order number: . . . . .

PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA

Ministry of Higher Education and Scientific Research

University Center Si-Elhoues – Barika –

INSTITUTE OF LETTERS AND LANGUAGES
DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE

Dissertation
Submitted in partial fulfillment of the requirements for the degree of
Master in English Language
Speciality: Didactics of foreign Languages

Title of the dissertation

Meeting Students' Needs via Artificial Intelligence
Case of Third-Year English Students at Barika University Center

By
Aliouche Mounia
Mezghich Douaa

Under the supervision of
Habi Linda

Composition of the jury

Zitouni Khadidja	University Center of Barika	President
Habi Linda	University Center of Barika	Reporter
Bouzidi Amina	University Center of Barika	Examiner

June, 2022

Dedications

In the name of Allah, Most Merciful, and Most Compassionate

God's praise and peace upon our prophet Mohammed

To my parents,

To my husband, Youcef, and my little kids, Yahia and Yousr,

To my sisters and brothers,

For all who answered the call with no hesitation or delay through day and night,

With deep love, this humble work I dedicate.

Aliouche Mounia

Dedications *II*

With deep love, this research is dedicated to:

My Father and Mother

My Sisters and my little Brother

Mezghich Douaa

Acknowledgments

We firstly express our deep indebtedness to the almighty Allah, Lord of the world, who guides and helps us through all the stages of this study, grants us success, and shows us the way to attain our aims, and to whom we owe everything.

This dissertation is the outcome of a challenging journey, researchers' effort, and the constant support of many people around us, to whom we must be thankful for being part of this success.

*We are pleased to convey our deepest gratitude and a special tribute to our supervisor **Dr, HABI Linda** for her supervision, immense support, guidance, indefatigable patience, and invaluable feedback that has shaped and assembled this study.*

Our gratitude, indebtedness, and deliberation are extended to the members of the jury for devoting time and patience to read and examine the present research work, their priceless comments will surely help us enormously.

*Thanks are required for the department of English at Barika University, with sincere emotions to all of our teachers for their expertise and academic assistance for 5 years. With special thanks to **Dr, SELLALI Ridha** for being the best teacher that we ever had, we would not forget.*

We are also thankful to third-year students at the Department of English at Barika University for taking part in this research.

"You are all worth praising"

Abstract

Meeting the learners' needs is the purpose of any English as a Foreign Language (EFL) program. Nowadays, Artificial intelligence (AI) is among the crucial areas of investment that affects all aspects of life. Hence, this research was an effort to shed light on the potential of AI to meet EFL students' needs in post-COVID-19 pandemic era. In the present study, forty-one (41) third-year students from the English department of Barika University Center were conveniently sampled to be questioned about their needs using a valid and reliable Needs Analysis (NA) questionnaire. Subsequently, deductive thematic analysis for ten (10) purposively sampled literature; using themes parallel with the NA's results, was conducted. Results show that AI can cover participants' needs in the following areas: providing practice opportunities, enhancing linguistic skills and components with a variety of applications/software, providing a learner-centered environment that ensures productivity, providing a variety of real-like materials with visual aids, enhancing autonomy and self-regulation, reducing the affective filter and enhancing motivation, self-efficacity, and self-confidence, providing immediate formative feedback, personalizing the teaching/learning experience, guiding and giving recommendations, providing collaborative learning opportunities. Hence, the use and investigation of AI in EFL education is highly recommended.

Keywords: Needs analysis, artificial intelligence, EFL, deductive thematic analysis, post-COVID-19 era.

الملخص

تلبية احتياجات المتعلمين هو الغرض من أي برنامج تعليمي للغة الإنجليزية. في الوقت الحاضر، يعد الذكاء الاصطناعي من بين مجالات الاستثمار المهمة التي تؤثر على جميع جوانب الحياة. ومن ثم، كان هذا البحث محاولة لإلقاء الضوء على قدرة الذكاء الاصطناعي على تعويض احتياجات متعلمي اللغة الإنجليزية كلغة اجنبية. في هذه الدراسة، تم اختيار (41) طالبًا من طلاب السنة الثالثة من قسم اللغة الإنجليزية بجامعة بريكة لاستجوابهم حول احتياجاتهم باستخدام استبيان تحليل احتياجات صالح وموثوق. بعد ذلك، تم التحليل الموضوعي الاستنتاجي لـ (10) مؤلفات ذات مصداقية عالية؛ باستخدام موضوعات موازية لنتائج تحليل الاحتياجات. تظهر النتائج أن الذكاء الاصطناعي يمكن أن يعوض احتياجات المشاركين من حيث : توفير فرص تطبيقية ، تعزيز المهارات والمكونات اللغوية مع مجموعة متنوعة من التطبيقات / البرامج ، توفير بيئة تركز على المتعلم و تضمن الإنتاجية ، توفير مجموعة متنوعة من المواد الواقعية - مثل المواد التي تحتوي على مساعدات بصرية ، تعزيز الاستقلالية والتنظيم الذاتي ، تقليل التصفية العاطفية وتعزيز الحافز ، والكفاءة الذاتية والثقة بالنفس ، تقديم ملاحظات تكوينية و تقييم فوري ، تخصيص تجربة التدريس / التعلم لتتوافق مع خصائص الطالب ، التوجيه وإعطاء التوصيات ، توفير فرص التعلم المشترك. ومن ثم ، يوصى بشدة باستخدام الذكاء الاصطناعي والتحقيق فيه في تعليم اللغة الإنجليزية كلغة أجنبية.

الكلمات المفتاحية: تحليل الاحتياجات، الذكاء الاصطناعي، اللغة الإنجليزية كلغة أجنبية، تحليل موضوعي استنتاجي، حقبة ما بعد COVID-19.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AI: Artificial Intelligence.

EFL: English as a Foreign Language.

FL: Foreign Languages.

FLA: Foreign Language Anxiety.

GE: General English.

IPA: Intelligent Personal Assistants.

NA: Needs Analysis.

PLL: Personalized Language Learning.

SPSS: Statistical Package for the Social Sciences.

VR: Virtual Reality.

Introduction

As a universal language and the lingua franca of our modern world, the English language acquired an outstanding position with the deepening of the globalization process. English education in Algeria faces tremendous difficulties, in which gaining a proficiency level in the English language is considered a challenge that faces many EFL students (Bouhass, 2008; Guettal, 2008; Saidouni, 2019; Sellam & Keskes, 2016). In this vein, Saidouni (2019) mentions that the prevailing traditional ways of teaching, which is manifested by the lack of technological equipment, less exposure to authentic English language, and the lack of practice inside and outside the classroom leave the students with a limited ability to communicate efficiently. Iddou-Derraz (2009) manifests that English students in Algeria face a lot of problems as EFL Algerian programs are not suitable for the learners' needs. That being the case, the wind of change must blow away Algeria's education system by pursuing modernization policies, to develop EFL education and keep up with the learners' needs (Mami, 2013).

Châu (2020) gives huge importance to the learners' needs, stating that all the elements of teaching methodology, learning contents, as well as learning goals, can be affected by the needs of learners. Similarly, Hutchinson and Waters (1987) state that when decision-makers, instructors, and students understand why English is needed by the students, that awareness will affect what is considered acceptable and feasible as appropriate content. As a result, several scholars (Arias-Contreras & Moore, 2022; Brindley, 1989; Brown, 1995, 2009; Chemir & Kitila, 2022a, 2022b; Elsaid Mohammed & Nur, 2018; Long, 2005; Mahmoudi, 2019; Mujahidin et al., 2020; Nhat & Kieu, 2021; E. Park, 2021; Richards, 2001; Sutiman et al., 2020) believe that NA performs a vital function in the overall designing of English courses, in which it is considered as a powerful information gathering tool or a process that helps clarify and validate true needs. Moreover, Park (2021) expresses that scholars agree on

the necessity and importance of NA for technology integration. In this vein, many scholars had used the NA to explore technology integration and use (Armut et al., 2020; Mujahidin et al., 2020; Nhat & Kieu, 2021; O 'reilly, 2016; E. Park, 2021; M. Park & Slater, 2015; Sutiman et al., 2020; Vatanartiran & Karadeniz, 2020).

Nowadays, AI is among the major crucial areas of investment. Recently, In this 4.0 era, where technology has been a part of our daily lives, the integration of smart devices into education is an indispensable movement that we are striving for (Nhat & Kieu, 2021). Due to the unprecedented spreading of technology devices and the development of wireless communication and sensing technology, the use of AI in EFL teaching and learning has become a practical choice (Junaidi, 2020). Many researchers suggest the use of AI applications as supporting tools to ameliorate the process of EFL teaching/ learning (Aldosari, 2020; Alemi et al., 2014; Al-Zawaideh, 2022; Borge, 2016; X. Chen, Zou, Cheng, et al., 2021; Gruber & Kaplan-Rakowski, 2022; Haristiani & Rifai, 2021; Junaidi, 2020; J. Li, 2021; Petrović & Jovanović, 2020; Xue, 2021; Y. Zhang, 2022). Accordingly, AI educational applications can provide new possible solutions for many problems to meet the learners' needs and carry out revolutionary educational reforms (Gruber & Kaplan-Rakowski, 2022). Moreover, due to new restrictions on coronavirus which necessitated confinement and social distancing; in which the learning process has expanded beyond the physical classroom walls, and the increasing number of those who use technology autonomously to learn the language, the insertion of technology become an inevitable procedure in the field of Foreign Languages (FL) teaching/learning (Chu, 2020).

1. **Statement of the Problem**

In the light of the English department of Barika University Center, and as a new department, teachers and students face a plethora of problems and difficulties. A pre-study questionnaire (See Appendix A), which was conducted in the primary stages of this study, supports the previous argument, in which it was found that the third-year English students

have moderate levels of motivation and anxiety, low levels of metacognition, and low practicing opportunities (See Appendix D). Hence, investigating the situation and conducting a NA in the English Department of Barika University Center stands as an urgent need. Moreover, trying to compensate for those needs, is even more important.

On another hand, regardless of the enormous benefits of AI in the field of EFL teaching/learning, especially with the increasing number of those who use technology autonomously to learn the language and with distance learning due to Coronavirus. For the Arab world, AI is a relatively new concept, as Arab universities use traditional education approaches and there is no theory, applied research, or even studies on AI (Aldosari, 2020, p. 146). Thus, the vast majority of EFL teachers, learners, and scholars are unaware of what AI may offer to them. Recently, numerous education institutes in Algeria have been confronted with limitations and challenges in implementing successful electronic/ distance-learning programs, imposed due to Covid-19, which proved the low experience of Algerian educational staff in using technology (Bentaleb, 2021). Mujahidin et al. (2020) state that learners have not yet suited their capabilities to utilize technology giving their learning. This was also supported by the findings of the pre-study questionnaire, which indicated a very low level of AI familiarity in learning among third-year students (See Appendix D). Simultaneously, it is believed that the unsystematic use of AI may lead to non-accomplishment rather than accomplishment (Abalkheel, 2022). Vatanartiran and Karadeniz (2020) manifest that the lack of technological leadership and technology integration plans limited the efficient use of technology in education. Nevertheless, there is a scarcity of studies that indicate how properly AI can be used in education (Bécue et al., 2021).

Therefore, in order to change the teaching/ learning situation of deaf-mute English which does not meet the learners' needs and operate in today's progressive modern life, English teaching and learning must develop at a fast pace by including AI in the teaching/ learning process. At the same time, before getting to study or experiment the AI use in EFL teaching/

learning, it is vital, in such an infant unprecedently used or investigated area of research in Algerian universities, in general, and in Barika University Center, in specific, to seek the proper introduction and integration of AI in the field of EFL learning. Thus, digging deep and investigating the use of AI according to the learners' needs, as a major keystone to maintain successful teaching and learning process is crucial.

2. Motive

As students at the English department at Barika University Center, we noticed that teaching and learning English in our department is far from ideal, as many students' needs are not met which causes the low proficient levels among the students, even among the undergraduate students. The difficulties students face have been growing significantly since the COVID-19 pandemic erupted, in which the customary traditional classrooms have been seriously impacted and distance learning become obligatory. In another hand, an immense absence of the use of smart technology in learning was observed, even though the predominance of the students have smart devices, internet, and have full ability to use those devices effectively. According to Luo et al. (2015), "this aspect of their life must be taken into consideration when talking about education, as their all-free time is devoted to these smart devices, educational apps could implement some aspect of learning while using these devices" (p. 1413). However, those students are not aware of what AI may introduce to them concerning their English learning, particularly distance and online learning. In this respect, and accordingly with what Khare et al. (2018) maintain, that there is a favorable influence of AI tools on EFL academic achievements, this study suggests using AI to fulfill the needs of the English language learners. Yet, this cannot be manifested without conducting first a NA for the students to cope more effectively and precisely with their needs, and to be able to analyze the possible solutions AI may offer to meet those needs.

3. Research Questions

This study seeks to probe into the use of AI to address EFL students' needs. The query then goes as:

➢ Does AI have the potentials to meet the EFL students' needs?

The primary question is accompanied by a set of equally important sub-questions:

1- What are the language learning needs of third-year English learners at the English department at Barika University Center?

2- What can AI provide for the EFL learners' needs according to the literature?

3- Is it suitable to use AI for covering the needs of EFL learners at Barika University Center?

4. Hypothesis

This study hypothesis that:

❖ AI has the potentials to meet third-year EFL students' needs at Barika University Center.

5. Aims and Objectives

Through the current study, we seek shedding lights on the potentials of AI to meet up with the EFL learners' needs at the English department of Barika University Center. Thus, the major aims of the present research are:

1- To understand the recent EFL education situation at the English department of Barika University Center by scrutinizing the learners' needs.

2- To investigate the effective utilization of AI in learning the English language based on the learners' needs.

3- To clear the way for a proper introduction and implementation of AI technology in EFL teaching and learning.

In addition, the current work pursues to attain a set of objectives that can be summarized in the next points:

1- To investigate third-year English learners' needs in the English department at Barika university.

2- To review the literature on what AI may offer to EFL learners.

3- To link what AI may offer to EFL learners with their learning needs.

4- To suggest some recommendations regarding the integration and implementation of AI in EFL teaching and learning, for the best exploration.

6. Significance of the Study

The research outcomes are expected to bring some theoretical and practical implications. Theoretically, the findings can contribute to the literature on "AI and FL education", since there is a study scarcity concerning proposing an appropriate implementation for "the AI uses in the foreign classrooms", in general, and in the Arab world, in particular. Hence, an immense gap would be filled with useful information, and is likely to serve as a reference for other researchers conducting similar research.

Practically, it is expected to gain some advantages for teachers, learners, researchers, and curriculum designers. For teachers, this paper fosters their understanding of their learners, and their awareness of the AI uses in enhancing the teaching and learning processes. This may assist teachers in changing their traditional approaches and adopting creative and innovative methods by integrating AI technology in an effective way that meets learners' needs.

Additionally, it gives the chance for the learners to realize their needs, which will actively enhance their learning process. This study will help them discover the utility of AI tools in their learning in an effective way that reflects their needs and goals.

For scholars, the research may extend the understanding of learners' needs. In addition, it can play the role of a supporting document that attempts to assist scholars to explore future directions for AI integration in EFL education. As it may contribute to the modification and strengthening of theories that concentrate on novel technologies and their benefits inside and

outside the EFL classrooms. Respectively, scholars will be motivated to conduct more studies on the AI uses in the EFL context.

Curriculum designers will equally benefit from the use of technology, in general, and AI, in particular; and will be directed toward the proper integration of AI tools when planning and implementing the curricula. Thus, this study will not only raise their awareness about AI applications, but also help identify how these applications can be used to enhance and innovate the educational curricula in terms of content and activities. Moreover, the current study helps curriculum designers to realize the learners' needs, and how learners prefer to learn, and reveals some factors that may influence the successful integration of AI.

7. Scope and Limitations of the Study

This research is an endeavor to cover EFL learners' needs and to clear the way for a proper introduction and integration of AI technology in EFL teaching and learning, by illuminating AI's potential to meet the needs of EFL learners. The study was conducted in the English Department of Barika University Center during the academic year of 2021/2022 with third-year students. The methodology underpinning the study is the descriptive method relying on a mixed approach, as it is the most suitable approach to answer our questions and meet the main aims of our study. The data sources will encompass both primary, and secondary data. Primary data will be gathered using an NA questionnaire for the students to be descriptively analyzed using the "Statistical Package for the Social Sciences (SPSS) software". Meanwhile, secondary data will be sourced from previous literature and analyzed qualitatively using thematic analysis, to describe what are the needs that AI can meet.

However, this study has some limitations, specifically, three main limitations were identified:

1- The small sample size, thus, generalization of results is not possible.

2- Time limitation, six months are a very short time to conduct a comprehensive NA and thematic analysis of the literature.

3- The system of teaching in batches, imposed because of Corona-restrictive measurements, has made it difficult to reach participants.

4- Scarcity of studies concerning using AI in meeting the EFL learners' needs, in general, and the studies on AI in the EFL Algerian context, in particular. In addition to the scarcity of studies concerning general English learners' needs in the Algerian context.

8. Definition of Key Terms and Variables

The following terminologies are described in order to assist the reader understand how they are used in this study:

7.1. Needs analysis

Brown (1995) describes NA as "the systematic collection and analysis of all subjective and objective information necessary to define and validate defensible curriculum purposes that satisfy the language learning requirements of students within the context of particular institutions that influence the learning and teaching situation" (p. 36). In this study NA is considered as the process of collecting and analyzing quantitative information about the learners' needs to investigate the AI's potentials to meet those needs.

7.2. Artificial intelligence

Popenici and Kerr (2017) define AI as an umbrella term for an automated system capable of mimicking human intellectual processes like self-reflection, learning, and reasoning. However, the current study refers to AI as the implementation of AI development and elements for enhancing EFL teaching and learning.

9. Structure of the Dissertation

The present study is structured into two main chapters, in addition to the introduction and conclusion sections. The introduction section presents a general overview of the study, including the statement of the problem, aims, significance, questions, scope and limitation, and the definition of key terms and variables. Chapter one reviews the relevant literature, it is divided into two sections. The first section is devoted to NA, including, its definition, the

definition of the term "needs", NA importance, NA approaches, NA principles, NA data collecting tools, and lastly NA with technology; to review previous studies. The second section review the AI uses in EFL teaching and learning, involving AI definition, AI elements, AI in EFL teaching and learning including oral skills, writing skills, grammar, vocabulary, motivation, anxiety, feedback, personalization, autonomy, AI in teaching, AI application for EFL teaching and learning, and the challenges that face the implementation of AI in EFL teaching and learning. Chapter two is devoted to the analytical framework, it encompasses the methodological design; in which the techniques and procedures followed in this study were explained such as the methodology, the sampling, data collection instruments, validity and reliability, data analysis, and administration. Then, results, discussion and interpretation of results are, also, presented in this chapter. Lastly, the conclusion section is dedicated to give a general conclusion that overviews all of what be done through the entire study.

Chapter I:

Theoretical Overview

Chapter I: Theoretical Overview

Introduction

This chapter considers the theoretical frame of this study. In which, the literature was comprehensively reviewed. Due to the nature of this study, this chapter encompasses two main sections, each of which gives a deep overview of a focal concern in this work. On the first hand, section one deals with NA. it involves NA's definition, the definition of the term needs, the importance of NA, NA principles, and NA approaches; mentioning: 1. The Sociolinguistic Model, 2. The Systematic Approach, 3. The Learning-Centered Approach, 4. The Learner-Centered Approach, 5. Task-Based Approach, 6. Li's (2007) Model, 7. Target and Present Situation Analysis. After that, the review deals with NA data collecting tools, NA in General English (GE), and in the end, NA with technology; encountering previous studies concerning NA and technology. On the other hand, section two deals with AI in EFL teaching and learning. The latter section includes AI definition, AI elements, AI in EFL teaching and learning; encountering: 1. AI and EFL oral skills, 2. AI and EFL writing skills, 3. AI and EFL grammar learning, 4. AI and EFL vocabulary learning, 5. AI to provide feedback and assessment, 6. AI and EFL learning motivation, 7. AI and EFL learning anxiety, 8. AI and personalized EFL learning, 9. AI and EFL autonomous learning, 10. AI and EFL teaching. Then, AI application in EFL teaching and learning, and lastly, the challenges that face AI integration in EFL teaching and learning.

Section I: Needs Analysis

1.1. NA Definition

The emergence of NA in language education could be retraced to the 1960s and 1970s, when FL programs began spotlighting the English for Specific Purposes (ESP) field to assess the learners' communication needs and the methods for attaining certain instructional objectives (Sönmez, 2019). The first who suggested a NA model for the language teaching and learning field was Richterich, in 1972 (Liang and Yan, 2011). After that, ND was utilized to identify the FL programs' content and objectives, then it gradually found its role in EFL curriculum design. The adoption of NA by The Council of Europe's contemporary project of language education at that time was the main reason for its widespread (Boroujeni et al., 2013; Nunan, 1999).

NA or needs assessments were the focus of many researchers (e.g., Basturkmen, 2018; Bosher & Smalkoski, 2002; Brindley, 1989; Brown, 1995, 2009); Chaudron et al., 2005; Long, 2005; Nunan, 1988; Richards, 2001; Robinson, 1991; Seedhouse, 1995; West, 1994; Hutchinson and Waters, 1987), each of which tried to present his perspective for the NA definition. For instance, Brown (1995) describes NA as "the systematic collection and analysis of all subjective and objective information necessary to define and validate defensible curriculum purposes that satisfy the language learning requirements of students within the context of particular institutions that influence the learning and teaching situation" (p. 36). Nunan (1999) introduces NA as a set of steps of collecting information for the purpose of designing a syllabus. Richards (2001) expresses that NA is the process used when it is necessary to figure out what the learners' needs are.

From a recent view, Mehrdad (2012) defines the NA process as the tasks encompassed for collecting data in order to build curriculums that can fulfill the learning needs of a certain set of learners. Similarly, Al-Hamlan and Abdelrahman (2015) state that NA is "a specific ground

for future development of the academic activities of a particular group of students" (p.120). NA's main purpose is to identify the needs of language learners before, during, and after the curriculum/ syllabus/ course/ lesson fulfillment (Fatihi, 2003; Watanabe, 2006). Basturkmen (2013) describes it as what individuals need to know or accomplish using the target language to perform successfully in their study field or work. Arias-Contreras and Moore (2022) state that it entails acquiring information from the outside world of the classroom regarding the learners' linguistic needs in certain situations. Widodo (2017) claims that "needs should be seen as resources for fully understanding histories, social and cultural values, beliefs and identities of the learners" (p.130). Nowadays, as the NA objective is to obtain data about learners' needs, the tasks of conducting it differ greatly when the context, the learners, and the researcher differ (Otilia & Brancusi, 2015; Sönmez, 2019).

1.2. Definition of the Term Needs

The term "needs" may not be simple as it appears, many terms are occasionally used to allude to needs such as wishes, wants, expectations, demands, limits, motivations, requirements, and lacks (Brindley, 1984). When speaking about language education, the needs would then be language-related. Thus, they are frequently characterized regarding linguistic deficiency, or the gap between what the learners can do now and what they should be able to achieve in the target language to survive in the target language society (Richards, 2001). On another hand, Auerbach (1995) argues that it is not only about linguistic needs but includes the needs that "enable learners to critically examine and become active in shaping their roles in the curriculum" (p.15). Others, divide this term to include four sections, "what learners need to learn", "how they feel about learning", "how much effort they are likely to invest" and "how much ability they possess for the process of learning" (Tzotzou, 2014, p.60).

Moreover, Brindley (1984) states that "need is not a thing that exists and might be encountered ready-made on the street. It is a thing that is constructed, the center of conceptual networks and the product of a number of epistemological choices" (p.29). Maybe the simplest

definition of the term needs is that of Tzotzou (2014), who indicates that the term "needs" sets for the language forms and skills that learners would likely require utilization to communicate successfully in the target language setting. In addition, Richards (2001) manifests that a need is judgment-based, thus, it reflects the interests of those who make the decision such as instructors, effective, parents, learners, and stakeholders, which may all encounter dissimilar perspectives on what has to be met. Henceforth, needs are wide, and many scholars divide them into different types, which resulted in a variety of NA approaches that can be used.

1.3. NA Approaches

Due to the importance of NA, many scholars have laid forth approaches to conducting a NA. Among others, the ones listed below are the most prominent:

1.3.1. The Sociolinguistic Model

Introduces by Munby, this model aims to develop a syllabus based on the analysis of learners' profiles. Here, the learner's fill-in profile contains information about the communication events and mediation that he did experience throughout the whole day, in addition to the partner, the setting, the objectives, the possessed level of English, the model, and even tone and dialect (Munby, 1981). This model was criticized by many scholars. For example, Al-Hamlan and Abdelrahman (2015) state that it can scarcely be applied in practice because everything was developed theoretically, it is difficult to be used for learners as it lacks flexibility, it is inconvenient to use in a group setting, and is time-consuming, and it focuses on the learners rather than their needs; "collects data about the learner rather than from the learner" (West, 1994, p. 9).

1.3.2. The Systematic Approach

It is a model developed by Richterich and Chancerel (1977) to address the drawbacks of the sociolinguistic model by bridging the model's flexibility gap and paying closer attention to the learner. Richterich and Chancerel (1977) tried to get a more comprehensive view of the

learners' needs, giving more importance to the learning situation and the learner's position in it, evaluating the learning process at the beginning, during, and at the end. However, despite its effectiveness, this model neglects the learners' real-world needs, and it also puts too much faith in the perceptions of learners (Al-Hamlan & Abdelrahman, 2015). In this vein, Long (2005) declares that the learners' perception cannot reflect the real needs, since learners may not have the ability to realize their real needs, also it makes learners more inclined to their perceptions, which will make them create preoccupied opinions about what should be focused on when taking the assessment and forgot the real problems.

1.3.3. The Learning-Centered Approach

Hutchinson and Waters (1987) created this approach aiming to analyze the learners' needs from the very start until the desired outcome in an easy way by focusing on how the learner learns rather than the language needs. In essence, Hutchinson and Waters (1987) divided the learners' needs into (02) two components. First, target needs stand for "what the learner needs to do in the target situation" (p. 54). This latter is also divided into three components, including the necessities; what learners should know to fulfill their tasks, lacks; "the gaps between what the learner knows and the necessities" (Hutchinson & Waters, 1987, p. 56), and wants; "what the learners think they need" (Nation, 2000, p. 2). Second, the learning needs which focuses on an immense number of variables that can influence teaching/ learning such as the learners' demographic information, practical skills, background knowledge, preferred teaching, and learning styles, the best time and setting, the classes' status, the preferred instructional materials, their learning expectations, the learners' levels, learner attitudes towards English language and culture and more (Al-Hamlan & Abdelrahman, 2015; Hutchinson & Waters, 1987). Moreover, the constant systematic evaluation of the learners' needs is one of the most essential elements of this model, in which tools such as surveys, interviews, observations, and questionnaires can be used (Al-Hamlan & Abdelrahman, 2015). As a result, this model has many supporters such as Eggly (2002) and Nation (2000). Yet,

Basturkmen (2010) criticizes it as an inflexible approach that is likely to contribute very little to the creation of educational materials.

1.3.4. The Learner-Centered Approach

Berwick (1989) and Brindley (1989) did initiate this model to focus on the learners' expectations and attitudes as the fundamentals of their needs. Moreover, this approach offers three perspectives for NA: "perceived needs vs. felt needs", "product-oriented vs. process-oriented" and "objective needs vs. subjective needs". First, perceived needs are the learners' needs from the experts' perspectives, which likely represent the needs they have, while felt needs represent what the learners feel it is necessary to have from their perspectives (Berwick, 1989). The second, perspective contradicts product to process interpretations. Here, the former focuses on the language needed in a certain setting, whereas the latter focuses on the how of the learning process, including cognitive and affective variables that can impact learning (Brindley, 1989). Lastly, while objective needs are those needs related to the particular learner focusing on his factual information such as his real-life, his language proficiency, and the difficulties he faces, subjective needs steam from the inner variables of the learner, including affective and cognitive aspects like attitude, confident, anxiety, personality, motivation, learning strategies, autonomy, cognitive styles, expectations, etc. Having said that, it is obvious that learners' feelings and attitudes are of a high focus in this model. Berwick (1989), and Brindley (1989) declare the affective and cognitive variables and the learning situations as the most important factors to understand how to learn a language or how it has to be learned.

1.3.5. Task-Based Approach

In this approach, Long (2005) focuses on examining scenarios in which learners wish to take part. Thus, Long (2005) tried to organize lessons around tasks as a meaningful unit in learning (Châu, 2020), encouraging the learners to employ the target language in a variety of scenarios such as going to the museum or visiting a doctor. Moreover, this model emphasizes

the use of different sources when collecting data to ensure validity and reliability (Châu, 2020). As a result, many scholars identify this approach as rigorous and effective such as (Alhadiah, 2021; Châu, 2020; Mudraya, 2006).

1.3.6. *Li's (2007) Model*

Li (2007) suggests that the learners' needs may be analyzed from "linguistic", "cognitive", and "affective" perspectives. The linguistic one presents the learners' points of view in terms of what is needed to be learned involving the FL components (vocabulary, pronunciation, and grammar) and skills (reading, writing, speaking, and listening). The cognitive view addresses the learners' cognitive factors through the FL teaching/learning. The cognitive processing mechanism is of high importance since FL learning is "an internally-generated process" (Li, 2007). Including factors like learners' preferred styles of learning, preferred activities, preferred teaching methods, and learners' expectations of the teachers' role. The affective view investigates the learners' affective factors through the FL teaching/learning. As "Learning a language is an emotional experience, and the feeling that the learning process evokes will have a crucial bearing on the success or failure of the learning" (Li, 2007, p. 21). Involving learners' attitude, motivation, and confidence.

