

# The Effect of Text-to-speech Software on the Reading Skill of Poor Readers of English in a Bengali Medium School

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## Abstract

*The purpose of this study is to evaluate the effect of text-to-speech software used by K-YAN Projectors on the poor readers of English in a government sponsored Bengali medium school. A majority of the learners of Bengali medium government sponsored schools have very little exposure to English. They learn English as their second language which is also a foreign language to them. They can scarcely pronounce words correctly and are seldom fluent at reading as well as speaking English. This generates a general fear and dislike for English among the Bengali medium students which also has a serious consequence on their confidence. These learners fail to attain all the four language learning skills namely- listening, reading, speaking and writing. To correct this problem and to give our selected language learners proper language exposure we installed 'Balabolka', free text-to-speech software, in our K-YAN device and arranged some consecutive listening-reading classes and then recorded their improvement in reading skill, confidence, fluency and pronunciation via statistical measures. The statistics showed positive growth in learners' confidence, fluency, pronunciation and reading skill. This experiment clearly highlights the necessity of deploying text-to-speech software in crowded English language learning classes in government sponsored Bengali medium schools of West Bengal.*

**Keywords:** K-YAN Projectors, English Language Teaching, Text-to-speech software, Government School

## Introduction

English language teaching is not new to our country. English is taught in almost all the government schools and private schools of our country. But still English is a formidable language to most of the students. They are afraid of it and this fear of English ultimately undermines their confidence. The root cause of this fear, however, is lack of exposure. Most of the students who read in government

sponsored schools of our country belong to parents of low or middle income groups. These students seldom get enough exposure to English in their family, surroundings or even in schools. Unlike the English medium schools in vernacular schools, all the subjects are taught in the local language. Therefore, the learners get exposure to English language only in their English class. Besides, they seldom find a chance to

apply their English language skills in their life. Therefore, English is an alien language to them.

Another obvious reason for a learner's failure to learn English is, of course, the overcrowded classrooms. In overcrowded classes a teacher often fails to draw the attention of all the students to study, teacher's voice may not reach the backbenchers; there could be individual differences in the learners' previous knowledge. These are practical problems that hinder effective English language teaching in the classroom. The answer to all these problems can be found in technology. Technology can help teachers to manage overcrowded classrooms more effectively and efficiently. It can boost up their confidence to manage chaotic classrooms, it can amplify their voice, and it can enable them to attract the attention of the majority of the students for a long time. Keeping in mind the benefits of education technology, government agencies of education are leaving no stones unturned to deploy technology in the practical field of education, namely the actual classrooms of government owned as well as the government aided and government sponsored schools, despite several constraints. The aim is to replace the regular classes with smart classes to harvest the benefits of use of technology in education. The Department of Education, Government of West Bengal with active encouragement of the Department of Information Technology, Government of West Bengal introduced computer based learning (CAL) system titled 'K-YAN' (vehicle of knowledge) in a phased manner through West Bengal

Electronics Industry Development Corporation Ltd (WEBEL) mandated ILFS-ETS as implementing agency. This programme provides schools ICT tools like digital content, alternative power supply solutions and capacity building programmes to bridge the digital gulf and ensure sustainability. K-YAN has been deployed in almost all districts of West Bengal. The general outcome of this programme is positive (Sharma, 2014). We had further equipped the KYAN device with text-to-speech software, 'Balabolka.'

### **Need and Importance of the Study**

This study is important because globalization and open market concepts are changing our economy and standard of living very fast. Multinational companies are making their presence felt. Parents who can afford private schools are sending their wards to English medium schools. According to a report of District Information System for Education (DISE) of National University of Educational Planning and Administration (NIEPA) under the Ministry of Human Resource Development, Government of India, enrolment in English medium schools has increased by 50% between 2008 and 2009. This clearly shows the importance Indian parents attach to English language learning. But a huge number of children who belong to the lower or middle income group parents, who cannot afford private education or English medium schools for their children are still sending their wards to government aided or government sponsored schools. These children who belong to the disadvantaged group

should not lag behind in the competitive job market in future. Therefore, it is important to find out the means to improve the quality of English language learning classes effectively; that is why this study was necessary.

