have more confidence in teaching listening skill while using the technology. There are three conditions which endorse this teaching confidence: the suitability of instructional materials used with the learning curriculum and pupils' level of English proficiency, teachers' self-efficacy to the teaching task, and the integration of technology in classroom teaching. The study suggests that TTS system can be used as computer assisted language learning (CALL) application particularly in the development of listening comprehension materials. The study also confirms earlier studies that teacher professional development can be promoted through integrated training on technology for classroom use.

Keywords: Native-like speaker (NLS), listening materials, text-to-speech (TTS), English as a foreign language (EFL)

Artikel ini melaporkan kegiatan guru dalam membuat materi mendengarkan (listening) yang mirip dengan penutur asli (NLS) untuk pembelajaran bahasa Inggris menggunakan teknologi text-to-speech (TTS). Observasi dilakukan untuk merekam prosedur yang dilakukan guru. Wawancara dilakukan untuk mengetahui persepsi guru terhadap NLS dan untuk mengetahui manfaat yang guru peroleh terhadap pengembangan materi melalui teknologi. Kuestioner diberikan kepada 65 siswa kelas 8 untuk mengetahui pendapat mereka terhadap materi belajar yang dikembangkan oleh guru. Data menunjukkan bahwa guru dan murid memberikan respon positif terhadap pengembangan materi NLS. Di samping itu rasa percaya diri guru dalam mengajarkan kemampuan mendengarkan dengan teknologi juga meningkat. Ada tiga kondisi yang memungkinkan rasa percaya diri meningkat: kecocokan antara materi yang digunakan dengan kurikulum dan tingkat kemampuan bahasa Inggris siswa, keyakinan guru terhadap tugas mengajar, dan integrasi teknologi dengan pengajaran di kelas. Studi ini merekomendasikan bahwa sistem TTS dapat digunakan untuk pengajaran bahasa melalui komputer, khususnya dalam mengembangkan bahan ajar mendengarkan. Studi ini juga mendukung penemuan studi sebelumnya yang menyatakan bahwa untuk mengembangkan profesionalitas guru dapat dilakukan melalui penggunaan teknologi di kelas.

INTRODUCTION

Despite the increasingly prevalent issue of an English as an International Language (EIL), many English as a Foreign Language (EFL) teachers still use English native speakers' (NS) voice and accents for listening materials in order to promote the best model for real English language use. Recent developments in computer technology have enabled English teachers to provide their pupils with listening materials by NS. There is a plethora of listening materials recorded by NS available online that English teachers may select for classroom use. A number of websites such as BBC (British Broadcasting Company), British Council, VOA (Voice of America), CNN (Central News Network) and other similar web pages offer direct access to the real world examples of English spoken by NS.

However, the use of audio materials from websites in classroom practice does not seem always to promote pupils' listening comprehension skills due to validity issues including lack of universal validity and pupils' experience. The use of audio materials available online does not correspond to the classroom procedure (Sha, 2010). She argues that, as the online materials intend to cover a wide range of audiences (e.g. various ages), there is no evidence of universal validity from a single piece of audio presently available. In

addition, many EFL learners often experience difficulties in comprehending fluent, natural conversation due to a lack of experience (Chang & Read, 2006). According to Chang and Read (2006) such difficulties in comprehending listening task encountered by many EFL learners create a stressful learning environment that, in turn, may diminish the validity of listening comprehension task. These two issues on listening material validity are believed to lead teachers into unsound inferences regarding learners' accomplishment of the intended outcomes (Brindley & Slatyer, 2002).

In the Indonesian context, many English teachers still rely on the listening materials available online for listening comprehension (see Cahyono & Widiati, 2010; Suarcaya, 2011; Sulistyawati, 2013). Because of this dependency on online materials, teachers have encountered two prominent problems in classroom practices that consequently lead them to avoid carrying out listening activities in their classroom teaching (Adnan, 2012). The first technical problem deals with facilities and technical support provided by schools to help teachers access the listening materials online. Although the Indonesian government has provided strong support for technology integration at schools (Firman & Tola, 2008), many English teachers are still restricted to the internet access (Son, Robb, & Charismiadi, 2011). Two profound factors, namely a limited budget and an unreliable internet connection are believed to discourage teachers and students from either streaming or downloading audio materials available on websites (Suarcaya, 2011; Sukmaningrum, 2012). The second problem includes the inadaptability of the listening materials to address pupils' level of English proficiency. Quite often classroom teachers serve their pupils with audio materials obtained online as they are without any adjustment. Accordingly, many Indonesian pupils perceive these online materials spoken by the NS as difficult to understand (Muljanto, 2012; Silviyanti, 2014). This negative perception towards the listening materials spoken by NS then impacts on pupils' listening comprehension (see Hasan, 2000).