1.3.7. *Target and Present Situation Analysis*

Ali (2011) proposed this model including "Target Situation Analysis (TSA)" and "Present Situation Analysis (PSA)" as the key constitutions to analyze learners' needs in terms of language learning. However, according to Elsaid Mohammed and Nur (2018), these constitutions were used long before by many scholars. Chambers (1980) used the TSA when he tried to explain the terminology ambiguity, Munby (1981) utilized it when presenting his communicative needs processor (CNP), and the Council of Europe in the 1970s also used it. In addition, Elsaid Mohammed and Nur (2018) manifest that the TSA is similar to Hutchinson and Waters' (1987) model including wants, lacks, and necessities that rely on questions about

the target situation and the learners' attitudes about it. Thus, TSA concentrates on the learners' needs at end of the course.

Moreover, Ali (2011) introduced the PSA as a complement to the precedent. In this vein, Elsaid Mohammed and Nur (2018) declare that similarly to TSA, PSA components were used by many scholars (e.g., Dudley-Evans and St John (1998), Richterich and Chancerel (1977), Robinson (1991)) before Ali (2011) for other reasons. In essence, Hyland (2006) suggests that PSA gives objective information (proficiency, learning experience, age) and subjective data (self-perceived needs, strengths, and weaknesses). Hence, the PSA provides information on the learners' present situation in the language from different sources, including the learners' proficiency levels (Elsaid Mohammed & Nur, 2018). Furthermore, Ali (2011) maintains that a comprehensive NA should be viewed as a hybrid of TSA and PSA.

➢ In a more modern vein, Sönmez (2019) conducted a study to examine the approaches of collecting and analyzing tools that recent studies did employ to administer NA in the language education field. The findings indicated that to specify the language learning needs, scholars generally focus on identifying present situation needs using descriptive models and surveys.

1.4. Importance of NA

The importance of NA is well documented in the literature. In this vein, Mehrdad (2012) counts seven benefits of NA for general language courses according to different scholars:

➢ Help to create a learner-centered curriculum and select beneficial content that helps learners meaningfully fulfill their real-life requirements.

➢ NA assists instructors to understand their learners' needs in order to take the best practical pedagogical and evaluation decisions to enhance the teaching and learning process.

➢ NA serves as the basis of the assessment process, which has to test learners' capability to complete tasks in real-life settings.

➢ NA identifies the real-world tasks that have to be fulfilled in order to manage tasks-based syllabi.

➢ Teachers can use NA to compare and contrast their learning expectations with those of their learners, which gives them a better understanding of the learning process and help them manage a proficiency-directed teaching process.

➢ NA can provide highly important information from the learners about a certain program, which plays a vital role in designing, implementing, evaluating, and revising this program.

➢ Any program that tries to address learners' needs would be more successful and motivating.

Sönmez (2019) also summarizes some of the NA objectives such as providing information on the learners' goals in a specific program, exploring the present situation and effectiveness of a program, providing information on preferred learning styles, skills, and preferred teaching activities and methods, exploring variables that affect the relationship between learners and teachers and the function of this relationship in the language education procedure. Similarly, Arias-Contreras and Moore (2022) express some purposes for NA involving: deciding whether a certain program meets the learners' aims and needs, evaluating a particular program to establish the necessity to introduce some changes, orienting certain improvements, making a program effective and acceptable for teachers and learners, introducing new modern teaching and learning approaches meet the learners' aims and needs.

Moreover, Kohnke and Jarvis (2021) consider NA as the milestone for designing material and developing the curriculum. Which helps to tailor a language curriculum to the learners' needs and assists teachers and learners in developing a sense of motivation and ownership (Chemir & Kitila, 2022a). Hence, NA "helps the field design and tailor the best methodologies and resources based on the needs of the students" (ibid, p.2). In addition, Belcher (2009) suggests that NA is not only for curriculum design, but teachers have to get

training on the NA process and make it an integral component of their teaching. As "NA is not only the starting point for materials development, but also guides the selection of contents, assessment, and classroom activities" (Elsaid Mohammed & Nur, 2018, p. 54). Similarly, Richards (2001) states that NA generates data that may be utilized for numerous purposes, including setting objectives, evaluating courses, creating assessments and testing, and delivering information about a program to a third party. As a result, NA is considered a cornerstone of any effective program (Mehrdad, 2012).

Châu (2020) gives huge importance to NA, stating that "all the elements of teaching methodology, learning contents, as well as learning goals, can be affected by the needs of learners, that can be defined by the NA" (p.119). In essence, Akyel and Ozek (2010) express that "NA is a powerful tool that helps clarify and validate true needs" (p.969). NA connects the teaching process as much as possible to learning and learners (Grier, 2005). Also, it directs decision-makers to select more accessible, acceptable, and better materials, lessons, and activities for the teaching and learning process (Long, 2005). The main goal of NA is to help instructors translate learners' needs into linguistic and pedagogical concepts to supply a successful teaching process (Mackay & Mountford, 1978). Poedjiastutie and Oliver (2017) suggest that NA will assist teachers to allot "the gap between what is currently being taught and what needs to be taught for students' future careers" (p.3), arguing that "filling this gap should be the key purpose of education" (p.3). Hence, NA can help design and implement language policy at both the macro and local levels, with far-reaching implications (McCawley, 2009).

1.5. Principals of NA

Châu (2020) summarizes a set of principles concerning the NA involving:

➢ *Prioritizing the communication needs*, in which those needs have to reflect the real needs of the learners when dealing with the real world. As the language mastery is not enough,

it has to be accompanied by communication skills enabling the learner to understand the discourse situations using authentic situational materials.

➢ *Learning needs are equally important*. Those needs have to reflect the learning tools like oral expressions and problem-solving, the learning content, such as values, skills, and knowledge, and cognitive and affective factors, in addition to the situation of learning.

➢ *Considering the context*, it highly contributes to the teaching and learning process. It is likely to be ineffective and inadequate without specifying specific groups of learners. Analyzing the context could be by analyzing the learners' knowledge about the culture and the parameters of the target language country, or by analyzing the learners' social variables.

➢ *Examining the learners' needs from different perspectives*. Since multiple agents are included in the educational process, the researcher has to examine the learners' needs from different perspectives and judgments. It is also preferred to consult a variety of authors when it comes to the stage of interpreting findings.

➢ *The implementation of various collecting methods and instruments* for gathering the NA data, to get more valid reliable data and handle complex variables. In this context, interviews can be used, or well-designed questionnaires that can offer generalizations and be used on a large scale.

➢ *NA has to examine on an ongoing basis*. The needs of learners are expected to alter throughout time according to factors such as affective, personal, and contextual factors.

1.6. NA's Data Collection Tools

Ibrahim (2017) manifests that "there is a common agreement on the variety of the methods used to collect data in NA" (p. 3). Many researchers (e.g., Basturkmen, 2010; Brown 1995, 2009; Dudley-Evans & St John, 1998; Hyland, 2006; Long, 2005; Richards, 2001; West, 1994) agree that various data-gathering instruments may be utilized to survey the needs of

learners, including interviews, observations, questionnaires, analyzing authentic spoken

and/or written forms. Umam (2016) explains some of these tools in terms of NA, stating that:

➢ *Questionnaires* are the least consuming way of gathering data. They can help researchers

in gathering much data on learners' needs such as long-term and short-term goals. A

questionnaire, in general, is utilized quantitatively, for small scales or large scales NA.

➢ *Interviews:* provide in-depth needs exploration for small groups, hence, it can be

administered before designing NA questionnaires as they give the direction of what

problems should be concentrated on. Interviews take a long time to be administered.

➢ *Observation*: observing practical sessions or subject lectures, enables the researcher to

cover different activities from watching learners perform certain tasks to close-

observation of individuals.

➢ *Data collection tasks*: gathering data on the problems learners have, generally, and how

well they perform on various FL tasks.

➢ *Analysis of available information*: using sources such as journal articles, records/files,

surveys and reports, and books. It is considered the initial step in NA.

1.7. NA in General English

According to Xu (2021) "General English (GE, EGP) courses focus on cultivating wider

knowledge of the English language and improving the overall linguistic ability of students

regarding their accurate and proficient uses of English in general situations" (p.452). General

English programs aim to prepare the learners to communicate effectively in general situations

when the language is needed (Munby, 1981). EGP courses are "more usefully considered as

providing a broad foundation" for learners (Far, 2008, p. 3). Respectively, many scholars

argue the proficiency of using NA to specify the general English learners' needs and to design

GE curricula and courses (Ahour & Mohseni, 2015; Al-Hamlan & Abdelrahman, 2015;

Alqunayeer & Zamir, 2016; Behzadi & Lashkarian, 2015; J.-Y. Liu et al., 2011; Mahmoudi,

2019; Mehrdad, 2012; Moiinvaziri, 2014; Richards, 2013; Seedhouse, 1995; Tarone et al., 1989; Xu, 2021). Moreover, also many scholars did use NA to specify the learners' needs in GE settings. For instance, Liu, et al. (2011) conducted a NA for GE and conclude that GE learners regarded writing and speaking as the most necessary skills, and that learners had clear long and short-term goals concerning their learning that shape their needs. Behzadi and Lashkarian (2015) revealed that Iranian learners in their sample enrolled in a GE program to increase their grammar and vocabulary. Moiinvaziri (2014) found that learners in his study specified completing their learning as the first reason for English learning and reported interactive learning as the preferred style of learning.

1.8. NA and Technology (Previous Studies)

Many scholars did use NA with technology integration and use. Park and Slater (2015) used NA to investigate ESL learners' real-world activities in mobile learning in order to help pedagogic designers in the future. Srichanyachon (2014) conducted a study to explore the needs and barriers that face online learners, using a NA model. Mavroudi and Hadzilacos (2013) yielded research entitled "Learning Needs Analysis of Collaborative E-Classes in Semi-Formal Settings: The REVIT Example" in order to, a) evaluate a set of collaborative e-courses for adults, b) demonstrate that providing efficient training opportunities via distant education is possible and cost-effective; just by "utilizing existing infrastructure and by making use of modern digital technology" (p.211). O 'reilly (2016) created a technology needs assessment survey model for language teachers in a US higher educational setting.

More recently, Vatanartiran and Karadeniz (2020) manifest that the lack of technological leadership and technology integration plans limited the efficient use of technology in education. Hence, they carried out a large-scale NA aiming to survey the teachers' needs and challenges when using technology in classrooms, and design a technology integration plan. Armut et al. (2020) conducted a study entitled "Technology in Foreign Language Teaching: A Needs Analysis" mainly to examine the learners' technology-based language-learning needs.

Sutiman et al. (2020) carried out a NA process to develop an "interactive virtual reality-based educational media", manifesting that "NA is the first and necessary step for the researchers to design a newly developed learning media" (p.1). Mujahidin et al. (2020) state that learners have not yet suited their capabilities to utilize technology given their learning, thus, they conducted NA for mobile learning. Nhat and Kieu (2021) suggested a NA model investigating the needs of learners for mobile learning and autonomy to ensure the ability and readiness of learners to be integrated with a mobile-learning program. Moreover, according to computer-assisted language learning scholars, the use of technology in education is hampered by the lack of technology integration planning (Park, 2021). Through his investigation, Park (2021) claims the necessity of NA for the proper use of technology in teaching and learning settings.

Section II: Artificial Intelligent in EFL Teaching and Learning

2.1. AI Definition

AI is one of the most important areas of investment nowadays. "It is a broad field that is used in many disciplines such as computer science, statistics, linguistics, psychology, education, and decision science" (Ghareeb, 2020, p. 78). From a simple perspective, Popenici and Kerr (2017) define AI as an umbrella term for an automated system capable of mimicking human intellectual processes like self-reflection, learning, and reasoning. Similarly, Russell and Norvig (2010) refer to it as the art of making technological devices that can think and act rationally in a human-like way.

Others, consider AI in a larger sense as science. For an instant, Stone et al. (2016) claim: "artificial intelligence (AI) is a science and a set of computational technologies that are inspired by—but typically operate quite differently from—the ways people use their nervous systems and bodies to sense, learn, reason, and take action" (p.10).

2.2. AI Elements

AI can be considered as an umbrella term that encompasses many elements, each of which has a specific function. Acemoglu and Restrepo (2018) introduce eight (8) elements of AI including:

2.2.1. Neutral Networks

A circumstance or phase in which a brain accepts a given input from either an external or internal source before processing it to create a specific output. The neuron is the brain's most fundamental computation unit, and it is in charge of processing inputs and producing outputs.

2.2.2. Natural Language Processing

The ability of computer programming to process and evaluate large amounts of natural language data enables technological devices to understand, analyze and produce a language like humans, to effectively interact with humans using this language.

2.2.3. Vision

Technological devices' capability to see, process, and act based on visuals, like pictures.

2.2.4. Expert Systems

Computer programs that can mimic the ability of humans to make decisions. As a result, these systems are deployed as expert replacements or as expert supporters.

2.2.5. Robotics

Robots are simply physical machines, while robotics is their study.

2.2.6. Evolutionary Computation

The family of algorithms used for universal development that is based on biological evolution. Hence, it is the ongoing process of improving solutions over time, to produce better and better solutions.

2.2.7. Speech Interpretation

The ability of technological devices to recognize and predict the speech of someone or something from an external source.

2.2.8. Machine Learning

AI branch that enables technological devices to learn and become progressively better to do never done before tasks or new others independently without any human interaction (Almaleki, 2021). Thus, from a certain set of data, machines can acquire knowledge and build a model (Barakhsanova et al., 2016). This type of technology is advancing at breakneck speed, which enables it to rapidly complete complex tasks (Almaleki, 2021). Moreover, according to Acemoglu and Restrepo (2018), machine learning has three levels: deep learning; supervised learning; and unsupervised learning.

2.3. AI in language EFL Teaching and Learning

AI considers one of the outstanding technological developments in the 21 century, that affect different life fields. The field of EFL teaching and learning has not been left behind. Over the past years, the attention on AI in the field of EFL has grown significantly, as a result

of the great development that AI has been known recently. Henceforth, many researchers studied the application of AI in several parts of the EFL teaching and learning process.

2.3.1. AI and EFL Oral Skills

Oral communication skills give the ability to formally or informally deliver messages and preserve social relationships by creating, obtaining, and analyzing language (Brown, 2001). For Arab English learners, most communications are placed during EFL academic sessions which lack authenticity (Attia, 2015; Lee & Park, 2019). To remedy this, Hamuddin et al. (2020) manifest that "AI can be used to improve speaking a foreign language when a native speaker of the foreign language is unavailable in the classroom context"(p. 6736). Similarly, Daniels (2015) indicates that, when using AI, users can converse with technological devices in the same way that they converse with humans. Supplementarily, Nordrum (2017) states that AI can continuously motivate children to raise their EFL oral engagement. As well, it is observed by Ghareeb (2020) that listening and interacting with smart machines serves as a springboard for interactive discussion and intense practice of the FL. In addition, Mukhallafi (2020) mentions that AI-based communication tools assist in the creation of learning settings, and correcting letters' and words' pronunciation using sound exercises and visual media. Including listening exercises, in addition to describing and interpreting visuals and everyday events, and guiding pronunciation practice. Hence, in alliance with previous literature (Almohammadi et al., 2017; Atwell, 1999; Fryer & Carpenter, 2006; Gharee, 2020; Hsu et al., 2021), integrating AI application in EFL teaching/learning has a great impact on the learners' oral language skills. In essence, some scholars investigated the AI effect on fluency (Al-Zawaideh, 2022), pronunciation (Becker & Edalatishams, 2019; Fathi & Jelani, 2017; Samad & Ismail, 2020), communication skills (Alkinani, 2021; Ryan et al., 2019), oral accuracy (Hsu et al., 2021; Hynes, 2016; Kim, 2016b), and speaking anxiety (El Shazly, 2021; Ketelaars et al., 2016; Slater et al., 2006), in which all indicate the positive effect of AI tools.

Furthermore, Students must be exposed to authentic and relevant listening materials to enhance listening and speaking proficiency (Kim, 2018). This view is supported by many researchers concerning AI use in EFL teaching/learning. According to Mukhallafi (2020), "AI applications such as simulation and communication programs simulate real-life situations for conversation and communication in English" (p.44). Likewise, Ghareeb (2020) observes that "while talking to robots; it gives learners correct models of language input either in spelling or pronunciation" (p.73). Thus, using AI in learning the English language will increase authenticity. In a similar vein, Ali (2020) declares that AI provides better listening activities that can prepare learners with a native-like interaction environment. Also, Wang (2019) maintains that by using AI English learning becomes more visual.

Moreover, learners are more comfortable, relaxed and often prefer conversing with machines than with people (Han, 2012). Also, a lot of researchers demonstrate that students have positive attitudes toward AI tools for oral training (Kučak et al., 2018; Qian & Tang, 2018). This can be contributed to that AI delivers easy-to-use tools to assist students in enhancing their oral skills, listening/ speaking (Ghareeb, 2020). Above and beyond, AI can deliver personalized responses to learners' communications, score their performance, and offer improvement suggestions (Pokrivcakova, 2019). This was also observed by Wang (2019) claiming: "AI corrects the errors in the dialogue in time, so that students can learn English in a relaxed and pleasant atmosphere" (p.394). Underwood (2017) supports that argument, declaring that the learning experience can be effortless and joyful when using AI, by engaging learners in self-correction and creating high enthusiasm to make AI tools execute tasks.

In this sense, maybe the most influential applications/ platforms to practice oral skills are chatbots, Intelligent Personal Assistants (IPA), and Virtual Reality (VR). A chatbot is a program that can deliver a human-like language interaction (Abu Shawar & Atwell, 2007). As Kim (2019) mentions, chatbots, as conversational agents, provide a natural language interface

for human-like interaction, and convince their users that they are speaking with a real person while they are speaking with a machine. Hence, these AI platforms help EFL learners to use the target language more clearly, confidently, and fluently (Kim, 2017). Moreover, many researchers praise the use of chatbots for FL learning and teaching (Becker & Edalatishams, 2019; Fathi & Jelan, 2017; Fryer & Carpenter, 2006; Samad & Ismail, 2020) clarifying that chatbots not only provide human-like interaction but it is fun to use, interesting and motivating. Further, since interaction with a chatbot can be orally or in written forms, formally or informally, it increases the all four language skills, including reading, listening, speaking, and writing (Samad & Ismail, 2020).

In this vein, it was observed that learners, with the use of chatbots, can practice their speech output through a two-way conversation.(Dizon, 2017a, 2020; Golonka et al., 2014) with no restrictions on time or place (Zhang & Zou, 2020). Adamopoulou and Moussiades (2020) indicate that chatbots provide an amicable and fruitful learning environment. More of the same, Goda et al. (2014) reports that prioritizing dialogue with a chatbot before an EFL session can effectively raise the learners' contributions in addition to their critical thinking. Furthermore, some chatbots can give immediate, formative feedback on the learners' fluency, pronunciation, grammar, vocabulary, stress, and intonation. Other researchers, went further claiming that conversing with a chatbot is more efficient in enhancing grammar skills and overcoming communication breakdowns compared to chatting with a human, since it has some limitations to understanding learners, making them actively put more effort (Brooks, 2018; Kim, 2016a, 2016b; Lee et al., 2011). Moreover, IPA can be considered as a type of chatbot, that takes oral orders to do some tasks or to answer particular questions, thus, many scholars indicate that IPA has the same previously mentioned advantages of chatbots on EFL learners, yet, with a less interactive environment, and no feedback (Dizon, 2017b, 2020; Goksel Canbek & Mutlu, 2016; Moussalli & Cardoso, 2020; Myers et al., 2007). However, VR apps can have more advantages for language learners; not only do they provide an

authentic interactive environment, but also mimic different real-life contexts by giving various helpful scenarios in a motivating joyful manner (Chen, 2016; Chen et al., 2014; Gruber & Kaplan-Rakowski, 2022; Kaplan-Rakowski & Gruber, 2021; Ketelaars et al., 2016; Melchor-Couto, 2018; Slater et al., 2006; Thrasher, 2021).

2.3.2. AI and EFL Writing Skills

Writing is the most difficult and complex of the four language skills (Chang et al., 2021). Further, within the context of second/foreign language learning, writing is even more difficult, since it necessitates other lower-level language skills like vocabulary and grammar (Schoonen et al., 2009). Moreover, scholars indicate that when writing in an FL, students cannot produce at a respectable level (Li, 2021). In this vein, many researchers encourage the use of digital AI-based tools (Chang et al., 2021; Fitria, 2021a, 2021b; Kim et al., 2020; Kılıçkaya, 2020; Li, 2021; Nazari et al., 2021; Parra & Calero, 2019; Wang et al., 2013; Zhang, 2020). Whereby, AI can boost engagement, motivation, and learning environment for the writing process (Kangasharju et al., 2022), assists writers by supplying plagiarism detection, grammar checker, and rich educational practices (Zawacki-Richter et al., 2019), in a flexible, timely saving manner (Koltovskaia, 2020). In Nazari et al. (2021) opinion, AI writing tools offer "affective provisions, motivational features, in-depth analytic learning, plagiarism detector, and social interaction platforms that may enhance writing skills, engagement, and non-cognitive traits"(p.2). More of the same, Walker et al. (2007) highlight the AI's ability to independently generate texts, or assist learners to write and develop their writing compositions.

Moreover, some writing applications based on AI, namely plagiarism and grammar-checkers, can give an accurate and reliable, summative and formative evaluation of writing performance (Nazari et al., 2021). In essence, Fitria (2021a) investigated the effect of Grammarly on learners' writing skills, the results proved the efficiency of this tool in alerting the vast majority of errors including grammar and spelling mistakes and weak paraphrases, in

addition to effectively detecting plagiarism, thus, learners can write comfortably without thinking about grammatical mistakes "Type with confident". Besides, Tucker (2018) states that Grammarly helps users to identify their common errors, hence in the future, they are more inclined to avoid doing those mistakes. Consequently, learners are motivated to practice writing more and more, raising their metacognitive skills and knowledge. As a result, several scholars praise the use of AI grammar-checking tools, manifesting that they do not only detect errors, but further provide correcting suggestions after giving learners the chance to correct themselves, and enhance their critical thinking by the necessity to review results, therefore, promote learners' academic writing performance (Fitria, 2021a; Ghufron & Rosyida, 2018; Karyuatry, 2018; Koltovskaia, 2020; O'Neill & Russell, 2019; Zhang et al., 2020).

Additionally, AI can be used as an assistant tool in many creative tasks like design, writing, and painting. In this vein, Kangasharju et al. (2022a) conducted research on an AI writing tool called: The Poetry Machine, and indicate that this tool made the poetry writing easier for learners, as it provides support, ideas, and feedback, and enables students to experiment never-known poetic features, also, it increases students' interest an appreciation of poetry. Similarly, Osone et al. (2021) state that novel co-creation AI encourages writers to output more and more diversified unique papers, thus helping to enhance the contents, and it can even motivate writers to generate more and more. Moreover, AI co-writers have been largely studied particularly in story writing, and proved to be very efficient tools in all writing levels, from ideas generation, to brainstorming, to rewriting and editing (Yuan et al., 2022). Academic writing did not be left behind; there are a variety of AI co-writers' tools for academic writing, in which users can get a whole essay, or divided parts, just by specifying some context to the AI tool (Resch & Yankova, 2019; Yang et al., 2009). Above, paraphrasing is an effective writing strategy to avoid plagiarism and put ideas in a better wording, therefore, AI paraphrasing/ summarizing tools are very beneficial (Fitria, 2021b). In this connection, Fitria (2021b) declares that "QuillBot" app can help learners in different

writing tasks, such as making passages, rebuilding citations in a better style and tone; providing various paraphrasing options for the same idea, summarizing long passages, gives synonyms and present words in context. To put it shortly, AI writing mediums, such as "QuillBot", can assist the writer to understand and deliver his or others' ideas easily, in a coherent and cohesive manner respecting both grammar and content, identifying essential points in writing, contrasting and comparing sources and more (Fitria, 2021b; "QuillBot's New Grammar Checker Uses Cutting-Edge AI to Perfect Your Writing: The AI Writing Platform Now Has an Arsenal of Productivity-Enhancing Tools That Are Already Changing the Way the World Writes.," 2021).

Furthermore, AI's capability to output writing has advanced dramatically (Conversation, 2021). For an instant, AI writing tools encompass "automatic text generation, extraction, prediction, mining, form-filling, paraphrasing, translation, and transcription" (ibid, p.2). Advanced AI writing technologies, now more than ever, can create writings identical to those of humans (Hall, 2022), which made real writers compete with those artificial fellows qualitatively and quantitatively (Miroshnichenko, 2018). An AI application called "Wordsmith", in 2016, created and published 1.5 billion news writings that readers could not distinct from other human writings. Hence, EFL learners and researchers can effectively use these AI-writers and co-writers to help them write. As a result, AI misconduct concerns are already widespread, many scholars raised the question of using these technology tools to write for learners, as a cheating technique. Conversation (2021) mentions that "unfortunately, with technology, students can use their ingenuity and entrepreneurialism to cheat. These concerns are also applicable to faculty members, academics, and writers in other fields, bringing new concerns surrounding academic integrity and AI" (p.1).

Over and above, there are also writing tools meant for people with special needs. Including AI apps for people with Dyslexia (Wu et al., 2019), the "Fluent" apps for people who stutter (Ghai & Mueller, 2021), for people with visual impairment (Hanakovič & Nagy, 2006; Waqar

et al., 2019), Sign Language Users (Ivanova & Eriksen, 2012), etc. Evmenova et al. (2010) proved the efficiency of some AI writing systems (Co:Writer, WordQ, and WriteAssist) for learners with learning disabilities to help them joyfully generate accurate papers and reduce spelling mistakes. In the end, we can say that "The changes AI bots could unleash in science writing are remarkable" (Tatalovic, 2018, p.2).

2.3.3. AI and EFL Grammar Learning

Grammar for EFL learning is fundamental. As mentioned by many researchers (Chuah & Kabilan, 2021; Gain et al., 2019; Ghufron & Rosyida, 2018; Kim, 2019; Park, 2019; Perdana & Farida, 2019), learning grammar is an absolute necessity. Grammar stands for the structures and rules that governed language use; thus, mastering it is vital in language learning (Gain et al., 2019). As a result, being grammatically correct is a must of course (Perdana & Farida, 2019). Yet, many learners struggle with grammatical barriers that prevent them to meet their educational needs (Ghufron & Rosyida, 2018; Karyuatry, 2018; Yang, 2018). To remedy this, AI technologies can be used to enhance the grammatical skills of learners. Shafaei (2012) in his study about the effect of AI-assisted technologies in learning English, found that AI makes grammar rules easy to understand and learn. O'Neill and Russell (2019) demonstrate that grammar-checkers applications such as "Grammarly" are useful to detect grammar mistakes, hence, understanding grammar more easily and effectively. In their study on the students' perception of using the AI tool Grammarly, Cavaleri and Dianati (2016) found that students support this claim and felt that the AI tool was not able only to improve their writing accuracy, but further raise their understanding of grammar rules. In essence, Ghufron and Rosyida (2018) discuss the ability of Grammarly feedback to reduce the learners' grammatical mistakes, manifesting that the errors reduction percentage was much higher when using the AI tool compared to getting the human feedback. Therefore, it is safe to say that AI writing tools not only check and correct grammatical mistakes, but are also helpful to

understand grammatical rules and reduce grammatical mistakes. Moreover, the same can be said about AI feedback on the students' oral output (Samad & Ismail, 2020).

Furthermore, Other researchers, claim that chatting with an AI chatbot is more efficient in enhancing EFL grammar skills and overcoming communication breakdowns compared to chatting with humans (Brooks, 2018; Kim, 2016a, 2016b; Lee et al., 2011). According to the latter, interaction with chatbots requires an accurate language, since it is hard for chatbots to handle the ambiguity in EFL learners' speaking, which results in more frequent communication breakdowns. Henceforth, learners need to put more effort to overcome this communication failure, which helps to improve the users' grammatical skills significantly (Kim, 2019). In this vein, many chatbots are designed specially to overcome grammar problems, such as "Gengobot", a chatbot-based dictionary for grammar development (Haristiani, 2019). Additionally, Chuah and Kabilan (2021) emphasize the use of two chatbots, "Anndy" and "Wordsworth" to practice English and foster grammar skills. These types of applications are helpful to learn and practice English, in addition, they include grammar and vocabulary lessons, in which the user can take lessons, in which, the chatbot will provide the user with explanations and various examples and practicing tasks to grasp the grammatical rules more easily and effectively in an interactive environment (Tran et al., 2020).

2.3.4. AI and EFL Vocabulary Learning

"Without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (Wilkins, 1972, p. 111). In the EFL teaching and learning context, vocabulary significance has been largely acknowledged and well documented (Ardasheva et al., 2019). Yet, as a result of the limited classroom time and/or the limited exposure to the FL, learning vocabulary is among the hardest tasks for the FL learners (Hao et al., 2021). Therefore, students' vocabulary acquisition is frequently beneath expectations (Gibson, 2016). In this matter, AI opens up fresh instructional possibilities to promote FL vocabulary learning. In

general, the employment of AI is frequently linked to positive effects on FL vocabulary acquisition (Hao et al., 2021). Sharifi et al. (2015) express that computer technology including AI may accelerate and facilitate the vocabulary learning process. Park (2019) and Alsadoon, (2021) demonstrate that learning vocabulary becomes easier with the variety of learning aids provided by AI, as they not only yield online translation tools, dictionaries to review unknown words, picture search engines, or concordances, but as well, deliver practicing opportunities using online materials, interactive exercises, AI writing tools with feedback, and chatbots.

