# Using an Artificial Intelligence Based Program to Enhance Primary Stage Pupils' EFL Listening Skills

## Prepared by

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# Abstract

Appreciating the opportunities and challenges that artificial intelligence (AI) creates, made it important to verify what AI is today and what the future may bring when it is widely used in education. The current study aimed at investigating the effectiveness of an artificial intelligence (AI) based program in Enhancing EFL listening skills among sixth year primary stage pupils. The participants of the study included (80) pupils divided into two groups: the experimental group (N=40) that was taught using the Artificial Intelligence based program and the control group (N=40) that received regular instruction. The instruments of the study included: an EFL listening skills checklist to determine the most important listening skills to be developed by sixth year primary stage pupils, a pre-post listening skills test to measure pupils' listening skills before and after implementing the program, and a rubric for correction. Data was analyzed statistically to verify the study hypotheses. Findings of the study revealed that the experimental group pupils' EFL listening skills were enhanced as a result of using the Artificial Intelligence based program.

**Key words:** Artificial Intelligence, EFL Listening Skills, Primary Stage Pupils

# إستخدام برنامج قائم على الذكاء الاصطناعي لتطوير مهارات الاستماع فى اللغة الإنجليزية لدى تلاميذ المرحلة الابتدائية

## ملخص

هدفت الدراسة الحالية إلى التحقق من فعالية برنامج قائم على الذكاء الاصطناعي (AI) في تطوير مهارات الاستماع فى اللغة الإنجليزية لدى تلاميذ الصف السادس الابتدائي. شمل المشاركون في الدراسة (٨٠) تلميذاً مقسمين إلى مجموعتين: المجموعة التجريبية (ن= ٤٠) التي تم تدريسها باستخدام برنامج قائم على الذكاء الاصطناعي بينما تلقت المجموعة الضابطة ( ن= ٤٠)  التدريس باستخدام الطريقة العادية.  وقد تضمنت أدوات الدراسة: قائمة لمهارات الاستماع للغة الإنجليزية كلغة أجنبية لتحديد أهم مهارات الاستماع لدى تلاميذ الصف السادس الابتدائي ، واختبار لقياس مهارات الاستماع قبل وبعد تطبيق البرنامج. وقد أظهرت نتائج الدراسة فاعلية البرنامج القائم على الذكاء الاصطناعي فى تنمية مهارات الاستماع فى اللغة الإنجليزية لدى تلاميذ المجموعة التجريبية.

الكلمات المفتاحية: الذكاء الاصطناعي ، مهارات الاستماع للغة الإنجليزية ، تلاميذ المرحلة الابتدائية

# I) Introduction

Listening, as a receptive skill, is very important in learning any language. It is listed as the first skill not only because it appears first in natural language acquisition but also because it is used almost all the time. Flowerdew and Miller (2005); Hamouda (2013) stated that the problems of listening comprehension exist in the four factors that constitute the aim and process of listening: the message, the speaker, the listener and the physical settings. In addition, methods of teaching listening and lack of materials are responsible for the poor level of listening comprehension. Some previous studies indicate that CALL, Multimedia, Internet and smart or interactive boards are effective in enhancing listening comprehension skills (Idrissovaa, Smagulovaa, & Tussupbekova, 2015; Vahdat & Eidipour, 2016; Yusof, 2012).

Through technology, students can have access to authentic materials of the target language and take more responsibility towards their own learning in a meaningful context (Ahmadi, 2018; Murphy, DePasquale, & McNamara, 2003; Parvin & Salam, 2015; Pourhossein Gilakjani, 2017). With the Enhancement of the fifth generation of computers, artificial intelligence (AI) has been greatly enhanced, and the focus of artificial intelligence during this period is to make intelligent boards that can help learners practice AI applications. Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. These procedures incorporate learning (the securing of data and principles for utilizing the data), thinking (utilizing standards to arrive at estimated or unmistakable resolutions) and self-revision.

AI boards are proved to be an exciting and fun bit of technology to integrate and to help learners get access to AI applications. It influences learning in a few different ways, for example, raising the degree of learners' engagement, and advancing their eagerness for learning, in a variety of environments (Kannan & Munda, 2018; Reiland, 2017). The AI board is an effective artificial intelligence tool that can be used for different purposes. It is connected to a computer and a projector, which displays the image seen on the computer screen. The user needs only to press the board's surface to open and close files, explore and interact

with web sites on the internet, or operate software (Hager, Bryant, Horvitz, Mataric, & Honavar, 2017).

## *1. Context of the problem*

The problem of the current study is derived from the following resources:

1) Previous Egyptian related studies in EFL listening skills (Abo-Essa, 2005; Abdelrasoul, 2010; Al-Ahmadi, 2010; Khalil, 2015; Ali, 2016; Goda, 2017) revealed that primary stage pupils' EFL listening skill is weak and needs improvement.

2) A pilot study was conducted on forty pupils enrolled in a primary language school to document pupils' weakness in EFL listening comprehension skills. A test was administered to the pupils. The test was divided into three types of questions that pupils answered after listening to a passage. The first question was about listening and filling in gaps. The second question was about four sentences and deciding true or false whereas the third one consisted of three open ended questions to check pupils' comprehension. The results assured the low level of pupils in EFL listening comprehension skills.

