

Using Adaptive Feedback in an ESP Course for Developing University Students' EFL Listening and Reading Comprehension Skills

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Abstract

It has been frequently suggested that effective teachers adapt their teaching to account for the complexity of classroom instruction. However, little research has been conducted in the EFL context on how teachers adapt their instruction and the effect of adaptive teaching on their students' learning. The current study addresses this gap in the research literature. It investigates the effect of adaptive feedback on developing university students' listening and reading comprehension skills. Following a personalized student-centered view of foreign language learning, it was hypothesized that listening and reading comprehension could be enhanced by providing the students with adaptive feedback as they completed listening and reading comprehension exercises. The study sample consisted of 26 first-year university students of education at Minia University who were enrolled in a teacher preparation program for pre-service Chemistry teachers using English as a medium of instruction. The study followed a pretest-posttest one-group design to collect quantitative data through two listening and reading comprehension tests. The study's findings revealed a positive impact of adaptive feedback as the participants' listening and reading comprehension post-test scores improved. The differences were statistically significant favoring the post-administration of the listening comprehension test and the reading one. These findings were discussed concerning the ongoing debate regarding the role of personalized education through adaptive learning and instructional practice to suit the learners' abilities and

dispositions as a primary goal of education to provide a learning environment conducive to more powerful language learning.

Keywords: adaptive feedback, listening comprehension skills, reading comprehension skills, EFL university students, English for Specific Purposes.

استخدام التغذية الراجعة المعدلة في مقرر لغة إنجليزية للأغراض الخاصة لتنمية مهارات الفهم الاستماعي والقرائي لدى طلاب الجامعة إعداد

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مستخلص باللغة العربية:

تشير العديد من الدراسات في المجال التربوي إلى أن المعلمين الفعالين يقومون بتعديل تدريسهم للتعامل مع المواقف التدريسية المعقدة في الحجرات الدراسية. ومع ذلك، قليل من الدراسات في سياق تعليم اللغة الإنجليزية كلغة أجنبية تناولت كيفية تعديل المعلمين لتعليمهم وتأثير التدريس المعدل على تعلم طلابهم. وتتناول الدراسة الحالية هذه الفجوة في الأدبيات البحثية حيث تقوم بدراسة تأثير التغذية الراجعة المعدلة في تنمية مهارات الفهم الاستماعي والقرائي لدى طلاب الجامعة. وتطلق الدراسة من ضرورة الاهتمام بتعليم اللغة الإنجليزية الذي يركز على الطالب حيث تم الافتراض بأنه يمكن تنمية مهارات الفهم الاستماعي والقرائي من خلال التدريب على هذه المهارات باستخدام التغذية الراجعة المعدلة. وتكونت عينة الدراسة من مجموعة مكونة من ٢٦ طالبًا جامعيًا في السنة الأولى بكلية التربية بجامعة المنيا، والذين التحقوا ببرنامج إعداد معلمي الكيمياء باللغة الإنجليزية قبل الخدمة. واتبعت الدراسة

تصميم المجموعة الواحدة للاختبار القبلي والبعدي لجمع البيانات الكمية من خلال اختبارين في مهارات الفهم الاستماعي والقرائي. وكشفت نتائج الدراسة عن تأثير إيجابي للتغذية الراجعة المعدلة حيث تحسنت درجات الطلاب في الاختبار البعدي في مهارات الاستماع والقراءة وكانت الفروق بين درجات الطلاب في الاختبار القبلي والبعدي دالة إحصائياً لصالح التطبيق البعدي لاختبار مهارات الفهم الاستماعي واختبار مهارات الفهم القرائي. وقد نوقشت هذه النتائج على ضوء التوجهات الحديثة للتعلم النشط المتمركز حول الطالب من خلال التدريس المعدل والممارسات الصفية واللاصفية بما يتناسب مع قدرات المتعلمين وميولهم كهدف رئيس للتعليم لتوفير بيئة تعليمية مواتية لتعلم لغة أكثر فعالية.

Introduction

The English language has become particularly essential for university students who join programs that provide courses using the English language as a medium of instruction. In such a case, proficiency in the English language has the potential to help university students master the content of the area they are majoring in. In addition, technological progress has made it easier for students than ever before to gain limitless knowledge through various online hubs. It is through listening and reading that students can have access to such vast knowledge. Therefore, the development of language skills in general, and listening and reading in particular, has become one of the goals of university education for both majors and non-majors of the English language.

In Egypt, There has been an interest in the last few years to provide high-quality education. One way to achieve this is through providing private education parallel to public education at both school and university levels. It was revealed in a report by the World Bank Group (2022) that educational reform strengthens the resilience of the Egyptian educational system and that the achievement of the private sector in Egypt was much better in four consecutive years

(2017-2021) in terms of class size and teacher-student ratio. Besides, the report's results highlight that reforming education, from a holistic perspective, entails expanding access to private provision. Unlike public schools, which have limited autonomy and a highly centralized and rigid budget process that contributes to their deteriorating environment, resources at private schools can be reallocated to their best use and need.

In Egyptian schools, private education is provided in three types of schools, i.e., experimental language schools, private national language schools, and international schools (El-Fiki, 2012). Experimental language schools teach the same national curriculum but through the medium of English for sciences, mathematics, and computers. Private national language schools teach most of the government curriculum in English. International schools are privately established but regulated by international agreements between Egypt and interested countries. They offer additional educational programs and the national curriculum, such as the American High School Diploma and the British IGCSE (International General Certificate in Secondary Education).

At the university level, private programs are provided as parallel programs in public universities to provide quality educational services to students. One of these programs is the Science and Mathematics Teacher Preparation program using English as a medium of instruction at Minia University, where this study was conducted. El-Fiki (2012) points out that graduates with an education degree are sometimes recruited to teach their subject of specialization through the medium of English. Teachers strive to keep themselves marketable by teaching in non-traditional ways, such as using English as a medium of instruction, adopting student-centered approaches, varying instructions and materials, and using technology.

The education and further training of English-medium teachers became a component of various teacher training programs. Several public universities, including the one where the current study was carried out, offer such a program to prepare science teachers to use

the English language as a medium of instruction. The present study was carried out to prepare the participants to teach Science through the English language in preparatory (grades 7-9) and secondary (grades 10-12) schools by providing them with the necessary reading and listening skills that they need to proceed well in their university study and to prepare them as prospective teachers. Besides, the focus on personalized learning and teaching approaches aligns with an emphasis on empowering learners and improving educational quality through active learning pedagogies, or what is also called in the Egyptian context student-centered approaches (Ginsburg, 2010).

The nature of feedback

Providing personalized feedback to EFL learners is essential to facilitate the development of their language skills. Nassaji (2016) underscores that "to deal with learner errors is an issue of central importance in second language teaching and learning, and thus has long been of interest to both second language (L2) teachers and researchers" (p.535). According to Lee (2017), feedback is the information intended to help the learner and is given continuously during the learning process, arguing that "feedback should be given with a view to bridging the gap between the current level of understanding and the desired outcome (also in relation to the learning goals). Such feedback is descriptive and diagnostic, yielding specific information about progress (i.e., what students did well) and how to proceed (i.e., how to improve their learning)" (Lee, 2017, p.5). It is unlike summative assessment, which is a measurement typically given by a score at the end of a study period. Perez-Segura et al. (2020) underscore that it is through formative assessment that information collected about the learners' performance is used to provide feedback. Thus, it is argued that feedback is linked to formative assessment and matches neatly with the '*assessment for learning*' paradigm instead of the problematic summative assessment characteristic of the '*assessment of learning*' paradigm (Hargreaves, 2005). The '*assessment for learning*' paradigm makes assessment oriented toward learning (Careless, 2007; 2015).