Many researchers indicate the positive effect of AI writing applications on vocabulary learning. H.-S. Kim et al. (2020) state that the use of AI writing assistance reported significant improvement, especially in vocabulary. In addition, Deals (2021) declares that an AI writing app called "ProWritingAid" can spot issues like repetitive and vague wording which can successfully support vocabulary acquisition. Similarly, Fitria (2021a) expresses that "Grammarly" software can detect and correct words that are misused, and thereby facilitates word acquisition. On the same hand, among many effective vocabulary learning strategies, mentioning, grouping similar words' meanings (McCrthy, 1997), and learning chunks (M. H. Chen, 2019), therefore, paraphrasing help students learn faster and recall better in term of vocabulary (ibid). Relatively, AI paraphrasing tools can play a vital role in vocabulary learning. Fitria (2021b) examined the uses of QuillBot, an AI paraphrasing and summarizing tool, and indicates that it uses several ways of paraphrasing, including using equations or synonyms and changing the order of words in sentences, as it also removes superfluous words and identifies the correct synonyms for the concerned context, which thereby causes rich vocabulary gaining. In addition, Fredholm (2019) investigated the use of Google Translates (GT) on vocabulary, stipulating that as long as GT is utilized, it leads to greater lexical diversity.

In another hand, Petrović and Jovanović (2020) ensure the chatbots' abilities to give variance of syntax, semantics, and vocabulary while interacting with users. Additionally,

some of those chatbots, Duolingo, Andy, and Wordsworth, embrace varied beneficial lessons on vocabulary memorization (Hynes, 2016), with the ability to get explanations and various examples, practicing tasks and games with the chatbot to grasp the items more easily and effectively. In this account, Sharifi et al. (2015) demonstrate that "one to one interaction between a student and the computer might have facilitated students' vocabulary achievement and made the students actively involved in the learning process" (p.265). Along with others, Al-Seghayer (2001) indicates that the visuals' contextual richness and authenticity provided by AI tools make vocabulary, more meaningful and memorable. In a similar vein, Wang (2019) maintains that by using AI English learning becomes more visual, simulating real-life situations. Sharifi et al. (2015) conducted a study that compared the impact of Rosetta Stone, an AI tool, on enhancing vocabulary with teacher-led instruction, and the results showed that utilizing the AI tool had a much better positive influence on vocabulary learning, in which the users remembered and learned more lexis easily and funnily. Sharifi et al. (2015) explain the later results by stating that "the software used in this study made it possible to simultaneously present visual and textual information" in which " students will not only learn a greater number of words, but also the usage of those words as well" (p.265). Hence, using an AI chatbot is considered an efficient learner-centered method that provides personalized activities, makes learners work autonomously, and raises their curiosity and interest with its lively environment and animation (ibid). Consequently, one can conclude that AI may provide the best environment for vocabulary learning.

Over and above, other researchers investigated the use of VR for vocabulary learning and get positive results, thus, it was highly recommended as a productive method to learn vocabulary (Alfadil, 2017; Y. L. Chen, 2016; Y.-L. Chen et al., 2014; Lan et al., 2016; Liou, 2012; Tai et al., 2020). Gee and Levine (2009) express that VR tools create visualized, contextual environment, using experience, dialog, action, and images to grasp vocab in a real-

like situation to make words more understandable and memorable. According to Tai et al. (2020), VR applications, such as "Mondly", "Second Life", and "3D desktop-based VR":

> Can effectively facilitated vocabulary learning because they provided an immersive environment, comprehensible input and multimodal support, real-time interactivity, and immediate feedback. Furthermore, the VR players could experience authentic language and construct word knowledge through active interaction, participation, and navigation. Additionally, many AI applications are designed especially for vocabulary learning. (pp. 21-22)

Concerning AI vocabulary games, "Google Semantris" is a word association game that can effectively help in vocabulary learning in a motivational way (Chimrov et al., 2021). Also, "Word AI" is a game for enriching vocab and enhancing logical thinking that can be played versus humans or AI, it includes five levels, a dictionary, and vocabulary describing thesaurus, with other many beneficial features. As indicated earlier, the majority of AI chatbots provide interactive vocabulary games and lessons, among which, are Andy, Wordsworth, Replica, Anima, and TextGenome.or (Kannan & Munday, 2018).

2.3.5. AI to Provide Feedback and Assessment for EFL Learners

Feedback is vital in the EFL context to gain high proficiency. Teachers are typically expected to provide regular and fast corrective feedback to their students (I. Lee, 2014). However, according to Moon (2021), it is difficult for instructors to match learners' expectations for feedback as it is such a time-consuming and demanding task. Worse still, large class sizes and limited class time make it even more difficult. In this light, Nazari et al. (2021) state that "the most important contributions of AI in education and meaningful learning are giving immediate feedback to the students about the learning progress" (p.2). Dodigovic (2007) illustrates that AI systems can facilitate language acquisition through the detection of errors in speech and writing, and subsequent provision of feedback to the learners. Ryan et al. (2019) reveal that digital recordings using AI can generate

individualized, accurate, and detailed feedback for users, in addition to the ability to compare with peers. Li (2021) asserts that AI feedback can help teachers accomplish composition correction more swiftly, encourage mutual assessment easily, and foster learners' autonomy and lifelong learning. Further, AI can assist distance education students in visualizing their progress toward attaining their competency would result in better outcomes (Grann & Bushway, 2014).

Henceforth, AI can provide immediate feedback on the performance of the learners. For an instance, AI can detect and correct grammar and spelling mistakes, incorrect sentence structures, and plagiarism (Allen et al., 2014; Almaleki, 2021; Fitria, 2021b; Myers et al., 2007). Deals (2021) declares that an AI writing app called "ProWritingAid" can spot issues like "repetitiveness, vague wording, awkward sentence length, passive voice, over-complicated sentence constructions, and more" (p.2). Fitria (2021a) mentions that "Grammarly" software can detect errors such as "prepositional errors, irregular verb conjugations, inappropriate use of nouns, and also corrects words that are misused" (p.66). Li (2021) indicates that "Cloud Classroom" gives detailed feedback and correction, comprising the use of punctuation, the accuracy of sentences, grammar, and words' appropriateness, as it also gives a range of correction adjustment suggestions. Allen et al. (2014) claim that an AI app called "The Writing Pal" can address different writing strategies to enhance the learners' quality of academic writing. Karsenti (2019) states that the "Turnitin" application can give feedback on the students' plagiarism degree, showing the parts that are likely to have been plagiarized, the potential sources, and the plagiarism percentage. Supplementarily, Edelblut (2020) argues that "MY Tutor" application provides "immediate, detailed and developmentally appropriate prescriptive feedback, for each domain involving focus and meaning, content and development, organization, language use, voice and style, and mechanics and conventions, which give students a narrative learning pathway that adjusts to their changes" (p. 287). Therefore, as it is vital to get immediate feedback on the writing

performance of the learner, we can highly encourage the use of AI to get this formative, immediate feedback.

Moreover, AI tools may offer feedback on the learners' pronunciation, intonation, fluency, and accuracy, including segmental issues such as consonant clusters, sounds of aspiration, and schwa (Fakdawer, 2020). Sidgi and Shaari (2017) declare that some AI tools not only show the learners' errors but give explications of mispronounced words and feedback, it can also give a comparison between the users' pronunciation versus natives and present the articulation's place for the sound. Other AI technologies give the right percentage ranking and a comprehensive report that can be downloaded by users (Fakdawer, 2020). Similarly, Zou et al. (2020) express that AI applications like Liulishuo offers gratuitous tests templates including virtual examiners and an environment to mimic real speaking exams, while recording all voice responses for 15 minutes, to release detailed feedback after that, which embraces vocabulary, fluency, pronunciation and grammatical errors. The authors go further and indicate that Liulishuo can generate more extended evaluation, including the user's willingness to interact, and listed the overused words with changing suggestions (ibid). Henceforth, AI tools can assess the user's oral performance and provide extensive, immediate feedback positively.

Feedback makes learners more active, motivating, independent, and knowledge producers, thus, enhancing achievement (Nazari et al., (2021); Zimmerman & Kitsantas, (2007)), especially when it is immediate, since feedback delayed is feedback denied (Wible et al., 2001). In this sense, AI feedback is immediate and can reduce teachers' workload concerning correcting the learners' work (Zhang, 2020). Above that, AI can monitor the students' behavior, progress, and changes over time which brought many advantages (Chapelle and Sauro 2017), including improving the students' grammatical accuracy and reducing the creation of future grammatical mistakes, increasing autonomy and motivation (J. Zhang et al., (2020); J. Li (2021)), and encourage self-checking and self-directing (D. Lee, 2007).

Moreover, AI creates a novel assessment approach in EFL teaching and learning (J. Park, 2019), supplying a variety of assessment methods, combining peer assessment, teacher assessment, and self-assessment that foster motivation and engagement (J. Li, 2021).

2.3.6. AI and EFL Learning Motivation

In the EFL context, motivation is a vital aspect of success (Muñoz-Restrepo et al., 2020). Laufer and Hill (2000) claim that when an educational tool is favored by learners, then it will be useful too. Yet, it is a typical problem to have some students bored because they already know what the teacher is doing, or have some students who do not understand anything in the lecture. In this vein, the efficacity of AI tools to enhance EFL learners' motivation is well documented in the EFL literature (Muñoz-Restrepo et al., 2020; O'Neill & Russell, 2019; Wehner et al., 2011; Yu et al., 2019; J. Zhang et al., 2020; Z. Zhang, 2020; Zou et al., 2020). Indeed, to the best of our knowledge, as yet, there does not exist any study that had stipulated the opposite of this argument, literature indicates that AI tools have not just been considered effective, but are preferred. "AI has the potential to provide more, and more motivating, opportunities for children to practice the target language" (Ghareeb, 2020, p. 72), without being restricted by time or place (Al-Zawaideh, 2022), by which " the learning experience can be effortless and joyful" (Buddhima & Keerthiwansha, 2018, p. 33).

To illustrate, in his research on the students' perceptions towards Siri, an IPA, Haryanto (2019) found that students prefer these AI tools to the traditional instructor-learner environment. This claim was confirmed by Haristiani (2019) in his study about the usability of "Cortana", another AI tool. In a similar vein, Alsadoon (2021) indicates that the students in his study used words such as "I love this chatterbot, "It is joyful", and "I want to use it", to express their perception of AI learning tools. Hence, students prefer to use AI devices instead of dealing with their teachers or peers (Han, 2012). Shafaei (2012) mentions that students are more than interesting to use AI tools, they are eager to use them. Subsequently, AI tools can enhance classroom motivation, and interest in language learning, whereby, students not only

enjoyed using them, but they, the AI tools, encouraged the students to initiate and sustain practice and raise the students' contributions (Alm & Nkomo, 2020; Coniam, 2008b; Fryer & Carpenter, 2006; Goda et al., 2014; Haristiani, 2019; Underwood, 2017).

Accordingly, Bibauw et al. (2019) express that chatbots analyze the students' capabilities and invoke their interests, involving them in contextual linguistic activities that foster a deeper, more active learning process. Chatbots can provide a lively environment, including authentic and native-like conversational practices that enhance curiosity and create a better mental picture (Adamopoulou & Moussiades, 2020). According to Munday (2015), chatbots are easy-to-use, helpful, promote self-directed learning, and are enjoyable. N.-Y. Kim (2019) states that "AI tools, chatbots, are not unwilling to repeat the same task with students endlessly, so they never lose their patience or get bored" (p.38). Henceforth, Ghareeb (2020) concludes that AI "fosters curiosity, mostly to see what AI could and could not do, asking questions, giving commands, and getting a response with AI made learning meaningful and often joyful, even when they were not understood they often tried again" (p.103). Equivalently, Garrido-Iñigo and Rodríguez-Moreno, (2015), Tai et al. (2020) and Wehner et al. (2011) ensure the usefulness of VR tools to enhance EFL learners' motivation, explaining that "VR learning environments motivated the VR players to observe, search and evaluate their hypotheses, and thus enhance involvement" (Tai et al., 2020, p. 22).

Over and above, other researchers investigate the ability of AI co-writing tools to enhance the learners' writing motivation, the finding results assert the effectivity of the former on the latter (Erstad, 2015; A. Kangasharju et al., 2022b; A. I. Kangasharju et al., 2021; Osone et al., 2021). The latter scholars claim that AI co-writing tools increase the writer's appreciation for creative writing and his interest to produce more and more, as due to AI co-writing tools, the students perceive writing as enjoyable and easy task. In this context, A. Kangasharju et al. (2022) declare that "AI tools offer opportunities that can support the writing process by offering supportive and inspiring learning environments" (p.1).

2.3.7. AI and FL Learning Anxiety

Foreign Language Anxiety, FLA, is "the feeling of tension and apprehension specifically associated with second language contexts, including speaking, listening, and learning" (MacIntyre & Gardner, 1994, p. 284). FLA is typical, negatively influencing variable that obstructs EFL learning (Gardner & MacIntyre, 1993; Oxford, 1998). The harmful effects of anxiety in the EFL context are well documented (Horwitz, 1986; Horwitz et al., 1986a; MacIntyre & Gardner, 1994; Occhipinti, 2009). FLA is commonly generated when language learners feared about being misunderstood or ridiculed, due to their accent, limited vocabulary, grammatical errors, inadequacy, or incompetency (Jin et al., 2021; C. Li et al., 2021). Controversially, FLA is not always associated with a lack of ability (Horwitz, 1986; Occhipinti, 2009). One possible approach to compensate for this is through interaction with AI (Bao, 2019). Respectively, El Shazly (2021) mentions that AI tools have the ability to immensely minimize all three types of FLA specified by Horwitz et al. (1986) namely: communication apprehension, fear of negative evaluation, and test anxiety.

In this connection, many scholars have argued that AI tools inhibit affective filters like anxiety, stress, and fear, hence, boost confidence, motivation, and engagement when using chatbots (Alemi et al., 2014; Almaleki, 2021; Alsadoon, 2021; Dizon, 2017b; Fryer & Carpenter, 2006; Ghareeb Ahmed Ali, 2020; Goda et al., 2014; Gruber & Kaplan-Rakowski, 2022; J. Han, 2012; Kessler, 2018; N.-Y. Kim, 2016a, 2016b, 2017, 2019; Moussalli & Cardoso, 2020; Stachowicz-Stanusch & Amann, 2018), VR tools (Chien et al., 2020; Deutschmann et al., 2009; Gruber & Kaplan-Rakowski, 2022; Kaplan-Rakowski & Gruber, 2021; Ketelaars et al., 2016; Melchor-Couto, 2017, 2018; Teimouri et al., 2019; Thrasher, 2021; Z. Wang et al., 2021; York et al., 2021), AI writing agents (H.-S. Kim et al., 2020), and IPA (Tai & Chen, 2020).

The positive impact of AI tools on reducing FLA was justified, by the aforementioned scholars, in that AI tools can provide a safe and highly authentic learning environment with

total anonymity, in which learners do not have to worry about negative judgments or comments, hence, learners feel free, comfortable, relaxed and safe. Accordingly, Gruber and Kaplan-Rakowski (2022) state that "The awareness that the avatars are computer generated and the anonymity of VR offers users an environment in which they can make mistakes without losing face" (p.4). Resulting in the students feeling more relaxing interacting with AI than with peers or instructors (Haristiani, 2019). Furthermore, the motivating, joyful environment that AI tools can provide, in which learners displayed higher levels of happy engagement, plays a vital role in reducing the users' anxiety (Al-Zawaideh, 2022).

Over and above, El Shazly (2021) argues that a moderate level of anxiety is favored in the EFL context according to many scholars (e.g., Alpert & Haber, 1960; Chastain, 1975; Gkonou et al., 2017; Kleinmann, 1977). Having said that, it was proved that AI tools such as VR, can trigger a certain degree of internal feelings and emotions, thus anxiety, in which users feel that their experience is really happening (Gruber & Kaplan-Rakowski, 2022; Slater, 2009). Therefore, the experience of realism and authenticity that AI tool can deliver, play a crucial role to provide the best environment for learners that reduce inhibitive anxiety without reducing motivation and interest. Relatively, El Shazly (2021) declares that "AI applications have the potential to leverage manageable anxiety levels to motivate learners to expend the required effort, thereby evoking problem-solving techniques and activating strategic competence" (p.12).

2.3.8. AI and EFL Personalized Learning

Personalization Language Learning (PLL) is a vital approach that addresses individual diverse needs and variations by efficiently diagnosing individual EFL students (X. Chen, Zou, Xie, et al., 2021). However, it is difficult for a tutor to fully meet the students' differences and expectations which affect the learners' outcomes and performance (Almaleki, 2021). In this vein, "AI for personalized learning has attracted increasing attention in various educational contexts and domains, including language learning" (X. Chen, Zou, Xie, et al., 2021, p. 241).

Hence, advances in AI tools immensely smooth personalized EFL teaching/ learning. AI can be used through personally owned devices such as mobiles, tablets, or computers. Therefore, learners can use it voluntarily and independently to focus on their personal goals and interests, thus, learners can make personal choices, as to choose a personally convenient time for practicing, and they can use the rewind feature to repeat the activities more than once (Kukulska-Hulme, 2016). However, the latter, (Kukulska-Hulme, 2016), declares that using AI can give great qualities for the best PLL, states that "it never just about using a particular mobile service or application because the learner wants to"(p.17).

Thanks to technology development, massive learner data, concerning learners' personalized parameters, can be collected and used by AI tools to perfectly personalize the teaching and learning process (Reiland, 2017). Data can be collected by tracing learners in their social accounts or making students fill out personal account information and tests. Having said that, scholars identify several personalization parameters that AI tools can address including background knowledge, language level, competencies, learning abilities and barriers, preferences, and interests, movements and behaviors, context and settings of learning, learning goals, learning styles, age, emotional states, and finally learning needs, including special needs (Bittencourt et al., 2008; X. Chen, Zou, Cheng, et al., 2021; X. Chen, Zou, Xie, et al., 2021; Godwin-Jones, 2017; Grivokostopoulou et al., 2014; C. K. Hsu et al., 2013; Kannan & Munday, 2018; Kukulska-Hulme, 2016; Ohler, 2008; Pataranutaporn et al., 2021).

Some AI tools use a data-driven recommendation strategy that can consider individual differences to filter and assess content fitness, then trigger the most effective learning materials and testing tasks recommendations (Godwin-Jones, 2017; C. K. Hsu et al., 2013; Kukulska-Hulme, 2016; Y. Lee, 2011; Lu et al., 2018; Nikiforovs & Bledaite, 2012; Sunil & Saini, 2013; L. Yang et al., 2019). Subsequently, the recommended contents can target the intended learning outcomes. AI recommendations can trigger content such as learning

materials and resources, maybe by using Personal Learning Environment (PLE) or Massive Online Open Courses (MOOCs) (Case, 2015; García-Peñalvo & Conde, 2015; Laakkonen, 2011; Pegrum, 2014). Reading learning recommendations (Hooshyar et al., 2018; C. K. Hsu et al., 2010, 2013; T. T. Wu et al., 2014) such as "DLLgame". Vocabulary learning recommendations (Demmans Epp, 2017; Devedzic, 2016; Nikiforovs & Bledaite, 2012; Pereira et al., 2012; Wible et al., 2011; Xie et al., 2016) using tools such as "VocabNomad", "Merlot" and "Ariadne". Grammar learning recommendations (Fang et al., 2018; Haristiani et al., 2019) utilizing tools such as "Gengobot". Material AI-recommendations according to context and setting (M. P. Chen et al., 2019; Kukulska-Hulme, 2016) like "iMap", "Mapp", "The European MASELTOV". AI-recommendation tools to reduce FLA (C. M. Chen et al., 2016). Further, AI can recommend suitable learning strategies and procedures (Bittencourt et al., 2008; Gelan et al., 2018; Spector & Ma, 2019), or recommend materials for special needs learners (Connected Women, 2015; Jalbout & Farah, 2016; P. Kim et al., 2008; McMahon et al., 2013; Pereira et al., 2012).

Above giving a personalized recommendation, AI can adapt the learning process according to the learners' progress and changes rather than customize a predefined learning process according to the learners' primary profile (X. Chen, Zou, Cheng, et al., 2021; X. Chen, Zou, Xie, et al., 2021; Pereira et al., 2012). Due to its ability to assess and optimize formative, personalized feedback and evaluation, which provide a personalized diagnosis of the learner's progress and change, and trace learners' progress, AI can adjust the learning pace and supply a personalized pathway (Bittencourt et al., 2008; Buddhima & Keerthiwansha, 2018; Chapelle & Sauro, 2017; C. M. Chen et al., 2016; Grivokostopoulou et al., 2014; Pérez-Paredes et al., 2018; Sharples et al., 2015). Respectively, Pokrivcakova (2019) states that "AI-powered tools can collect massive amounts of data on learner´s learning progress, on their basis to model their learning curves and to adapt learning content accordingly" (p.138). In addition, "the data that helps researchers and instructors gain insights

45

into group performance also enables continuous re-calibration of learning materials to individual learners" (Godwin-Jones, 2017, p. 10). Thus, personalization using AI can be oriented toward individuals or groups of learners (Kukulska-Hulme, 2016). That being the case, AI for PLL can extend its advantages further from the learning process to include the teaching process (Buddhima & Keerthiwansha, 2018; X. Chen, Zou, Cheng, et al., 2021; X. Chen, Zou, Xie, et al., 2021; Kukulska-Hulme, 2016; J. Li, 2021; R. Wang, 2019). According to R. Wang (2019) "English teachers can customize personalized teaching activities for students according to their different learning characteristics and assist by artificial intelligence, and then provide targeted teaching optimization measures according to different students' English foundation"(p.394). For instance, gamification, VR, and chatbots are the most widespread AI language learning tools that provide personalized environment for users and deal with each user according to his characteristics and personality (X. Chen, Zou, Cheng, et al., 2021; X. Chen, Zou, Xie, et al., 2021; Kılıçkaya, 2020; Lin & Mubarok, 2021).

2.3.9. AI and EFL Autonomous Learning

Learner autonomy is learners' ability to make their own decisions about what and how to learn (Little et al., 2003). Further, "an autonomous learner is responsible for making decisions, implementing them and assessing the outcome" (Benson, 2013, p.11). Due to its importance for language learners (Lian et al., 2021), "Autonomous Learning (AL) has been one of the most discussed topics in language learning, especially during a pandemic like nowadays, when teachers are required to provide learning with existing limitations" (Haristiani, 2019, p. 562). Respectively, the difficulties that learners face in becoming autonomous learners cannot be ignored (Fakdawer, 2020). However, with AI's contentious development and the booming increase of EFL autonomous recently, AL effectivity has been immensely boosted (Y. Zhang, 2022). Thus, many scholars had emphasized the use of AI to AL in EFL (Almaleki, 2021; Chapelle & Sauro, 2017; C. Chen, 2021; Dinh et al., 2016; Dodigovic, 2007; Fahimirad & Kotamjani, 2018; J. Li, 2021; Muehlhauser & Bostrom, 2014;

Y. Zhang, 2022). For instance, Y. Zhang (2022) declares that "AI technology is indispensable for autonomous English language learning"(p.11).

According to Anastasiades (2012), providing different choices for practicing raise the students' feelings of autonomy and cognitive involvement. Equally, the ability to learn anywhere and at any time (Almaleki, 2021), which is the case when using AI. Dodigovic (2007) declares that AI may give a chance for students to learn on their own in a way they are comfortable with, which enhances autonomy. Especially, since the vast majority of AI applications are designed to be used voluntarily and independently allowing students to learn individually, without the need for classmates or teachers (Kukulska-Hulme, 2016). Many researchers support this argument, emphasizing the ability of different AI tools to enhance autonomy, such as chatbots (Abu Shawar & Atwell, 2007; Shawar & Atwell, 2007), VR (Y. L. Chen & Hsu, 2020), AI games (Shaalan, El-Nabawi, 2018), and AI writing tools (Nazari et al., 2021), since the presence of AI is an alternative to any human presence, teachers, peers, or parents, to be used independently, at anytime and anywhere to practice preferred and needed topics (Haristiani, 2019; Haristiani & Rifai, 2021). Van Harmelen (2006) mentions that the availability of different tools and resources can raise ownership, connectedness, and openness, thus autonomy. Respectively, AI presence can "enhance the student's feeling of ownership over the learning environment and increase her willingness to practice autonomy over her learning process" (Rahimi et al., 2015, p.244).

Moreover, Hamad and Metwally (2019) maintain that scaffolding provides a wider library of resources and more opportunities. Therefore, since embedded, AI-recommended electronic resources are a type of scaffolding in EFL, it effectively increases autonomy by making the learner a knowledge provider and an active searcher (C. Chen, 2021; Rahimi et al., 2015). AI recommendations help learners to reach better materials and resources according to their aim, and needs, they help the learner to regulate their learning and improve students' initiatives in autonomy without teachers' monitoring (Khaliliaqdam, 2014), which make learners classified

47

as "high autonomous learners" (Poole, 2005). Similarly, the ability of AI to adapt the learners'

path according to their progress and change, makes the learners more self-planed and goal-

oriented which enhances autonomy at a high level. In another hand, feedback makes learners

more active engagers, autonomous, knowledge creators (Nazari et al., 2021), and self-

regulated (Y. J. Wang et al., 2013). Thus, AI immediate, formative feedback can reinforce

independency by making learners examine their mistakes, identify incorrect patterns,

reformulate errors, and understand their weaknesses better, which develop the learners' self-

reflection abilities, self-diagnosis, and help them become assessment capable (B. Han, 2019;

Nazari et al., 2021; Shaalan, El-Nabawi, 2018). Similarly, using AI co-writing tools to help

learners in writing, paraphrasing, summarizing, finding definitions or synonyms, making

references and avoiding plagiarism, and so forth. As a result, they help learners to become

self-directed autonomous learners (Nazari et al., 2021), and enhance learners' capability to

lead the learning process (McMillan & Hearn, 2008).

Above, AI is a dynamic tool to enhance self-efficacy and motivation in the EFL context

(Cotos, 2011; Nazari et al., 2021; Parra & Calero, 2019). Simultaneously, learners'

participation in self-directed learning experiences may strengthen their confidence in

autonomous learning (Lai, 2019; Nazari et al., 2021). The latter will make learners put more

effort, and exert more persistence, hence, being highly autonomous (Usher & Pajares, 2008).

To sum up, using AI in EFL learning can enhance self-efficacy, independence, self-

regulation, self-directed (Y. L. Chen & Hsu, 2020; Goksel Canbek & Mutlu, 2016; Nazari et

al., 2021), self-correct, self-assessment, self-monitored, self-initiatives, self-planning, self-

reflection (Almaleki, 2021; Haristiani, 2019; Nazari et al., 2021), responsibility, and lesson

boredom and dependency (Goksel Canbek & Mutlu, 2016; Shaalan, El-Nabaw, 2018), to

make learners learn at their own pace autonomously (Almaleki, 2021; Y. L. Chen & Hsu,

2020; Kukulska-Hulme, 2016; Nazari et al., 2021; Shaalan, El-Nabaw, 2018; Sharifi et al.,

2015). With AI recommendations, scaffolding, adaptive environment, formative feedback,

and different choices that AI provides, leaner can successfully achieve his goals and direct his learning without human help.

2.3.10. AI and EFL Teaching

The current situation of EFL teaching is characterized as follows: a large number of students, the heterogeneous classification among students, students' low level, the major responsibility for meeting each student's needs, the complex assessing and evaluating process (Buddhima & Keerthiwansha, 2018), instructors' lack, limited teaching resources and lack of authenticity (Xue, 2021). Hence, teachers are reluctant to teach FL (J. Park, 2019), and traditional methods proved to be insufficient (Xue, 2021). Therefore, a more flexible system is required; one that is capable of removing the existing barriers and relying on technological advancements to open doors and provide knowledge (Gharee, 2020). Respectively, it has been proven by many scholars that integrating AI into English teaching activities can optimize the effect and mode of English teaching, and promote healthy development and innovative reforms in English education (Gharee, 2020; Holmes et al., 2019; Huang, 2020; Kannan & Munday, 2018; J. Li, 2021; Pokrivcakova, 2019; Y. Wang, 2021; Xia, 2020; Xue, 2021).

First of all, AI can collect large characteristic data about the learners and the learning process, such as behavioral pattern data, students' extracurricular autonomous learning data (J. Li, 2021), intrinsic motivation and cognitive style (Huang, 2020), learners' outputs, their learning needs and personal characteristics, the learner´s learning progress and changes (Pokrivcakova, 2019), data about the teachers and teaching process, and data about the contexts in which teaching and learning take place (J. Li, 2021). This massive amount of data collected can be accurately analyzed and reported by AI (Huang, 2020). According to (TeachOnline, 2018, p. 3) " AI is enabling teaching and learning analytics to detail what is happening (descriptive), why it is happening (diagnostic), predictive (what will happen), and prescriptive (what needs to happen)". Subsequently, on the basis of this big data, AI can "provide precise clues, and guidance to teachers for their personalized instruction" (Y. Liu,

2018, p. 5). As a result, English teachers can customize personalized teaching content and tasks, and supply targeted teaching optimization measures, methods, and plans parallel to learners' different learning needs and characteristics (R. Wang, 2019) which can also simplify classroom management and increase the productivity of teaching (Mukhallafi, 2020; Pokrivcakova, 2019).