**Table (1):**
**Results of the pilot study**

| Skills | Number of Pupils | Percentage of correct answers |
|---|---|---|
| Listening Skills | 40 | 47.5% |

## *2 Statement of the problem*
The problem of the current study lies in the weakness of EFL listening skills among sixth primary school pupils as it is clearly stated in the previous studies and results of the pilot study.

## *3 Questions of the study*
The problem of the current study could be addressed in the following key question: What is the effectiveness of an Artificial Intelligence based program in enhancing sixth year primary school Pupils' EFL listening skills?

This question is divided into the following sub questions:

1) What are the EFL listening skills needed for primary stage pupils?

2) What are the features of the proposed program?

3) What is the effectiveness of an Artificial Intelligence based program in enhancing the overall EFL listening skills among sixth primary stage pupils?

   3.1 What is the effectiveness of an Artificial Intelligence based program in enhancing phonology skill among sixth primary stage pupils?

   3.2 What is the effectiveness of an Artificial Intelligence based program in enhancing vocabulary and Overall Comprehension skill among sixth primary stage students?

   3.3 What is the effectiveness of an Artificial Intelligence based program in enhancing grammatical structures forming skill among sixth primary stage students?

## 4  Hypotheses of the study

1) There would be a statistically significant difference between the mean scores of the experimental group and those of control group on the posttest in the overall EFL listening skills in favor of the experimental group.

2) There would be a statistically significant difference between the mean scores of the experimental group and those of control group on the posttest in EFL phonology skill in favor of the experimental group.

3) There would be a statistically significant difference between the mean scores of the experimental group and those of control group on the posttest in EFL vocabulary and Overall Comprehension skill in favor of the experimental group.

4) There would be a statistically significant difference between the mean scores of the experimental group and those of control group on the posttest in EFL grammatical structures forming skill in favor of the experimental group.

## 5 Aim of the study

The present study aims to enhance EFL listening skills among sixth year primary school pupils through using the suggested artificial intelligence-based program.

## 6 Significance of the study

The current study could be significant to EFL teachers, pupils, curriculum designers and researchers in the following aspects:

1- EFL teachers: The current study could:
   a. Provide teachers with an artificial intelligence-based program that helps them improve their pupils' EFL listening skills.
   b. Enable them to know how to utilize technology in teaching.
2- Students: The current study might help them to:
   a. Gain confidence in EFL listening skills.
   b. Use the artificial intelligence-based program to listen interactively.
   c. Be responsible for their learning through using artificial intelligence tools in a positive environment.

3- Curriculum designers:

The current study could draw curriculum designers' attention to the importance of technology and artificial intelligence in teaching EFL listening skills; it might direct their attention to the steps of integrating artificial intelligence activities during the planning, and implementation stages of the curriculum.

4- Researchers

The current study is an attempt to help researchers explore possible future directions for integrating artificial intelligence into EFL curricula.

## 7 Delimitations of the study

The current study is delimited to:

1. Some EFL listening skills required for sixth primary school pupils, which have been approved by the jury members. Listening skills include (Phonology skill, vocabulary and Overall Comprehension skill and grammatical structures forming skill).

2. A group of sixth primary school pupils from a primary language school.
3. The first semester of the 2019-2020 academic year as the time duration of the experiment.

## 8 Instruments and materials of the study

1) A checklist of EFL listening skills required for sixth primary school pupils.
2) An EFL listening skills test that is used as pre-posttest for testing both groups.
3) An artificial intelligence based program to enhance EFL listening skills among sixth primary school pupils.

## 9 Definition of terms

Artificial Intelligence (AI)

Artificial Intelligence (AI) is utilized to depict computerized systems that reenact cognitive capacities that are associated with the human personality for example, learning and critical thinking (Hager et al., 2017; Reiland, 2017). The current study views artificial intelligence as the examination and plan of intelligent board framework that perceives its environment and adopts activities which boost learners' chances of success (Dodigovic, 2007; Reiland, 2017). Its software helps teachers and learners to plan lessons, make notes, browse the internet, explore, and use Language Processing applications.

Listening

The current study adopts the definition of Idrissovaa et al. (2015); Rukthong and Brunfaut (2019) which views listening as a process of getting what the speakers really say; processing information; and enhancing meaning with the speaker, and reacting through involvement, creative mind and sympathy. Listening, then, consists of complex and dynamic procedures of understanding in which listeners coordinate what they hear with what they know.

## II) Review of Literature

### 1 Nature of the listening skill

Listening is an oral medium that facilitates language acquisition and helps learners engage in speech communication. Thus, learners with good listening skills can participate effectively in the classroom. In addition, learners can read, write and speak to others (Idrissovaa et al., 2015). Abdulkadir (2018); Hayati (2010); Vahdat and Eidipour (2016) assure that although language learning depends on listening, it was the least emphasis skill in EFL classes.

Listening as an Active Skill

Bodie (2011) states that listening requires willingness and active cooperation on the part of the listener. Learners must listen and share; they need to think when decoding the encrypted message and responding correctly. To make listening effective, teachers are recommended to set clear goals for their students and themselves. Thus, students can identify their purpose in listening. Active processing requires an adequate understanding of the encrypted message and its content; To successfully accomplish this, the listener must rely on his background knowledge (Graham, 2017; Hamouda, 2013).