The *assessment for learning* paradigm is founded on three principles as essential steps in making assessments at the service of the learning process. The first principle is that assessment tasks should embody the desired learning outcomes, and the students are primed for profound learning experiences by progressing toward these outcomes to make assessment tasks learning tasks. The second principle is that students should actively participate in assessment-based learning through self-evaluation. The third principle is that students need to receive suitable feedback, which they can use to forward into independent and future work. Kerr (2020) highlights that effective feedback has two essential characteristics: it should be goal-oriented and entail the learner to be actively involved. Kerr points out that feedback should be specific and related to learning goals.

It is argued that feedback is more effective when it provides information about achieving specific goals, such as developing a particular skill. Additionally, effective feedback pushes the learner towards greater autonomy by prompting the learners to modify their knowledge. Kerr asserts that providing goal-oriented, student-centered feedback requires changing the teachers' roles as they become less center-stage. The provision of feedback necessitates that the teachers be knowledgeable about their students in terms of their strengths and weaknesses related to language proficiency. According to Kerr (2020), this knowledge improves the students' reactions to teacher feedback. The provision of feedback may alter the stereotypical views about giving feedback.

Adaptative Feedback

Feedback is rooted in the sociocultural theory of learning (Vygotsky, 1986), as the teacher's use of feedback provides learners with opportunities for scaffolding. Hattie and Timperley (2007) describe feedback as one of the most powerful influences on learning. Similarly, Sheen (2011) argues that learners' differences influence their receptivity to error correction and, thus, the effectiveness of the feedback. Given that these differences impact how students respond to feedback, it is essential to shape feedback by adapting it to their needs (Kerr, 2020).

Šarmanová and Kostolányová (2015) point out that “By adaptation of education, we mean the changes in the teaching of the same curriculum that are carried out in a different manner to suit the needs of every student” (p. 34). Natriello (2017) points out that interest in adapting learning opportunities to the needs of learners has appeared in four strands of thought that can be specified as relationships, institutional settings, communities, and mechanical affordances. The relationship strand highlights the possibility of enhancing learning through a teacher’s masterful provision of undivided attention to an individual learner. The institutional strand addresses the limitations on adaptive learning posed by the organization of modern educational systems, which aim to configure classes of students who must meet common goals.

The institutional strand underscores the power of pedagogies such as individualized instruction, which can be adapted to the student's needs, even in classrooms where age grades organize students. The community strand focuses on an individual learner's ability to thrive through the assemblage of vast human resources and connections in the contemporary era of social networks with no boundaries. The mechanical strand aims to assist individual learners through non-human resources represented in successive generations of technologies at a learner's disposal. These four strands highlight the role of the teacher, learner, and technology in adaptive learning.

Šarmanová and Kostolányová (2015) point out that the consistent individualization of education is virtually impossible because of time constraints, even for experienced teachers who cannot afford to adapt instruction to the needs of every student. To overcome this difficulty, adaptive learning and feedback could play a vital role in individualized instruction. Sawaki (2017) defines adaptive feedback as personalized diagnostic information to individual learners. Specifically, in the current study, adaptive feedback is meant to focus on personalized diagnostic information represented in the knowledge of correct and incorrect responses, the rationales of these responses, and adaptive material provided to the participants on their performance of listening and reading exercises.

Perez-Segura et al. (2020) point out that the assessment of learning is fulfilled when the correctness of the answers is appraised. In this case, the role of feedback is to verify knowledge over the correctness of the answers. They refer to this type of feedback as 'verified feedback.' However, assessment for learning is achieved through feedback via elaboration in the form of guidance information provided to lead learners to answer correctly (elaborated feedback). Thus, according to Perez-Segura et al., the starting point of feedback is the information collected through assessment. Subsequently, feedback focuses on how such information is handled and transmitted to specific learners to help them in their subsequent performance.

Kerr (2020) highlights the need to support learners while giving feedback because of its sensitivity and to avoid threatening or causing psychological harm to learners who receive it. Likewise, Hyland & Hyland (2019) underscore that instructors, while giving feedback, need to consider the factors that influence feedback choices and student responses to them, including their preferences, the types of feedback employed, and the needs of individual learners. It is, therefore, necessary to adapt feedback to these needs to make it both meaningful and appealing. Furthermore, adaptive feedback should be selective so learners are not overwhelmed or distracted. This principle aligns with Kerr (2020), who urges avoiding feedback overload. Kerr further asserts that when providing feedback, less is often more.

Furthermore, the current study aligns with the macro-adaptive learning approach (Mavroudi & Hadzilacos, 2016) by specifying the course content and skills that require adaptive feedback based on the learners' proficiency levels as determined by pre-testing. Unlike the micro-adaptive instructional model, which relies on on-task measures and the temporal nature of learners' characteristics, the macro-adaptive model relies on pre-planned adaptive learning by diagnosing the learners' needs and providing them with suitable instructional prescriptions.

Listening and Reading Comprehension

Listening and reading are essential skills for language learners. Contrary to the widespread belief that language knowledge is linked

to the ability to produce it through speaking and writing (Nunan, 2002), it is well established that listening and reading abilities allow L2 learners to obtain comprehensible input (Krashen, 1985). Mushait and Mohsen (2019) point out that second language acquisition theory seeks adequate inputs to acquire a foreign language by providing a "comprehensible input" beyond the students' proficiency level. They further argue that, previously, input was restricted to text material presented in printed or audio forms through a single input, i.e., reading or listening contexts. Currently, input has been broadened to cover textual material and other modes like aural and audio-visual material through which learners can learn from exposure to multimodal inputs that suit their varying needs and interests.

Inadequate language learning and teaching activities are partly responsible for students' lack of language ability, as research in English as a Foreign Language (EFL) suggests. For instance, while answering reading comprehension questions, Sawaki (2017) found that when students spent too much time on the initial text reading, they had a fragmented understanding of the global text structure. Therefore, they found it difficult to quickly locate specific information or identify main ideas and essential details. Reading behaviors such as reading a word-by-word translation are common in EFL classes, including the Egyptian context of the current study (Gahin, 2001; Abdelhafez, 2011). Such behaviors do not encourage students to develop the necessary skills to perform well in language proficiency-related tasks.

Research suggests that EFL learners need an extended period to develop language proficiency. Kozulin and Grab (2001) argue that reading comprehension ability is a cognitive function that is difficult to improve in a short time. This is because successful readers carry out a variety of inferential processes, including monitoring their reading, planning strategies, adjusting efforts appropriately, and evaluating the success of their ongoing efforts to understand. The same applies to the listening comprehension ability, given that listening is a strategic process that involves many different types of listening, which are classified according to, among other variables, the purpose for listening, the listener's role, and the type of the

listening text (Nunan, 2002). According to Nunan, these variables are mixed in different configurations, each requiring a particular listener strategy. It is, therefore, necessary to develop these abilities to focus on the areas that need improvement in the given training time. One approach to achieve this goal is through the provision of feedback.

Previous research studies highlighted the positive impact of adaptive feedback on developing EFL learners' language abilities. The results of the study by Horký (2014), as cited in Šarmanová and Kostolányová (2015), confirmed that the students who are taught a foreign language in the adaptive system are statistically more successful in mastering it than the students who are taught a foreign language in a non-adaptive system. Similarly, Sawaki (2017), who investigated the effects of different levels of performance feedback on improving reading test performance, found that receiving video-based instruction provided with the correctness of learner responses and rationales for correct/incorrect answers enhanced learners' understanding of the TOEFL item types. It was suggested that the enhancement was due to the provision of on-demand videos followed by an explanation of effective ways to answer test items grouped according to the sub-skills to which they relate. Perez-Segura et al. (2020) recommend, based on their study of the effect of personalized feedback on the listening and reading skills of sixth-grade EFL students, that adaptive feedback activities should focus on the subskills in which the learners need to be thoroughly informed about the kind of errors related to each subskill to ensure that they understand them.