Additionally, AI can reduce the workload of teachers in correcting the learners' work and give formative feedback. Since, AI can analyze the oral and written work made by students, give automatic analysis and point out errors, to introduce detailed feedback and assessment for each student, in addition to a holistic assessment for the whole class (Buddhima & Keerthiwansha, 2018; J. Li, 2021). Moreover, AI enables instructors to evaluate the instructional process and highlight the problems in the content, the materials, and the lesson, as it can identify commonly made errors by the learners, and continuously provides teachers with amelioration suggestions, feedback, solutions, and alternatives (Borge, 2016; Mukhallafi, 2020). Supplementarily, with the ability of AI to constantly monitor and analyze teachers' and learners' actions, outputs, and progress (Kamuka, 2015; Mukhallafi, 2020), teachers can continuously improve, adapt and adjust the curriculum and teaching methods in accordance with the learners' characteristics and progress (Karsenti, 2019; J. Li, 2021).

Over and above collecting and analyzing the needed data, AI can guide the teacher and give appropriate recommendations, in terms of materials, contents, and teaching methods that are consistent with the collected data (Kukulska-Hulme, 2016). Further, AI helps teachers to collect diversified sources and provide unprecedented rich resources and opportunities, exercises, and various activities (J. Li, 2021); thus, providing a personalized learning environment that is more visual, and increasing the authenticity and interaction in EFL teaching/ learning settings (R. Wang, 2019). Respectively, the typical problem of boredom as knowing what the teacher is doing and others not understanding anything will be solved, in

addition to reducing the huge effort and time that teachers take to plan and select teaching materials and methods (Buddhima & Keerthiwansha, 2018; Pokrivcakova, 2019).

Recently, AI brings forth the notion of an "Educational Cobot", "Cognitive tutor", or "AI tutoring system", as tools to aid the teachers in the classroom to differentiate instruction and give more tailored teaching (Buddhima & Keerthiwansha, 2018; J. Li, 2021; Timms, 2016; Underwood & Luckin, 2011). The latter teaching mode is named by Huang (2020) as AI Assistant + Teacher Mode, further, he indicates the possibility of using AI tutor tools as a principal tutor, rather than just an aiding tool: "AI Tutor + Teacher Mode", saying that in this mode "both human teachers and artificial intelligence are in the position of bishops, and jointly decide teaching methods" (Huang, 2020, p. 203). Similarly, Buddhima and Keerthiwansha (2018) state that cognitive tutors "aim to act like human tutors, constantly monitoring learner actions and guiding learners towards correct solutions, providing help on-demand and in response to common mistakes and giving meaningful feedback to students on their acquisition of skills" (p.32).

Otherwise, the learning opportunities that AI can provide, including reducing learners' anxiety, raising the learners' motivation, and using AI co-writers and chatbots to practice autonomously, can reduce teachers' teaching pressure (B. Han, 2019). Therefore, AI tools are highly successful aids for teachers, in and out of classes, since they can liberate instructors from tiring, energy and time-consuming tasks, like assessing works and selecting materials, thus, opening the door for teachers to spend more time with students and maintaining a good teacher-learner relationship (Pokrivcakova, 2019). Put it shortly, Xue, 2021 manifests the following:

> The educational innovation brought by AI is not only the innovation of teaching methods, learning contents and management mode, but also the recognition of education, knowledge and skills, which are mainly reflected in the innovative aspects

of teaching organization form, teaching mode, teachers' skills and ideas, assessment,

and teaching resources selection and application (p. 141).

2.4. AI Application/ Software in EFL Teaching and Learning

Table 1, summarizes all the applications/ software that have been mentioned in the

previous sub-section of this literature and proved to have useful effects on the EFL teaching

and learning.

Table 1

AI Application/ Software in EFL Teaching and Learning

AI Applications' Types	Function
Speech Assessment Tools	Assess, and give immediate feedback on the users' communication skills, including fluency, pronunciation, grammar, accuracy, spelling, vocabulary, stress, and intonation. *Examples: -Mirror AI, -Honest mirror, -Gweek, -ICORRRECT, -Correct Spelling.*
Assisted English Learning Chatbots	Create optimal proactive, easy access, comprehensive, and interactive English learning environment, tasks, activities, videos, dialogues, etc. including: listening to natives, interactive practicing, record the practicing. Then, give immediate feedback and highlight learners' errors with clarifications. Also, track students' progress and provide personalized feedback and practice. *Examples: -ELSA (Samad & Ismail, 2020), -Duolingo (Usai et al., 2018), -Liulishuo (Yang et al., 2019), -Busuu (Rosell-Aguilar, 2018), -Memrise (Karjo & Andreani, 2018), -Rosetta Stone (Sharifi et al., 2015), -Kahoot (A. I. Wang, 2018)*
Chatting Chatbots	Conversational agents, provide a natural language interface for human-like interaction. By learning from the users, they aim to be their best friends. With time, their personality gets more similar to their users as a result of their interactions. Most chatbots include some tasks and games to fulfill with their users, others even supply grammar and vocab lessons and practices. They are also designed to start the conversation. *Examples: -Replika$_1$ (J. Hsu, 2018), -Anima$_2$, -A-BOT, -Tandem Chat, -English2Go.com, -Jenney talk*
Intelligent Personal Assistants "IPA"	Artificial smart assistants, generally in mobile devices, work by getting oral orders. They can perform tasks like taking dictation, griping directions, presenting emails, organizing and reminding appointments, giving jocks, and answering questions. *Examples: -Apple's Siri$_1$, -Google Now$_2$, -Amazon Echo (Goksel Canbek & Mutlu, 2016; Myers et al., 2007)*

Speech-To-Text Tools	Transcribe text from speech. As dictation tools, they allow the user to assess his pronunciation, and write oral data, information, and ideas. ***Examples***: *-the Dragon transcription, -Dictation.io, -Google Cloud* (IANCU, 2019)
AI Grammar-Checker Tools	Give immediate feedback on writing performance, offer grammar and spelling checks, and detect plagiarism, also provide suggestions to enhance writing style, cohesion and coherence, clarity, tone, and lexis. ***Examples:*** *-Grammarly, -Turnitin, -ProWritingAid, -Proof Writing, -Ginger*
AI Paraphrasing/ Summarizing Tools	Help in different writing tasks, especially when ideas are complicated, such as making passages, rebuilding citations in a better style and tone, including various paraphrasing options, and summarize long passages, give synonyms, and present words in context. ***Examples:*** *-QuillBot, -NooJ, Rephrase, Parphraser, Spin Rewriter, WordAI.*
AI Creative Co-Writer Tools /Text Adventure Games	Users create and arrange dramatic beats to achieve certain story goals, through which the tools curve the storylines parallel to the user's directions, generate ideas supporting the themes or poetic structures and features. *Examples: -AI dungeon$_1$,-, -TextSpark$_3$, -Latitude$_4$, -Storyteller$_5$, -Ice-Bound$_6$, -BunCho$_7$, -PoetryMachine$_8$, -Writing Buddy$_9$, -Creative Help$_{10}$, -Wordcraft$_{11}$*
AI Academic Co-Writer Tools	Automatically generate original, and high proficiency passages with accurate languages and tones, in a few seconds, just by entering some guidance words or context. *Examples: -Rytr, QuillBot, -SciNote, -EssayBot, -Copymatic, -AI-WRITER, -textio, -Hyperwriteai.com, -Shortlyai.com, -copy.ai*
AI Vision Tool/ Smart Glasses/ Wearable Smart Camera	Read any type of paper, even with two or more different languages, convert oral information or handwriting papers into written digital ones just by taking a picture of it, or scanning it. Very helpful for EFL learners and more for people with visual impairment, as they include voice recognition, navigating directions, detection of obstacles, and merging phase (scans the environment) *Examples: -Envision-AI, -GoPro, -MeCam, -Looxcie, -Google Glass*
AI Recommendation Tools	Use a data-driven recommendation strategy that can consider individual differences to filter and assess content fitness then trigger the most effective learning material and testing task recommendations. *Examples: MOOC, Khan-Academy, EdX, Coursera, Udacity, India read, VocabNomad, -Gengobot, -Merlot and Ariadne, -DLLgame, -IMap*
Virtual Reality "VR" Tools	Mimic different real-life contexts by giving various helpful scenarios with great authenticity, interactivity, visuality, and motivations. *Examples: -Second Life, - OpenSim, - Mondly*
AI Gamification	Different EFL learning games that are based on AI technology. *Examples: -Writing-Pal, Crystallize, Google Semantris, AI words*
Machin Translation Tools	Translate words, sentences, and paragraphs. Also, give synonyms, examples, and definitions, with the phonological writing, and read any passage for the user. *Examples: -Google tradition, -Reverso*
AI Tutor	Educational tools to aid the teachers in the classroom to differentiate instructions and provide better teaching personalized environment so that learners receive more tailored teaching. *Examples: - The E-Tutor, -Cognitive tutor, -EFL teaching cloud classroom*

2.5. Challenges Face AI Integration in EFL Education

Despite all the benefits AI may bring to EFL teaching and learning, it is important to admit the other side of the coin. Recently, scholars have discovered flaws in AI's use in education (Bécue et al., 2021). First of all, AI tools for education is still in the initial stage of development (Huang, 2020), have many limitations, and are not 100 % accurate (Coniam, 2008a), for example, grammar-checkers still slip some mistakes, and machine translations still make some too. Accordingly, Huang (2020) states that "there is still a long way to explore in the future. The gap between theory and practice needs to be slowly bridged"(p.204). However, many researchers such as N.-Y. Kim (2017, 2019) indicates that these deficiencies are beneficial for the EFL learners, since the latter always need to put more effort to review the AI tools' outputs which make him active, motivated, and more engaged, thus learn more, raising his critical thinking and prevent him to be 100% dependent on AI tools. Second, even with these deficiencies, students and even scholars can use advanced AI tools to complete the work for them and cheat, which open new arguments about the ethical use of AI in education (Conversation, 2021). When it comes to data safety, AI is providing issues (Unesco, 2019), as it contradicts with the goals of building transparent systems and threats the learners and teachers' privacy (Kannan & Munday, 2018), since using massive datasets without authorization considers as a huge copyright and privacy violation (Gillard, 2018).

Over and above, according to Xue (2021) AI offers more options and improves the learning/teaching environment, yet, it introduces novel challenges and demands for education. Almaiah et al. (2020) attribute the reason for these challenges to a lack of technical support in educational sectors. While Abalkheel (2022) mentions the lack of information, training and expertise impeded the educational cadre, including teachers, learners, administration staff, and even decision-makers, and curricular designers. Thus, typical technical maintenance is not totally possible yet for many universities and schools (Almaiah et al., 2020). For instance, Abalkheel (2022) investigated the challenges encountered by Saudi EFL teachers and students

during the COVID-19 pandemic, and the findings revealed various problems such as virtual

facilitation, technological accessibility, time management, low readiness, equity, cognitive

limitations, and self-efficacy. Consequently, organizational support including professional

development and ongoing technical training sessions for EFL instructors and students are vital

to achieving success in AI integration in the educational sector (Al Lily et al., 2020; Alkinani,

2021). Almaleki (2021) adds that "there is a need to recognize and appreciate that AI is a

promising technology tool in teaching and learning languages" (p.3).

Additionally, concerns regarding instructors' roles, replacement, and losing human values

are raised (Underwood, 2017; Underwood & Luckin, 2011), and the fear of robots taking over

jobs and having a detrimental impact on the language learning sector has boosted (Kannan &

Munday, 2018). These arguments raised instructors' resistance to change and decrease the

teachers' and students' preparedness to welcome such development (Unesco, 2019). In fact,

the effect of AI on human labor cannot be denied, yet, AI cannot be considered as a humanity

threat, but only aiding practical tools (Kannan & Munday, 2018).

As a result, to face the integration of AI in the educational sector in general, and EFL

teaching and learning, in specific, " it is necessary to formulate some corresponding principles

as a bridge, to regulate the development and authority of artificial intelligence, together with

the policy and other aspects of the protection"(Huang, 2020, p. 204). However, when it comes

to incorporating AI into education, experts are still hunting for a paradigm that it effectively

works (Ciolacu et al., 2019). It is believed that the unsystematic use of AI may lead to non-

accomplishment rather than accomplishment (Abalkheel, 2022). Nevertheless, there is a

scarcity of studies that indicate how properly AI can be used in education (Bécue et al., 2021).

Regardless of all of this, it is unarguable to say that the pros of using AI in language

education exceed its coins, especially when regulating some uses' principles (Abalkheel,

2022; Almaleki, 2021; Huang, 2020).

Conclusion

The purpose of this chapter was to dig deep into the key concepts of this study. A comprehensive review of the literature was yielded to reveal two sections, namely NA and AI in the field of EFL teaching and learning. The first section of the NA reviews the NA definition, the definition of the term "Need", NA approaches, NA importance, its principles, its tools, NA in GE, and lastly NA and technology. The second section of AI includes AI definition, its elements, AI in EFL teaching and learning, AI application in EFL teaching and learning, and lastly the challenges that face AI integration in EFL education.

Chapter II:

Field Work

Chapter II: Field work

Introduction

This analytical chapter is devoted to the identification of the research methodology design and procedures, i.e., the approaches in which the study was conducted, including Sampling, data collection procedures and tools, validity and reliability, and data analysis methods. In addition to the results, discussion and interpretation of the results and lastly recommendations.

1. Research Approaches and Methods

1.1. Research Methodology Design

Due to the research nature, the methodology underpinning the study is the mixed-method approach. The latter is considered the most adequate method that suits the main objectives of our research and allows us to gain a fuller understanding of the target phenomenon.

Moreover, as far as this research is concerned, the present work tends to rely on descriptive approach, as it is the one required for finding answers to our questions in the most effective way. Therefore, in addition to the pre-study questionnaire that was set in the primary stage, this study goes through two other stages. In the first stage, a NA questionnaire is conducted to be descriptively analyzed and interpreted, to specify and understand the learners 'needs. In the second stage, a deductive thematic literature analysis is conducted, in which themes are inferred in accordance with the results of the first stage (i.e., the learners' needs), to review the potentials of AI regarding those needs.

1.2. Sampling

1.2.1. Participants Sampling

The subjects of this study were third-year English department students at Barika University Center. All participants are adults, males and females, native speakers of Arabic, with English being their third, FL. The selection of the sample is based on the convenience sampling

technique. Whereabouts, a total of "41 students" voluntarily accepted to take part in this study and complete the questionnaires.

The rationale behind the population selection is based on certain reasons. Firstly, the study targeted university students due to the important role they play and will play as future English teachers. As argued by Bouhas (2008) that university language departments around the world play a critical role in developing FL education that extends beyond the university itself, to other educational levels, such as high, middle, and primary schools, as the majority of their students will become English teachers at the high and middle school level, this was also confirmed by the data collected in this study, since the majority of the student chose becoming English teachers as the main reason for studying the English language. Second, in addition to being the researchers' university, this study targeted students from the English department at Barika University Center being a new department. Thus, gathering specific information concerning students' needs at this early stage is expected to give meaningful information for the learners, teachers and curriculum developers to improve the teaching and learning situation. Especially for the English department, where NA had never been conducted and AI as a learning tool had never been investigated. Thirdly, this study targeted third-year students since they are presumed to possess sufficient background knowledge, experience and competence that enable them to recognize their learning needs and levels, as they have already received at least two years of university instruction.

1.2.2. Articles Sampling

Using a purposive sampling, the selected articles for the aim of reviewing the applications of AI in EFL teaching and learning were obtained from Google Scholar. A primary list of references was drawn up containing the keywords "AI" and "EFL". The inquiry also included AI-related keywords such as "virtual reality," "chatbot," "IPA," "AI-based writing tools," "Smart technology," "AI recommendations," "intelligent system," and "intelligent tutor". Further, the results of the primary search were restricted to those in the English language, and

narrowed down involving only those related to FL education including keywords like "EFL," "FL," "language education," "FL speaking," "FL writing," "FL listening," "FL reading," "personalization," "FL grammar," "FL vocabulary," "FL pronunciation," "FL motivation," "FL autonomy,". Also, only articles and conference papers registered in Scopus were chosen to ensure the resources' eligibility criteria, since compared to others, these sources are more reliable. The final list includes ten (10) articles, referenced in Appendix (F).

1.3. Data Collection Procedures

In collecting the data, a mix-method was applied, in which data were collected qualitatively in the first stages using close-ended questionnaires, and quantitatively using previous studies papers, in the second stages.

1.3.1. *First Stages: Data Collection Instruments*

Pre-Study Questionnaire. To peruse a proper and eligible study, a pre-study questionnaire was delivered to the sample. The questionnaire was intended to get a deep understanding of the students' deficiencies and problems concerning their learning process, as well as their familiarity with the use of AI in learning. Respectively, the pre-study questionnaire included 29 items; divided into six sections; Motivation, anxiety, metacognition skills, metacognition knowledge, practice opportunities, and the familiarity with using AI in learning. These sections are adapted from different valid and reliable sources (See Appendix A), each of which proved to be reliable in the current study (See Appendix B) with Cronbach's alpha values ranging from (0.66) to (0.85). Also, Pearson correlation coefficient indicates that all the items' values are significant at either the level 0.01 or the level 0.05 (See Appendix C), which ensures the construct validity of the questionnaire. The questionnaire uses the five-point Likert scale that ranges from strongly disagree (SD = 1) to strongly agree (SA =5). The choice of these variables was due to their importance in EFL learning, both in classroom learning and in distance learning.

NA Questionnaire. This inquiry was conducted by distributing a NA questionnaire to the learners, in order to treat their needs. The NA instrument was chosen on the basis of the aims of the present study, the review of literature, and information collected from the pre-study questionnaire. The questionnaire was mainly adapted from Al-Hamlan and Abdelrahman (2015). This model is a valid, reliable, and modern approach to NA, and it was designed for a closely similar setting to the current study. The original questionnaire is composed of 78 items, with a five-point Likert scale that ranges from strongly disagree (SD = 1) to strongly agree (SA =5), and divided into 9 sections; 1) The purpose of studying English, 2) Level of linguistic skills and components, 3) The Linguistic needs, 4) The needed curricular and extracurricular activities, 5) The learning styles that suit learners, 6) The preferred teaching methods, 7) The difficulties students face, 8) Suggestions for better learning, 9) Learning wants. However, due to the research's nature which entails analyzing the learners' needs as frequencies rather than means, to be more eligible when linked with the literature, the scale was converted from the five-point Likert scale into the categorical scale, using the main sections that were used in the original questionnaire. Also, the second section is restricted to the general linguistic skills and components. The final version of the questionnaire included nine questions to elicit information about the learners' needs, in addition to the gender question, intended just for the description purpose of the sample (See Appendix E).

1.3.2. First Stages: Validity and Reliability

Validity refers to the extent to which a study accurately reflects or assesses the particular notion that the researcher is attempting to measure (Robson, 2002). Moreover, according to Silverman (2013) reliability concerns with the consistency degree to which items are assigned to the same section by the same examiner on multiple occasions or by multiple examiners.

Validity and Reliability of the Pre-Study Questionnaire. SPSS software version 26. was used to test the construct validity and reliability of this questionnaire. Calculating "Pearson

correlation coefficient", and "Cronbach's Alpha coefficient", proved that this questionnaire is valid and reliable (See Appendix (A) and Appendix (C)).

Validity and Reliability of the NA Questionnaire. For the NA questionnaire, the adopted model from Al-Hamlan and Abdelrahman (2015) is a highly reliable and valid instrument, in which "the face validity was verified", Pearson correlation coefficient indicated that "all the values are significant at the level of 0.01 or 0.05", which ensures the questionnaire's construct validity, also, "Cronbach's Alpha coefficient for the original questionnaire is 0.750", which ensures its reliability. Moreover, this model was referenced and used by other scholars (e.g., Priyanka et al., 2017; Zafari et al., 2020) who also ensure its validity and reliability. Additionally, the questionnaire was piloted with six (06) participants, indicating that the questionnaire is clear and comprehendible. Moreover, to ensure the reliability of the adapted questionnaire in the setting of this study, the data was inserted in the SPPS, as binary data, then Cronbach's Alpha was calculated concerning each question as a whole section. The results indicated that the NA questionnaire is reliable, with an Alpha coefficient of 0.98. The detailed results are presented below in Table 2,:

Table 2

Cronbach's Alpha for the NA Reliability

The section	Number of items	Cronbach's Alpha
Question 1: English studying purpose.	7	.68
Question 2: Linguistic difficulties	7	.90
Question 3: Linguistic wants.	7	.94
Question 4: Linguistic needs.	9	.92
Question 5: Curricular and extracurricular activities	7	.88
Question 6: Learning style.	6	.85
Question 7: Teaching method.	8	.93
Question 8: General difficulties.	8	.94
Question 9: Suggestions for better improvements	7	.91
Total	66	.98

1.3.3. First stages: Administration

The administration of the NA questionnaire took place on February 6th, 2022 at the department of English, Si-Elhawess University Center, Barika. The questionnaire was

answered immediately, students needed about five minutes to complete it. Further, participants were ensured that participation is totally voluntary and desirable. Also, anonymity and confidentiality were guaranteed. Additionally, the researchers provided the participants with essential explanations about the study's aims to avoid any possible ambiguities. Students welcomed the administration of the questionnaire and were willingly cooperative. The process went smoothly; each student is asked to answer the questionnaire alone to have valid results.

1.3.4. Second Stage: Data Collection from the Articles

To ensure the validity and reliability of the data collected from the sampled literature, only articles and conference papers registered in Scopus were used, since these sources are highly valid and reliable. For data collection, Alhojailan and Ibrahim (2012) state that in a deductive thematic method, the data is collected and analyzed with some predefined themes in mind. Henceforth, in order to extract the core of text written by academics, the ten sampled articles were read and comprehended. Then, inferred by highlighting the valuable parts, according to the codes and themes set by the researchers of this study; balanced with the results of the NA, and the research questions.

1.3. Data Analysis Procedures

In analyzing data, a mixed-method approach was utilized; in which, a quantitative procedure was utilized first, followed by qualitative analysis. On the first hand, the data from the questionnaires were interpreted quantitatively, statistically, on the basis of descriptive statistical analysis using SPSS software version 26, i.e., by using frequency and mean scores to highlight findings in the form of tables and figures. On the other hand, Alhojailan and Ibrahim (2012) manifest that "thematic analysis is a comprehensive process where researchers are able to identify numerous cross-references between the data and the research's evolving themes"(p. 39). Consequently, data gathered from the sampled articles were analyzed qualitatively using a deductive thematic analysis. Themes were identified according to the NA results to involve nine themes, 1)Opportunities to practice English, 2)Linguistic skills and

components, 3) Learner-centredness and productivity, 4) Learning/ teaching materials (variety, authentic, real-like), 5)Autonomy and self-regulation, 6) Affective variables (anxiety, motivation, self-confidence), 7)Feedback, 8) Personalization (guidance and recommendation), 9) Collaborative learning.

2. Results and Interpretation

2.1. Results

2.1.1. Pre-Study Questionnaire Results

The first section's (motivation) overall mean score is (3.98), this indicates that the learners are moderately motivated to study English. The second section's (anxiety) overall mean score is 3.17, meaning that participants share a moderate anxiety level. The third section's (metacognitive skills) overall mean score is (2.35), meaning that participants have weak metacognitive skills. The fourth section's (metacognitive knowledge) overall mean score is (2.12), which indicates weak levels of metacognitive knowledge for the respondents. The fifth section's (practicing opportunities) overall mean score is (2.68), which indicates a moderate absence of the outside-classroom practicing opportunities for the respondents. The sixth section's (AI familiarity) overall mean score is (4.9), which indicates a total unfamiliarity with using AI in learning by the participants, further, the last question in this section indicates that the learners are unfamiliar with the mentioned AI applications or with other AI applications. The detailed results of the pre-study questionnaire are presented in Appendix D.

2.1.2. NA Questionnaire Results

Question 1: What is your gender?

Table 3

The Participants' Gender

N°	Item	Frequency	Percentage
1	Male	7	17.1%
2	Female	34	82.9%

Figure 1

The Participants' Gender
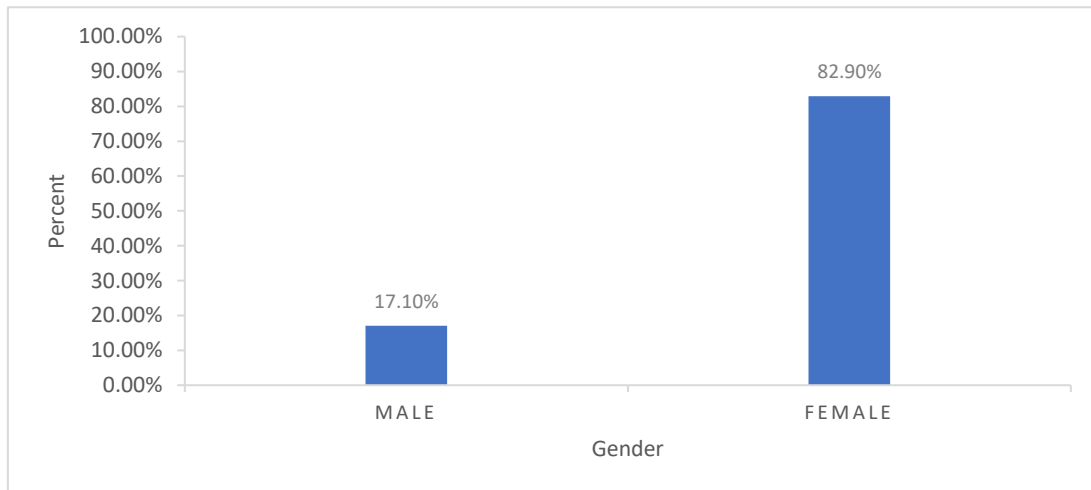
As shown in Figure 1, (82.90%) of the participants are female, while (17.10%) are males.

Question 2: Why do you need to learn English?

Table 4

Purpose of studying English

N°	Item	Frequency	Percentage
1	To help me in communication.	10	24.4%
2	To help me in employment	32	78%
3	To help me in traveling abroad	9	22%
4	To help me in dealing with technology	7	17.1%
5	To help me feel confident	9	22%
6	"I learn English only to meet the desires of my parents, get a diploma"	6	14.6%
7	I learn English to become an English teacher	34	82.9%

Figure 2

Purpose of studying English
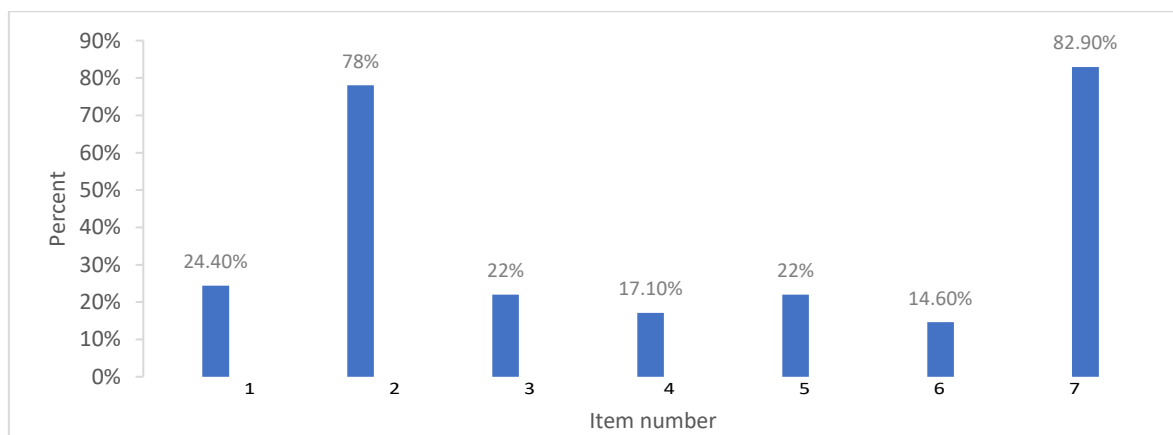
Question (2) examines the participants' purpose of studying the English language. As shown in Figure 2, those who responded to this question ranked "I learn English to become an English teacher" with (82.9%) and "To help me in employment" with (78%) as the two primary reasons for their English studying. Meanwhile, the participants give close ranks for the other purposes, in which they give (24.4%) for "To help me communicate", (22%) for "To help me travelling abroad" and "To help me feel confident", (17.10%) for "To help me dealing with technology" and (14.6%) for "Only to meet the desire of my parents, get a diploma". This suggests that students generally study English for functional reasons.