The application of text-to-speech (TTS) in computer-assisted language learning (CALL) continues to inspire debate. Such debate is particularly driven by the question of whether TTS applications are ready to be used in the EFL learning classroom (Handley, 2009). For its proponents, the TTS application for listening comprehension is seen as an alternative solution to the difficulties that teachers encounter in promoting listening comprehension materials spoken by the natives. The TTS application is considered as an advantage for teachers in adapting the native speaker voice to contextualize listening materials as well as fit their pupils' level of English proficiency (Sha, 2010). Likewise, such an application can benefit pupils' language learning particularly when used as a reading

machine, pronunciation model, and conversational partner (Handley, 2009; Handley & Hamel, 2005). However, very few studies have been conducted to explore teachers' use of TTS application in listening material development particularly the benefits L2 teachers and pupils may derive from such an application. The present study attempts to answer the following research questions:

1. What are teachers' and pupils' perceptions of teachers' self-created NLS listening comprehension materials using TTS application?
2. How do teachers' attempt to develop NLS listening comprehension materials using TTS application contribute to their classroom teaching practice?

Text-to-speech Application in an EFL Classroom

Recently, there has been increasing interests in the application of text-to-speech (TTS) in EFL listening classrooms (e.g. Ming-Kuan & Young, 2010; Sha, 2010). The present study has sought three conditions that become an impetus for such an application for listening comprehension: the appropriate pronunciation model, the communicative expressions that promote natural dialogue, and the practical benefits. In terms of its role in the EFL classroom, text-to-speech (TTS) application seems to be identical to a pronouncing tool, in that it is used exclusively for the teaching of pronunciation (González, 2007; Kilickaya, 2006; Sobkowiak, 2003). Few studies have demonstrated that TTS application suggests an appropriate NS pronunciation to EFL learners (e.g. Damper, Marchand, Adamson & Gustafon, 1999; Handley, 2009; Sobkowiak, 2003). Damper et al.'s (1999) study, for example, has shown that a TTS system can accurately pronounce 72% English words. Although, Damper et al. acknowledge that, when Elovitz et al.'s (1976) good pronunciation criteria are applied, the accuracy drops to approximately 25.7 % of words that are pronounced correctly.

Many researchers have driven their interest to the development of expressive or emotive text voice within TTS applications in order to promote natural conversation (for example see Campbell, Hamza, Hoge, Tao, & Bailly, 2006; Schröder, 2009). Harashima's (2006) TTS application review, for instance, mentions that English voice quality of Voice Text – a TTS application – is outstanding, stating that such an application “uses the real voice sample” (p. 134). Harashima also states that the TTS application has included an

emotive voice and expressions. Similarly, Handley's (2009) study shows that the accuracy and naturalness of the voice in TTS applications were positive at the level of phonetic pronunciation. However, Handley points out that such a measure does not apply to the prosodic aspect, and the quality of the phonetic pronunciation was indeed found to be higher than of the prosodic. This finding, therefore, indicates that the TTS application may work satisfactorily for production of a single word, like in a talking dictionary, but it is unlikely to function adequately as a conversational partner due to an unnatural quality of voice. Handley identifies some contributing factors for this: voice distortion, inability to model change adjustment, and uncovered prosodic natural speech.

In addition, TTS application in the EFL classroom is primarily driven by its practical benefits. According to Sha (2010, p. 640), there are considerable practical reasons for utilizing TTS in the development of listening materials: flexibility and adaptability of the technology, adjustable voice speed, availability of numerous speakers, ease of distribution, and greater cost-effectiveness than traditional speech recording. These practical benefits facilitate teachers in a number of ways. First, flexibility and adaptability of TTS application allow teachers to promote syllabus demand and the pupils' daily context in the listening comprehension classroom. Second, the speech rate modification is believed to meet pupils' need. And third, the produced audio materials are easy to keep and can be used anytime teachers need them.