Listening as a Complex Skill

Graham (2017) describes listening as a complex process where learners first describes the complex process by which listeners encounter a foreign language; they only hear a string of meaningless sounds. Gradually, after the language presentation, learners understand elements such as phonemes, pitch, words and, expressions. After they are equipped with the phonological, syntactic, and semantic codes of the language precisely, learners have arrived at the degree of acknowledgment, where they filter out the message bearing units for perception, comprehension, and retention. According to Fathi and Hamidizadeh (2019), listening is a creative process in which listeners has an important role in shaping the complete message where learners create meaning, associate new information with what they already know or what they hear.

## 2- Artificial Intelligence

AI applications and language learning

1. Dragon Transcription Software is One of the primary AI applications, which captures text from speech. This speech recognition software was integrated into Windows in the nineteenth. Using this tool has many advantages to the pronunciation of foreign language (Pourhozine Gilakjani & Sabou Ri, 2017). Downloadable Automatic Speech Recognition (ASR) software such as Duolingo and Carnegie Speech have been utilized in language training. This software not only transcribe speech from text but also, identify errors helping learners to correct their mistakes (Canero et al., 2018).

2. AI-based language translation software, for example, Google Translate have gained phenomenal ground in supporting second language. It utilizes statistical machine translation rather than grammar rules, criticizes accuracy problems. More updated versions of Google translate move into extensive improvements in terms of accuracy (Icon, 2019). Google's move to neuropsychological translation aims to translate whole sentences rather than short ones, which is expected to improve     precision. Linguistic accuracy in Google Translate affect students' structural ability (Cole, Skolnick, & Spector-Cohen, 2018).

3. Methods of language learning: enhancing learning has risen as a natural byproduct of advanced algorithms.  When systems attempt to duplicate human reasoning, they find aspects of language learning such as structures, predictive analysis, and frequency of use that are not taught (Pellet & Murray, 2015; Borow, Carston U., Jingin F., & S., 2009). AI-based vocabulary Enhancement systems such as TextGenome.org, provide language opportunities where students can choose their own way of learning (Boscourt, 2017; Dawson, Nowak, & Ritschaft, 2008). In addition, learners can take responsibility for their learning learners (Kimura, 2015; Rodinatz & Sarbasoya, 2012). Focusing on strengthening students' learning AI programmes has moved to a reinforcement learning framework in real-world contexts to provide a set of language learning strategies for language. (Rodinatz & Sarbasoya, 2012; Steinbergen-Hu & Cooper, 2014).

4. Assessment of language learning: AI mainly uses big data from users to create adaptive learning. It affects education. Online sfotware such as Duolingo and MOCC are increasingly collecting student data (Krishnan and Munde, 2018). Validation of this data should be used to assess and enhance students' intended learning outcomes and commitment to learning.

## *Characteristics of AI Boards*

1) Intensiveness

Perceptual organization and imaginary are used to enhance Learning. Hence, using hand, mouse, active desktop, active interface; and web functionality are all examples of ways the AI board can integrate these functions. The learned theme combines physical performance with a screen pointer and activation, without the use of a finger, pen or mouse. The ability to move from side to side, upwards and upwards in one group or another, provides greater student support.

2) Ludic elements

Play feature is a basic learning element, and the learning materials that lead to the AI board presentation integrate educational objectives with fun. The ability to combine, sound, video, movement and content helps to enhance students' learning styles.

3) Visualization

The most powerful reason for using AI board is the ability to visualize a process for learners through the elements provided on AI board. The use of sound, video, colors and movement across learning levels contribute to students' learning enhancement.

4) Bricolage

If bricolage is why do it yourself. AI boards offer the ability to combine different elements of audio video, animation, text, web materials and traditional curriculum materials. Also, learners can create meaning for each other and for themselves. Tosku (2013), Kathel (2005) and Gogil (2003) Clarify that AI boards have become a necessary component in lesson preparation, presentation and assessment.

## *The Technical Functionalities of AI Board*

For (Gkiouzeli, 2015); Mercer et al (2010) and Schmid (2008), AI board is the medium that is afforded with several technical functionalities as well as attributes. In addition, there are tools that provide users with drag functions, remove or reveal items placed, zoom in and zoom out functions, using colours to highlight text or objects, objects' animation, removing objects, saving, printing, and sharing products with others. The results can be displayed immediately in the main board in graphical format or exported to a spreadsheet. Wireless includes a graphic tablet that operates remotely and enables attendees to take control of the board from anywhere in the class (Giaciocelli, 2015; Fatemi, 2015; Keane, 2014 and Coyle, 2010).

## 111 Listening and AI Boards

According to Levy (2012) and Field (2012), awareness of language specific phonetic characteristics could be increased using technology. This will facilitate repetition, segmentation and speed control of the listening instruction. With the help of new technologies like AI boards; Teachers can extract individual sounds and speech passages from audio materials, play back audio, and slow down. New technologies can add interactivity to listening processes and enable learners to combine audio content with more information about a topic via a web page. With the AI board, editors can integrate various kinds of media (images, text, audio, and video, etc.). For example, clicking on a word within a file can play an audio file that shows the spelling of that particular word; Another click will lead to a dictionary entry showing the definition of the word, or a specific sound-pronounced exercise within the word.

Most people who speak a language do not speak properly, therefore; it is prudent to introduce learners to languages with other forms of language. Through real objects and contexts, learners actually articulate language speech features (overlapping turns, fillers, and false starts). AI boards can contain many resources, such as online television broadcasts, YouTube-videos, magazine articles, blogs, and social media, allowing learners to show not only different dialects of the spoken language but also different registers (Thornbury, 2012; Fox, 2010; Martin, 2010).