Question 3: Whenever I practice English, I face difficulties in:

Table 5

Linguistic Difficulties

N°	Item	Frequency	Percentage
1	Speaking	18	43.9%
2	Writing	24	58.5%
3	Listening	6	14.6%
4	Reading	12	29.3%
5	Grammar	12	29.3%
6	Vocabulary	18	43.9%
7	Pronunciation	11	26.8%

Figure 3

Linguistic Difficulties
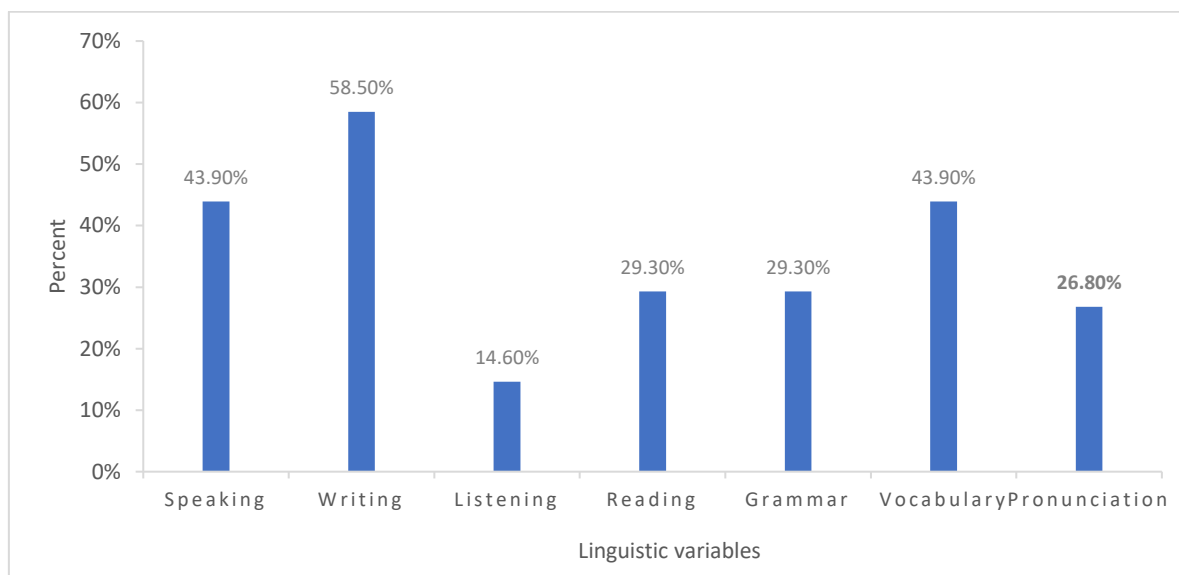
Question (3) examines the linguistic difficulties that face participants when practicing English. Figure 3, shows that the participants regard writing (58.5%) as the skill that they find difficult. Then speaking and vocabulary with (43.9%), reading and Grammar with (29.3%) and pronunciation (26.8%), and lastly, listening with (14.6%). These results suggest that learners face difficulties in all the language skills and components in a kind of proximate way, yet productive skills are more difficult for them.

Question 4: Which of the following do want to study more?

Table 6

Linguistic wants

N°	Item	Frequency	Percentage
1	Speaking	36	87.8%
2	Writing	23	56%
3	Listening	15	36.6%
4	Reading	7	17.1%
5	Grammar	12	29.3%
6	Vocabulary	20	48.8%
7	Pronunciation	11	26.8%

Figure 4

Linguistic wants
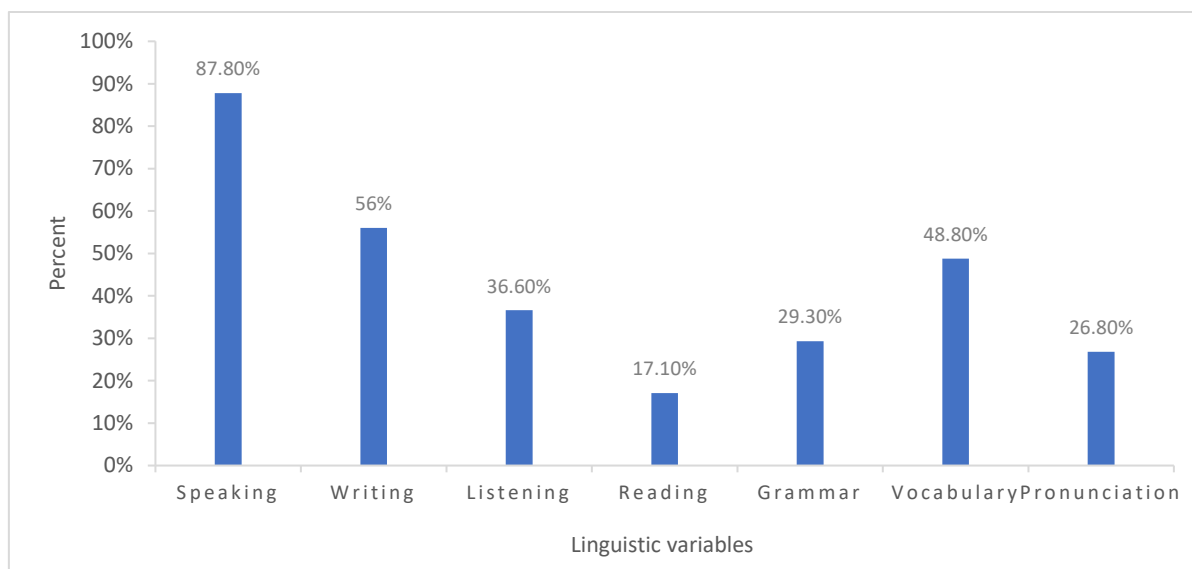
When asked about the linguistic wants of the participants in Question 4, as Figure 4 shows, speaking appears to have been the favorite skill with (87.8%), 23 students (56%) choose writing, closely, vocabulary with (48.8%), (36.6%) choose listening, (29.3%) choose grammar, (26.8%) choose pronunciation, and in the last rank reading with (17.1%). These suggest that learners give more importance to speaking skills, writing skills, and vocabulary, while considering the others bit less significant.

Question 5: Choose the statements that best describe your English linguistic needs?

Table 7

Linguistic Needs

N°	Item	Frequency	Percentage
1	To become more fluent in speaking English.	25	61%
2	To pronounce words in English correctly.	10	24.4%
3	To be able to speak with others.	33	80.5%
4	"To learn English grammar for being able to form English sentences correctly."	15	36.6%
5	To enlarge my English vocabulary in general.	21	51.2%
6	To learn from English authentic reading materials.	6	14.6%
7	To improve my English writing.	15	36.6%
8	"To understand what others say to me in English."	13	31.7%
9	To be able to transcript audio in English.	5	12.2%

Figure 5

Linguistic Needs
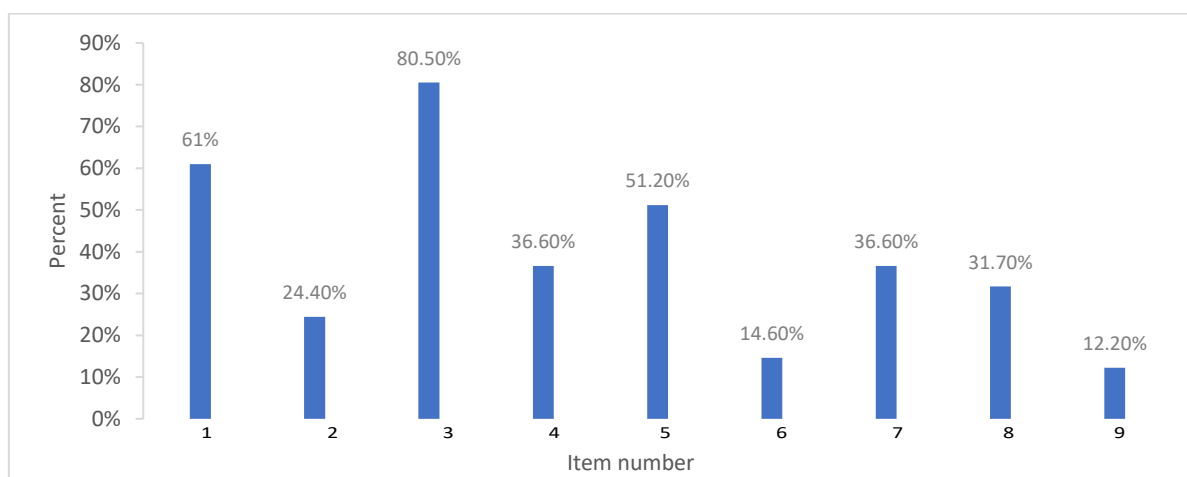
Asked about their linguistic needs, as appear in Table 7, and Figure 5, 33 students (80.5%) choose "To be able to speak with others", "To become more fluent" and "To enlarge my English vocabulary" rank second with (61%) and (51.2%), respectively. "To learn English grammar" and "To improve my writing" rank third with (36.6%) for both. (31.7%) for "To understand what others say", (24.4%) for "To pronounce words correctly". Lastly, (14.6%) for "To learn English authentic reading materials" and (12.2%) for "To be able to transcript audio in English". One can conclude that learners focus on different linguistic skills and components.

Question 6: Choose the statements that best describe your opinions on what are the activities you need and prefer?

Table 8

Curricular and Extracurricular Activities

N°	Item	Frequency	Percentage
1	"I prefer to learn English from the activities that resemble the daily life situations."	30	73.2%
2	"I like to learn English through problem-solving activities."	18	43.9%
3	"I like learning English through projects such as making an interview with a colleague or a person or making a report about any issue or making a blog"	33	80.5%
4	"I prefer oral tests only."	5	12.2%
5	"I prefer written tests only."	9	22%
6	"I prefer oral and written tests."	16	39%
7	"I like to introduce new topics every day"	24	58.5%

Figure 6

Curricular and Extracurricular Activities
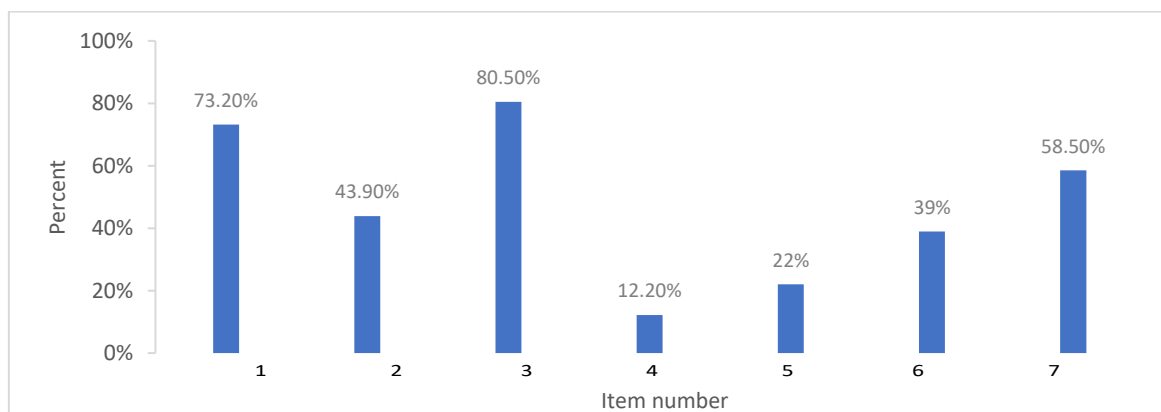
Question (6) examines the curricular and extracurricular activities that participants prefer. "I like learning English through projects…" appears to have been the favorite among the participants with (80.5%), closely followed by "I prefer to learn English from the activities that resemble the daily life situations" with (73.2%). Then, "I like to introduce new topics every day" with (58.5%), "I like to learn English through problem-solving activities" with (43.9%), "I prefer oral and writing tests" with (39%),"I prefer writing tests" with (22%), and lastly, "I prefer oral test only" with (12.2%). These results suggest that learners preferred to learn by doing projects, using materials resembling their daily life situations with new topics

every day, while giving less importance to other elements. Also, they like both oral and

writing tests.

Question 7: Choose the statements that best describe your preferred learning style

Table 9

Preferred Learning Style

N°	Item	Frequency	Percentage
1	"I prefer to perform the activities individually"	6	14.6%
2	"I prefer to perform the activities in small groups."	17	41.5%
3	"I prefer to perform the activities in big groups."	19	46.3%
4	"I prefer to have the ability to choose that exercise that suits me."	35	85.4%
5	"I wish the use of other resources besides the handouts."	30	73.2%
6	"I prefer the use of only the handouts."	1	4.1%

Figure 7

Preferred Learning Style
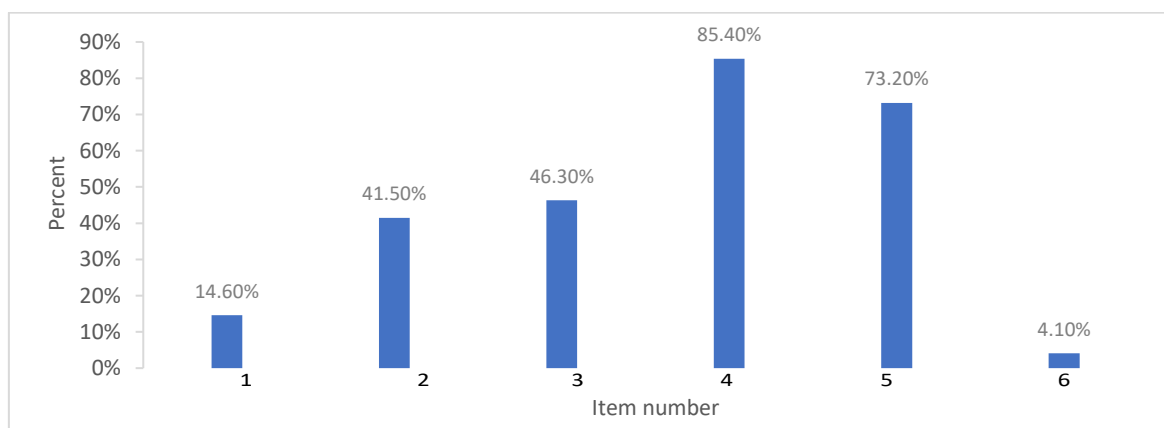
As to the sample's preferred learning style, "I prefer the ability to choose the exercises that

suits me" was ranked the first with (85.4%), closely followed by "I wish the use of other

resources besides the handouts" with (73.2%). "I prefer to perform the activities in big

groups" and "I prefer to perform the activities in small groups" ranked the second with

(46.3%) and (41.5%) respectively. While participants neglect "I prefer to perform the

activities individually" with (14.6%) and "I prefer the use of only the handouts" with (4.1%)

in which just one participant did choose it. As a result, participants prefer to have the ability to

choose exercises and use different sources while learning. They also prefer learning in groups.

Question 8: Choose the statements that best describe your opinions on what you prefer your English teacher do.

Table 10

Preferred Teaching Method

N°	Item	Frequency	Percentage
1	"I need that the teacher translates the difficult words"	15	36.6%
2	"I prefer getting the meaning of the words from the text and to guess the meaning."	14	34.1%
3	"I wish that the teacher gives me the opportunity to speak in English in class."	34	82.9%
4	"I wish that the teacher gives me the opportunity to correct my errors myself."	14	34.1%
5	"I prefer to collect information about a certain topic from different sources."	10	24.4%
6	"I wish to learn English in a special lab"	33	80.5%
7	"I prefer that the teacher corrects my errors in the class."	11	26.8%
8	"I prefer to learn grammar through examples."	16	39%

Figure 8

Preferred Teaching Method
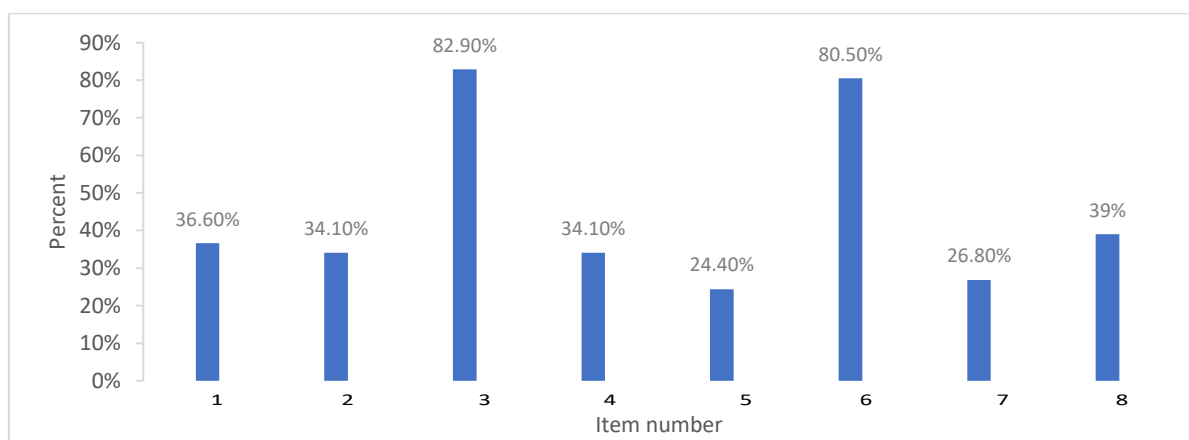
Table 10, and Figure 8, represent the samples' answers to the eight questions concerning their preferred teaching method number. "I wish that the teacher gives me the opportunity to speak in English in class" and "I wish to learn English in a special lab instead of the classroom" raked the first with (82.9%) and (80.5%) respectively. Meanwhile, the other items were close in which (39%) for "I prefer to learn grammar through examples", (36.6%) for "I need that the teacher translates the difficult words for me", (34.1%) for both "I prefer getting the meaning of the words from the text and to guess the meaning" and " I wish that the

teacher gives me the opportunity to correct my errors myself", (26.8%) for "I prefer that the teacher corrects my errors in the class" and lastly (24.4%) "I prefer to collect information about a certain topic from different sources". These results suggest that participants want to get opportunities to speak more, and prefer studying in a special lab rather than the classroom. Also, they slightly preferred getting information from the teachers rather than extracting it while learning.

Question 9: What are the difficulties that face you in your English learning at Barika University Center?

Table 11

Learners' General Difficulties

N°	Item	Frequency	Percentage
1	"I feel bored in English class"	25	61%
2	"Frustrated in class as I cannot match with my classmates"	11	26.8%
3	"Frustrated when corrected by my peers in the classroom."	18	43.9%
4	"I feel low self confidence in my English language abilities."	24	58.5%
5	"I feel anxious whenever I use English in front of others"	22	53.6%
6	"The teacher does not encourage me to learn."	18	43.9%
7	"The teacher does not care for differences between learners."	17	41.5%
8	"The teacher does not facilitate the language learning."	8	19.5%

Figure 9

Learners' General Difficulties
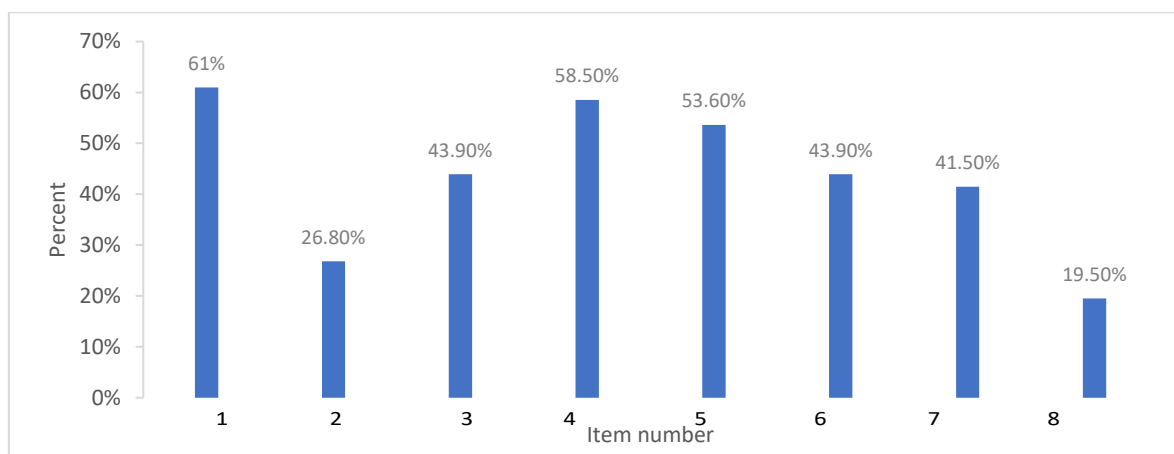
Question (9) examines the general difficulties that face the sample. The participants give proximate ranking for many items. (61%) for "I feel bored in English class", (58%) for "I feel low self-confidence in my English abilities", (53%) for "I feel anxious whenever I use English in front of others", (43%) for both "I feel frustrated when corrected by my peers" and "Teacher does not encourage me", (41%) for "Teacher does not care for differences between learners". Participants neglect " Frustrated in English class as I cannot match with my classmates" with (26%) and "Teacher does not facilitate learning" with (19%). These suggest that participants generally feel bored, have low self-confidence, and anxiety. They also do not like to be corrected by peers and feel that teachers do not care about their differences.

Question 10: Suggestions for better learning of the language.

Table 12

Learners' Suggestions for Better Learning of the Language

N°	Item	Frequency	Percentage
1	"I wish more practice in language skills (writing, reading, speaking, and listening)"	35	85.4%
2	"I wish to learn more new words in the different fields."	16	39%
3	"I wish to use more audio-visual materials."	26	63.4%
4	"I want to apply to the use of smart technology."	30	73.2%
5	"I need to communicate more with my colleagues and teacher in class in English."	33	80.5%
6	"I recommend the use of learning games"	15	36.6%
7	"I recommend the use of authentic materials"	22	53.6%

Figure 10

Learners' Suggestions for Better Learning of the Language
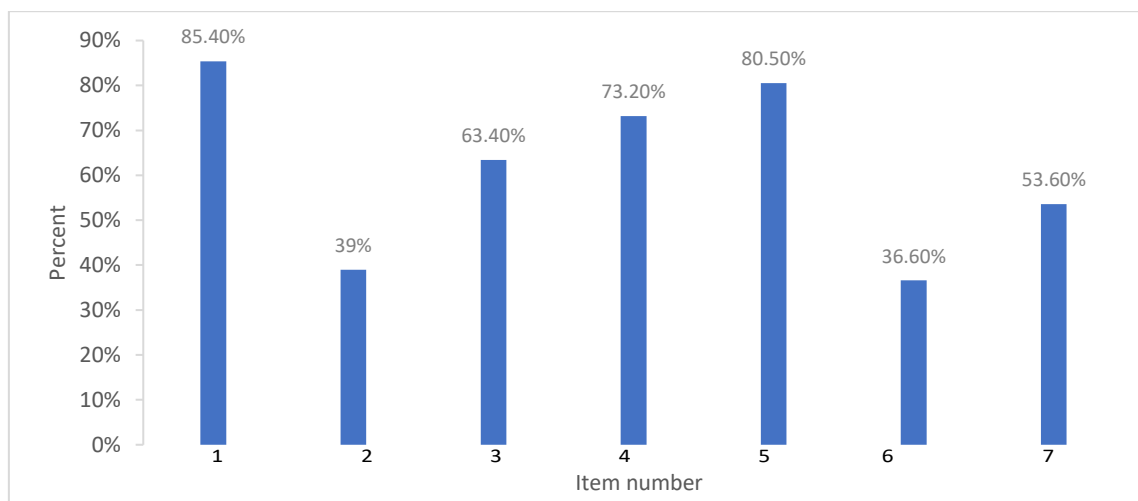
When asked the sample about what they suggest to get a better learning process, participants give close ranking for many items. First, "I wish more practice in language skills" with (85.4%), then, (80.5%) for "I need to communicate more with my colleagues and teacher in class in English" and (73.2%) for "I want to apply to the use of smart technology". Further, (63.4%) for "I wish to use more audio-visual materials", (53.6%) for "I recommend the use of authentic materials", (39%) for "I wish to learn more new words in the different fields" and "I recommend the use of learning games" with (36.6%). Hence, participants want more practice, they generally like using smart technology, audio-visual and authentic materials.

2.1.3. Results of the Literature's Thematic Analysis

Themes were divided deductively in accordance with the NA findings and the familiarization step; comprehensive reading of the data. It involves nine themes, 1) Opportunities to practice English, 2)Linguistic skills and components, 3) Learner-centredness and productivity, 4) Learning/ teaching materials (variety, authentic, real-like), 5)Autonomy and self-regulation, 6) Affective variables (anxiety, motivation, self-confidence), 7) Providing feedback, 8) Personalization (guidance and recommendation), 9) Collaborative learning.

❖ *Opportunities to Practice English*

*"chatbot encouraged the students **to initiate and continue the conversation more often**"(Kim, 2019, p. 39).*

*"Artificial intelligence **provides a good learning environment** for interactive English learning"(R. Wang, 2019, p.394).*

*"chatbots may be beneficial in advancing FL learning **with significant potential in EFL** contexts, facilitating improved interaction and oral communication"(El-Shazly, 2020, p. 1).*

*"offer learners **meaningful opportunities** for TL model and practice"(El-Shazly, 2020, p. 14)*

*"Chatbots provide learners with **opportunities for two-way interchanges**, allowing them to practice their oral output without time and place constraints"(El-Shazly, 2020, p. 3).*

*"The **educational innovation brought by artificial intelligence** is not only the innovation of teaching methods, learning contents and management mode, but also the recognition of education, knowledge and skills"(Xia, 2021, p. 141).*

*"On the one hand, artificial intelligence provides **more choices and better conditions** for education and teaching" (Xia, 2021, p. 140).*

*"allow FL learners/users to self-regulate their learning according to their own pace, agenda, and syllabus, thereby **extending their learning into their everyday lives**" (El-Shazly, 2020, p. 3).*

*"Artificial intelligence can **enrich the application and communication of language**: For a long time due to the lack of native language environments in English teachings, many students have few opportunities for English application and communication. Artificial intelligence technology can build a platform for English learning and communication using computer technology for different stages and students at the same level to provide a real communication environment let learners feel the fun of learning English and improve the imperials and enthusiasm and initiative of English learning" (Yongjuan, 2020, p. 509).*

*"Artificial intelligence **can build a 24-hour companion practice class** for learners, can communicate face to face with artificial intelligence robots and human communication the advantage is that introduce the burden and embarrassment during the direct communication with foreigners" (Yongjuan, 2020, p. 510).*

❖ *Linguistic Skills and Components*

*"Through the establishment of the AI-assisted **writing platform** and the introduction of a benign mechanism of peer review, the quantity and quality of English writing can be widely improved" (J. Li, 2021, p. 309).*

*"Through the composition evaluation report, teachers can grasp the students' learning status and **writing** problems in real time, so as to effectively improve the curriculum and teaching methods. In addition, teachers can upload expansion exercises to the cloud class platform to facilitate students' after-school learning. Through the combination of reading and writing, translation and writing, students can master the writing principles and skills of various styles, cultivating their comprehensive ability to analyze and solve problems, and enhancing their critical thinking ability and innovative consciousness. The teaching process emphasizes the structural analysis, and layer by layer progress, paying attention to the systematization. The teachers combined the writing task with after-class discussion and in-class communication, innovating the writing teaching form" (J. Li, 2021, p. 310).*

*"There is evidence that an online grammar checker is useful for low-proficient L2 learners' **writing** (Grimes and Warschauer, 2010). Compared to teacher feedback, AI's significantly reduced writing errors (Vajjala, 2018)" (Nazari, 2021, p. 7).*

*"the significant encouraging impact of AI applications on **FL speaking skills**" (El-Shazly, 2020, p. 3).*

*"Moreover, the new AI Applications provide a comprehensive instructional practice and plagiarism detection component that may assist ESL in research **writing progress**" (Nazari et al., 2021, p. 1).*

*"New writing tools, powered by Artificial Intelligence (AI) and available in mobile devices, are promising tools to assist students in learning and develop **writing skills** that are hard to learn from traditional training" (Nazari et al., 2021, p. 1).*

*"Let students better use and improve the comprehensive abilities **of English words, spoken English and English writing**. Not only that, the cultural and customs knowledge of different English-speaking countries collected in AI can be used to communicate and interact with students, but also can greatly enhance students' interest in English learning"(R. Wang, 2019, p. 394).*

*"Similarly, instructional material writers may benefit from integrating AI-driven applications to support their learners' gains particularly in **speaking**. In light of the interactionist approach, FL material designers should leverage the proposed synergy of textual and auditory chatbots (the intervention design) to promote focus on form and negotiation of meaning which has significantly improved learners' speaking skills" (El-Shazly, 2021, p. 12).*

*"This study confirmed the **improved grammar skills** by the participants in the chatbot group, comparison with those in the human group" (N-Y. Kim, 2019, p. 37).*

*"since chatbots can provide both text and speech, they allow students to practice **both reading and listening skills**" (N-Y. Kim, 2019, p. 38).*

*"provided with opportunities to use a variety of **vocabulary, phrases, and grammatical structures** that are important them to know but are rarely taught" (N-Y. Kim, 2019, p. 38).*

*"Students can practice a wide range of **language skills** that they ordinarily would not have chances to use"* (N-Y. Kim, 2019, p. 38).

*"engaging in chat with a chatbot is more effective in **increasing EFL grammar skills** compared to having a chat with a human chat partner. indicating that EFL students participate in chat more actively to overcome communication breakdown that occurs when engaging in chat with a chatbot. Since, chatting with a chatbot can cause more communication breakdown than chatting with a human chat partner because of the errors that students make"* (N-Y. Kim, 2019, p. 43).

*"the chatbot group in the current study were able **to improve their grammar** skills by trying to deliver exactly what they have in mind and to make the chatbot, Replika, understand clearly to overcome any communication problem"*(N-Y. Kim, 2019, p. 44)

*"To promote L2 **vocabulary learning**, recent advances in computer technology provide new pedagogical opportunities for superior learning experiences. Based on the concept of real-life simulations and interactivity"*(Tai et al., 2020, p. 2).

*"Researchers have claimed that desktop VR is a promising learning tool that facilitates L2 **vocabulary acquisition** by providing various simulated real-life situations and contextual support ensure learners productivity"* (Tai et al., 2020, p. 2).

*"VR technology provides an ideal environment for **deep linguistic immersion** and various situated learning experiences, which enhanced EFL **learners' phonological, morphological, grammatical and syntactical knowledge"*** (Tai et al., 2020, p. 3).