Based on previous literature, adaptive feedback needs to be more thoroughly researched to investigate how feedback works in the classroom and learning process. It was asserted that researchers needed to understand the nature of the various forms of feedback fit for purpose, given that different types of feedback were inherently different (Lyser & Ranta, 2013). The previous studies and theoretical framework underscored the need to carry out the present study on the effect of adaptive feedback on EFL learners' language performance to gain deep insight into its role in improving university

students' language skills, especially listening and reading. To the researcher's best knowledge, no study of such kind was conducted in the context of the current study.

Context of the Problem

Despite the critical role of feedback in developing language learning, it was asserted that researchers knew little about the kinds of feedback on learners' errors that might effectively improve students' scores in language proficiency examinations, as highlighted in the previous theoretical framework. Helpful diagnostic information was absent in language preparation materials reported in previous studies. Researchers knew little about whether such diagnostic information affected learners' performance. Besides, little was known about the types of feedback that make language preparation more effective in improving students' proficiency at teacher preparation programs that use English as the medium of instruction in the Egyptian context. Adaptive feedback in the present study sought to address this gap.

The focus on adaptive feedback in the present study aligned with current approaches in English language education in the Egyptian context that prioritize student-centered learning, self-directed learning, and responsive pedagogy. Besides, the use of adaptive, personalized learning systems aligned with differentiated instruction based on student variables, curriculum sequences adapted for different students, and learning environments conducive to students' participation and involvement. Given that experiments focusing on providing feedback were one of the most proven ways of teacher development, they highlight the need for training teachers on providing feedback to focus less on the awarding of grades and more on the provision of adaptive comments. Adaptive teaching was considered a cornerstone of effective EFL instructional practices. Given that recent educational reform efforts implementing adaptive teaching during language instruction have been rare in the context of the present study, the study's findings would contribute to the literature on adaptive teaching and learning of EFL in general the Egyptian context in particular.

Statement of the Problem

Based on the researcher's observation of giving the course in previous years and based on the findings of the listening and reading comprehension diagnostic pre-test administered to the study group before the start of the course, the problem of the current study could be stated that first-year students enrolled in the Chemistry teacher preparation program (using English as the medium of instruction) at the Faculty of Education, Minia University lacked the necessary listening and reading comprehension skills which were found by previous studies to be essential for the participants to equip them as EFL lifelong learners and prospective teachers of content using English as a medium.

Purpose of the Study

The present study's purpose was to investigate how adaptive feedback can be used to promote university students' English language skills. Specifically, the study sought to measure the effectiveness of adaptive feedback on developing listening and reading comprehension skills of first-year pre-service teachers of Chemistry using English as the medium of instruction.

Questions of the Study

The study sought to answer the following two questions:

- 1- What was the effectiveness of using adaptive feedback in developing university students' listening comprehension skills?
- 2- What was the effectiveness of using adaptive feedback in developing university students' reading comprehension skills?

Hypotheses

The literature shows that feedback has the potential to assist students in English learning language skills, including listening and reading; however, more research is needed to investigate the role of adaptive feedback in improving university students' listening and reading skills. Based on the previous literature and theoretical framework, it is postulated that the use of adaptive feedback will improve the

participants' scores in the listening and reading comprehension post-tests compared to their scores in the pre-tests. Therefore, the following two hypotheses are formulated:

Hypothesis 1: There will be a statistically significant difference in the mean scores obtained by the participants in the listening comprehension pre-test and post-test in favor of the post-test.

Hypothesis 2: There will be a statistically significant difference in the mean scores obtained by the participants in the reading comprehension pre-test and post-test in favor of the post-test.

Significance of the Study

The present study attempted to contribute to the ongoing debate regarding the role of personalized education through adaptive learning and instructional practice to suit the learners' abilities and dispositions as a primary goal of education to provide a learning environment conducive to more powerful language learning. It is significant to various groups, including EFL university students, teacher educators, and material course developers.

- Firstly, the student is significant to EFL university students majoring in education who are being prepared to use the English language as the medium of instruction. Adaptive feedback is part and parcel of the work of teachers. Relating it to the development of language skills benefits the students to develop these skills and enrich their pedagogical repertoire.
- Secondly, the study is significant to EFL teacher educators as adaptive feedback constitutes an essential component of an instructional strategy based on using different activities and tasks that account for the students' different needs and learning style preferences.
- Thirdly, the study is significant to course material developers. Several adaptive materials could be developed to attend to different types of learners with different ability levels and learning needs.

To the researcher's knowledge, the present study is the first to explore using adaptive feedback in an ESP course to develop university

students' EFL listening and reading comprehension of in the Egyptian context. It could lead to more studies investigating the effectiveness of adapting various elements of the teaching and learning process.

Delimitations

The current study was conducted while the researcher was giving an English language course to first-year university students of education. The duration of the course was 40 hours (20 hours for face-to-face meetings and 20 hours for the provision of online feedback). The course was given in the second term of the academic year 2021/2022. The face-to-face training lasted for ten weeks, 4 hours every other week, and two sessions for administering the pre-tests and post-tests. Due to COVID-19 precautionary measures at that time, face-to-face lectures were scheduled every other week. However, other communication channels were made use of. Online contact continued through the university's LMS and a WhatsApp group. The twenty face-to-face training hours were devoted to listening and reading exercises, pair work, whole class discussion, teacher modeling, and adaptive oral feedback. The online training time (two hours a week) was used to share instructional material and interact with participants, answering their questions and responding to personalized comments and remarks.

Definitions of Terms

Adaptive feedback

Šarmanová and Kostolányová (2015) defined adaptation as ‘the changes in the teaching of the same curriculum that are carried out in a different manner to suit the needs of every student’ (p. 34). Feedback is the information intended to help the learner and is given continuously during the learning process (Lee, 2017). Sawaki (2017) defines adaptive feedback as personalized diagnostic information to individual learners. Specifically, in the current study, adaptive feedback is meant to focus on personalized diagnostic information represented in the knowledge of correct and incorrect responses, the rationales of these responses, and adaptive material provided to first-

year EFL university students on their performance while carrying out listening and reading comprehension activities.

Listening Comprehension

Kim and Pilcher (2016) defined listening comprehension as ‘one’s ability to comprehend spoken language at the discourse level – including conversations, stories (i.e., narratives), and informational oral texts – that involves the processes of extracting and constructing meaning’ (p.3). In the present study, listening comprehension is operationally defined as an EFL first-year university student's ability to understand spoken conversations and talks to extract and construct literal and inferential meanings to be able to answer comprehension questions.

Reading comprehension

Reading comprehension is “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (Snow, 2002, p. 11). It involves a host of abilities (e.g., attention, memory, inference), motivation (e.g., reading goals and reader’s interest), and knowledge (e.g., domain knowledge and linguistic knowledge), all of which are influenced by the specific texts used and the activity the reader. In the present study, reading comprehension is operationally defined as an EFL first-year university student's ability to understand written texts to extract and construct literal and inferential meanings to be able to answer comprehension questions.