Native-like Listening Materials

The terms native speaker (NS) has been widely discussed in literature (e.g. Davies, 1991; Jourdain, 2000; Medgyes, 1992). Lee (2005) summarizes six features that draw what NS is, including acquiring the language in early childhood and continued use of the language, knowledge of the language, communicative competence and the ability to use it naturally in varied social settings. The term speaker (NLS) refers to someone with the ability to communicate the language in a manner, "though error-free, yet has qualities which in native speakers frequently raise at least doubts whether it is native or non-native in origin" (Ringbom, 1993, p. 5, as cited in Jourdain, 2000, p. 187).

In the present study, NLS competence is defined by two traits. First, NLS definition takes a certain limited account of the speaker's ability to pronounce English words "without any noticeable accent" (Hyltenstam, 1988, p. 70). The NLS referred to in the present study is not a human that utters or produces English words, but a machine (or computer application): a TTS application, which is used to help teachers create a native-like voice from input text.

Second, in the EFL classroom, NS and non-NS teachers, though different, both contribute to the success of pupils' learning (Medgyes, 1992). The NLS materials in the present study combine the value of NS pronunciation (Davies, 1991; Jourdain, 2000; Medgyes, 1992) with the value of the non-NS teacher in encountering common classroom issues (for example see Árva & Medgyes, 2000; Kurniati, 2012; Medgyes, 1992). The use of NLS materials which promotes the use of native American or British English speaker accents is believed to promote pupils' learning motivation as well as the authenticity of the language (see Major, Fitzmaurice, Bunta, & Balasubramanian, 2002), and at the same time may provide a contextual learning environment. The present study endeavours to contribute to a growing body of research on the use of TTS synthesis in the CALL context (Handley, 2009).

In promoting native-like but understandable listening comprehension for Indonesian pupils, the present study perceives speech control as an alternative solution. Many leading authors believe controlling native speaker speech either by reducing the rate or by adding pauses may assist in an improvement of pupils' listening comprehension (e.g. Flaherty, 1979; Griffiths, 1990, 1991; Zhao, 1997). However, this speech control appears to some extent, to violate what Kilickaya (2006) describes as "authentic speech" or in a broader term "authentic materials" (see Brown, 2004; Harmer, 2007). Therefore, the definition of native-like voice in the present study may not fit the aspects of fluency and extemporaneous discourse of NS as suggested by Davies (1991) and Medgyes (1992).

Technology Integration and Teachers' Professional Development

There is ample literature discussing the interconnection between technology integration and teachers professional development. Many authors suggest that professional development is vital, particularly in helping teachers to preserve with changes, familiarize themselves with a new method, and make their teaching effective through integration of technology (Lawless & Pellegrino, 2007). When teachers benefit from professional development integrated with technology, they are more likely to feel comfort with using technology to facilitate their teaching, boost their confidence as well as to improve their expertise to reshape learning curricula (Mulqueen, 2001).

A review of the literature suggests that technology integration in teacher professional development is likely to be effective if it involves three conditions. They are that it focuses on content, provides wide opportunity for teachers to practise, and responds to teachers' needs (Hew & Brush, 2007). Such a review has urged for technology integration training

that includes sharing information about technology (types of software and available tool for teaching) and learning how to use certain software. Specifically, teachers seem to require training on how they can use technology to help them achieve particular instructional goals (Ertmer, 2005).

In addition to the above three conditions, Schrum (1999) argues that effective professional development should include prospect for teachers to work with other colleagues. This collaborative work may allow teachers to learn from other colleagues' experiences, gain supports from their school community and eventually they could solve any potential issues during technology integration in classroom practices. The amount of contacts teachers maintain for technology integration in their professional development and the support they gain from other colleagues in the process have been shown as factors that promote teachers' innovative use of technology (Drent & Meelissen, 2008).

METHODS

Design of the Study

The present study employed a mixed method approach that combined the qualitative and quantitative research strands. A narrative qualitative design was adopted as it promoted wider opportunity for teachers to gain knowledge through their teaching experience (Xu & Connelly, 2009). In this qualitative design, classroom observation was carried out to gain understanding of how teachers plan NLS listening materials, develop and eventually use such materials in the listening classroom. Additionally, teacher interviews were undertaken at the end of the listening sessions. The teacher interviews were done to explore teachers' experience of using technology to develop NLS listening materials and their perceptions of the NLS materials for the listening comprehension. To validate the result of the qualitative analysis, a questionnaire was distributed to the pupil participants to collect data related to their perceptions of the listening comprehension materials, which were developed and used by their teachers.