### Operational Definition of Key Terms

- **K-YAN Projector:** K-YAN is a single wire, plug and play, integrated digital teaching device which was developed in collaboration with IIT Mumbai in 2004. It is portable, user friendly and modelled on the best principles of technology in education. It has won the India Innovation Award 2005 and Maharashtra IT Award 2004 for best community learning technology. K-Yan is actually a device that amalgamates a powerful DLP projector along with a Multimedia Computer and audio amplifier with powerful speakers. The package also consists of accessories like Wireless Multimedia Keyboard; Wireless Optical Mouse; signal receiver for the wireless keyboard and mouse and a single Power Cord. Windows 8.1 SL / Linux is generally provided as an operating system. It also includes Office Package and other utility software. K-YAN can also be connected to the Internet. K-YAN can be used for different computations; it can also be used as a movie projector; we can use it for Video Conferencing, for powerpoint presentations and also as a Technology Aided Learning tool.

- **DLP Projector:** The abbreviation DLP stands for Digital Light Processing is a set of chipset based on optical micro-electro-mechanical technology that uses a digital micromirror device. It was originally developed by Larry Hornbeck

of Texas Instruments. • **Text-to-Speech or Speech Synthesis software:** Text-to-Speech software or Speech Synthesis is the artificial production of human speech. A text-to-speech (TTS) engine converts written text to phonemic representation to waveforms that can be output as sound.

- **Balabolka:** It is a free text-to-speech software. Its quality and flexibility is as good as any paid application. With Balabolka we can customize the reading. We can choose one from the three reading options, namely- British English, American English and Indian English. We can select the pitch and the speed of the reading. We can also choose from different voices that the software offers. In our study we have used this particular software in the available K-YAN device. This software is available in various web platforms for free.

### Literature Review:

K-YAN is certainly a very important invention for the education system of our country. It is a multimedia device; therefore, it is pretty effective to grab the attention of the learners for a long time. It makes children more attentive, enthusiastic and interested in study. Children seldom want to miss a class in which a K-YAN is deployed (Mondal, 2014). The good news is with serious effort on the part of the government K-YAN has reached a considerable number of schools. According to Shah (2019), in the last eleven years K-YAN has reached 30,000 schools and 5, 00,000 teachers. The same study shows that K-YAN empowers teachers as mentors; it also claims that introduction of K-YAN

has improved students' participation in class. On the other hand, Sharma (2014) statistically shows that teaching has improved and the improvement can be quantified in percentile terms as 4% every quarterly cycle, in comparison to the earlier rounds of field evaluation conducted. So, the effectiveness of K-YAN is quite evident.

Dutta and Bala (2012) evaluates teaching of English at primary level. In it, they point out that the textbooks at level 1 that is classes I and II are not focused on listening and speaking skills and that is why they do not build familiarity with the language. These books also do not link a child's life at school to its life outside the school. Therefore these books fail to build an emotional attachment of the child with the language. The same research also points out that the present curriculum does not offers any opportunity to the children to listen to the language or speak the language.

The study conducted by Bione et al. (2017) evaluates the voice quality of a TTS system in comparison with a human voice and examines its pedagogical potential for use in English as a foreign language (EFL) setting. Their findings suggest that TTS systems are ready for pedagogy because it has already proved its efficacy. Another study by Meihami & Hussein (2012) concludes that word stress and word intonation aspects of reading benefited most from using TTS in the classroom. Use of TTS in the classroom also improved the fluency of the learners. So this study also confirms the positive effect of text-to-speech software. All these studies indicate effectiveness of text-to-speech software in language teaching scenarios.

## Objectives

The objectives of this research were:

1. To study the effect of text-to-speech software on the reading skill of the poor English readers of a Bengali medium school.
2. To study the effect of text-to-speech software on the confidence, fluency and pronunciation of the poor English readers of a Bengali medium school.

## Methodology

The methodology of study comprises sample, population, tool, instrument, method of research, procedure of data collection and the procedure of data analysis.

## Sample

For this study we have used a purposive sampling strategy. The sample of the study consists of 60 students of class VIII of a government sponsored Bengali medium high school. A diagnostic reading test was conducted to ensure that all the selected learners are poor at reading English. This school was selected because it has already been provided with K-YAN projectors by the government.

## Population

The population of the study shall include all the current students of class VIII of Bengali medium government schools.

## Tool

The tool for this study was a particular text named 'Midnight Express' (Lesson 11) which is an edited version of Alfred Noyes' famous short story of the same name and is included in the prescribed text book of class VIII, 'Blossoms'. Beside this, a word list of disyllabic, trisyllabic and tetrasyllabic words was prepared from the above mentioned text to conduct the diagnostic pre-test and the post-test.