*"all the learners, used VR, improved significantly **in oral communication** competence, especially with those performing the reasoning- gap task"* (Tai et al., 2020, pp. 3-4).

*"Regarding VR-**mediated vocabulary learning**, researchers have indicated that desktop VR positively affects vocabulary learning because it provides a learner-centered, immersive language learning platform which offers comprehensible input and meaningful interaction through context-based learning"* (Tai et al., 2020, p. 4).

*"This aided learners to effectively acquire **new words and pragmatic competence** in context, especially regarding those words with abstract concepts (e.g. profession and appointment)"* (Tai et al., 2020, p. 21).

*"the VR app positively facilitated **EFL learners' vocabulary** learning and retention regarding both word meaning and word use in context"* (Tai et al., 2020, p. 21).

*"facilitate him/her in remembering new and previously-learned words for a longer time, resulting **in individual vocabulary ability improvement**"* (Chen et al., 2021, p. 241).

❖ ***Learner-Centredness and Productivity***

*"artificial intelligence and education continue to be deeply integrated, which creates a good opportunity for the construction **of learner-centered** intelligent education"* (J. Li, 2021, p. 309).

*"findings support the integration of AI technologies as effective tools in FL education, providing flexible, interactive, and **learner-centred learning**"*(El-Shazly, 2021,p. 1).

*"improves students' practical operation ability to a certain extent. providing various simulated real-life situations and contextual **support ensure learners productivity**"*(R. Wang, 2019, p. 349).

*"provides a **learner-centered**, immersive language learning platform which offers comprehensible input and meaningful interaction"(Tai et al., 2020, p. 4).*

*"through active interaction, participation and navigation. Such interaction and exploration in VR learning environments motivated the VR players to observe, search and evaluate their hypotheses, and thus **enhance involvement**" (Tai et al., 2020, p. 22).*

*"Empirical research on the integration of AI technologies into FL learning have revealed that the amount and complexity of learner language **production has increased** significantly with chatbots (Golonka et al., 2014; Zhang & Zou, 2020)"(El-Shazly, 2021, p. 3).*

*"allowed students to become **more engaged**, knowledge builders, active and autonomous" (Nazari et al., 2021, p. 2).*

*"**thereby extending their learning** into their everyday lives" (El-Shazly, 2021, p. 3).*

*"artificial intelligence can give full play to virtual reality and augmented reality technology, and form **a learner-centered** intelligent learning environment through the construction of online intelligent classrooms, intelligent laboratories, virtual factories and other intelligent experience centers"(J. Xue, 2021, p. 142).*

❖ ***Learning/Teaching Materials (Variety, Authentic, Real-like, Visual)***

*"**With natural-like interaction** frames (a constructive interactive communicative model), these applications may help breaking the mould of relying mostly and solely on textbooks focusing on competence and performance" (El-Shazly, 2021, p. 12).*

*"VR can provide L2 learners with **realistically simulated environments** for language learning, creates a strong sense of presence, allows space for exploration and interaction, and thus enhances learning" (Tai et al., 2020, p. 2).*

*"VR technology provides **an ideal environment** for deep linguistic immersion and various situated learning experiences" (Tai et al., 2020, p. 3).*

*"Overall, the literature reviewed emphasized that the unique affordances of VR as a learning tool stem from VR's ability to implement contexts and enable learners **to visualize, manipulate and interact** with information and objects, all of which facilitate language learning" (Tai et al., 2020, p. 4).*

*"VR can **provide multimedia learning materials** involving audio, textual, and visual aids to enable learners to visualize, understand, and construct knowledge" (Tai et al., 2020, p. 5).*

*"The deep integration of classroom teaching and information technology is an important approach to foreign language teaching reform and the key to improving teaching quality in the new era. Information technology and intelligent technology provide new teaching methods, learning methods **and unprecedented rich resources** for English teaching. Foreign language educators should make full use of information technology to implement hybrid teaching mode and actively create a **diversified teaching and learning environment**" (J. Li, 2021, p. 309).*

*"Artificial intelligence provides a **good learning environment** for interactive English learning"(R. Wang, 2019, p. 394).*

*"**instructional material** writers may benefit from integrating AI-driven applications to support their learners' gains" (El-Shazly, 2021, p. 12).*

*"English learning becomes more stereoscopic and visual. Students communicate with AI through man-machine interface, which not **only increases the authenticity** of the language environment, but also corrects the errors in the dialogue in time, so that students can learn English in a relaxed and pleasant atmosphere" (R. Wang, 2019, p. 394).*

*"AI can provide a **real simulation dialogue** platform for English teaching and learning" (R. Wang, 2019, p. 394).*

*"chatbots are **not unwilling to repeat** the same task with students endlessly, so they never lose their patience or get bored." (N-Y. Kim, 2019, p. 38).*

*"VR technology allows learners to access **simulated, immersive and interactive** virtual environments to perform authentic learning activities"(Tai et al., 2020, p.1).*

*"By increasing the number of **material categories in line with learner preferences**, the optimal materials can be expected [13]. Recommended materials are also encouraged to be diversified and daily-life-related to promote learner learning motivation"(X. Chen et al., 2021, p.241).*

*"Artificial intelligence can transform boring English into **vivid images or audio**, allowing students to choose according to their learning situation to stimulate students' interest" (Yongjuan, 2020, p. 509).*

*"The massive listening **resources** of the online platform make it easy for learners with the poor English Foundation to find their own listening materials" (Yongjuan, 2020, p. 510).*

*"it provides **rich and diverse content** and plans optimizes the learners learning and strategies and enable learners to form expiratory itself learning language habits" (Yongjuan, 2020, p. 510).*

❖ ***Autonomy and Self-regulation***

*"the interactive features of VR applications and the challenges of gamification design enable students to improve their **autonomous** learning ability. It can be seen that the new intelligent program is conducive to improving students' **autonomous learning ability**"(Y. Zhang, 2022, p. 2).*

*"we can know that the students' English **autonomous learning** ability will be improved with the use of artificial intelligence technology" (Y. Zhang, 2022, p. 2).*

*"Artificial intelligence promotes the development of education. It also promotes **the autonomous** learning of English and lays a rich theoretical and practical foundation for the improvement of students' ability" (Y. Zhang, 2022, p. 3).*

*"Artificial intelligence technology **is indispensable for autonomous** English language learning" (Y. Zhang, 2022, p. 11).*

*"allowed students to become more engaged, knowledge builders, **active and autonomous**" (Nazari et al., 2021, p.2).*

*"There is evidence that instructional feedbacks may enhance writing problem-solving (Li et al., 2014) and **self-regulatory strategies**" (Nazari et al., 2021, p.2).*

*"They **develop self-regulation and self-reflection** abilities, become assessment capable, and have their motivation and confidence boosted as a result. They also take responsibility for learning and **become autonomous** learners" (Nazari et al., 2021, p.7).*

❖ *Affective Variables (Anxiety, Motivation, Self-efficacity, Self-confidence)*

*"The results showed that AI was an effective intervention for **enhancing self-efficacy and academic emotions in L2 students**. Our findings are consistent with previous research on AI's efficacy in L2 students" (Nazari et al., 2021, p.7).*

*"Mainly, self-assessment, followed by self-referential feedback, can **generate positive achievement emotions** (i.e., hope and pride; Vogl and Pekrun, 2015). The normative assessments administered by teachers can induce negative emotions (e.g., anxiety)" (Nazari et al., 2021, p.7).*

*"They develop self-regulation and self-reflection abilities, become assessment capable, and have **their motivation and confidence boosted as a result**" (Nazari et al., 2021, p.7).*

*"Individualized and oral English learning **stimulates students' interest** in English learning and improves the learning atmosphere in English classroom"(R. Wang, 2019, p. 393).*

*"FL contexts should **leverage manageable anxiety** levels to motivate learners to expend the required effort, thereby evoking problem-solving techniques and activating strategic competence, rather than provoking inhibitive anxiety. AI applications have a **potential favourable impact** on FL learning outcomes, and thus, educators, designers, and FL stakeholders should integrate them astutely in FL classrooms to optimize learning gains" (El-Shazly, 2021, 12).*

*"Chatbots **are interesting** to students" (N-Y. Kim, 2019, p. 38).*

*"These positive communicative experiences with chatbots can improve **students' motivation** and arouse new **or renewed interest** in language" (N-Y. Kim, 2019, p. 38).*

*"students can be **more relaxed** when talking to a machine than to a person" (N-Y. Kim, 2019, p. 38).*

*"**chatbot encouraged** the students to initiate and continue the conversation more often. Regarding the students' attitudes toward English, the chatbot turned out to be effective in **enhancing belief, confidence, motivation, and interest in English**. Also, the students **reduced their anxiety and stress related to English learning**" (N-Y. Kim, 2019, p. 39).*

*"By connecting their social media accounts, the participants also allowed Replika to **understand them better and to become their best friend** by learning from them. **Considering people's desire to feel understood which is one of the strongest desires people have [17]**, Replika, might have made the chatbot group **feel more valued and understood**. The participants in the chatbot group, therefore, seem **to have lowered their affective filter** in **a relaxed and comfortable environment**. This might result in their academic achievement, according to many previous studies" (N-Y. Kim, 2019, p. 42)*

*"chatbots for EFL learning can lead to EFL students' academic achievement **by inhibiting affective filters such as reducing the students' fear, anxiety, and stress**"(N-Y. Kim, 2019, p. 45)*

*"Gump, and Downey (2011) investigated the effects of Second Life **on the motivation** of English-speakers learning Spanish. Forty undergraduates participated in the 10-day study. They found that Second Life increased the participants' motivation"(Tai et al., 2020, p. 3).*

*"VR can promote motivation, **foster self-efficacy and reduce the affective filter**" (Tai et al., 2020, p. 3).*

*"the VR-mediated vocabulary learning **was enjoyable, motivating** and beneficial" (Tai et al., 2020, p. 21).*

*"An **affective module recognizes learner emotion** and adapts learning process to them accordingly. By jointly adopting various tools and modules with different functions"(X. Chen et al., 2021, p. 245).*

*"How do you spell intelligence can continuously **motivates the learners' enthusiasm** and gradually guides the learner from passive to exploratory"(Yongjuan, 2020, p. 510).*

❖ *Providing Feedback*

*"The computer-based applications are increasingly becoming alternatives to facilitate writing **using automated writing evaluation** (AWE), automated essay scoring (AES), and automated written corrective feedback (AWCF)"(Nazari et al., 2021, p. 1).*

*"chatbots can provide **quick and effective feedback** related to students' spelling and grammar. While some chatbots are designed to overlook spelling or grammar errors, others can correct the students' mistakes" (Na-Y. Kim, 2019, p. 38).*

*"personalized **diagnosis of learner learning performance**, students' learning difficulties, or misconceptions"(X. Chen et al., 2021, p. 245).*

*"Moreover, they **can evaluate learners** by making data-driven decisions without criticizing them or pressurizing them with high-stakes reports (Bibauw et al., 2019). With stimulated discussions and simulated interactions, FL learners can identify and work on their weaknesses while eliminating the perceived threat of derogatory judgement"(El-Shazly, 2021, p. 3).*

*"**The real-time formative feedback**, followed by practical and instructional examples, provides new possibilities for learners' more personalized experiences. There is evidence that instructional feedbacks may enhance writing problem-solving (Li et al., 2014) and self-regulatory strategies (Wang et al., 2013)"(Nazari et al., 2021, p. 2).*

*"The use of automated systems to assess student progress and **provide feedback** is increasing for writing. With advances in technology, AI provides new teaching and learning experiences in the assessment" (Nazari et al., 2021, p. 2).*

*"AI **corrects the errors** in the dialogue in time, so that students can learn English in a relaxed and pleasant atmosphere"(R. Wang, 2019, p.349).*

*"With advances in technology, AI new teaching and learning experiences in the assessment, tutoring, content generation, and **feedback** for teachers and students. Perhaps the most contributions of digital writing tools are defined throughout the formative feedback and assessment" (Nazari et al., 2021, p. 1).*

*"The function of guidance and intelligent marking can **provide intelligent evaluation** report for students' compositions, and the whole process of teaching and learning English writing is traceable" (J. Li, 2021, p.309).*

*"With the help of artificial intelligence technology, the hybrid teaching can use automatic sentence analysis technology, which can automatically analyze the sentences made by foreign language learners according to their characteristics, give **the automatic analysis results** of the sentences, and point out the errors, so as to improve the awareness of foreign language*

learners for errors in the process of writing and consciously **correct errors**" (J. Li, 2021, p.309).

"*The system makes intelligent corrections to the articles, provides students with an intelligent evaluation report, and gives an **overall evaluation** of the articles from the aspects of discourse structure, vocabulary use, grammar and spelling [9]. The cloud classroom can also provide detailed solutions for writing, involving the use of punctuation marks, whether the sentence is complete, whether it conforms to the grammatical rules, and whether the words are appropriate. In addition, the cloud classroom can also provide the article embellishment scheme, and can provide a variety of phrase substitution and sentence structure adjustment scheme*" (J. Li, 2021, p.309).

"*Grammarly Provides the opportunity to self-correct the tasks before a **summative assessment** via revision. It helps to highlight areas where the students are going wrong before they get graded, meaning students have the opportunity to improve their work. Self-regulatory skills are critical to managing negative emotions associated with writing*" (Nazari et al, 2021, p. 7).

"*Grammarly's impact on **negative academic emotions related to assessment** (anxiety) can be considered as this AI's affect students' well-being*" (Nazari et al, 2021, p. 7).

"*Teachers can **also evaluate the** effectiveness of teaching by the results of the data analysis, and speculate on the future learners learning performance, find deficiencies and potential problems in the education and teaching, carry out kitchen reflection activities*" (Yongjuan, 2020, p. 510).

"*AI technology can realize the real-time data which is used in the English learning to establish a dynamic **evaluation** system*" (Yongjuan, 2020, p. 510).

❖ ***Personalization (Recommendation, Guidance)***

"*Using AI, teachers assign tasks related to the content of the course according to the actual situation of students, so that students' learning willingness **and emotional needs are respected** and their learning autonomy is exerted. **According to the characteristics** of different courses, teachers innovate the forms of classroom interaction to meet students' learning needs [7]. The learning data of students in the artificial intelligence cloud class will be statistically fed back in real time. The artificial intelligence will analyze the class participation and the form of course organization to help teachers adjust the teaching method in real time*" (J. Li, 2021, p. 310).

"*With the help of artificial intelligence technology, the hybrid teaching can use automatic sentence analysis technology, which can automatically analyze the sentences made by foreign language learners **according to their characteristics**" (J. Li, 2021, p. 309).

"*artificial intelligence technology can divide the original data of English learners into major categories, such as the learner's basic information (name, grade, learning ability and cognitive level), English learning files (exam scores, expansion activities experience, teachers evaluation), social files (interests, hobbies, APP usage habits, personality types) and other auxiliary files, using artificial intelligence technology to continuously **record and track, and constantly enriching the data of each file**. The machine-based deep learning function categorizes and analyzes these historical data, and decomposes them into learning*

motivation, English level, learning style and goals. Based on the output results, a learning file belonging **to each individual learner** *is established" (Yongjuan, 2020, p. 509).*

"A. Artificial intelligence can help provide **personalized learning** *strategies: The process of English learning activities is extremely complex dynamic with many uncertainties that will affect the effectiveness and quality of learning. Artificial intelligence technology can be used to simulate the human thinking mode for corresponding algorithm design, which is its main features. to provide individualized learning strategies for English learners, and provide dynamic and intelligent teaching assistance" (Yongjuan, 2020, p. 509).*

"English teachers can **customize personalized** *teaching activities for students according to their different learning characteristics and assisted by artificial intelligence, and then provide targeted teaching optimization measures according to different students' English foundation"(R. Wang, 2019, p. 394).*

"AI-assisted PLL involves using AI to facilitate language **learning personalizedly***, with positive effects being highlighted"(X. Chen, 2021, p. 241).*

"demonstrated fuzzy inference's effectiveness **in finding articles of suitable difficulty** *levels for individuals according to his/her learning preferences" (X. Chen et al., 2021, p. 241).*

"indicated artificial neural network (ANN)'s ability to **simulate learners' learning path to predict individual learner learning abilities and barriers and provide precise clues and directions** *to teachers for their personalized instruction" (X. Chen et al., 2021, p. 241).*

"focusing on personalized reading **material recommendations***"(X. Chen et al., 2021, p. 241).*

"focus on **recommending personalized** *English news articles to learners based on learner reading" (X. Chen et al., 2021, p. 244).*

"abilities detected using a fuzzy Item response theory. Hsu [23] aims **to provide English learners with reading courses suiting individual learners' interests** *" (X. Chen et al., 2021, p. 244).*

"These platforms analyse the learner/user abilities and **appeal to their interests***, engaging them in meaningful language tasks and enabling deeper involvement (Bibauw et al., 2019)" (El-Shazly, 2021, p. 3).*

"However, some have claimed that technology-enhanced applications benefit the learning outcomes, output, interaction, affect, and motivation of learners (Alemi et al., 2015; Lee, 2019)" (El-Shazly, 2021, p. 3).

"They **offer personalized experiences** *that allow FL learners/users to self-regulate their learning according to their own pace, agenda, and syllabus" (El-Shazly, 2021, p. 3).*

"use of intelligent tutoring systems, natural language processing, and artificial neural network in **facilitating personalized diagnosis** *and learning path and* **material recommendations** *in language learning" (X. Chen et al., 2021, p. 241).*

"the present AI is mostly used to **provide personalized learning material** *and testing task* **recommendation***s based on learners' abilities identified by item response theory. To facilitate recommendation effectiveness, not only should the number of materials be continually increased to match learner needs, but the number of material categories should be increased to allow more learners to gain recommended materials. By increasing the number of material categories in line* **with learner preferences***, the optimal materials can be expected [13].*

Recommended materials are also encouraged to be diversified and daily-life-related to promote learner learning motivation" (X. Chen et al., 2021, p. 245).

*"**recommend suitable** and context-aware materials to individual learners" (X. Chen et al., 2021, p. 245).*

*"encouraging students to actively participate in and cooperate in exploration, **and guiding students to actively** construct meaning" (J. Li, 2021, p. 311).*

*"**Through the guidance of English knowledge** content in AI system, problems can be solved step by step and content knowledge can be focused"(R. Wang, 2019, p. 394).*

*"Artificial intelligence can collect learners' information at multiple levels, quickly process a large number of structured data, quickly generate a learning database, and **highly customized learning programs** for each student, and **guide students to carry out repetitive practice**. On the one hand, it enables teachers to have more quantitative cognition of learners' learning state and learning ability"(Xia, 2021, p. 143).*

*"It can truly realize the teaching according to the attitude advocated by the ancient, and also **meet the individual needs** of English learners, maximize English learning efficiency, help students know their learning blind sports, and then optimize English learning methods and goals" (Yongjuan, 2020, p. 510).*

*"Artificial intelligent technology a companies and **guides of the entire learning** based on the collected learning data optimized learning experience and enables English learners to make cool use of fragmentation time" (Yongjuan, 2020, p. 510).*

*"Artificial intelligence technology based on a neural networks has created an online English learning platform to create **personalized** files that needs the characteristics of learners to big data and cloud computing, it can be effectively analyzed based on the learner's personality characteristics it provides rich and diverse content and plans optimizes the learners learning and strategies and enable learners to form expiratory itself learning language habits" (Yongjuan, 2020, p. 510).*

*"While artificial intelligence can analyze the learning files tailored to the learners to **match the learners interests** and English levels and learning goals automatically **recommend** listening materials suitable for learners reduce the time wasted by learners aimlessly" (Yongjuan, 2020, p. 510).*

*" Identify the problems such as the weak links shown in the course, and the students English learning boards, to provide **intensive guidance and guides students** to perform intensive exercises" (Yongjuan, 2020, p. 510).*

*"Artificial intentions technology can analyze data recorded in the field in the files of English learners mind the quality behind the data achieve the purpose of **evaluating the learners learning** effect and **guide to adjust the next learning plan** based on the evaluation results" (Yongjuan, 2020, p. 510).*

❖ ***Collaborative Learning***

*"Luckin et al. (2016) classified AI software applications in education into three functional categories: tutoring systems, support for **collaborative learning systems**, and virtual reality systems" (El-Shasly, 2021, p. 3).*

2.2. Discussion and Interpretation of Results

The finding results of the pre-study questionnaire indicated that participants have moderate low levels of motivation, moderate anxiety levels, weak metacognitions, moderate absence of the outside-classroom practicing opportunities, and a total unfamiliarity with using AI in learning. Therefore, the state of the learners indicates that a change in the learning and teaching process is necessary. Also, the researchers cannot use a direct NA concerning AI uses in learning, as we cannot ask them about what they are not familiar with. Hence, the current study includes three main questions, whereas the researchers opt for linking the regular learners' needs with the literature.

To answer the first question, **"What are the language learning needs of third-year English learners at the English department at Barika University Center?"** The finding results of the NA questionnaire can be summarized as follows:

1. The plant majority of participants learn English for employment reasons, to become English teachers. These support Liton (2012) and Al-Hamlan and Abdelrahman (2015) argument that learners study English mainly for functional goals. Hence, learners are required to get high levels in the English language which necessitate *continuous practicing of the language*.

2. Many participants face difficulties in writing and speaking, and less in reading and grammar. Further, the plant majority of students preferred practicing speaking skill, fewer participants preferred writing and vocabulary, then comes listening and grammar. Moreover, many students indicated the need for fluency and vocabulary, fewer participants choose grammar, writing, and listening. These results are in line with that of Moattarian and Tahririan (2014) and Brindley (2012), demonstrated that *learners pay attention to different language skills and components* and that the learners' major aim is developing language skills. Therefore, more practicing and focusing on the linguistic

skills and components "Speaking", "Writing", "Vocabulary", "Listening", "Grammar", "Reading", and "pronunciation".

3. The majority of participants preferred to learn by doing projects, using real-like materials to deal with a variety of topics up to their choices. Also, they like both oral and writing tests. These results connote that of Zafari et al. (2020) which ensure the participants' need to be actively engaged in a *learner-centered environment, as productive agents,* not just passive recipients.

4. Participants preferred to get involved in choosing the activities they will be doing. These are aligned with Kaewpet (2009) and Al-Hamlan and Abdelrahman (2015) findings. Thus, students have to get more responsibilities, *enhance autonomy and self-regulation*

5. Participants show a preference for *collaborative learning* through interactive group work, this is supported by many scholars (e.g., Mavroudi & Hadzilacos, 2013).

6. Moreover, in questions seven (7) and eight (8) the participants indicated their need for dealing with a *variety of sources, materials and topics* that resemble their daily life and *using audio-visual and authentic materials*. This supports Ali's (2011) and Liton's (2012) argument.

7. Many participants preferred getting information from the teachers rather than extracting it while learning. In the same vein, ALHARBY (2015) emphasizes the role and importance of the teacher in the learning process, manifesting that learners need guidance and supervision whatever their levels are. Therefore, *learners have to get constant guidance.*

8. Participants generally feel bored, have low self-confidence and have anxiety. This aligns with Brindley (1989), Brown (2009), and Ali (2011) results, that more attention should be paid to *the students' affective variables*, and the way of giving feedback.

9. Participants do not like to be corrected by peers and feel frustrated. Therefore, in accordance with Al-Hamlan and Abdelrahman (2015), teachers have to ensure *giving immediate feedback in a pleasant way* for the learners.

10. Participants feel that teachers do not care about their differences and needs. Consequently, connote to Long (2005) and ALHARBY (2015), teachers have *to personalize more the learning experience.*

11. Many participants like and want to use smart technology in their learning, using audio-visual and authentic materials. Hence, aligning with (J. Li, 2021) demonstration, *using smart technology* in learning the English language becomes inevitable.

To answer the second and third questions, **"What can AI provide for the EFL learners according to the literature?"**, **"Is it suitable to use AI for compensating the needs of EFL learners at Barika University?"**, the finding results of the sampled literature's thematic analysis, that was made in accordance with the participants' needs can be summarized as follows:

1. *In terms of providing practice opportunities*, AI can provide learners with a variety of meaningful opportunities for English practice, including more choices and better conditions, and 24-hour companion practice and guidance, without time and place constraints. As a result, learners will be able to apply and extend what they have learned to their daily life.

2. *In terms of linguistic skills and components*, AI can positively facilitate EFL learners learning in terms of linguistic skills and components, writing, speaking, listening, reading, vocabulary, grammar, and pronunciation. There are a variety of AI applications; chatbots, VR applications, and grammar-checker tools, that can help learners in learning the linguistic skills and components. Since linguistic skills and components are interrelated, each of the AI tools asserts to be significantly useful to enhance different skills and component not only one of them. Several scholars did investigate the effects of various AI learning tools on different linguistic skills and components, mentioning:

> ➢ For oral skills: Chatbots like Replica (Na-Y. Kim, 2019), ELSA (Samad & Ismail, 2020), and Rosetta Stone (Sharifi et al., 2015). VR apps like Mondly, Second Life, and 3D desktop (Tai et al., 2020).

> ➢ For writing skills: grammar-checkers like Grammarly (J. Zhang et al., 2020), paraphrasing tools like QuillBot (Fitria, 2021a), and speech-to-text apps like *Dictation.io* (*IANCU, 2019*).

> ➢ Grammar/ vocabulary: Chuah and Kabilan (2021) emphasize the use of two chatbots that provide grammar and vocabulary lessons, "Anndy" and "Wordsworth" in a motivational authentic environment.

3. *In terms of learner-centredness and productivity*, AI can provide a flexible, interactive, and learner-centered intelligent learning environment. Thus, AI improves students' practical operation ability, enhances involvement, makes learners more active, engaged and knowledge builders, to ensure learners' productivity.

4. *In terms of teaching/learning materials*, AI can give different multimedia materials for teaching and learning, including, visual audio and textual aids that simulate real-life situations and are daily life related, which assists students in visualizing, comprehending, and constructing knowledge better and easier. Also, it helps teachers and instructional material writers by giving the optimal materials recommendations in line with learner preferences and needs. In this connection, maybe the most influential applications that can give a simulation to real-life situations are VR applications, in which the learner can live the experience.

5. *In terms of autonomy and self-regulation,* the use of AI applications promotes the autonomous learning of English, it helps learners enhance self-reflection and self-regulation capabilities, becoming responsibility-takers, assessment-capable, and autonomous learners. In this vein, Haristiani (2019) also support this argument claiming that AI tools can assist the learner in all the phases of his learning (e.g., for writing:

recommendation tools, paraphrasing tools, grammar and plagiarism checkers, etc./ for speaking: chatbots, VR, IPA, speech assessment, etc) which make the learner independent from his teachers or peers.

6. *In terms of learners' affective variables,* AI applications have a favorable impact on learners. As AI can lower the learners' affective filter, by enhancing belief, confidence, relaxation, encouragement, self-efficacity, motivation, and interest, and reducing anxiety and stress related to English learning. This is supported by Ghareeb (2020), claiming that AI provides easy to use tools, with interactive and authentic environments, and that learners use these tools without the threat of being judged. For instance, AI chatbots like "Replica", can provide the learners with a native-like interaction, and can recognize the learner's emotions and makes them feel more valued and understood (N-Y. Kim, 2019).

7. *In terms of providing feedback,* AI creates novel teaching/learning assessment experiences. AI can provide immediate formative feedback related to students' outcomes, both for the written and the spoken compositions, involving feedback about spelling, grammar, intonation, accuracy, pronunciation, and intonation, with correction suggestions and explanations. Hence, learners can identify and work on their weaknesses while eliminating the threat of being judged unfavorably. In this vein, "ELSA" give detailed feedback on the speaking, and listening performance (Becker & Edalatishams, 2019). Additionally, there are applications that are specifically designed to evaluate oral performance such as "gweek". Moreover, many scholars emphasize the efficiency of AI-writing tools like Grammarly and Turnitin to provide accurate feedback for writing performance (Moon, 2021). AI can also give feedback and recommendation to the teachers concerning their teaching procedures, materials, and methods

8. *In terms of providing a personalized learning experience,* AI can collect massive learner data, concerning learners' personalized parameters (e.g., age, level, preferences,

style, cognitive levels, hobbies, interests, personality, grades, experiences, and needs), and then provide targeted teaching/learning optimization measures for teachers and learners. AI can personalize different aspects of the teaching/learning process such as materials, activities, assessments, methods, and tests. VR and chatbots are the most widespread AI language learning tools that provide a personalized environment for users and deal with each user according to his characteristics and personality, and even try to be the user's best friend (X. Chen, Zou, Cheng, et al., 2021; Lin & Mubarok, 2021). Also, AI-Tutors such as "*The E-Tutor"* help to personalize both the teaching and the learning processes (Xue, 2021).

9. *In terms of providing guidance for learners,* AI can give recommendations on the learning and teaching process, such as recommending materials, activities, tasks, tests, and methods that suit the learners' characteristics. For example, "DLLgame" application can give reading learning recommendations (Hooshyar et al., 2018), and "VocabNomad", "Merlot", and "Ariadne" give vocabulary learning recommendations (Demmans, 2017). Moreover, AI can adapt the learning process according to the learners' progresses and changes rather than customize a predefined learning process according to the learner; give adjustments each time the learners change or progress. In this vein, "ELSA" always adapts the learning path when the user improves (Samad & Ismail, 2020).

10. *In terms of collective use,* AI applications can be used individually, in small groups or in big groups, according to the used application and preference of the student.