Participants

The present study was conducted at a junior secondary school in Jakarta, Indonesia. Two English teachers and 65 pupils aged between 13-14 years old voluntarily participated in the study. The two teachers were both female, and their participation was motivated by their personal interest in using technology to support their daily teaching practices. The two

teachers had similar abilities in using computers such as office and presentation applications, and some online skills including online browsing, email correspondence, and uploading and downloading files from and into local storage. Teachers' interest and their computer competence benefited the study as it encouraged teachers to integrate technology into their classroom practices (Baylor & Ritchie, 2002).

Computer Training

Prior to the study, the two teacher participants attended three computer-training sessions with total of three hours. As suggested by Jeneatte (2002), the computer training was carried out to introduce a new computer technology i.e. TTS application that fit teachers' pedagogical needs. The training was also purposefully done to enable teachers to use a TTS application that helped them technically develop the NLS listening materials. When teachers were competent enough to use technology, teachers' confidence in using technology in classroom practise was expectedly to grow.

In the first session of the training, teachers were introduced to the TTS application and its potential uses for listening comprehension. In the second session, teachers were trained to develop a listening script and to convert the scripts into a native-like voice. This text-to-sound conversion was done using the NR application. In the third session, teachers were taught to smooth the voice using a sound modification application. During the third session, teachers were also trained on how to use the materials they had created in the listening classroom.

In the study, the teachers used Natural Reader Education v.9.1 Gold (henceforth NR). The NR application was selected based on the state of its art applications as discussed in Mulyono (2014) including the Speech Application Language Tags (SALT) technology, the availability of numerous natural voices, maximum 148kHz sampling rate, and 48kHz 16 bit stereo output frequency. At the outset, the NR application was installed on the teachers' laptops. The two laptops operated Windows 7 with 64bit Microsoft (MS) Word 2007. The NR add-in was also installed into the MS Word application to facilitate the teachers in converting the text to voice directly from their MS Word documents. The NR application is also available online; however, because the internet access at the research site was not reliable, the offline version of NR was used. As shown in Table 1, four out of 10 American English voices available in the NR application were installed in the teachers' laptop.

However, in the present study the teachers used only two of these: Natural voice Kate and natural voice Paul due to their naturalness.

Table 1: NS voices installed in the NR application

Voices	XML* tag	Sampling rate
Microsoft Anna	Microsoft Anna	16 kHz, 16 bit
ATT Mike16	Mike16	16 kHz, 16 bit
Natural Voice Kate	Kate	Unavailable
Natural Voice Paul	Paul	Unavailable

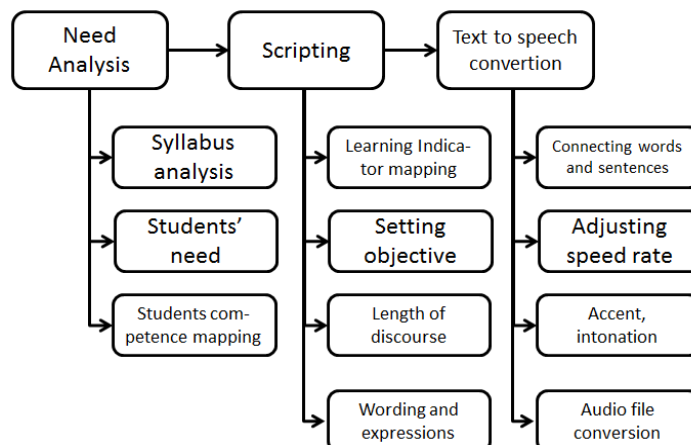
*XML, extensible markup language

The total duration of the training was about six hours. It was three hours longer than initially planned because teachers needed more time to become familiar with the TTS application in order to use it properly. Although teachers spent more hours to adapt the new TTS technology, teachers sought this “technology specialization” whilst the training sessions as a challenge to promote the integration of TTS technology in their listening classroom (see Evans-Andris, 1995).

The Development Procedures

The development of the NLS EFL listening covered three stages including a needs analysis, scripting, and text-to-voice conversion (see *Figure 1*). Under a needs-analysis framework, a needs analysis was done to connect the instructional tasks to real-world target tasks (see Long & Crookes, 1992).