1 Advantage of AI Boards

According to El Badwy (2017),Sagia (2015) ,Shams(2014) ,Coyle (2013) and Březinova (2009), AI boards are used for many reasons:

1) AI boards enable teachers to add audio clips, video clips, movies, songs, electronic microscopes, interviews, and various websites into their curriculum.

2) The AI Board helps learners gain access to many online games and allows them to play teams or compete and ask individuals to do their best.

3) Recording the entire course on board, save it for further use in the classroom, and then send it to students for review or for those who were not present in school.

4)AI board software contains several tools that lend themselves particularly well to specific subjects. Recently, tools such as timeline makers, spellcheckers and word generators have been enhanced with other subject areas in mind.

## V1 Method, Instruments, and Procedures

### *Design of the study*

The researchers used the analytical description method for reviewing literature and related studies concerning the variables of the study. They also adopted the quasi-experimental design |(two – group pre/post )  to detect the effectiveness of AI based program in developing participants' EFL listening skills.

### *1 The EFL listening skills checklist*

 The purpose of the EFL listening skills checklist

The listening skills checklist was designed to determine the listening skills that are relevant to sixth grade primary school pupils (Appendix B).

Description of the EFL listening skills checklist

The EFL listening skills checklist consists of sixteen sub skills of three major domains: phonology (sound discrimination), vocabulary and

overall comprehension (word and sentence recognition) and grammatical structures forming.

Validity of the EFL listening checklist

In order to check the validity of the checklist, the researchers presented it to a group of jurors for validating and suggesting any recommendations.

## *2 The EFL listening skills test*

Aim of the EFL listening skills test

The listening skills test aims to measure sixth-grade elementary pupils' entry level in the previously mentioned listening skills. The test enabled researchers to determine the effectiveness of the AI-based program in enhancing listening skills. (Appendix C)

Description of the EFL listening skills test

The test consists of two versions:

a) The first is concerned with the teacher. It presents the verbal stimuli for the test, the written items, scripts, pictures and the test directions.

b) The second is directed to pupils. They are required to choose and circle the right answer, reorder the events, complete the missing words, correct errors and produce complete sentences.

The listening test was divided into three parts:

- The first part measures the participants' ability to differentiate between English sounds. It consisted of five questions.

- In the form of two passages with two questions under each, Part two assesses the participants' ability to recognize word and sentence meaning.

- Four questions of different grammatical structures are given in part three to assess participants' skill of using correct grammatical structures.

Piloting the EFL listening skills test

To determine the clarity of the test instructions and questions, the test was applied to 40 6th year primary school pupils not involved in the study to investigate:

1. The clarity of test instructions.
2. The suitability of the test items in terms of the pupils' educational level.
3. The simplicity /difficulty of the test questions to make sure that pupils could understand them easily.
4. Test timing.

The piloting helped in estimating the time needed for answering the questions according to the following equation:

$$\text{Test time} = \frac{\text{The sum of each pupil's time (2000)}}{\text{Pupils' number} \quad (40)}$$

Accordingly, the time of the test was (50) minutes.

Scoring the EFL listening test

The total mark of the listening test is "85" marks divided as follows:

"30" marks for section one (Recognizing Sounds).

"30" marks for section two (Comprehension).

"25" marks for section three (Grammatical Competence).

Validating the EFL listening test

To determine both face validity and content validity, the test was submitted to a jury of EFL specialists in curriculum and methods of teaching (N=8) .They were requested to read the test items and give their opinions as to the following:

1- To what extent the test items are appropriate and sufficient to measure EFL listening skills.
2- To what extent the test items are appropriate for the sixth primary school pupils.

## Internal consistency

Internal consistency was measured using the correlations between different skills and the total sum of the test. Table (2) indicates correlation between the three main skills (sixteen sub-skills) and the total sum of the test score. All correlations were found to be statistically significant. This shows that the test is internally consistent.

**Table (2):**
**Correlation between the sub-skills and the total sum of the test score**

| Overall listening Skill | Phonology (sound discrimination) | Vocabulary and overall comprehension | Grammatical structure & forming |
|---|---|---|---|
| Pearson Correlation | 0.75 | 0.90 | .87 |

## Reliability of the EFL listening test

Test-retest method
To report the EFL listening test reliability, the test was administered to a randomly chosen group of 40 $6^{th}$ grade pupils, other than the sample involved in the current study. Then, it was retested on the same group after two weeks, then the correlation between the pupils' marks of the test and retest was calculated.

Inter- rater reliability
Inter-rater reliability was used to determine the extent to which different raters / observers provided consistent estimates of the same phenomenon.

To avoid the subjectivity factor in grading the EFL listening test, inter rater reliability was calculated. All answers of the listening test was given to another rater (an English teacher who has been trained for correcting the listening test), with its scoring scales, to mark it on his own.

### 3The AI based Program
The AI based program is designed to Enhance some EFL listening skills of $6^{th}$ year primary school pupils at language schools. The program includes the following:
1- Objectives of the program.
2- Structuring of the program.

3- Sources of the program.
4- Content of the program
5- Instructional aids.
6- Activities.
7- Teacher and pupils' roles.
8- Piloting the program.
9- Administration.
10-Feedback and Evaluation.