Methodology

A one-group pretest-posttest design was adopted in the current study to compare the participants' performance in the listening and reading comprehension sub-skills before and after the course. The use of one group pretest-posttest design is acknowledged to be a limitation of the current study. This is because the intact group who participated in the study represented all the first-year students majoring in Chemistry in English.

The Participants

The study sample consisted of an intact group of twenty-six students at the Faculty of Education, Minia University, where English is considered a foreign language. The participants took part in the course as required by their teacher preparation program to become teachers of Chemistry in English. The proficiency level of the participants in listening and reading comprehension was B2 as measured by the pre-test and according to the Common European Framework of Reference (CEFR). The attrition rate (the difference between the number of participants who started the course and those who completed it) was 92.3 % for the listening test and 100% for the reading test. The drop in the attrition rate in the listening section was because of the absence of two of the participants in the pre-test and the difficulty of repeating the listening test for these two participants. The choice of the sample aligns with Kerr's (2020) emphasis that feedback should prioritize learners at less advanced stages of cognitive, social, and emotional growth. This is because such a group needs scaffolding to improve their learning.

Instruments

Two tests measured the participants' listening and reading comprehension skills. The two tests were the listening and reading sections of the TOEFL test by Phillips (2004) as standardized measures of the participants' language proficiency in spoken and written English as a foreign language, two equal forms of each test (the diagnostic pre-test and the post-test). The two forms were used to avoid the pre-testing effect by listening to or reading the test content twice. The diagnostic pre-tests measured the participants' level of performance and provided the necessary information to determine specific areas of weakness before the beginning of the course. Their TOEFL scores were 450 (raw score = 20) in listening comprehension and 480 (raw score = 30) in reading comprehension. The post-tests measured the participants' progress after working through the skills at the end of the course. Based on analysis of the participants' raw scores in the pre-tests and post-tests, the two tests were found to have a high level of internal consistency reliability,

with Cronbach's Alpha values reaching (.88) for the listening test and (.79) for the reading test.

The listening comprehension test consisted of 50 questions that measured the participants' abilities to understand spoken English by listening to various types of passages on a recording and responding to multiple-choice questions about the passages. The test duration was 35 minutes. The total score for the test is 50 marks, one for each correctly answered question. The test was in three parts. The first part consisted of 30 short conversations, each followed by a question. The questions, in this part, measured six skills: (1) restatements of ideas, (2) understanding negative expressions, (3) understanding expressions of a suggestion, (4) understanding who or what is doing the action in a passive sentence, (5) determining who the speaker was or where the conversation probably took place and (6) understanding expressions of agreement. The second part of the test consisted of two long conversations, each followed by four questions. The third part consisted of three talks, each followed by four questions. As for the second and third parts of the listening test, it was helpful for the examinees to anticipate what the questions would be and listen specifically for their answers, to think about the main idea for each conversation or talk, and to think about the answers to the questions in the order they are listed in the test book.

The reading comprehension test measured the participants' abilities to understand written English by answering 50 multiple-choice questions about the ideas and vocabulary in the reading passages. The test lasted for 55 minutes. The total score for the test was 50 marks, one for each correct answer. The test consisted of five passages, each followed by several comprehension and vocabulary questions. The questions measured six skills: (1) to find the main idea of a passage rather than the passage as a whole, (2) to find a piece of information in the passage rather than the passage as a whole (stated detail questions), (3) to find an answer that is not stated or true in the passage (unstated detail questions), (4) to conclude from information that is given in the passage (implied detail questions), (5) to determine the meaning of a complex word or

expression (vocabulary questions), and (6) to determine where in the passage a piece of information is found (where questions).

The ESP Course

With a learner-centered approach promoted using adaptive learning in the present study, the primary purpose of the ESP (English for Specific Purposes) course was to attend to the specific needs of the target participants and to satisfy language needs relevant to their teacher preparation program as prospective teachers of subject matter (Chemistry or other Science-related subjects) through the English language as a medium of instruction. Accordingly, the purpose of learning is directly related to what the learner needs to do in their job (Harding, 2007). Thus, the present study was conducted through an ESP course focused on developing the participants' language skills through language-related activities and selected learning materials focused on science-related topics. Through these activities and learning materials, the content and aims of the course were attuned to the needs of a particular group of learners (Richards & Schmidt, 2010).

As highlighted by Ramírez (2015), ESP classes in a foreign language context are different from General English classes in that they are more directed toward the learners' immediate professional and academic needs. Similarly, Belcher (2009) pointed out that, in an ESP course, materials and methods are adapted to the learners' needs to provide them with highly responsive instruction. Despite the emphasis on situation-specific language use in an ESP course, it needs to be adaptive to some groups of learners with a low overall level of English (Laborda & Litzler, 2015), which is true of participants in the EFL setting in the present study. The participants were recent graduates from general secondary school with relatively low levels of English, as revealed by their language proficiency test scores in listening and reading comprehension skills. Therefore, some course instruction was devoted to language-focused activities as a pre-requisite for providing listening and reading tasks dealing with subject-related content materials.

Learning Material

A variety of online and face-to-face learning resources and teaching aids were available to the participants to make use of and carry out in-class and out-of-class activities. The textbook selected activities and practice materials focused on science-based topics to attend to the participants' language needs and content interests as prospective teachers of Chemistry and Science subjects. The participants had access to the LMS university platform to study and download the course materials. The Longman Introductory Course for the TOEFL Test: The Paper Test by Deborah Philips (2004) was the textbook for students. This book was chosen because it is suitable to the students' levels and provides intermediate students (scores of 380-480 on the paper TOEFL test) with the skills and strategies they need to increase their scores on test sections in paper format. In the pre-assessment test, the participants' mean scores in the listening and reading sections were 450 and 480 consecutively, which indicates the suitability of the sourcebook to their levels and the purpose of the research.

In-class feedback was given to the participants through error correction, teacher explanations, and modeling. Besides, on-demand recorded mini-lectures and links to selected YouTube materials were shared with the participants via a WhatsApp group created for course purposes. This is in addition to supplementary material given to individual participants according to their learning needs. Besides, the participants could submit session assignments online through the university LMS. Additionally, a WhatsApp group was created to communicate with the participants semi-formally. It proved very effective due to the ubiquitous nature of mobile applications in learning. Depending on various online channels aligns with Kerr (2020), who recommends the use of numerous tools to facilitate the provision of feedback. In addition to online and mobile learning resources, the classroom was well-equipped with the necessary tools for the training course. The room had a projector for giving PowerPoint presentations. There was also a smart board with a quality output sound system for playing the audio material. It was also used for presenting visual material. The various learning

resources in the lecture hall provided the participants with a multimodal learning environment conducive to using various adaptive feedback.

Different types of feedback were instantly and constantly provided through the WhatsApp group. They included the correct answers to exercises, samples of the participants' model answers, audio material for the listening section, video lectures, and instructions for attendance. Based on the pre-test results, important information was collected about the participants' performance as a whole and that of individual students. Each student's responses were analyzed separately to identify their level of performance in the listening and reading tests and the sub-skills related to each test. Immediately after the pre-test, each student was informed about their test results and the sub-skills for each test. This was necessary for the current study so that the participants were aware of their areas of strength and weakness from the beginning of the course. Accordingly, their attention was drawn to the sub-skills that needed improvement. Additionally, the researcher provided adaptive feedback to the whole class on the sub-skills with an average low mean score and to individual participants according to the tests and sub-skills.