Figure 1: The NLS Development procedure



In the preparation for the listening scripts, teachers first set learning objectives and planned listening comprehension materials. Teachers searched for references from the course books and internet web pages to develop a listening script. The script was developed to be of between 2-4 minutes in duration. Since teachers were granted access to the development of the listening comprehension script, they were able to manage “the accuracy, fluency and effectiveness of the students’ dialogues” (Milton, 2005, p. 252). During the process of script writing, teachers were given information on how to rotate the script with pauses, speed of the voice, and expressions. Teachers were taught to use some tagged texts already available on the TTS application to attribute pauses, speeds, and expressions in the script. Some examples of the tagged texts are shown below:

```
<set xml=true><VOICE REQUIRED="NAME=Kate" ><set xml=true><rate speed="-1"
> I'm really sorry <set xml=true><silence msec="10000" / > I don't mean it
```

```
<set xml=true><silence msec="10000" / >
```

```
<set xml=true><VOICE REQUIRED="NAME=Kate" ><set xml=true><rate speed="-1"
> That's okay<set xml=true><silence msec="10000" / >
```

However, teachers experienced difficulty in inserting such tagged texts into the script. Teachers were not familiar with XML and its use was seen to be complicated for them. Alternatively, teachers were trained to use dot (.) and comma (,) to replace XML code for silence or pause. The sample of the script above was then rewritten as below:

(Teacher clicks the speaker menu, selects Natural Voice Kate)

I'm really sorry

,

.

I don't mean it

(Stop, or convert to audio file)

(Create new audio file)

(Teachers clicks speaker, selects Natural Voice Paul)

.

.

That's okay

.

(Stop, or convert to audio file)

(Teachers merge the audio files)

Soon after the script was ready, the teachers converted it into speech using the NR application. This text-to-voice conversion was done directly from the add-in menu in the teachers' MS Word document. In the NR application, the available speeds range from -10 to 10, with 0 as the default. In the study, the speed of NS voice was set within the range of -1 to 0. Some pauses were also added between sentences to control the speed. An additional sound modification application was utilized to merge some audio files created. Teachers used output frequency 48 kHz 16 bit stereo to produce an audio file. This 48kHz output is believed to ensure the highest quality of sound (Mulyono, 2014; Sha, 2010). Finally, the produced NLS voice was then converted into *.mp3 audio file format with 128 kbit rate and saved in a local drive. The conversion into *.mp3 was applied to allow teacher to play the audio file from their mp3 player and share it with colleagues.

FINDINGS AND DISCUSSIONS

Teachers' and Pupils' Perceptions

The two teachers in the present study responded positively about the NLS materials. Teachers said that the NLS materials corresponded to their classroom needs. The TTS application had facilitated the teachers in self-developing listening materials that suited the standard of competence required by the learning syllabus. Moreover, the NLS materials

suggested an appropriate pronunciation model for both teachers and their pupils. Teachers also opined that the NLS materials suited the English competency of the pupils and fitted the context of their daily life. Teacher A commented:

“The NR application is very helpful in that I can create listening materials based upon my needs and the pupils’ as well. However, it provides only about 90% of all the things needed.”

Additionally, teacher B commented:

“You know, I tend to skip the listening session because I faced many obstacles, particularly in providing the materials. I used to get the listening materials from course book’s CDs and British Council. ... However, the materials did not suit the standard of competence as in the learning syllabus and the materials were not appropriate to the pupils’ ability; for example, the native voice was too fast, and the vocabulary used was too advanced for the pupils’ level. ... I tried the NLS materials, and I found that such materials suited my needs, and the pupils could get the materials based on their level.”

Pupils’ perception of the NLS materials was also shown as positive. The NLS listening materials at a more appropriate speaking speed provided more opportunities for them to comprehend. Compared to the listening materials pupils used to use, a large number of pupils (89.23%, $n=65$) expressed their preference for having the NLS materials in the classroom (see Table 2). Furthermore, 95.39% of the pupils felt that they were motivated with such use of NLS materials.