## Objectives of the program

By the end of the program, pupils would be able to:

1. Use the AI based program to Enhance EFL listening skills.
2. Perform listening activities individually, in pairs and in groups
3. Listen and understand the English language in a semi native-like manner and improve phonology, grammatical and vocabulary skills.
4. Answer different online questions to improve their listening skills.

## Content of the program

The program consists of 16 sessions. The first two sessions were devoted to explaining the purpose of the program and the tools that were used in all modules to the participants of the study. The remained sessions were instructional ones. The program lasted for 8 weeks (two periods a week).

## Instructional Aids

AI board, internet, and computers

## Activities

The program includes the following types of activities that are prepared by the researchers with the help of board browsers.

1- Listen and drag the answer
2- Use the camera to take pictures from the video and complete the table
3- Drag from the magic box and put in suitable table
4- Press the site URL and do the activity online
5- Click on the button and choose
6- Drag the sound to the picture

7- Match the sound with the right word
8- Yes / no question
9-  Word quiz
10- Circle the write answer
11- Listen and use eraser to check the answer
12- Sort in groups
13- Complete the table
14- Sing with me
15- Express your feelings (likes/ dislikes)
16- Move into different directions
17- Fill in the gaps
18- Move the chart
19- Correct the verb
20- Underline the right answer
21- Listen and guess the answer
22- Use the lens to discover the right answer
23- Listen carefully, complete or choose the correct answer
24- Move the pictures to make complete sentences
25- Listen and match the question with the right answer
26- Use the lens and describe what you can see under the picture
27- Listen and rearrange the sentences in chronological order
28- Move the curtain to read
29- Move a copy from the answer to the right space.

**Administration of the program**

The program lasted for 16 sessions in the first semester of 2019-2020 from September to November at an experimental language school.
 **Pre-experimentation**
**a) Administration of the pre-test**
     The researchers administered the EFL listening pre-test. The t-value proved that there were no significant differences between the mean scores of the control and the experimental groups on the pre-test. The two groups were homogenous in their EFL listening skills. The following table (3) describes the means and the standard deviation of the scores of both groups on the EFL listening skills pre-test according to the sub skills and the total score.

**Table (3)**
**Results of t-test of the control and experimental groups on the**
**listening pre- test**

| Skill | groups | N | Mean | SD | T | Level Of Sig. | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|
| Total listening skills | control | 40 | 46.275 | 4.613 | .75 | .45 | |
| | Experimental | 40 | 47.050 | 4.568 | .75 | .45 | |
| Phonology Skill | control | 40 | 14.275 | 2.459 | .45 | .65 | **Not** Significant |
| | Experimental | 40 | 14.525 | 2.459 | .45 | .65 | |
| Vocabulary &Overall comprehension skill | control | 40 | 15.850 | 2.557 | .39 | .69 | |
| | Experimental | 40 | 16.075 | 2.555 | .39 | .69 | |
| Grammatical structure& forming skill | control | 40 | 16.150 | 2.732 | .50 | .61 | |
| | Experimental | 40 | 16.450 | 2.620 | .50 | .61 | |

b) **The orientation sessions**
The researchers familiarized pupils with the AI based program, informed them with the objectives of the experiment, and described how to deal with different activities in the program. The researchers helped the pupils to learn some skills that will be used during the experimentation.
1. Navigating the operating system.
2. Saving and opening files.
3. Managing File.
4. Clicking and dragging.
5. Minimizing and maximizing windows and switch between open programs.
6. Using imported existing graphics (clip art, pictures, etc.) from within Programs and from other sources, especially the Internet.
7. using scanned images.
8. using a search engine on the Internet.
9. organizing Internet pages into Favorite folders

10. Using hyperlinks and hypertext within and between programs and external resources e.g. websites, moving between other pages within                a file or hyperlinks from spelling lists and word banks. Administering Google translate is also a skill to use.

## Experimentation

1. In pre - listening stage: the pupils began to think and make predictions about what they listened to using brainstorming or answering online questions presented on the AI board

2. In while- listening stage: pupils are involved in carrying out activities to discriminate sounds, guess the meanings, identify main ideas and details, and recognize grammatical forms.  After that, pupils followed the instructions in the "notes browser" to do the activity either individually in front of the class or in groups using the AI software on the computers in the technology lab. In each lesson, pupils found some AI board tools that helped them to answer the questions such as pen, highlighter, camera, shapes, arrows, ruler, lens and more tools. At the end, they could follow the instructions to find the right answer and the estimated self-evaluation for their work.