Various forms of adaptive feedback were given to the participants throughout the course. These forms included:(1) in-class feedback to model the sub-skills relevant to the focus of the research and provide the participants with immediate error correction and feedback, (2) mobile feedback through a WhatsApp group to provide the participants with a written permanent record of model answers to exercises and assignments and to share useful information with the participants, (3) direct feedback to particular learners to draw their attention to specific problems, (4) indirect feedback in the form of skill explanations and tips and strategies for answering comprehension questions to give all participants information about the common problem areas related to the sub-skills with weak performance, (5) oral feedback carried out in class while correcting errors and handling students' responses, (6) written feedback carried out both in class and through WhatsApp in response to the students'

assignments as a way to provide individualized instruction and draw the students' attention to individual problems, (7) individual feedback to particular students in response to their questions and answers and to adapt feedback to their needs, (8) peer feedback in class while students were carrying out cooperative learning assignments, (9) whole-class feedback to focus on the sub-skills that needed extra attention from most of the participants and to give them general tips and strategies for how to answer questions correctly and quickly within the time limit, (10) audio feedback given through voice memos posted on WhatsApp to all class or to individual students to easily and quickly respond to their questions and remarks, (11) visual feedback in the form infographics and images to facilitate instruction post on WhatsApp and to attend to the participants' various learning needs and learning style preferences, and (12) audio-visual feedback through recorded mini-lectures and YouTube videos that were shared with the participants on WhatsApp to consolidate learning and provide them with accessible learning material.

Training procedures

Analogous to the procedures of Kozulin and Grab (2001) of the mediation process following the pre-testing stage, the training materials were developed based on a detailed analysis of the participants' responses to the pre-test items. Consequently, the participants' listening and reading skills that needed to be improved were identified. The participants completed 26 listening and reading exercises. They reviewed the answers using the type of feedback provided through whole class discussions and completed assignments online through the WhatsApp group. The online feedback included model answers to the assigned work, the exercises completed in class, and video lectures explaining the listening and reading sub-skills the participants needed to develop.

The structure and content informed the choice of training materials for the TOEFL listening and reading test sections. It is argued that for students to develop the required skills tested in the TOEFL, it is necessary to include exercises that help them foster skills like what

they encounter on the test (Sawaki, 2017). Leighton and Gierl (2007) point out that students need to know how to study the materials effectively, the skills measured by different items, and the strategies for responding to individual items. Consequently, the students develop a cognitive task performance model, enabling them to answer correctly and effectively.

The feedback was given to the participants immediately after the pre-test. Each participant was given a report of the test scores highlighting the skills that needed improvement. Besides, the overall statistical analysis of the items of the pre-tests of listening and reading skills revealed specific skills that all the group participants lacked. This was revealed by the low scores obtained by the students in the sub-skills of the listening and reading tests.

This pre-assessment served the learning process and the provision of adaptive feedback that followed. This step was necessary given that feedback or formative assessment goes hand in hand with the *assessment for learning* paradigm, which informs the current study. Freeman et al. (2017) argue that learning analytics has been a critical development in the progress of measuring learning since it has "the potential to transform learning by converting data about learners into understandable, meaningful, and actionable information" (p.45). Similarly, Nyland (2018) highlights that the most effective learning systems support the educational process by collecting as much student performance data as possible, parsing through the data using advanced analysis techniques, and then presenting patterns and trends back to the instructor or teacher using visual techniques. Such analytical techniques are crucial in providing learners with personalized feedback (Perez-Segura et al., 2020).

Through learning analytics, the participants were supported using 'individualized feedback sheets' (Kerr, 2020). At the course's first session, each participant was given a report on their scores in the listening and reading tests. Besides, based on item response analysis, the listening and reading sub-skills were ranked in terms of the overall mean obtained by the participants. The sub-skills with low performance were identified. Bar graphs of the sub-skills with

correct answer percentages were generated and presented to the participants in the class. They were also asked to comment on the bar graphs to be familiar with the sub-skills that required individualized adaptive feedback.

During the training course, various forms of adaptive feedback were given to the participants. According to Ellis (2009), teachers need to systematically experiment with different feedback options in their teaching to constantly evaluate their effectiveness and relevance in meeting the needs and preferences of individual learners. One type of feedback given to the participants was in-class elaborated feedback to stimulate discussion about corrections, as Murphy (2007) suggested. Van der Kleij et al. (2015) highlight that feedback with explanations of errors (elaborated feedback) is more effective than just providing the learners with correct or incorrect answers (verified feedback). This agrees with Perez-Segura et al. (2020) regarding the superiority of elaborated feedback.

A mixture of oral and written feedback responses was provided to the participants during the sessions and through online interaction. It is argued that written feedback provides learners with a permanent record, whereas oral feedback allows for more dialogue and negotiation (Kerr, 2020; Nassaji, 2017). A blend of indirect and direct feedback responses was provided using prompts and oral and written explanations. The researcher began providing feedback with less direct comments to encourage the learners to self-correct.

The participants were encouraged to use indirect feedback while carrying out the multiple-choice listening and reading comprehension exercises. They were offered hints until they answered each item correctly. Providing prompts activates the learners' prior knowledge and catalyzes them to reach the correct answer by themselves. This, in turn, helps in learning retention. The use of prompting is more effective than the provision of direct feedback. According to Kerr (2020), indirect feedback is more likely to lead to learning as "it requires learners to do more of the work themselves: they are required to take a more active role in their learning, and this should help memorization and automatization" (p.9).

The researcher started with oral comments during the course sessions. These comments prompted the participants to answer by casting a net around the expected answers. Plenty of discussion, self, and peer correction followed. Kerr (2020) explains that class discussion is essential for learners to benefit from indirect feedback, given that they become more actively involved as they participate in such discussions. In addition to indirect comments through oral casting, discussion, and negotiation of form and meaning related to the target sub-skills, more direct comments were given through writing. The written explanations were provided to the participants through comments on returned assignments.

Further explanations of common problems were given through recorded screencasts available for the participants through the university LMS. Additional adaptive feedback in the form of selected YouTube videos was shared with the participants through the WhatsApp group. The videos focused on the listening and reading sub-skills that needed feedback. Kerr (2020) highlights that teachers may choose to give feedback to the whole class when there are common problems or when they want to give illustrative feedback.

Modeling was one of the strategies used while conducting the training to provide the participants with the necessary adaptive feedback. Modeling aimed to promote the participants' awareness of the nature and purpose of each listening and reading skill and the steps involved in answering different types of questions. Thus, the researcher, who was also the course instructor, demonstrated the steps of arriving at the correct answers to selected items representing the skills with the most needed feedback.

In addition to teacher modeling, the participants were asked to work in pairs while completing the exercises before providing whole-class discussion and individualized feedback. Kerr (2020) argues that peer feedback represents a valuable stepping-stone toward learning independently. The use of peer feedback is recommended in the literature due to its benefits for increasing student-student interaction as learners engage in discussions, clarify concerns, or seek further explanations or confirmation, unlike the classroom context, where

teacher feedback is not questioned or discussed (Storch & Aldossary, 2019). Given that learners are commonly more receptive to teacher feedback than to peer feedback (Maas, 2017), the participants were given the chance to work with peers of their choice. The use of pair work was repeated in each session. It is argued that peer feedback becomes most effective when treated as a regular rather than a peripheral activity. Thus, it should be integrated into teaching and learning in the classroom (Lee, 2017).