As an answer to our main question, "**Does AI have the potentials to compensate the EFL students' needs?**", we can say that AI, to a very large extent, can have the potentials to meet the third-year students' needs of the English department at Barika University Center. AI can compensate for the participants' needs by providing different opportunities, enhancing linguistic skills and components, providing learner-centered environment that ensures

91

productivity, providing a variety of real-like materials with visual aids, enhancing autonomy and self-regulation, reducing the affective filter and enhancing motivation, interesting, self-efficacity and self-confidence, providing motivational and immediate formative feedback, ensure personalized learning and teaching experience, guide the learners and teachers in each step of the learning/teaching process by providing valuable recommendations and adjustments. It is also worth mentioning that AI can be used individually or within groups.

As a result, the hypothesis suggested, **AI have the potentials to meet third-year EFL students' needs at Barika University Center**, is confirmed.

3. Recommendations

On the basis of the study results, some recommendations were made to the educators, learners, and future researchers:

➢ Conducting the same study with a larger sample, to generalize the results.

➢ Conducting the same study in other universities, and even in other educational levels such as high schools. Which would provide a better understanding of the effective potentials of AI in the field of AI in Algeria to facilitate its integration in the Algerian educational institutes.

➢ Future studies are suggested to survey the learners' and teachers' acceptance for AI.

➢ Further investigations are suggested to test the possibility of using AI tools in EFL Algerian educational institutes.

➢ Future investigations and experiments are recommended to examine the effect of AI tools on the overall EFL teaching and learning process, concerning the linguistic skills and components and concerning affective and cognitive learning variables.

➢ Further researches are suggested to investigate the negative influence of AI tools, especially concerning autonomy and writing; since learners can negatively depend on those tools and use them to do the work for them.

➢ Future investigation is recommended to examine more comprehensively the EFL
learners' needs, especially concerning GE settings in Algeria.

Conclusion

Through the lines of this chapter, we attempt to present a detailed view of the overall
research process of research. The present chapter included three major sections. In the first,
the overall research approaches, methods, and procedures; concerning sampling, data
collection, and data analysis, were introduced. Respectively, the second section was devoted
to the display of the results in a comprehensible way using tables, graphs and statements. The
third section, provides the discussion and interpretation of the results to answer the research
questions and verify its hypothesis. In the end, some recommendations for future research
were introduced.

General Conclusion

According to the literature, EFL English learners still face a lot of difficulties and deficiencies in which the teaching/learning environment is far from meeting their needs. This was supported by the pre-study questionnaire (See Appendix D). The latter ensure that the third-year students from the English department of Barika university have a moderate low of motivation, moderate anxiety levels, weak metacognitions, moderate absence of the outside-classroom practices opportunities and a total unfamiliarity with using AI in learning. In another hand, AI has already ensured its efficiency to meet many of the EFL learners' problems and enhance their learning outcomes, as many scholars suggest the use AI as supporting tools to ameliorate the process of EFL teaching/ learning, thus, improve and enhance the proficiency level of learners. Having said that, the main aim of the present study is to reveal what AI can introduce to EFL learners in terms of their learning needs, based on the literature. Therefore, this study weights to answer the following questions:

1. What are the language learning needs of third-year English students at the English department of Barika university center?

2. What can AI provide for the EFL learners according to the literature?

3. How suitable is the use of AI for compensating the needs of EFL learners?

To answer the questions and achieve the aims of this study, a mixed research method was adopted, as an alliance between quantitative and qualitative approaches. Under descriptive method, this study went through two stages. In the first stage, a NA questionnaire adapted from Al-Hamlan and Abdelrahman (2015) was conducted to collect quantitative data, that will be descriptively analyzed and interpreted. In the second stage, a deductive thematic literature analysis was conducted for ten (10) purposely sampled articles, in which themes were inferred according to the results of the first stage (i.e., the students' needs). Moreover, the validity and reliability of the research's tools were demonstrated, in addition to the

administration process. Then, the results were presented in detail using tables, figures and statements from the literature.

After discussing and interpreting the results, ten (10) key conclusions may be drowned, Firstly, AI with a variety of applications such as VR, IPA, Chatbots, Grammar-checkers, paraphrasing tools, etc., can provide learners with a variety of meaningful opportunities, without time and place constraints to extend what they have learned to their daily life. Second, there are a variety of AI applications that can help learners in learning each of the linguistic skills and components, each of which asserts to be significantly useful. Third, AI can provide a flexible, interactive, and learner-centered intelligent learning environment to ensure learners' productivity. Fourth, AI can provide and recommend different visual, audio, and textual aids that simulated real-life situations and are daily life related. Fifth, AI can promote autonomous learning, self-reflection and self-regulation capabilities. Sixth, AI applications have a favorable impact on learners, in which it can lower the learners' affective filter; anxiety and stress, and enhance confidence, self-efficacity, and motivation. Seventh, AI can provide immediate formative feedback, both for written or spoken compositions with correction suggestions and explanations in an accepted, autonomous manner for the learners. Lastly, AI can collect massive learner data, concerning learners' personalized parameters (e.g., age, level, preferences, style, cognitive levels, hobbies, interests, personality, grades, experiences, and needs), and then provide targeted teaching/learning optimization measures for teachers and learners to ensure the personalization of the teaching/learning process. Ninth, AI can provide teaching/ learning recommendations that suit the learners' characteristics, and guide the learners through their learning process. In addition, AI can monitor the learners' change or progress to adapt the teaching/learning process accordingly. Lastly, AI applications can be used individually, in small groups, or in big groups, according to the used application and preference of the student.

Bibliography

Abalkheel, A. (2022). Amalgamating Bloom's Taxonomy and Artificial Intelligence to Face the Challenges of Online EFL Learning Amid Post-COVID-19 In Saudi Arabia. *International Journal of English Language and Literature Studies*, *11*(1), 16–30.

Abu Shawar, B., & Atwell, E. (2007). Fostering language learner autonomy via adaptive conversation tutors. *Proceedings of Corpus Linguistic (CL'07)*.

Acemoglu, D. mname, & Restrepo, P. mname. (2018). Artificial Intelligence, Automation and Work. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3098384

Adamopoulou, E., & Moussiades, L. (2020). Chatbots: History, technology, and applications. *Machine Learning with Applications*, *2*. https://doi.org/10.1016/j.mlwa.2020.100006

Ahour, T., & Mohseni, F. (2015). INVESTIGATING EFL LEARNERS'PERCEPTION OF NEEDS: NECESSITIES, WANTS, AND LACKS IN DIFFERENT LANGUAGE SKILLS TAUGHT IN GENERAL ENGLISH COURSES. *Modern Journal of Language Teaching Methods*, *5*(1), 236.

Akyel, A. S., & Ozek, Y. (2010). A language needs analysis research at an English medium university in Turkey. *Procedia-Social and Behavioral Sciences*, *2*(2), 969–975.

al Lily, A. E., Ismail, A. F., Abunasser, F. M., & Alhajhoj Alqahtani, R. H. (2020). Distance education as a response to pandemics: Coronavirus and Arab culture. *Technology in Society*, *63*. https://doi.org/10.1016/j.techsoc.2020.101317

Aldosari, S. A. M. (2020). The future of higher education in the light of artificial intelligence transformations. *International Journal of Higher Education*, *9*(3). https://doi.org/10.5430/ijhe.v9n3p145

Alemi, M., Meghdari, A., & Ghazisaedy, M. (2014). Employing humanoid robots for teaching english language in iranian junior high-schools. *International Journal of Humanoid Robotics*, *11*(3). https://doi.org/10.1142/S0219843614500224

Alfadil, M. M. (2017). VR game classroom implementation: Teacher perspectives and student learning outcomes. *Unpublished Doctoral Dissertation, University of Northern Colorado, Greeley. Retrieved from Http://Digscholarship. Unco. Edu/Dissertations*.

Alhadiah, A. (2021). Communicative needs of Saudi EFL engineering students in an EAP context: Task-based needs analysis. *TESOL International Journal*, *16*(1).

Al-Hamlan, S., & Abdelrahman, A. (2015). A Needs Analysis Approach to EFL Syllabus Development for Second Grade Students in Secondary Education in Saudi Arabia : A Descriptive Analytical Approach to Students ' Needs. *American International Journal of Contemporary Research*, *5*(1).

ALHARBY, M. (2015). ESP TARGET SITUATION NEEDS ANALYSIS: THE ENGLISH LANGUAGE COMMUNICATIVE NEEDS AS PERCEIVED BY HEALTH PROFESSIONALS IN THE RIYADH AREA. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *53*(9).

Alhojailan, M. I., & Ibrahim, M. (2012). Thematic Analysis : A Critical Review of Its Process and Evaluation. *WEI International European AcademicConference Proceedings*, *1*(2011).

Ali, A. A. (2011). A needs analysis for designing an ESP syllabus for the students of Sudan Naval Academy. *Unpublished Doctoral Dissertation, Al Neelain University*.

Ali, Z. (2020). Artificial Intelligence (AI): A Review of its Uses in Language Teaching and Learning. *IOP Conference Series: Materials Science and Engineering*, *769*(1). https://doi.org/10.1088/1757-899X/769/1/012043

Alkinani, E. A. (2021). Factors affecting the use of information communication technology in teaching and learning in Saudi Arabia universities. *Psychology and Education Journal*, *58*(1), 1012–1022.

Allen, L. K., Crossley, S. A., Snow, E. L., & McNamara, D. S. (2014). L2 writing practice: Game enjoyment as a key to engagement. *Language Learning and Technology*, *18*(2).

Alm, A., & Nkomo, L. M. (2020). Chatbot experiences of informal language learners: A sentiment analysis. *International Journal of Computer-Assisted Language Learning and Teaching*, *10*(4). https://doi.org/10.4018/IJCALLT.2020100104

Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*, *25*(6). https://doi.org/10.1007/s10639-020-10219-y

Almaleki, W. S. A. (2021). Saudi international students' perceptions of the utility of artificial intelligence and intelligent personal assistant tools in EFL learning. In *Dissertation Abstracts International: Section B: The Sciences and Engineering* (Vol. 82, Issues 4-B).

Almohammadi, K., Hagras, H., Alghazzawi, D., & Aldabbagh, G. (2017). A survey of artificial intelligence techniques employed for adaptive educational systems within e-learning platforms. *Journal of Artificial Intelligence and Soft Computing Research*, *7*(1). https://doi.org/10.1515/jaiscr-2017-0004

Alpert, R., & Haber, R. N. (1960). Anxiety in academic achievement situations. *Journal of Abnormal and Social Psychology*, *61*(2). https://doi.org/10.1037/h0045464

Alqunayeer, H. S., & Zamir, S. (2016). Needs Analysis of Saudi EFL Female Students: A Case Study of Qassim University. *Journal of Curriculum and Teaching*, *5*(1). https://doi.org/10.5430/jct.v5n1p87

Alsadoon, R. (2021). Chatting with AI Bot: Vocabulary Learning Assistant for Saudi EFL Learners. *English Language Teaching*, *14*(6). https://doi.org/10.5539/elt.v14n6p135

Al-Seghayer, K. (2001). The effect of multimedia annotation modes on L2 vocabulary acquisition: A comparative study. *Language Learning and Technology*, *5*(1).

Al-Zawaideh, G. (2022). The Effectiveness of An Artificial Intelligence (AI) Applications on Fluency Performance Among Tenth Grade EFL Students. *Review of International Geographical Education Online*, *12*(1), 148–156.

Anastasiades, P. (2012). Blended learning environments for adults: Evaluations and frameworks. In *Blended Learning Environments for Adults: Evaluations and Frameworks*. https://doi.org/10.4018/978-1-4666-0939-6

Ardasheva, Y., Hao, T., & Zhang, X. (2019). Pedagogical Implications of Current SLA Research for Vocabulary Skills. In *Research-Driven Pedagogy*. https://doi.org/10.4324/9781351043281-7

Arias-Contreras, C., & Moore, P. J. (2022). The role of English language in the field of agriculture: A needs analysis. *English for Specific Purposes*, *65*. https://doi.org/10.1016/j.esp.2021.09.002

ARMUT, M., BAŞAR, T., & ÖZÜDOĞRU, G. (2020). Technology in foreign language teaching: A needs analysis. *Acta Didactica Napocensia*, *13*(2). https://doi.org/10.24193/adn.13.2.22

Atwell, E. (1999). *The Language Machine: The impact of speech and language technologies on English language teaching. British Council*.

Auerbach, E. R. (1995). The politics of the ESL classroom: Issues of power in pedagogical choices. *Power and Inequality in Language Education*, 9–33.

Bao, M. (2019). Can Home Use of Speech-Enabled Artificial Intelligence Mitigate Foreign Language Anxiety – Investigation of a Concept. *Arab World English Journal*, *5*. https://doi.org/10.24093/awej/call5.3

Barakhsanova, E. A., Savvinov, V. M., Prokopyev, M. S., Vlasova, E. Z., & Gosudarev, I. B. (2016). Adaptive education technologies to train Russian teachers to use e-learning. *Mathematics Education*, *11*(10).

Basturkmen, H. (2010). *Developing courses in English for specific purposes*. Springer.

Basturkmen, H. (2013). Between territories and domains: an ESP-oriented enquiry in the borders. Course development, genre analysis, and the role of ESP in education. *ASp. La Revue Du GERAS*, *64*, 17–21.

Basturkmen, H. (2018). Needs Analysis and Syllabus Design for Language for Specific Purposes. In *The Encyclopedia of Applied Linguistics*. https://doi.org/10.1002/9781405198431.wbeal0861.pub2

Becker, K., & Edalatishams, I. (2019). ELSA Speak – Accent Reduction [Review]. *Proceedings of the 10th Pronunciation in Second Language Learning and Teaching Conference*, *October*.

Bécue, A., Praça, I., & Gama, J. (2021). Artificial intelligence, cyber-threats and Industry 4.0: challenges and opportunities. *Artificial Intelligence Review*, *54*(5). https://doi.org/10.1007/s10462-020-09942-2

Behzadi, A., & Lashkarian, A. (2015). Iranian undergraduate students' needs in English courses for general and specific purposes. *International Journal of English and Education*, *4*(3), 67–80.

Belcher, D. (2009). What ESP is and can be: An introduction. *English for Specific Purposes in Theory and Practice*, 1–20.

Benson, P. (2013). Teaching and researching: Autonomy in language learning. In *Teaching and Researching: Autonomy in Language Learning*. https://doi.org/10.4324/9781315833767

Bentaleb, I. (2021) .The Emerging of Online Education in Teaching English as a Foreign Language in Response to COVID-19: Case Study: EFL Classes at the University of HBB, Algeria. *Journal of Languages & Translation*, 01(02), 44-56.

Berwick, R. (1989). Needs assessment in language programming: From theory to practice. In R.K. Johnson (ed.), The second language curriculum (pp. 48–62). Cambridge: CambridgeUniversity Press.

Bibauw, S., François, T., & Desmet, P. (2019). Discussing with a computer to practice a foreign language: research synthesis and conceptual framework of dialogue-based CALL. *Computer Assisted Language Learning*, *32*(8). https://doi.org/10.1080/09588221.2018.1535508

Bittencourt, I. I., Isotani, S., Costa, E., & Mizoguchi, R. (2008). Research directions on Semantic Web and education. *Journal of ScientiaInterdisciplinary Studies in Computer Science*, *19*(June).

Borge, N. (2016). Artificial intelligence to improve education/learning challenges. *International Journal of Advanced Enginering & Innovative Technology (IJAEIT)*, *2*(6), 10–13.

Boroujeni, S. A., Fard, F. M., & In, M. A. (2013). A Needs Analysis of English for Specific Purposes (ESP) Course For Adoption Of Communicative Language Teaching :(A Case of Iranian First-Year Students of Educational Administration). *International Journal of Humanities and Social Science Invention ISSN*, *2*(6).

Bosher, S., & Smalkoski, K. (2002). From needs analysis to curriculum development: Designing a course in health-care communication for immigrant students in the USA. *English for Specific Purposes*, *21*(1), 59–79.

Bouhas,F. (2008) *Attaining fluency in oral communication: the case of students at dlu english department*. (Unpublished doctoral thesis). Djilali Liabess university, Sidi Bel-Abess, Algeria.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2000). *How people learn* (Vol. 11). Washington, DC: National academy press.

Brindley, G. (1989). The role of needs analysis in adult ESL programme design. *The Second Language Curriculum*, *63*, 78.

Brindley, G. (2012). The role of needs analysis in adult ESL programme design. In *The Second Language Curriculum*. https://doi.org/10.1017/cbo9781139524520.007

Brindley, G. P. (1984). *Needs analysis and objective setting in the adult migrant education program*. Adult Migrant Education Service.

Brooks, E. M. (2018). Incorporating pop culture in formal and informal learning environments for L2 students. *The TFLTA Journal*, *7*, 29–37.

Brown, J. D. (1995). *The elements of language curriculum: A systematic approach to program development*. ERIC.

Brown, J. D. (2009). Foreign and Second Language Needs Analysis. In *The Handbook of Language Teaching*. https://doi.org/10.1002/9781444315783.ch16

Buddhima, N. W., & Keerthiwansha, S. (2018). Artificial Intelligence Education (AIEd) in English as a Second Language (ESL) Classroom in Sri Lanka. In *International Journal of Conceptions on Computing and Information Technology* (Vol. 6, Issue 1).

Case, M. (2015). *Language students' personal learning environments through an activity theory lens*.

Cavaleri, M. R., & Dianati, S. (2016). You want me to check your grammar again? The usefulness of an online grammar checker as perceived by students. *Journal of Academic Language and Learning*, *10*(1), A223–A236.

Chambers, F. (1980). A re-evaluation of needs analysis in ESP. *The ESP Journal*, *1*(1), 25–33.

Chang, T. S., Li, Y., Huang, H. W., & Whitfield, B. (2021). Exploring EFL Students' Writing Performance and Their Acceptance of AI-based Automated Writing Feedback. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3459043.3459065

Chapelle, C. A., & Sauro, S. (2017). Introduction to the Handbook of Technology and Second Language Teaching and Learning . In *The Handbook of Technology and Second Language Teaching and Learning*. https://doi.org/10.1002/9781118914069.ch1

Chastain, K. (1975). AFFECTIVE AND ABILITY FACTORS IN SECOND-LANGUAGE ACQUISITION. *Language Learning*, *25*(1). https://doi.org/10.1111/j.1467-1770.1975.tb00115.x

Châu, N. N. B. (2020). LANGUAGE NEEDS ANALYSIS FOR WORKING ABROAD: A CASE-STUDY IN THUA THIEN HUE PROVINCE. *Hue University Journal of Science: Social Sciences and Humanities*, *129*(6B), 117–134.

Chaudron, C., Doughty, C. J., Kim, Y., Kong, D., Lee, J., Lee, Y., Long, M. H., Rivers, R., & Urano, K. (2005). A task-based needs analysis of a tertiary Korean as a foreign language program. *Second Language Needs Analysis*, *225265*.

Chemir, S., & Kitila, T. (2022). Learners' needs analysis for English for academic purposes in ethiopian higher education institutions: The case of Wachemo University freshman students. *Cogent Education*, *9*(1), 2026190.

Chen, C. (2021). Using Scaffolding Materials to Facilitate Autonomous Online Chinese as a Foreign Language Learning: A Study During the COVID-19 Pandemic. *SAGE Open*, *11*(3). https://doi.org/10.1177/21582440211040131

Chen, C. M., Wang, J. Y., Chen, Y. T., & Wu, J. H. (2016). Forecasting reading anxiety for promoting English-language reading performance based on reading annotation behavior. *Interactive Learning Environments*, *24*(4). https://doi.org/10.1080/10494820.2014.917107

Chen, M. H. (2019). Phrasal paraphrase learning: Exploring an effective strategy to consolidate vocabulary knowledge. *Taiwan Journal of TESOL*, *16*(1). https://doi.org/10.30397/TJTESOL.201904_16(1).0002

Chen, M. P., Wang, L. C., Zou, D., Lin, S. Y., & Xie, H. (2019). Effects of caption and gender on junior high students' EFL learning from iMap-enhanced contextualized learning. *Computers and Education*, *140*. https://doi.org/10.1016/j.compedu.2019.103602

Chen, X., Zou, D., Cheng, G., & Xie, H. (2021). Artificial intelligence-assisted personalized language learning: Systematic review and co-citation analysis. *Proceedings - IEEE 21st International Conference on Advanced Learning Technologies, ICALT 2021*. https://doi.org/10.1109/ICALT52272.2021.00079

Chen, X., Zou, D., Xie, H., & Cheng, G. (2021). Twenty Years of Personalized Language learning: Topic Modeling and Knowledge Mapping. *Educational Technology and Society*, *24*(1).

Chen, Y. L. (2016). The Effects of Virtual Reality Learning Environment on Student Cognitive and Linguistic Development. *Asia-Pacific Education Researcher*, *25*(4). https://doi.org/10.1007/s40299-016-0293-2

Chen, Y. L., & Hsu, C. C. (2020). Self-regulated mobile game-based English learning in a virtual reality environment. *Computers and Education*, *154*. https://doi.org/10.1016/j.compedu.2020.103910

Chen, Y.-L., Doong, J.-L., & Hsu, C.-C. (2014). EFL learning scenarios: Effectiveness of using 3D virtual reality. *Society for Information Technology & Teacher Education International Conference*, 1090–1095.

Chien, S. Y., Hwang, G. J., & Jong, M. S. Y. (2020). Effects of peer assessment within the context of spherical video-based virtual reality on EFL students' English-Speaking performance and learning perceptions. *Computers and Education*, *146*. https://doi.org/10.1016/j.compedu.2019.103751

Chimrov, A. v., Sidorov, V. v., & Kachalov, N. A. (2021). Modern artificial intelligence technologies application in learning foreign languages by bachelors of energy. *AIP Conference Proceedings*, *2422*. https://doi.org/10.1063/5.0068142

Chou, H. C., Moslehpour, M., & Yang, C.-Y. (2016). My access and writing error corrections of EFL college pre-intermediate students. *International Journal of Education*, *8*(1), 144–161.

Chuah, K. M., & Kabilan, M. K. (2021). Teachers' Views on the Use of Chatbots to Support English Language Teaching in a Mobile Environment. *International Journal of Emerging Technologies in Learning*, *16*(20). https://doi.org/10.3991/ijet.v16i20.24917

Ciolacu, M., Tehrani, A. F., Binder, L., & Svasta, P. M. (2019). Education 4.0 - Artificial Intelligence Assisted Higher Education: Early recognition System with Machine Learning to support Students' Success. *2018 IEEE 24th International Symposium for Design and Technology in Electronic Packaging, SIITME 2018 - Proceedings*. https://doi.org/10.1109/SIITME.2018.8599203

Coniam, D. (2008a). An Evaluation of Chatbots as Software Aids to Learning English as a Second Language. *The EuroCALL Review*, *13*. https://doi.org/10.4995/eurocall.2008.16353

Coniam, D. (2008b). Evaluating the language resources of chatbots for their potential in English as a second language. *ReCALL*, *20*(1). https://doi.org/10.1017/S0958344008000815

Connected Women. (2015). Mobile access and usage in low- Table of Contents. *Gsma*.

Cotos, E. (2011). Potential of automated writing evaluation feedback. *Calico Journal*, *28*(2), 420–459.

Crookes, G., & Schmidt, R. W. (1991). Motivation: Reopening the research agenda. *Language Learning*, *41*(4), 469–512.

Daniels, P. (2015). Using web speech technology with language learning applications. *JALT CALL Journal*, *11*(2). https://doi.org/10.29140/jaltcall.v11n2.192

Darasawang, P., & Reinders, H. (2010). Encouraging autonomy with an online language support system. *CALL-EJ*, *11*(2).

Deals, T. (2021). *ProWritingAid sets AI loose to improve your writing like a trusted editor*. Amsterdam: Newstex. Retrieved from https://www.proquest.com/blogs-podcasts-websites/prowritingaid-sets-ai-loose-improve-your-writing/docview/2546959227/se-2?accountid=202267

Demmans Epp, C. A. (2017). Supporting English language learners with an adaptive mobile application. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *77*(8-B(E)).

Deutschmann, M., Panichi, L., & Molka-Danielsen, J. (2009). Designing oral participation in second life a comparative study of two language proficiency courses. *ReCALL*, *21*(2). https://doi.org/10.1017/S0958344009000196

Devedzic, V. (2016). Not Fade Away?: Commentary to paper Education and the Semantic Web (IJAIED Vol.14, 2004). *International Journal of Artificial Intelligence in Education*, *26*(1). https://doi.org/10.1007/s40593-015-0051-2

Dinh, T., Kim, Y., Gu, T., & Vasilakos, A. v. (2016). L-MAC: A wake-up time self-learning MAC protocol for wireless sensor networks. *Computer Networks*, *105*. https://doi.org/10.1016/j.comnet.2016.05.015

Dizon, G. (2017). Using Intelligent Personal Assistants for Second Language Learning: A Case Study of Alexa. *TESOL Journal*, *8*(4). https://doi.org/10.1002/tesj.353

Dizon, G. (2020). Evaluating intelligent personal assistants for L2 listening and speaking development. *Language Learning and Technology*, *24*(1). https://doi.org/10.125/44705

Dodigovic, M. (2007). C. *Language Awareness*, *16*(2). https://doi.org/10.2167/la416.0

Dörnyei, Z. (2003). Attitudes, orientations, and motivations in language learning: Advances in theory, research, and applications. In *Language Learning* (Vol. 53, Issue SUPPL. 1). https://doi.org/10.1111/1467-9922.53222

Dudley-Evans, T., & St John, M. J. (1998). Developments in English for specific. *Purposes. A Multi-Disciplinary. Approach. Cambridge: CUP*.

Edelblut, P. (2020). Realizing the promise of ai-powered, adaptive, automated, instant feedback on writing for students in grade 3-8 with an iep. *Lecture Notes in Computer Science*

(Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), *12214 LNCS*. https://doi.org/10.1007/978-3-030-50788-6_21

Eggly, S. (2002). An ESP program for international medical graduates in residency. *English for Specific Purposes*, 105–115.

el Shazly, R. (2021). Effects of artificial intelligence on English speaking anxiety and speaking performance: A case study. *Expert Systems*, *38*(3). https://doi.org/10.1111/exsy.12667

Elsaid Mohammed, A. S., & Nur, H. S. M. (2018). Needs Analysis in English for Academic Purposes: The Case of Teaching Assistants at the University of Khartoum. *HOW*, *25*(2). https://doi.org/10.19183/how.25.2.409

Erstad, O. (2015). Educating the digital generation: Exploring media literacy for the 21st century. *Nordic Journal of Digital Literacy*, *2015*(4). https://doi.org/10.18261/issn1891-943x-2015-jubileumsnummer-07

Evmenova, A. S., Graff, H. J., Jerome, M. K., & Behrmann, M. M. (2010). Word Prediction Programs with Phonetic Spelling Support: Performance Comparisons and Impact on Journal Writing for Students with Writing Difficulties. *Learning Disabilities Research & Practice*, *25*(4). https://doi.org/10.1111/j.1540-5826.2010.00315.x

Fadlan, A. (2020). Factors causing language anxiety of EFL students in classroom presentation. *Jurnal Sinestesia*, *10*(1), 11–21.

Fahimirad, M., & Kotamjani, S. S. (2018). A review on application of artificial intelligence in teaching and learning in educational contexts. *International Journal of Learning and Development*, *8*(4), 106–118.

Fakdawer, Y. R. (2020). ELSA Apps to Encourage Learner Autonomy. Faculty of Language and Arts, Universitas Kristen Sataya Wacana Salatig.

Fang, L., Tuan, L. A., Hui, S. C., & Wu, L. (2018). Personalized question recommendation for English grammar learning. *Expert Systems*, *35*(2). https://doi.org/10.1111/exsy.12244

Far, M. M. (2008). On the relationship between ESP & EGP: A general perspective. *English for Specific Purposes World*, *7*(1), 1–11.

Fathi Sidig Sidgi, L., & Jelani Shaari, A. (2017). The Usefulness of Automatic Speech Recognition (ASR) Eyespeak Software in Improving Iraqi EFL Students' Pronunciation. *Advances in Language and Literary Studies*, *8*(1). https://doi.org/10.7575/aiac.alls.v.8n.1p.221

Fatihi, A. R. (2003). The Role of Needs Analysis in ESL Program Design. *SOUTH ASIAN LANGUAGE REVIEW*, *XIII*.

Fitria, T. N. (2021a). Grammarly as AI-powered English Writing Assistant: Students' Alternative for Writing English. *Metathesis: Journal of English Language, Literature, and Teaching*, *5*(1). https://doi.org/10.31002/metathesis.v5i1.3519

Fitria, T. N. (2021b). QuillBot as an online tool: Students' alternative in paraphrasing and rewriting of English writing. *Englisia: Journal of Language, Education, and Humanities*, *9*(1). https://doi.org/10.22373/ej.v9i1.10233

Fredholm, K. (2019). Effects of Google translate on lexical diversity: vocabulary development among learners of Spanish as a foreign language. *Revista Nebrija*, *13*(26).

Fryer, L., & Carpenter, R. (2006). Bots as language learning tools. *Language Learning and Technology*, *10*(3).

Gain, A., Rao, M., & Bhat, K. S. (2019). Usage of grammarly - online grammar and spelling checker tool at the health sciences library, Manipal Academy of Higher Education, Manipal: A Study. *Library Philosophy and Practice*, *2019*.