3. In post- listening stage: the pupils used the AI board tools to do the activities in groups, checked their answers and discussed them with the teacher. Most of the activities in this stage depended more on internet navigation through different useful websites where pupils interact with these sites and virtual characters.
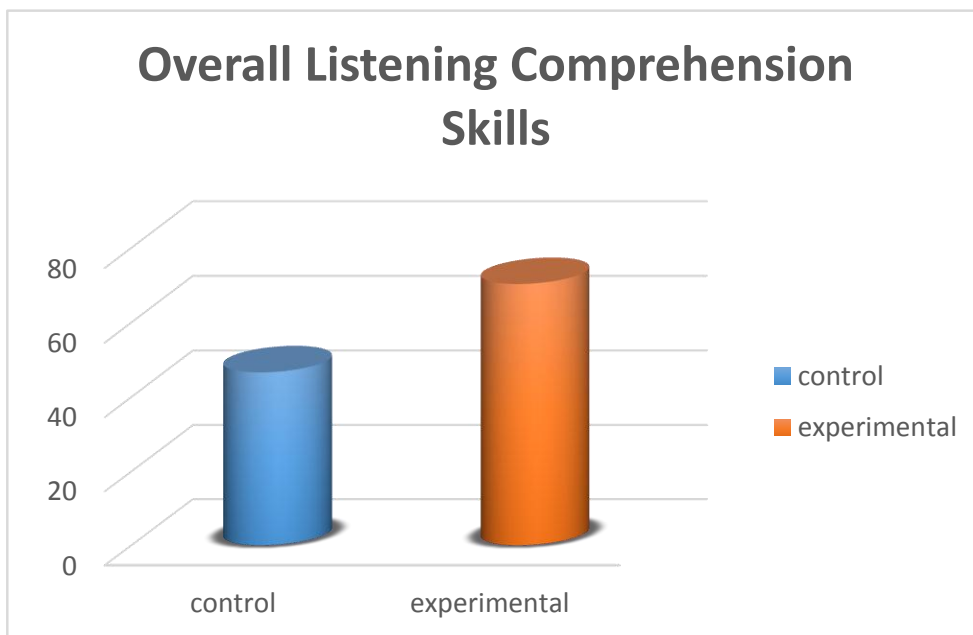
## Post experimentation

At the end of the study, the EFL listening posttest was administered to both groups to verify the type and significance of difference between them.

## V Results

SPSS (Statistical package for the Social Sciences, Version 19, was used to analyze participants' scores on the pre-posttests.

**Figure (1) Bar Chart of the Mean Scores of both groups on the posttest regarding overall listening comprehension skills**

It is clear from the previous graphic representation that there is a statistical difference between the scores of control and experimental group in overall listening comprehension skills graphically. To study the significance of the differences, t-value (Independent samples t- test) was used for as illustrated by the following table:

**Table (4): The Statistical Significance between the Mean Scores of the Two Groups Regarding Overall listening Skill**
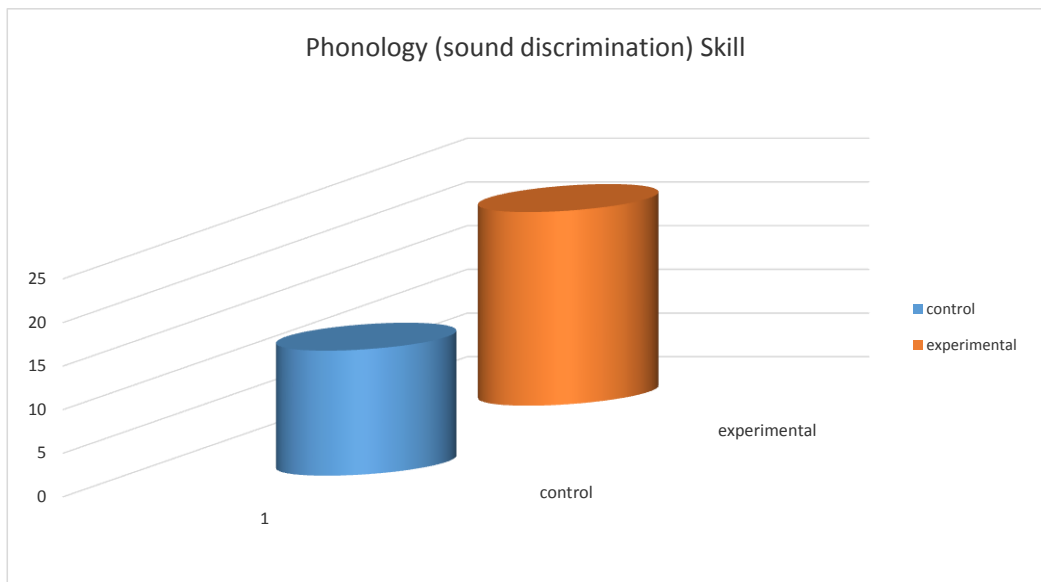
| Skill | Group | N | Mean | Std. Deviation | T-Value | d.f | sig | (η2) | Practical significance |
|---|---|---|---|---|---|---|---|---|---|
| Overall listening Skill | Control | 40 | 46.6250 | 4.64475 | 20.8 | 78 | Significant At (0.01) | .84 | Significant & educationally important |
| | Experimental | 40 | 70.3000 | 5.49219 | | | | | |

It is clear from the above table that the calculated value of "t" (20.8) was greater than the tabulated value of "t" at 78 degrees of freedom and significant level "0.01"; which meant that the difference between the mean scores of the control group and the experimental group had reached to the level of statistical significance. In order to investigate the effect and educational importance of the results and its educational importance and effectiveness; the value of ETA squared ($\eta^2$) had been calculated as its value (ETA square) was 0.84 ETA square value which was significant to the height effect and educational importance and the practical significance had exceeded the results in the psychological researches which were 0.14

*2 Results related to the sub hypotheses of the first main hypothesis:*

**Sub Hypothesis One**

**Figure (2) Bar Chart of the Mean Scores of both groups regarding phonology skills (sound discrimination)**



Phonology (sound discrimination) Skill

It is clear from the previous graphic representation that there is a statistical difference between the scores of control and experimental group regarding phonology skills. To study the significance of difference, t-value (Independent
samples t- test) was used as illustrated by the following table (5):