After doing the exercise in the first round of pair work activity, the researcher gave the participants an overall score for the exercise without correcting their errors as a way of indirect teacher feedback. Kerr (2020) highlights that teacher feedback should follow pair work after the learners incorporate the ideas from peer feedback. After being given the scores, the participants engaged in a second round of pair work discussed their errors, and self-corrected. This is followed by a whole class discussion to provide model answers, remove ambiguities, share insights, and draw the participants' attention to common errors. The whole-class discussion was carried out in each session to provide the participants with feedback in the form of correct answers to individual items and any sources of difficulty the participants faced in answering the items correctly. The skills were also explained to the participants in the class, and the course sourcebook was uploaded to the university LMS platform. The class discussion represented the form of delayed feedback. Delayed feedback and the immediate one were used to deal with the participants' common errors. This coincides with Quinn's (2014) argument related to preparatory attention that learning is enhanced when students give complete attention to their errors after performing a difficult task. Quinn further points out that delayed feedback facilitates L2 development because its corrective intent "is necessarily more explicit, leaving little room for learners to misinterpret or fail to notice it" (Quinn, 2014, p.22).

Data analysis

A quantitative data analysis using SPSS Version 21.0.0 was employed for all analyses conducted for the study. Various types of

preliminary analyses were conducted for the pre-test and post-test scores. Item response analysis of the listening and reading comprehension pre-tests was carried out to rank the skills in terms of difficulty level. This analysis was necessary for the current study to adapt feedback provision considering the participants' performance in the sub-skills of both the listening and reading comprehension tests. The analysis revealed the difficulty levels for the reading comprehension sub-skills of stated detail (.78), where questions (.73), main idea (.68), unstated detail (.57), vocabulary questions (.53), and implied detail (.52). It also revealed difficulty levels for the listening comprehension sub-skills of who/where questions (.68), agreement (.47), long conversations (.46), long talks (.41), negatives (.34), restatements (.34), passive (.33), and suggestions (.33). Besides, the t-test analyses were conducted to address the research hypotheses.

Results

Hypothesis 1

Data analysis of the results in this study using *t-test*, as shown in Table (1), reveals that there is support for *Hypothesis 1* as the results from the pre-test ($M = 20.08$, $SD = 8.26$) and post-test ($M = 25.75$, $SD = 8.07$) indicate that the use of adaptive feedback resulted in an improvement in listening comprehension, $t(23) = 5.466$, $p = .000$. Therefore, *Hypothesis 1* is accepted as the results indicate a statistically significant difference in the mean scores obtained by the participants in the listening comprehension test in favor of the post-test with a medium effect size as calculated by Eta squared ($d = 0.69$).

Table (1): *t-test* results of the listening comprehension test

Listening Test	N	Mean	SD	t-value	DF	Sig. (2-tailed)
Pre-test	24	20.08	8.26	5.466	23	.000**
Post-test	24	25.75	8.07			

* Significant at (0.05) ** Significant at (0.01)

This finding resonates with Perez-Segura et al. (2020) and Sawaki (2017) that providing personalized feedback plays a vital role in developing the EFL learner's listening ability. It also echoes the findings by Horký (2014), as cited in Šarmanová and Kostolányová (2015), that the students who are taught a foreign language in the adaptive system are statistically more successful in mastering it than the students who are taught a foreign language in a non-adaptive system.

Data analysis of the listening comprehension skills also revealed that four sub-skills (restatements, suggestions, who and where questions, and questions related to long talks) mainly contributed to the overall statistically significant difference in favor of the post-test. These skills, as shown in Table (2), were found to be statistically significant as reported below:

- (1) The results from the pre-test ($M = 3.75$, $SD = 2.09$) and post-test ($M = 6.20$, $SD = 2.24$) indicate an improvement in restatements, $t(23) = 5.77$, $p = .000$.
- (2) The results from the pre-test ($M = 1.33$, $SD = 1.30$) and post-test ($M = 2.33$, $SD = 1.34$) indicate an improvement in suggestions, $t(23) = 3.03$, $p = .006$.
- (3) The results from the pre-test ($M = 2.75$, $SD = .89$) and post-test ($M = 3.33$, $SD = .81$) indicate an improvement in who & where questions, $t(23) = 2.69$, $p = .013$.
- (4) The results from the pre-test ($M = 4.95$, $SD = 2.82$) and post-test ($M = 5.91$, $SD = 2.70$) indicate an improvement in long talks, $t(23) = 2.08$, $p = .049$.

Table (2): *t*-test results of listening skills with significant differences

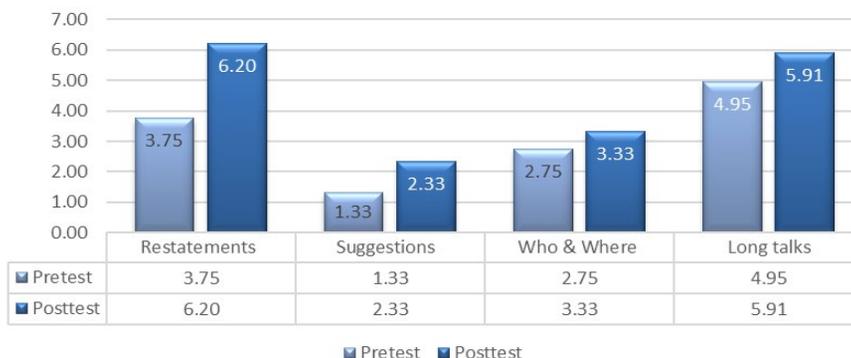
Listening Sub-skills		N	Mean	SD	t-value	DF	Sig. (2-tailed)
Restatements	Pre-test	24	3.75	2.09	5.77	23	.000**
	Post-test	24	6.20	2.24			
Suggestions	Pre-test	24	1.33	1.30	3.03	23	.006**
	Post-test	24	2.33	1.34			
Who &	Pre-test	24	2.75	.89	2.69	23	.013*

where questions	Post-test	24	3.33	.81			
Long talks	Pre-test	24	4.95	2.82	2.08	23	.049*
	Post-test	24	5.91	2.70			

* Significant at (0.05) ** Significant at (0.01)

Chart (1) shows the four listening skills *with* significant differences (restatements, suggestions, who & where questions, and long talks) and compares the participants' performance in each skill in the pre-test and post-test. All four skills significantly improved in the post-test and consequently improved the participants' listening ability in English as a foreign language.

Chart (1): Listening skills with significant differences.



The other four listening skills (negatives, passive, agreement, and long conversations) were not statistically significant. Table (3) shows the *t-test* results of these listening skills. No statistically significant differences were found related to these four skills, as reported below:

- (1) The results from the pre-test ($M = 2.08$, $SD = 1.55$) and post-test ($M = 2.79$, $SD = 1.84$) indicate no improvement in negatives, $t(23) = 1.92$, $p = .067$.
- (2) The results from the pre-test ($M = .66$, $SD = .63$) and post-test ($M = .66$, $SD = .81$) indicate no improvement in passive, $t(23) = 0.00$, $p = 1.00$.
- (3) The results from the pre-test ($M = 1.41$, $SD = 1.1$) and post-test ($M = 1.54$, $SD = 1.06$) indicate no improvement in agreement, $t(23) = .413$, $p = .684$.

(4) The results from the pre-test ($M = 3.70$, $SD = 1.80$) and post-test ($M = 3.70$, $SD = 1.60$) indicate no improvement in long conversations, $t(23) = .000$, $p = 1.00$.

Table (3): *t*-test results of listening skills with no significant differences

Listening Sub-skills		N	Mean	SD	t-value	DF	Sig. (2-tailed)
Negatives	Pre-test	24	2.08	1.55	1.92	23	.067
	Post-test	24	2.79	1.84			
Passive	Pre-test	24	.66	.63	.000	23	1.00
	Post-test	24	.66	.81			
Agreement	Pre-test	24	1.41	1.1.	.413	23	.684
	Post-test	24	1.54	1.06			
Long conversation	Pre-test	24	3.70	1.80	.000	23	1.00
	Post-test	24	3.70	1.60			

* Significant at (0.05) ** Significant at (0.01)

Chart (2) shows the listening skills *with no significant differences* (negatives, passive, agreement, and long conversations) and compares the participants' performance in each skill in the pre-test and post-test. The participants' performance in two skills (passive and long conversations) remained the same. The slight improvement was not statistically significant for the other two skills (negatives and agreement).