## Importance of K-YAN Projector for this study:

The K-YAN DLP Projector is an indispensable device for our experiment. We have already mentioned it. 'Balabolka', a popular text-to-speech software was installed which is easily available over the internet free of cost. It is a fact that we can install text-to-speech software on any computer, laptop or a smartphone. But, unlike these devices K-YAN has an integrated powerful speaker which delivers very clear and loud sound output which is ideal for an over-crowded class. We have used 'Balabolka' to machine read the text we have selected before the sample students. K-YAN and the text-to-speech software worked wonderfully together. Even the backbenchers could listen to the reading. Beside this the children could follow the text if they want on a big screen where the projector projected the text. However, the students were instructed to follow their own text closely and to underline the words that they found difficult after each reading. K-YAN has many advantages that make it an ideal device for our text-to-speech aided reading classes. Beside this K-YAN

is now available to a significant number of government sponsored Bengali medium schools.

## Method of Research

For this research, single group pre-test and post-test design was chosen. This design has been chosen because random assignment of participants into experimental and control groups was not possible to make. The first step of quasi-experimental research was to select learners who are poor at reading English. To select the sample of 60 learners a diagnostic reading test was conducted to find out the learners who are poor at reading English. Their performance was evaluated under three heads namely- Confidence; Fluency and Pronunciation. All these three heads had full marks of 5. According to their performance, each student was given a certain mark under each head. Then all these 60 students were given the text-to-speech reading treatment. After the completion of the treatment period a post-test was conducted in the same manner in which the pre-test was conducted by a reading test and their performance was evaluated and the data of pre and post-test was compared. The text-to-speech read along treatment included machine reading of the text along with chorus reading of the text by the sample learners. The text-to-speech software used for this particular study was 'Balabolka'. It allows one to stop reading whenever we want. During the treatment the reading was stopped after every single sentence and after every polysyllabic word, so that the students can repeat the same aloud. The students were instructed to follow

their text closely and mark the words they found difficult during each reading. This way the learners became conscious of their weaknesses. They also got an instant chance to correct themselves. Thus, the students' listening skill as well as reading skill has been treated together. All of them participated in the study actively and by self-correction they improved their English as well as confidence with each reading.

**The Difference between the Scores of Pre-test and Post-test**

At the beginning of the study a pre-test was conducted and after the completion of the treatment a post-test was conducted and the data was gathered. Here, we showcase the difference between the data that was found after statistical interpretations in table-1.

**Analysis and Interpretation of Data**

**Table-1: Difference between the mean scores and that of the standard deviation scores of pre-test and the post-test**

Description	Mean	Standard Deviation
Pre-test	12.27	8.111
Post-test	19.64	6.982

Table-1 clearly shows the difference between the mean scores and that of the standard deviation scores of pre-test and the post-test conducted on the sample of our study.

and the standard deviation was 8.111. On the other hand, the mean of the post-test turned out to be 19.64. The standard deviation of the post-test was 6.982.

The mean of the pre-test was 12.27

**T-Test of Pre-test and Post-test**

**Table-2: result of the T-Test performed on the data of the pre-test and the post-test**

	Paired ... 99% Confidence Interval of the ... Upper	t	df	Sig. (2-tailed)
Pair 1 Post-test - Pretest	8.604	15.943	58	.000

**Review of Data**

Table-2 shows the result of the T-Test performed on the data of the pre-test and the post-test conducted on the sample. It was a two tailed test. Here, the df or degree of freedom (df) is 58. The T-value is 15.943. The T-value is tallied at the 99 percent confidence

interval level and difference between the two means proves highly significant. Therefore, it can be concluded that there is a significant difference in the mean scores of the poor readers of English of the Bengali medium school between the pre-test and the post-test.

**Table-3: Four pre-tests and post-tests**

Mean			N	Std. Deviation	Std. Error Mean
Pair 1	Post-test	19.64	59	6.982	.909
	Pre-test	12.27	59	8.111	1.056
Pair 2	Post-test of Confidence	3.80	60	1.054	.136
	Pre-test of Confidence	2.73	60	1.260	.163
Pair 3	Post-test of Fluency	3.28	60	1.236	.160
	Pre-test of Fluency	2.27	60	1.287	.166
Pair 4	Post-test of Pronunciation	2.90	60	1.115	.144

**Difference of Means, Standard Deviation and Standard Error of Mean of the Pre-tests and the Post-tests**

Table-3 lists out all the four pre-tests and post-tests conducted in this experiment. The overall pre-test and post-test has been discussed already. However, to understand the impact of the treatment more precisely we have split the data further, under these three heads, namely- Confidence, Fluency and Pronunciation.