**Table (5):**
**The Statistical Significance between the Mean Scores of the two groups**
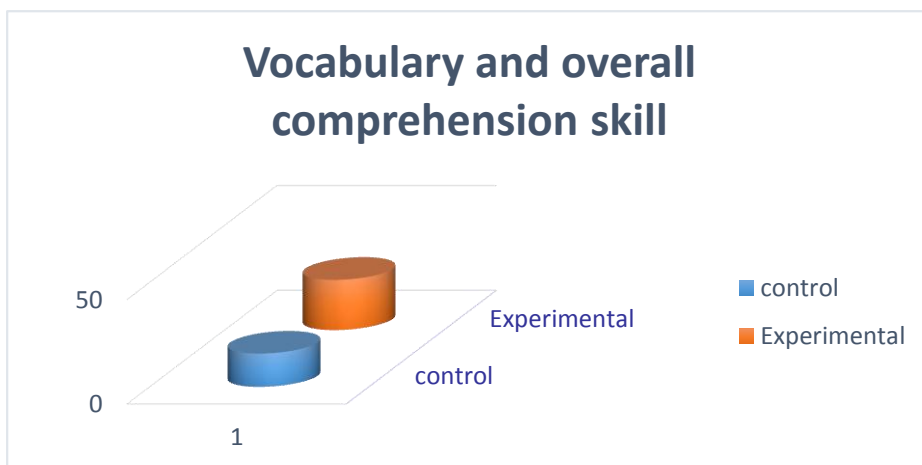**Regarding Phonology Skill**

| Skill | Group | N | Mean | Std. Deviation | T-Value | d.f | Sig | (η2) | Practical significance |
|-------|-------|---|------|----------------|---------|-----|-----|------|------------------------|
| Phonology Skill | Control | 40 | 14.3500 | 2.53714 | 15.83 | 78 | Significant At (0.01) | .76 | Significant & educationally important |
|  | Experimental | 40 | 22.1750 | 1.82416 |  |  |  |  |  |

It is clear from the above table that the calculated value of "t" (15.83) was greater than the tabulated value of "t" at 78 degrees of freedom and significant level "0.01"; which meant that the difference between the mean scores of the control group and the experimental group had reached to the level of statistical significance. In order to investigate the effect and educational importance of the results and its educational importance and effectiveness; the value of ETA squared ($\eta^2$) had been calculated as its value (ETA square) was .79.

**Sub Hypothesis Two**

**Figure (3)**
**Bar Chart of the Mean Scores of both groups regarding vocabulary and overall comprehension skill**

It is clear from the previous graphic representation that there is a statistical difference between the scores of control and experimental group regarding vocabulary and overall comprehension skill. To study the significance of difference, t-value (Independent samples t- test) was used as illustrated by the following table (6):
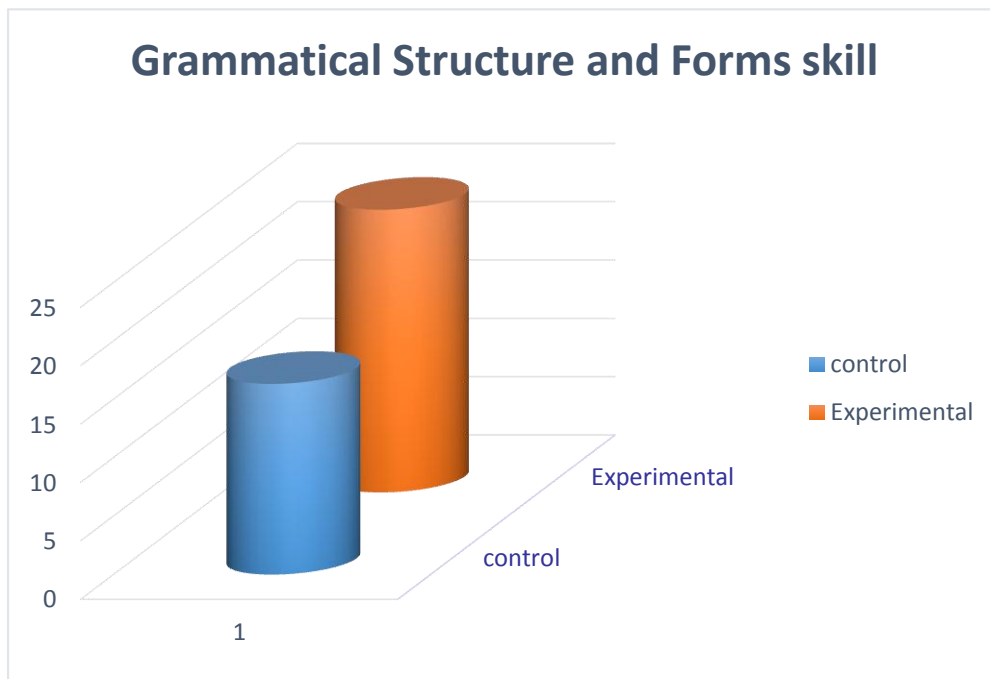
**Table (6):**
**The Statistical Significance between the Mean Scores of the two groups Regarding Vocabulary and Overall Comprehension Skill**

| Skill | Group | N | Mean | Std. Deviation | T-Value | d.f | Sig | (η2) | Practical significance |
|-------|-------|---|------|----------------|---------|-----|-----|------|------------------------|
| Vocabulary And overall Comprehension Skill | Control | 40 | 15.950 | 2.55152 | 13.396 | 78 | Significant At (0.01) | .69 | Significant & educationally important |
| | Experimental | 40 | 24.0250 | 2.83284 | | | | | |

It is clear from the above table that the calculated value of "t" (13.396) was greater than the tabulated value of "t" at 78 degrees of freedom and significant level "0.01"; which meant that the difference between the mean scores of the control group and the experimental group had reached to the level of statistical significance. In order to investigate the effect and educational importance of the results and its educational importance and effectiveness; the value of ETA squared ($\eta^2$) had been calculated as its value (ETA square) was .69.