Chart (2): Listening skills with non-significant differences.



Although some listening sub-skills were significant, other sub-skills (negatives, passive, agreement, and long conversations) were not statistically significant. This may be because listening is challenging for many EFL learners and requires an extended period to develop all the listening sub-skills. This finding aligns with Sari and Fithriyana's (2019) finding that the students face difficulty in getting the information in a long-spoken text as they lose concentration. They mention other factors, including difficulty understanding native speakers with various accents, fast pace, not pausing long enough, and lack of repetition. Furthermore, EFL students rate themselves as less good at listening than reading. Besides, understanding negative and passive expressions relates to the learners' ability to make inferences while listening in the target language. This skill was the most challenging for EFL university students (Sari & Fithriyana, 2019).

Hypothesis 2

Quantitative data analysis of the results in this study using *t-test*, as shown in Table (4), reveals that there is support for *Hypothesis 2* as the results from the pre-test ($M = 29.88$, $SD = 6.26$) and post-test ($M = 35.38$, $SD = 6.36$) indicate that the use of adaptive feedback resulted in an improvement in reading comprehension, $t(25) = 6.23$, $p = .000$. Therefore, *Hypothesis 2* is accepted as the results indicate a statistically significant difference in the means of scores obtained by the participants in the reading comprehension test in favor of the post-test with a large effect size as calculated by Eta squared ($d = 0.87$).

Table (4): *t-test* results of the reading comprehension test

Reading Test	N	Mean	SD	t-value	DF	Sig. (2-tailed)
Pre-test	26	29.88	6.26	6.23	25	.000**
Post-test	26	35.38	6.36			

* Significant at (0.05) ** Significant at (0.01)

This finding is in alignment with previous literature on adaptive reading instruction (e.g., Vaughn, 2019; Perez-Segura et al., 2020). Feedback is a critical component of successful learning and teaching (Nyland, 2018). Adaptive feedback is necessary for a variety of

reasons. Kerr (2020, p.7) highlights the need for adaptive feedback, stating, "Since different students in a class will be at different levels of language development, a degree of personalization in feedback will be necessary." Kerr further adds that in providing feedback to language learners, "teachers will need to operate some sort of selection policy because, without it, the feedback would be overwhelming" (p.8). Counter to the common belief that feedback is often seen as drawing attention to errors, Hattie (2012) found that providing feedback on correct responses is also effective as a meta-cognitive strategy of helping students self-regulate and as an alternative to assessing their level and performance. When learners know that they have mastered specific skills, their confidence increases. More importantly, they will have more time and effort to focus on areas where they are less competent.

Data analysis of the reading comprehension skills also revealed that three sub-skills (unstated detail, implied detail, and vocabulary) mainly contributed to the overall difference in favor of the post-test. These skills, as shown in Table (5), were found to be statistically significant as reported below:

- (1) The results from the pre-test ($M = 4.00$, $SD = 1.46$) and post-test ($M = 4.95$, $SD = 1.44$) indicate an improvement in unstated detail, $t(25) = 3.26$, $p = .003$.
- (2) The results from the pre-test ($M = 3.57$, $SD = 1.57$) and post-test ($M = 4.95$, $SD = 1.26$) indicate an improvement in implied detail, $t(25) = 4.14$, $p = .000$.
- (3) The results from the pre-test ($M = 10.11$, $SD = 2.48$) and post-test ($M = 12.73$, $SD = 1.88$) indicate an improvement in vocabulary, $t(25) = 4.96$, $p = .000$.

Table (5): *t*-test results of reading skills with significant differences

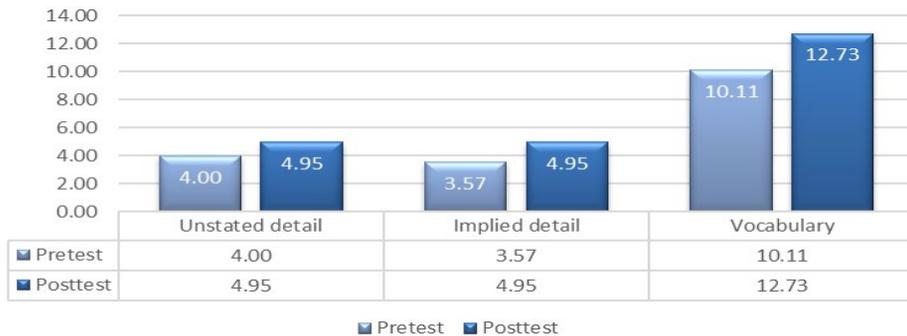
Reading Sub-skills		N	Mean	SD	t-value	DF	Sig. (2-tailed)
Unstated detail	Pre-test	26	4.00	1.46	3.26	25	.003**
	Post-test	26	4.95	1.44			
Implied detail	Pre-test	26	3.57	1.57	4.14	25	.000**
	Post-test	26	4.95	1.26			

Vocabulary questions	Pre-test	26	10.11	2.48	4.96	25	.000**
	Post-test	26	12.73	1.88			

* Significant at (0.05) ** Significant at (0.01)

Chart (3) shows the three reading skills *with* significant differences (unstated detail, implied detail, and vocabulary) and compares the participants' performance in each skill in the pre-test and post-test. All three skills significantly improved in the post-test and consequently improved the participants' reading ability in English as a foreign language.

Chart (3): Reading skills with significant differences.



The other three reading skills (main idea, stated detail, and where questions) were not statistically significant. Table (6) shows the *t-test* results of these reading skills. No statistically significant differences were found related to these four skills, as reported below:

- (1) The results from the pre-test ($M = 3.42$, $SD = 1.17$) and post-test ($M = 3.74$, $SD = 1.04$) indicate no improvement in the main idea, $t(25) = 1.39$, $p = .175$.
- (2) The results from the pre-test ($M = 5.50$, $SD = 1.36$) and post-test ($M = 5.07$, $SD = 1.34$) indicate no improvement in stated detail, $t(25) = 1.71$, $p = .099$.
- (3) The results from the pre-test ($M = 3.65$, $SD = .977$) and post-test ($M = 3.99$, $SD = 1.06$) indicate no improvement in where questions, $t(25) = 1.24$, $p = .226$.

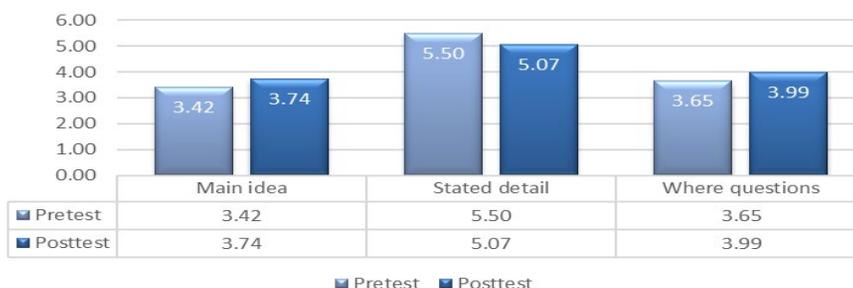
Table (6): *t*-test results of reading skills without statistical significance

Reading Sub-skills		N	Mean	SD	t-value	DF	Sig. (2-tailed)
Main idea	Pre-test	26	3.42	1.17	1.39	25	.175
	Post-test	26	3.74	1.04			
Stated detail	Pre-test	26	5.50	1.36	1.71	25	.099
	Post-test	26	5.07	1.34			
Where questions	Pre-test	26	3.65	.977	1.24	25	.226
	Post-test	26	3.99	1.06			

* Significant at (0.05) ** Significant at (0.01)

Chart (4) shows the reading skills *without* statistical significance (main idea, passive, stated detail, and where questions). It compares the participants' performance in each skill in the pre-test and post-test.