The first head is confidence. The mean of the pre-test of this head is 2.73. On the other hand, the mean of the post-

test is 3.80. The standard deviation from mean of the pre-test is 1.260 while that of the post-test is 1.054. The standard error of mean of the pre-test is 0.163. The standard error of mean of the post-test is 0.136.

The second head is fluency. Here too, we notice a difference between the mean of the pre-test and that of the post-test. The mean of the pre-test is 2.27. The mean of the post-test is 3.28. Standard deviation from the mean of the pre-test is 1.287 whereas the standard deviation from mean of the post-test is 1.236. The standard error of mean in the pre-test is 0.166. The standard error of mean in

the post-test is 0.160.

The third head is pronunciation. The mean of the pre-test turned out to be 1.98. The mean of the post-test turned out to be 2.90. The standard deviation from mean of the pre-test is 1.186. The standard deviation from mean of the post-test is 1.115. The standard error of

mean of the pre-test and of the post-test are 0.153 and 0.144 respectively.

All the data mentioned above shows a difference. Therefore, it is important to find out the significance of the difference. T-test was calculated to find out the significance of the differences.

**T-Test of All the Four Pre-tests and Post-Tests**

**Table-4: Result of the four T-tests**

		Paired ... 99% Confidence Interval of the ... Upper	t	df	Sig. (2-tailed)
Pair 1	Post-test - pre-test	8.604	15.943	58	.000
Pair 2	Post-test of confidence -	1.363	9.597	59	.000
	Pre-test of confidence	1.310	9.226	59	.000
Pair 3	Post-test of Fluency - pre-test of Fluency	1.195	8.780	59	.000
Pair 4	Post-test of Pronunciation - Pre-test of Pronunciation				

Table-4 lists the result of all the four T-tests that have been carried out. The result of the first test has been discussed already. The T-test concerning confidence has a Tvalue of 9.597; the degree of freedom (df) here is 58. The T-test concerning fluency has a Tvalue of 9.226 and the degree of freedom here is 59. The fourth pair or the test concerning pronunciation has a T-value of 8.780 where degree

of freedom (df) is 59. All the T-tests that have been performed showed the differences as positively significant at the 99 percent confidence interval level. Therefore, we can declare safely that all the hypotheses have been retained.

**Significance of the Study**

Some of the benefits of the method of using text-to-speech software in conjugation with K-YAN projectors have



been listed here. This can show the way in which the study can enrich the present English language teaching of our country.

- During this experiment the majority of the learners listened to the machine reading of the text with full concentration and then they repeated the same aloud. Thus, this method develops the learner's listening skill as well as reading skill.
- They read the text aloud in chorus which helps them to overcome their anxiety of reading English.
- They participated in the reading process willingly with their peers. Thus, they overcome their inferiority complex.
- Text-to-speech software generally offers two or three variants of reading. In this case the options were- British English, American English and Indian English. Here, British English was chosen. Thus, the students got an opportunity to listen to the native speakers and imitate and internalise their style of speaking English which is beneficial for learning a foreign language, according to Lee and Heinz's (2016).
- Lee and Heinz (2016) also highlight the importance of learner autonomy in English language learning. While giving the treatment we asked the students to identify the words that they found difficult and take extra care to listen and correct the same in the next reading. This approach certainly awakens the learners and compels them to take part in the reading actively and thus be responsible for their own development.
- The experiment provides the learners exposure to British English language. The learners listen to the native speakers, the receipt pronunciation (RP). Thus, this method can save the learners from any subjective error on the part of the teacher.
- Text-to-speech reading treatment not only improves learner's pronunciation and fluency but also it improves their sense of intonation and stress. Meihami and Husseini's (2012) study points this out. The same is evident in our study.
- In our experiment the students are required to read aloud the text after listening carefully to the reading by the machine. Lee and Heinz's (2016) prescribe reading aloud as an effective strategy to improve language learning. The experiment includes this strategy also.

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