**Sub Hypothesis Three**

**Figure (4)**
**Bar Chart of the Mean Scores of both groups regarding grammatical structure and forms**



To study the significance of differences, t-value (Independent samples t-test) was used for the difference between the mean scores of the two administrations as illustrated by the following table (7):

**Table (7):**
**The Statistical Significance between the Mean Scores of the two groups Regarding Grammatical structure and forming skill**

| Skill | Group | N | Mean | Std. Deviation | T-Value | d.f | Sig | (η2) | Practical significance |
|-------|-------|---|------|----------------|---------|-----|-----|------|------------------------|
| Grammatical structure and forming | Control | 40 | 16.3250 | 2.5559 | 13.557 | 78 | Significant At (0.01) | .70 | Significant & educationally important |
| | Experimental | 40 | 24.2250 | 2.65530 | | | | | |

It is clear from the above table that the calculated value of "t" (13.557) was greater than the tabulated value of "t" at 78 degrees of freedom and significant level "0.01"; which meant that the difference between the mean scores of the control group and the experimental group had reached to the level of statistical significance. In order to investigate the effect and educational importance of the results and its educational importance and effectiveness; the value of ETA squared ($\eta^2$) had been calculated as its value (ETA square) was .70.

### The results might be due to the following reasons:

1)  The modules, lessons and activities that were designed by the researchers.  Different AI tools and actions were used to give the pupils more time to interact with the activities, read the passages and listen to videos, do the activities and check their answers under guidance and support of the teacher in a meaningful, positive, peaceful and enjoyable atmosphere.

2) The AI-based program used authentic material that raised pupils' motivation, interest, and drew their attention by increasing visualization and providing students with opportunity for active participation. The pictures on the screen and the sounds helped them to understand the lessons.

3) The AI-based program made pupils focus on the comprehension of the communicative content of the message. Moreover, the online dictionaries helped the pupils to check the meanings of difficult words and facilitated their reading comprehension skills. The availability of different multimedia resources and electronic hyperlinks are useful for encouraging active learning.

4)  The AI technology created more ''possibilities" for exploring the video pedagogically. For example, since it is a lot simpler to move the video in reverse and forward, it becomes simpler for the instructor to react to students 'needs in case of understanding challenges. At any point of the illustration, the instructor can delay the video and, use, an incredible assortment of resources to clarify ideas and explicit terminology. This could be possible, for example, by accessing the electronic version of a video transcript and creating a voting exercise, with the use of the voting system.

5) The AI-based program raised the level of pupils' engagement in a classroom, motivate them and promote enthusiasm for learning. Lessons are more memorable because pupils are more engaged and motivated.

6) Through the AI- based program, the researchers could Enhance an optimal English learning environment for EFL learners that not only reinforces the function of classroom learning, such as guidance, face-to-face interaction and low frustration, but also could incorporate listening materials that are real-life connected and hands-on oriented into the classroom instructional design.

7) Immediate feedback the AI-based program provided to students helped them to have responsibility in learning and encourage them to answer then check if their answers are right or wrong. This program facilitated and supported self-learning. In addition, the program had "Reset" advantage that helped the pupils to answer the questions more than once using different styles of learning and discover more about different ways to do the activities through using different tools.

8) The researcher tried as possible to explore various tools of the AI board in listening activities that helped the pupils to Enhance their EFL listening skills. The researchers used various games and activities which depended mainly on authentic materials and websites to enrich pupils' learning in peaceful enjoyable environment.

# Conclusion

The current study investigated the effectiveness of an Artificial Intelligence based program to develop primary stage pupils' EFL Listening skills. Participants were divided into two groups: experimental and control. The researchers designed an EFL listening skills test. The test was administered before and after experimentation. The researchers prepared the Artificial Intelligence based program to develop primary stage pupils' EFL Listening skills. The program was taught to the experimental group whereas the control group received regular instruction. The results revealed a noticed development in the experimental group's listening skills.

# Suggestions for further research

The study offers the following suggestions for further research

1- The impact of using different artificial intelligence programs on developing other language skills.

2- Additional research is needed to use more artificial intelligence tools to do different activities that pupils use in learning EFL.

3- The effect of using artificial intelligence programs on developing pupils' motivation towards learning EFL, and teachers' attitudes towards using AI programs.

## Recommendations

Based on the study's results, the following recommendations are presented:

1. Teachers and students should be provided with specific training programs to use the AI interactive features.

2. There should be technical support strategies for teachers to use the AI boards so that they feel genuinely supported.

3. New technology tools should not be imposed on teachers involuntarily and across the board.

4. Teachers' awareness of students' motivation to apply various strategies should be raised to stimulate their taste for learning.

5. Assessment of the uses, benefits, and challenges of the AI technology in class should be continued.

6. Further action research and case studies on educational integration of the AI board should be conducted.

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