Table 2: Profile of pupils’ perception of the NLS materials

	M	SD	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14. I prefer teachers use the NR materials	4.21	0.71	23 (35.38%)	35 (53.85%)	5 (7.69%)	2 (3.08%)	0 (.0%)
15. I am interested if teachers use NR materials in the listening classroom	4.48	0.59	34 (52.31%)	28 (43.08%)	3 (4.62%)	0 (.0%)	0 (.0%)

The finding indicates two qualities of NLS materials that promote teachers' and pupils' positive perceptions, such as intelligibility and comprehensibility. From the intelligibility aspects, teachers perceived that the NLS sound from the audio file was clear so that pupils could understand the information conveyed. Additionally, the NLS materials may serve well as a pronunciation model for their pupils during the listening comprehension. The clear and natural sounding speech from the NLS in the materials also encouraged the two teachers to use such materials to practise their own English pronunciation. Teacher A commented:

“Although there is a little problem with the sound, 90% of it works. I could provide listening materials based on the pupils’ ability and the needs of the curriculum. ... Also, I sometimes use it to improve my pronunciation ability.”

However, the finding showed that some L1 words were mispronounced. Teacher A said:

“The learning objective of the English teaching at the junior secondary school is specifically to enable pupils to use English in their daily life, understand things that pupils meet every day, or that are closer to them ... When talking about a park, for example, pupils are familiar with “Taman Mini.” As I converted such a name into the NR application, it was pronounced quite weirdly.”

From the comprehensibility aspect, the study found that the pupils were better able to understand the information from the NLS materials when the speech rate was lowered to -1. In total, 98.46% (n=65) of pupils expressed that the materials developed by teachers using the TTS application were easy to understand (see Table 2). Most of the pupils (98.67%) also opined that the materials suited their needs.

Table 3: Pupils' perception of the comprehensibility aspect

		M	SD	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10.	Listening materials developed by teachers using NR application were easy to understand	4.35	0.51	24 (36.92%)	40 (61.54%)	1 (1.54%)	0 (.0%)	0 (.0%)
11.	Listening materials developed by teachers using NR application suit my need	4.29	0.49	20 (30.77%)	44 (67.69%)	1 (1.54%)	0 (.0%)	0 (.0%)

Asked about the reasons for modifying the speed rate, teacher B acknowledged that such a modification was purposefully done to meet her pupils' level of English listening proficiency. She reasoned:

"... I adjust the materials to their ability, so they could easily understand them and catch the meaning."

However, the finding showed that such a modification disadvantaged the NLS materials with a rough voice transition sound that distracted their naturalness. Teachers reported that, during the text-to-speech conversion, the pitch of one word to another from the NLS materials did not seem very stable and, therefore, sounded like a robot. The natural voice Kate and Paul did not seem quite as natural sounding as their developer claims. Teacher B said:

"The problem appears when we adjust the speed of the voice. Sometimes after the conversion, the voice sounded a bit flat though the pupils still could manage to understand."

The above findings on speed modification confirm those of earlier studies that a reduced rate from the NS' speech may improve pupils' comprehension (Griffiths, 1990, 1991; Zhao, 1997). Likewise, the additional pauses on the NLS materials suggest factors contributing to the pupils' better listening comprehension (Zhao, 1997). Pupils have more time to understand the information from the NLS materials due to the reduced the rate and additional pauses. However, despite these benefits, such an attempt significantly causes the distortion of NS speech, and, therefore, may alter its naturalness (Flaherty, 1979; Griffiths, 1990, 1991). Sha (2010) argues that the alterations of the naturalness of the voice ensues at the same time as the modification is made. He states that if the speed of the voice is reduced, all vowels, pauses and particular voiced consonants are strained accordingly; yet, voiceless consonants remain unaffected. This unnatural sound eventually affects the quality of the prosodic voice of the NLS materials.

The findings show that the voice produced by TTS application was similar to native English speaker and comprehensible. Although the prosodic sound quality of the NLS materials is low, the study demonstrates that such a low quality does not directly to influence pupils' listening comprehension. The pupil participants in this present study responded that they were not concerned with whether or not the NLS materials sound natural. Pupils responded that they could still comprehend the information from the NLS materials produced by the TTS application. This finding differs from Delogu, Conte, and Semintina's

(1998) earlier study indicating that the synthetic speech has shown to be more difficult for pupils either to listen or to comprehend compared to a natural voice. Delogu et al., whose study was participated in by 15 young adults aged between 19 and 23, argue that the synthetic voice requires more cognitive and memory capacity for young adults to listen to and comprehend than those listening to natural speech. The difference of these two findings can particularly be explained from the listener's age. Many leading researchers on TTS system have agreed that that listeners' age is one of various factors that may affect the intelligibility of voice produced by a TTS system (Jones, Berry, & Stevens, 2007). The pupil participants of this study, aged 13-14, were secondary pupils with limited knowledge of English. According to Sha (2010), these pupils, who were beginners in English, were unlikely to be familiar with different accents of English, and thus are considered prosody deaf. This prosody deafness has made them unable to distinguish accents from different English speakers. Accordingly, the modification of sound which resulted in the alteration of the prosodic sound quality may not affect their apprehension towards the information given through the TTS product.