Chart (4): Reading skills with non-significant differences.



The chart shows that the participants' performance in these skills improved; however, the slight improvement was not statistically significant. One reason to explain this is that these three sub-skills had low levels of difficulty at the pre-test: stated detail (.78), where questions (.73), main idea (.68), and unstated detail. For this reason, they did not receive adaptive feedback during the course, unlike the other three reading skills that were found significant, i.e., unstated detail, implied detail, and vocabulary.

Discussion

The current study's findings revealed the positive impact of adaptive feedback on the participants' improved test scores in listening and reading skills. It is worth noting that the participants' levels went up

in reading comprehension from B2 (independent user) to C1 (proficient user) according to the classification of CEFR. In listening comprehension, the participants' converted TOEFL scores went up from 450 (raw score = 20) to 480 (raw score = 26). Similarly, in the reading test, their scores went up from 480 (raw score = 30) to 520 (raw score = 35). Their overall converted TOEFL score in the two tests combined went up from 465 to 500.

These findings align with Ellis's (2017) view regarding intensive feedback directed at certain features instead of extensive feedback directed at a whole range of problems. Ellis argues that using focused tasks goes hand in hand with intensive feedback in developing a specified set of language features and skills. The findings also echo those by Sawaki (2017), who found that the provision of feedback affected the degree to which the participants perceived the benefits of the study materials to understanding different item types and developing strategies for mastering the sub-skills within a short time. Similar to the guidelines set by Sawaki, three levels of verified and elaborated feedback were provided to the participants upon completion of the listening and reading exercises: (a) feedback on the correctness of learner response (knowledge of the correct answers), (b) feedback and rationales for correct/incorrect answers were discussed during the training sessions, and (c) feedback and the rationales of listening and reading activities covering the sub-skills tested with on-demand video lectures on the skills that needed focused attention and effort.

Perez-Segura et al. (2020) refer to two purposes of adaptive feedback activities. The first purpose is to make the learners aware of the types of errors they make the most. This purpose was achieved in the current study by conducting a whole class discussion of the common errors. Additionally, the participants' attention to certain problematic sub-skills was drawn to these areas that required additional efforts. This was done individually to provide specific learners with the personalized adaptive feedback they needed. According to Perez-Segura et al., the second purpose of adaptive feedback is to carry out activities that require using the subskills in which the learners

perform the worst. The current study achieved this second purpose by identifying these listening and reading subskills to provide the participants with the intensive feedback they needed.

Another aspect highlighted by the current study's findings is the role of technology in providing adaptive feedback and, consequently, a suitable learning environment conducive to learning. With the advancement of e-learning technologies and mobile learning, video lectures were made available for the participants to watch through the electronic platform and through the WhatsApp group created at the start of the training for the course purposes. All the correct answers in PDF files were also sent to the participants through the WhatsApp group to ensure that all the participants, even those absent from the face-to-face sessions, received the necessary feedback.

Natriello (2017) argues that advances in information and communication technologies make the present a propitious time to achieve significant progress in the development of adaptive learning. According to Dabbagh & Kitsansis (2012), a personal learning environment is a potentially promising pedagogical approach for integrating both formal and informal learning using social media and supporting student self-regulated learning in the university context. Furthermore, Ai (2017) advocates the need to benefit from the rapid advancement of state-of-the-art technologies from neighboring fields in creating and hosting an adaptive individualized learning environment. Kinshuk (2016) adds that such an environment enables teachers to analyze the learning processes of individual students continuously and allows them to make modifications geared towards better learning outcomes.

Despite the positive impact of adaptive feedback on improving the participants' listening and reading comprehension performance, some limitations could be highlighted. Although the participants' improvement in the listening section was statistically significant in the overall test performance, some skills, such as listening to negative expressions and passive voice, did not improve. However, the participants found them challenging, as revealed by their performance in the pre-test. The use of adaptive feedback did not help to improve

these two skills. One reason was the difficulty in understanding negative expressions and passive voice, which EFL learners find difficult due to ambiguity, as Thuy and Quang (2021) and Fitria and Muliastari (2022) asserted. Therefore, more time was needed and could have been devoted to practicing listening to these skills during the course. The researcher found it difficult to equally cover all the skills that needed attention due to in-class time limits since the listening sub-skills were more in number than the reading ones. Besides, the focus on EFL listening in the current study context is less due to assessment practices that marginalize listening at the expense of reading, grammar, and vocabulary. Therefore, EFL students need more motivation to engage in listening practice in contrast to reading.

It has been shown that students are more interested in passing exams and obtaining good grades in a teacher-centered, examination-driven, and accuracy-focused environment than they are interested in formative feedback in the foreign language context of the current study and worldwide (Gahin, 2001; Lee, 2010; Abdelhafez, 2011; Burkert & Wally, 2013). Furthermore, Li & Vuono (2019) assert that most teachers often provide students with unfocused, comprehensive, and direct correction, pointing out that comprehensive feedback is mandated in their schools. Contrary to these stereotypical views, Natriello (2017) argues that personalizing education through adaptive learning and instructional practice to suit the learners' abilities and dispositions is the primary goal of education to provide a learning environment conducive to more robust learning.

Some limitations were encountered while conducting the current study. One of these limitations is the use of the one-group design and the small number of participants, which limits the generalizability of the study's findings to similar EFL contexts without carrying out replication studies. Another limitation is the lack of time devoted to developing the 14 sub-skills that constituted the scope of the current study. Future studies need to delimit the number of sub-skills under investigation, especially those of listening comprehension. This is because of the difficulties inherent in developing EFL listening comprehension skills compared to reading ones.

Recommendations

The current study's findings revealed the positive impact of adaptive feedback on improving university students' language ability. Based on the present study's findings, the following recommendations are made.

- Adaptive teaching and learning should be integrated as part and parcel of university courses to account for the students' varying needs and learning style preferences.
- Material developers should use adaptive feedback to enable teachers to cater to students' learning needs. Examples include the use of audio prompts while doing exercises in class. These include using textbooks, recorded video lectures supported with PowerPoint presentations and YouTube videos, and watching on-demand lectures through various online learning platforms.
- Recommended instructional and curricular sequences should be determined based on the principles of adaptive education to help learners successfully proceed in learning based on their given characteristics and the analysis of their responses to tasks and activities.
- Adaptive assessment, where students are progressively presented with questions or tasks of varying difficulty levels based on their answers to previous questions, should be a natural extension of the process of adaptive learning and teaching and the provision of adaptive feedback.

Suggestions for Further Research

The current study has focused on the impact of adaptive feedback on university students' listening and reading comprehension skills. Further studies may include:

- The study needs to be replicated on a larger sample with a control group.
- A study may examine the effect of an ESP course on other language skills, such as EFL writing and speaking.
- Another study may investigate the impact of training EFL pre-service teachers in adaptive feedback to to develop their motivation and willingness to communicate.

- Another study may also assess the effect of digital multimodalities of feedback, such as text, audio, and video feedback responses, on EFL students' language skills and content knowledge.
- The use of adaptive assessment to enhance the EFL students' language test scores may also be examined by further research.

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