The study shows that speech modification done by the two teachers in the TTS system thus appears as a dubious solution. The reduction of the speech suggests some benefits for EFL learners, yet it concurrently lowers the quality of sound produced by the system. Such a condition remains unchanged unless the default NS speed is appropriate for the learners and is available (Zhao, 1997). Nevertheless, the study has shown that pupils' comprehension towards the information from the NLS materials is not significantly affected by its prosodic sound quality. This finding, therefore, has indicated that despite its low prosody sound quality, the TTS voice can still be used for listening comprehension materials in an EFL classroom, in particular for pupils with low proficiency of English.

Contribution to Teachers' Teaching Practices

The result of this study showed that teachers' confidence in teaching listening comprehension grows when they were able to develop the listening materials themselves using TTS application. From classroom observation, teachers were shown enthusiastic to learn and utilize the NR application to develop NLS listening comprehension materials. The two teachers participating in the study said that the NR application was a new technology for them. They viewed that the application potentially brought a number of benefits to their

classroom instruction, particularly in listening sessions. Accordingly, teachers were shown to promote their strong commitment to the development of NLS listening materials.

The two teachers worked collaboratively during the development of the NLS listening comprehension materials. They set instructional objectives together, and collaboratively developed the learning materials. The two teachers were open for critiques and accepted suggestion from the researchers. During the text-to-speech conversion stage, teachers shared knowledge and discussed the difficulty they encountered together. As teachers perceived the NLS materials to fit the learning syllabus as well as the classroom needs, teachers were committed to developing more NLS materials and using them in their listening classrooms.

The findings also show that teachers' computer competence was shaped throughout their interaction with the new technology such as NR. Eventually, having benefitted from the technology integration in the NLS listening material development, they shared their experiences with other colleagues and invited them together to develop NLS materials for their pupils. Teacher A said:

“A few days ago I shared about this (using Natural Reader for listening comprehension) with my friends, and they were interested to initiate such use as well.”

The finding has shown that teachers' personal perception of their own capability to develop the instructional material using the TTS application contributes to their teaching confidence as well as a strong commitment to such use of NLS materials in classroom practice. Teachers in the study found that they were capable of using technology and serving their pupils' with appropriate listening materials. In addition, teachers' collaborative work has shown to promote their teaching practice. It should be noted that teachers' participating in the study had already possessed positive attitude towards technology as well as self-efficacy for computer use. Teachers were also given supervision during the development of NLS materials. The findings confirm an earlier study conducted by Drent and Meelissen (2008). Drent and Meelissen found that teachers with solid internal motivation to improve the quality of their teaching practice tend to take the initiative to achieve their goals. Moreover, teachers' interaction with other colleagues as well as educational experts for their professional development is believed to influence the innovative use of technology (Drent & Meelissen, 2008). The study thus indicates that teachers' positive attitude, computer self-efficacy, collaborative work as well as technological supports are some of the factors promoting teachers' confidence in using technology. The study also suggests that the

knowledge teachers gained from the overall process of the development of listening comprehension materials using technology contributes to their personal professional development.

CONCLUSIONS

The TTS application like Natural Reader has given EFL teachers a greater opportunity to self-develop their own native-like but still comprehensible listening materials. Teachers and their pupils perceived the NLS materials positively and felt that such materials met EFL listening classroom needs. In addition, the computer training addressed what the teachers needed and accordingly shaped their computer skills. Teachers' collaborative work during the NLS listening material development facilitated them to share knowledge and discuss the challenges they met together. It should be noted that teachers participating in the study had a positive attitude towards the use of technology in the EFL classroom prior to the experiment. Without this background information, teachers' perception of the overall process of the development of listening materials using TTS applications may vary. While this study suggests insights into the contribution of technology integration in teachers' teaching practices, it involved just two teachers and their classrooms, which is a small sample size. The result thus may not be generalizable.

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