García-Peñalvo, F. J., & Conde, M. (2015). The impact of a mobile personal learning environment in different educational contexts. *Universal Access in the Information Society*, *14*(3). https://doi.org/10.1007/s10209-014-0366-z

Gardner, R. C., & MacIntyre, P. D. (1993). On the Measurement of Affective Variables in Second Language Learning. *Language Learning*, *43*(2). https://doi.org/10.1111/j.1467-1770.1992.tb00714.x

Garrido-Iñigo, P., & Rodríguez-Moreno, F. (2015). The reality of virtual worlds: pros and cons of their application to foreign language teaching. *Interactive Learning Environments*, *23*(4). https://doi.org/10.1080/10494820.2013.788034

Gee, J. P., & Levine, M. H. (2009). Welcome to our virtual worlds. *Educational Leadership*, *66*(6).

Gelan, A., Fastré, G., Verjans, M., Martin, N., Janssenswillen, G., Creemers, M., Lieben, J., Depaire, B., & Thomas, M. (2018). Affordances and limitations of learning analytics for computer-assisted language learning: a case study of the VITAL project. *Computer Assisted Language Learning*, *31*(3). https://doi.org/10.1080/09588221.2017.1418382

Ghai, B., & Mueller, K. (2021). Fluent: An AI Augmented Writing Tool for People who Stutter. *The 23rd International ACM SIGACCESS Conference on Computers and Accessibility*, 1–8.

Ghareeb Ahmed Ali, S. (2020). Using an Artificial Intelligence Application for Developing Primary School Pupils' Oral Language Skills. المجلة التربوية لكلية التربية بسوهاج, *75*(75). https://doi.org/10.21608/edusohag.2020.97643

Ghufron, M. A., & Rosyida, F. (2018). The Role of Grammarly in Assessing English as a Foreign Language (EFL) Writing. *Lingua Cultura*, *12*(4). https://doi.org/10.21512/lc.v12i4.4582

Gibson, C. (2016). Bridging English Language Learner Achievement Gaps through Effective Vocabulary Development Strategies. *English Language Teaching*, *9*(9). https://doi.org/10.5539/elt.v9n9p134

Gillard, C. (2018). How Ed Tech's Invisible Hand Helps Itself to Student data. *The Chronicle of Higher Education*.

Gkonou, C., Daubney, M., & Dewaele, J. M. (2017). New insights into language anxiety: Theory, research and educational implications. In *New Insights into Language Anxiety: Theory, Research and Educational Implications*. https://doi.org/10.1093/elt/ccy042

Goda, Y., Yamada, M., Matsukawa, H., Hata, K., & Yasunami, S. (2014). Conversation with a Chatbot before an Online EFL Group Discussion and the Effects on Critical Thinking. *The Journal of Information and Systems in Education*, *13*(1). https://doi.org/10.12937/ejsise.13.1

Godwin-Jones, R. (2017). Emerging technologies: Scaling up and zooming in: Big data and personalization in language learning. *Language Learning and Technology*, *21*(1).

Goksel Canbek, N., & Mutlu, M. E. (2016). On the track of Artificial Intelligence: Learning with Intelligent Personal Assistants. *International Journal of Human Sciences*, *13*(1). https://doi.org/10.14687/ijhs.v13i1.3549

Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: A review of technology types and their effectiveness. In *Computer Assisted Language Learning* (Vol. 27, Issue 1). https://doi.org/10.1080/09588221.2012.700315

Grann, J., & Bushway, D. (2014). Competency map: Visualizing student learning to promote student success. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/2567574.2567622

Grier, A. S. (2005). Integrating Needs Assessment into Career and Technical Curriculum Development. *Journal of Industrial Teacher Education*, *42*(1), 59–66.

Grivokostopoulou, F., Perikos, I., & Hatzilygeroudis, I. (2014). Using semantic web technologies in a web based system for personalized learning AI course. *Proceedings - IEEE 6th International Conference on Technology for Education, T4E 2014*. https://doi.org/10.1109/T4E.2014.36

Guettal, I. (2008). Introducing storytelling activities as a basic technique to develop students' oral performancean experimental approach, case study: second year students of English at batna university. (Unpublished magister dissertation). Batna University, Batna, Algeria.

Gruber, A., & Kaplan-Rakowski, R. (2022). The impact of high-immersion virtual reality on foreign language anxiety when speaking in public. *Available at SSRN*.

Gurbin, T. (2015). Metacognition and Technology Adoption: Exploring Influences. *Procedia - Social and Behavioral Sciences*, *191*. https://doi.org/10.1016/j.sbspro.2015.04.608

Hamuddin, B., Julita, K., Rahman, F., & Derin, T. (2020). Artificial Intelligence in EFL Context: Rising Students' Speaking Performance with Lyra Virtual Assistance. *International Journal of Advanced Science and Technology*, *29*(5).

Han, B. (2019). Application of artificial intelligence in autonomous English learning among college students. *International Journal of Emerging Technologies in Learning*, *14*(6). https://doi.org/10.3991/ijet.v14i06.10157

Han, J. (2012). Emerging technologies ROBOT assisted language learning. *Language Learning and Technology*, *16*(3).

Hanakovič, T., & Nagy, M. (2006). Speech recognition helps visually impaired people writing mathematical formulas. *Lecture Notes in Computer Science (Including Subseries Lecture*

Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), *4061 LNCS*. https://doi.org/10.1007/11788713_177

Hao, T., Wang, Z., & Ardasheva, Y. (2021). Technology-Assisted Vocabulary Learning for EFL Learners: A Meta-Analysis. *Journal of Research on Educational Effectiveness*, *14*(3). https://doi.org/10.1080/19345747.2021.1917028

Haristiani, N. (2019). Artificial Intelligence (AI) Chatbot as Language Learning Medium: An inquiry. *Journal of Physics: Conference Series*, *1387*(1). https://doi.org/10.1088/1742-6596/1387/1/012020

Haristiani, N., Danuwijaya, A. A., Rifai, M. M., & Sarila, H. (2019). Gengobot: A chatbot-based grammar application on mobile instant messaging as language learning medium. *Journal of Engineering Science and Technology*, *14*(6).

Haristiani, N., & Rifai, M. M. (2021). Chatbot-based application development and implementation as an autonomous language learning medium. *Indonesian Journal of Science and Technology*, *6*(3). https://doi.org/10.17509/ijost.v6i3.39150

Haryanto, E. (2019). Students ' Attitudes Towards the Use of Artificial Intelligence Siri in EFL Learning At One Public University. *International Seminar and Annual Meeting BKS-PTN Wilayah Barat*.

Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and Implications for Teaching and Learning. In *Center for Curriculum Redesign* (Vol. 14, Issue 4).

Hooshyar, D., Yousefi, M., Wang, M., & Lim, H. (2018). A data-driven procedural-content-generation approach for educational games. *Journal of Computer Assisted Learning*, *34*(6). https://doi.org/10.1111/jcal.12280

Horwitz, E. K. (1986). Preliminary Evidence for the Reliability and Validity of a Foreign Language Anxiety Scale. *TESOL Quarterly*, *20*(3). https://doi.org/10.2307/3586302

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, *70*(2), 125–132.

Hsu, C. K., Hwang, G. J., & Chang, C. K. (2010). Development of a reading material recommendation system based on a knowledge engineering approach. *Computers and Education*, *55*(1). https://doi.org/10.1016/j.compedu.2009.12.004

Hsu, C. K., Hwang, G. J., & Chang, C. K. (2013). A personalized recommendation-based mobile learning approach to improving the reading performance of EFL students. *Computers and Education*, *63*. https://doi.org/10.1016/j.compedu.2012.12.004

Hsu, J. (2018). App roundup: Four AI chatbots, from good to possibly evil. *Retrieved January*, *17*, 2019.

Hsu, M.-H., Chen, P.-S., & Yu, C.-S. (2021). Proposing a task-oriented chatbot system for EFL learners speaking practice. *Interactive Learning Environments*, 1–12.

Huang, S. (2020). *Research on the Application of Artificial Intelligence in Teaching Chinese as a Foreign Language*. https://doi.org/10.2991/assehr.k.201030.041

Hutchinson, T., & Waters, A. (1987). *English for specific purposes*. Cambridge university press.

Hyland, K. (2006). *English for academic purposes: An advanced resource book*. Routledge.

Hynes, C. (2016). The App Using Artificial Intelligence To Improve English Speaking Skills. *Forbes. Com*, 1–2.

IANCU, B. (2019). Evaluating Google Speech-to-Text API's Performance for Romanian e-Learning Resources. *Informatica Economica*, *23*(1/2019). https://doi.org/10.12948/issn14531305/23.1.2019.02

Ibrahim, A. M. (2017). Specialization professors' perception on their students' needs for ESP: PEH students' case. *English for Specific Purposes World*, *54*(19), 1–22.

Iddou-Derraz, N. (2009). Reasons for unsuccessful English learning in Algeria. *Revue académique des études sociales et humaine. Numéro 01. Revue internationale éditée par l'université de Hassiba Benbouali de Chlef*.

Ivanova, N., & Eriksen, O. (2012). A bilingual bimodal reading and writing tool for sign language users. *Proceedings of the 8th International Conference on Language Resources and Evaluation, LREC 2012*.

Jalbout, M., & Farah, S. (2016). Exploring the potential of technology to deliver education and skills to Syrian refugee youth. *Global Business Coalition for Education & Theirworld. Retrieved March*, *9*, 2016.

Jin, Y., Dewaele, J. M., & MacIntyre, P. D. (2021). Reducing anxiety in the foreign language classroom: A positive psychology approach. *System*, *101*. https://doi.org/10.1016/j.system.2021.102604

Junaidi, J. (2020). Artificial intelligence in EFL context: Rising students' speaking performance with Lyra Virtual Assistance. *International Journal of Advanced Science and Technology Rehabilitation*, *29*(5), 6735–6741.

Kaewpet, C. (2009). A framework for investigating learner needs: Needs analysis extended to curriculum development. *Electronic Journal of Foreign Language Teaching*, *6*(2), 209–220.

Kamuka, I. A. D. (2015). Artificial intelligence in programmed education. *Education World Journal*, *49*(1), 84–96.

Kangasharju, A. I., Ilomäki, L., Toom, A., Lakkala, M., Kantosalo, A., & Toivonen, H. (2021). The Digital Poetry Machine Supporting Lower Secondary Students' Poetry Writing. *Journal of Literacy and Technology*.

Kangasharju, A., Ilomäki, L., Lakkala, M., & Toom, A. (2022). Lower secondary students' poetry writing with the AI-based poetry machine. *Computers and Education: Artificial Intelligence*, 100048.

Kannan, J., & Munday, P. (2018). New trends in second language learning and teaching through the lens of ICT, networked learning, and artificial intelligence. *Circulo de Linguistica Aplicada a La Comunicacion*, *76*. https://doi.org/10.5209/CLAC.62495

Kaplan-Rakowski, R., & Gruber, A. (2021). One-on-one foreign language speaking practice in high-immersion virtual reality. In *Contextual Language Learning* (pp. 187–202). Springer.

Karsenti, T. (2019). Artificial intelligence in education: The urgent need to prepare teachers for tomorrow's schools. *Formation et Profession*, *27*(1). https://doi.org/10.18162/fp.2019.a166

Karyuatry, L. (2018). Grammarly as a Tool to Improve Students' Writing Quality: Free Online-Proofreader across the Boundaries. *JSSH (Jurnal Sains Sosial Dan Humaniora)*, *2*(1). https://doi.org/10.30595/jssh.v2i1.2297

Kessler, G. (2018). Technology and the future of language teaching. *Foreign Language Annals*, *51*(1). https://doi.org/10.1111/flan.12318

Ketelaars, L. E. H., Stupar-Rutenfrans, S., & Peters, E. (2016). *Beat the fear of public speaking: Does the 360° video virtual reality exposure training in home environment reduces speech anxiety?*

Khaliliaqdam, S. (2014). ZPD, Scaffolding and Basic Speech Development in EFL Context. *Procedia - Social and Behavioral Sciences*, *98*. https://doi.org/10.1016/j.sbspro.2014.03.497

Khare, K., Stewart, B., & Khare, A. (2018). *Artificial intelligence and the student experience: An institutional perspective*.

Kim, H.-S., Cha, Y., & Kim, N.-Y. (2020). Impact of Mobile Interactions With AI on Writing Performance. *Modern English Education*, *21*(2). https://doi.org/10.18095/meeso.2020.21.2.1

Kim, J. (2018). *Artificial intelligence and retention*.

Kim, N.-Y. (2016a). Effects of different voice-chat conditions on Korean EFL learners' speaking ability, oral interaction, and affective factors. *Unpublished Doctoral Dissertation, Ewha Womans University, Korea.*

Kim, N.-Y. (2016b). Effects of voice chat on EFL learners' speaking ability according to proficiency levels. *Multimedia-Assisted Language Learning*, *19*(4), 63–88.

Kim, N.-Y. (2017). "A Study on Different Types of Speech Acts in Voice-Chat between EFL Students and a Chatbot." *Studies in English Education*, *22*(3). https://doi.org/10.22275/see.22.3.04

Kim, N.-Y. (2019). A study on the use of artificial intelligence chatbots for improving English grammar skills. *Journal of Digital Convergence*, *17*(8), 37–46.

Kim, P., Miranda, T., & Olaciregui, C. (2008). Pocket School: Exploring mobile technology as a sustainable literacy education option for underserved indigenous children in Latin America. *International Journal of Educational Development*, *28*(4). https://doi.org/10.1016/j.ijedudev.2007.11.002

Kılıçkaya, F. (2020). *Using a Chatbot, Replika, to Practice Writing Through Conversations in L2 English*. https://doi.org/10.4018/978-1-7998-2591-3.ch011

Kleinmann, H. H. (1977). AVOIDANCE BEHAVIOR IN ADULT SECOND LANGUAGE ACQUISITION. *Language Learning*, *27*(1). https://doi.org/10.1111/j.1467-1770.1977.tb00294.x

Kohnke, L., & Jarvis, A. (2021). Coping with English for Academic Purposes Provision during COVID-19. *Sustainability*, *13*(15), 8642.

Koltovskaia, S. (2020). Student engagement with automated written corrective feedback (AWCF) provided by Grammarly: A multiple case study. *Assessing Writing*, *44*, 100450.

Kučak, D., Juričić, V., & Đambić, G. (2018). Machine learning in education - A survey of current research trends. *Annals of DAAAM and Proceedings of the International DAAAM Symposium*, *29*(1). https://doi.org/10.2507/29th.daaam.proceedings.059

Kukulska-Hulme, A. (2016). Personalization of language learning through mobile technologies. *Part of the Cambridge Papers in ELT Series*.

Laakkonen, I. (2011). Personal learning environments in higher education language courses: an informal and learner-centred approach. In *Second Language Teaching and Learning with Technology: Views of Emergent Researchers*. https://doi.org/10.14705/rpnet.2011.000004

Lai, C. (2019). Learning beliefs and autonomous language learning with technology beyond the classroom. *Language Awareness*, *28*(4). https://doi.org/10.1080/09658416.2019.1675679

Lan, Y. J., Kan, Y. H., Sung, Y. T., & Chang, K. E. (2016). Oral-performance language tasks for CSL beginners in second life. *Language Learning and Technology*, *20*(3).

Laufer, B., & Hill, M. (2000). *What Lexical Information Do L2 Learners Select in a CALL Dictionary and How Does It Affect Word Retention?*.

Lee, D. (2007). Secondary school teachers' practices, perceptions and problems regarding English writing instruction. *Foreign Languages Education, 14(2)*, 37-64.

Lee, I. (2014). Revisiting Teacher Feedback in EFL Writing from Sociocultural Perspectives. *TESOL Quarterly*, *48*(1). https://doi.org/10.1002/tesq.153

Lee, S., Noh, H., Lee, J., Lee, K., Lee, G. G., Sagong, S., & Kim, M. (2011). On the effectiveness of Robot-Assisted Language Learning. *ReCALL*, *23*(1). https://doi.org/10.1017/S0958344010000273

Lee, Y. (2011). An Intelligent Course Recommendation System. *The Smart Computing Review*, *1*(1). https://doi.org/10.6029/smartcr.2011.01.006

Li, C., Huang, J., & Li, B. (2021). The predictive effects of classroom environment and trait emotional intelligence on Foreign Language Enjoyment and Anxiety. *System*, *96*. https://doi.org/10.1016/j.system.2020.102393

Li, J. (2021). Research on AI-assisted Hybrid Teaching for English Writing. *Proceedings - 2021 International Conference on Computers, Information Processing and Advanced Education, CIPAE 2021*. https://doi.org/10.1109/CIPAE53742.2021.00080

Lian, J., Chai, C. S., Zheng, C., & Liang, J. C. (2021). Modelling the Relationship Between Chinese University Students' Authentic Language Learning and Their English Self-

efficacy During the COVID-19 Pandemic. *Asia-Pacific Education Researcher*, *30*(3). https://doi.org/10.1007/s40299-021-00571-z

Li, S. (2007). Situation analysis and needs analysis in Chinese EFL context: A case of a senior high school in south-west China. Celea Journal, 30(4), 17-28.

Liang, A., & Yan, C. (2011). A Case study of college english curriculum design under the social needs analysis. *Studies in Literature and Language*, *3*(3), 1–5.

Lin, C. J., & Mubarok, H. (2021). Learning Analytics for Investigating the Mind Map-Guided AI Chatbot Approach in an EFL Flipped Speaking Classroom. *Educational Technology and Society*, *24*(4).

Liou, H. C. (2012). The roles of Second Life in a college computer-assisted language learning (CALL) course in Taiwan, ROC. *Computer Assisted Language Learning*, *25*(4). https://doi.org/10.1080/09588221.2011.597766

Liton, H. A. (2012). Developing EFL teaching and learning practices in Saudi colleges: A review. *Online Submission*, *5*(2), 129–152.

Little, D. G., Ridley, J., & Ushioda, Ema. (2003). Learner autonomy in the foreign language classroom : teacher, learner, curriculum and assesment. *Authentik: Books for Language Teachers*, *May*.

Liu, J.-Y., Chang, Y.-J., Yang, F.-Y., & Sun, Y.-C. (2011). Is what I need what I want? Reconceptualising college students' needs in English courses for general and specific/academic purposes. *Journal of English for Academic Purposes*, *10*(4), 271–280.

Liu, Y. (2018). The application of brain neural computational model in English learning. *NeuroQuantology*, *16*(5). https://doi.org/10.14704/nq.2018.16.5.1416

Long, M. (2005). *Second language needs analysis*. Cambridge University Press.

Lu, O. H. T., Huang, A. Y. Q., Huang, J. C. H., Lin, A. J. Q., Ogata, H., & Yang, S. J. H. (2018). Applying learning analytics for the early prediction of students' academic performance in blended learning. *Educational Technology and Society*, *21*(2).

Luo, B. R., Lin, Y. L., Chen, N. S., & Fang, W. C. (2015). Using smartphone to facilitate english communication and willingness to communicate in a communicative language teaching classroom. *Proceedings - IEEE 15th International Conference on Advanced Learning Technologies: Advanced Technologies for Supporting Open Access to Formal and Informal Learning, ICALT 2015*. https://doi.org/10.1109/ICALT.2015.22

M. Hamad, M., & Abdelsattar Metwally, A. (2019). Using Technology towards Promoting Online Instructional Scaffolding: Literature Review. *Arab World English Journal*, *1*. https://doi.org/10.24093/awej/efl1.7

MacIntyre, P. D., & Gardner, R. C. (1994). The Subtle Effects of Language Anxiety on Cognitive Processing in the Second Language. *Language Learning*, *44*(2). https://doi.org/10.1111/j.1467-1770.1994.tb01103.x

Mackay, R., & Mountford, A. J. (1978). The teaching of English for special purposes: Theory and practice. *English for Specific Purposes*, 2–20.

Mahmoudi, E. (2019). A Needs Analysis of 'General English'Course from the Perspective of Science Students. *Journal of Applied Linguistics and Language Research*, *6*(3), 24–33.

Mami, N. A. (2013). Teaching English under the LMD reform: the Algerian experience. *Proceedings of World Academy of Science, Engineering and Technology*, *76*, 243.

Mavroudi, A., & Hadzilacos, T. (2013). Learning needs analysis of collaborative e-classes in semi-formal settings: The revit example. *International Review of Research in Open and Distance Learning*, *14*(5). https://doi.org/10.19173/irrodl.v14i5.1544

McCawley, P. F. (2009). Methods for conducting an educational needs assessment. *University of Idaho*, *23*, 6–14.

McCrthy, N. S. and M. (1997). Vocabulary : Description , Acquisition and Pedagogy Edited by. *English*.

McMahon, D. D., Cihak, D. F., Gibbons, M. M., Fussell, L., & Mathison, S. (2013). Using a Mobile App to Teach Individuals with Intellectual Disabilities to Identify Potential Food Allergens. *Journal of Special Education Technology*, *28*(3). https://doi.org/10.1177/016264341302800302

McMillan, J. H., & Hearn, J. (2008). Student self-assessment: The key to stronger student motivation and higher achievement. *Educational Horizons*, *87*(1), 40–49.

Mehrdad, A. G. (2012). A subjective needs assessment of EGP students. *Procedia - Social and Behavioral Sciences*, *31*. https://doi.org/10.1016/j.sbspro.2011.12.101

Melchor-Couto, S. (2017). Foreign language anxiety levels in Second Life oral interaction. *ReCALL*, *29*(1). https://doi.org/10.1017/S0958344016000185

Melchor-Couto, S. (2018). Virtual world anonymity and foreign language oral interaction. *ReCALL*, *30*(2). https://doi.org/10.1017/S0958344017000398

Meşe, E., Sevilen, Ç., & Info, A. (2021). Factors influencing EFL students' motivation in online learning: A qualitative case study. *Journal of Educational Technology & Online Learning*, *4*(1).

Miroshnichenko, A. (2018). AI to bypass creativity. Will robots replace journalists? (The answer is "yes"). In *Information (Switzerland)* (Vol. 9, Issue 7). https://doi.org/10.3390/info9070183

Moattarian, A., & Tahririan, M. H. (2014). Language needs of graduate students and ESP courses: The case of tourism management in Iran. *Research in Applied Linguistics*, *5*(2).

Moiinvaziri, M. (2014). Students' Voice: A Needs Analysis of University General English Course in Iran. *GEMA Online Journal of Language Studies*, *14*(1).

Moon, D. (2021). Evaluating Corrective Feedback Generated by an AI-Powered Online Grammar Checker. *International Journal of Internet, Broadcasting and Communication*, *13*(4), 22–29.

Moussalli, S., & Cardoso, W. (2020). Intelligent personal assistants: can they understand and be understood by accented L2 learners? *Computer Assisted Language Learning*, *33*(8). https://doi.org/10.1080/09588221.2019.1595664

Mudraya, O. (2006). Engineering English: A lexical frequency instructional model. *English for Specific Purposes*, *25*(2). https://doi.org/10.1016/j.esp.2005.05.002

Muehlhauser, L., & Bostrom, N. (2014). WHY WE NEED FRIENDLY AI. *Think*, *13*(36). https://doi.org/10.1017/s1477175613000316

Mujahidin, A., Sari, M. S., & Suhadi, S. (2020). Needs Analysis for Mobile Learning of Plant Structure and Development Topic. *Jurnal Pendidikan Sains*, *8*(3).

Mukhallafi, T. R. al. (2020). Using Artificial Intelligence for Developing English Language Teaching/Learning: An Analytical Study from University Students' Perspective. *International Journal of English Linguistics*, *10*(6). https://doi.org/10.5539/ijel.v10n6p40

Munby, J. (1981). *Communicative syllabus design: A sociolinguistic model for designing the content of purpose-specific language programmes*. Cambridge university press.

Munday, P. (2015). THE CASE FOR USING DUOLINGO AS PART OF THE LANGUAGE CLASSROOM EXPERIENCE. *RIED. Revista Iberoamericana de Educación a Distancia*, *19*(1). https://doi.org/10.5944/ried.19.1.14581

Muñoz-Restrepo, A., Ramirez, M., & Gaviria, S. (2020). Strategies to enhance or maintain motivation in learning a foreign language. *Profile: Issues in Teachers' Professional Development*, *22*(1). https://doi.org/10.15446/profile.v22n1.73733

Myers, K., Berry, P., Blythe, J., Conley, K., Gervasio, M., McGuinness, D., Morley, D., Pfeffer, A., Pollack, M. E., & Tambe, M. (2007). An intelligent personal assistant for task and time management. *AI Magazine*, *28*(2).

Nation, P. (2000). *Designing and improving a language course*.

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial. *Heliyon*, *7*(5). https://doi.org/10.1016/j.heliyon.2021.e07014

Nhat, L. P. le, & Kieu, V. L. T. (2021). M-Learning and Learning Autonomy-Needs Analysis and Suggested Model. *Education Quarterly Reviews*, *4*(4).

Nhongo, R., Cekiso, M., Tshotsho, B., & Zhou, S. (2017). Exploring the second language teaching strategies of Ndebele English teachers in selected secondary schools in Zimbabwe. *Gender and Behaviour*, *15*(2), 8619–8629.

Nikiforovs, P., & Bledaite, L. (2012). *Personalized sequential language vocabulary learning recommender system*. Citeseer.

Nordrum, A. (2017). CES 2017: the year of voice recognition. *IEEE Spectrum*.

Nunan, D. (1988). *The Learner Centred Curriculum. Cambridge: University Press*. Cambridge.

Nunan, D. (1999). *Second Language Teaching & Learning*. ERIC.

O 'reilly, E. N. (2016). Developing technology needs assessments for educational programs: An analysis of eight key indicators. *International Journal of Education and Development Using Information and Communication Technology*, *12*(1).

Occhipinti, A. (2009). Foreign language anxiety in in-class speaking activities: two learning contexts in comparison. *Masters Thesis*.

Ohler, J. (2008). The Semantic Web in Education. *EDUCAUSE Quarterly*, *31*(4).

O'Neill, R., & Russell, A. M. T. (2019). Stop! Grammar time: University students' perceptions of the automated feedback program Grammarly. *Australasian Journal of Educational Technology*, *35*(1). https://doi.org/10.14742/ajet.3795

Osone, H., Lu, J. L., & Ochiai, Y. (2021). BunCho: AI Supported Story Co-Creation via Unsupervised Multitask Learning to IncreaseWriters' Creativity in Japanese. *Conference on Human Factors in Computing Systems - Proceedings*. https://doi.org/10.1145/3411763.3450391

Otilia, S. M., & Brancusi, C. (2015). Needs analysis in English for specific purposes. *Annals of the Constantin Brâncuşi University of Târgu Jiu, Economy Series*, *1*(2), 54–55.

Oxford, R. L. (1998). Anxiety and the Language Learner: New Insights. In *Affect in Language Learning*.

Park, E. (2021). Adopting a Mixed Method Needs Analysis for CALL Research. *SHS Web of Conferences*, *102*. https://doi.org/10.1051/shsconf/202110201002

Park, J. (2019). Implications of AI-based Grammar Checker in EFL Learning and Testing: Korean High School Students' Writing. *The Korea English Language Testing Association*, *14*. https://doi.org/10.37244/ela.2019.14.11

Park, M., & Slater, T. (2015). A Typology of Tasks for Mobile-Assisted Language Learning: Recommendations from a Small-Scale Needs Analysis. *TESL Canada Journal*, *31*. https://doi.org/10.18806/tesl.v31i0.1188

Parra, G. L., & Calero, S. X. (2019). Automated writing evaluation tools in the improvement of the writing skill. *International Journal of Instruction*, *12*(2). https://doi.org/10.29333/iji.2019.12214a

Pataranutaporn, P., Danry, V., Leong, J., Punpongsanon, P., Novy, D., Maes, P., & Sra, M. (2021). AI-generated characters for supporting personalized learning and well-being. *Nature Machine Intelligence*, *3*(12), 1013–1022.

Pegrum, M. (2014). *Mobile learning: Languages, literacies and cultures*. Springer.

Perdana, I., & Farida, M. (2019). ONLINE GRAMMAR CHECKERS AND THEIR USE FOR EFL WRITING. *Journal of English Teaching, Applied Linguistics and Literatures (JETALL)*, *2*(2). https://doi.org/10.20527/jetall.v2i2.7332

Pereira, A. B., Souza Jr, G. N., Monteiro, D. C., Barros, E. S., Costa, H. P., Nascimento, P. a, Marques, L. B., de Souza, D. G., Salgado, F. M., & Bessa, R. Q. (2012). A AIED Game to help children with learning disabilities in literacy in the Portuguese language. *2012 Brazilian Symposium on Games and Digital Entertainment*.

Pérez-Paredes, P., Ordoñana Guillamón, C., & Aguado Jiménez, P. (2018). Language teachers' perceptions on the use of OER language processing technologies in MALL. *Computer Assisted Language Learning*, *31*(5–6). https://doi.org/10.1080/09588221.2017.1418754

Petrović, J., & Jovanović, M. (2020). *Conversational Agents for Learning Foreign Languages a Survey*. https://doi.org/10.15308/sinteza-2020-14-22

Poedjiastutie, D., & Oliver, R. (2017). English learning needs of ESP learners: Exploring stakeholder perceptions at an Indonesian University. *Teflin Journal*, *28*(1), 1–21.

Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of Language and Cultural Education*, *7*(3). https://doi.org/10.2478/jolace-2019-0025

Poole, A. (2005). The Kinds of Forms Learners Attend to During Focus on Form Instruction: A Description of an Advanced ESL Writing Class. *Asian EFL Journal*, *7*(3).

Popenici, S. A. D., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*, *12*(1). https://doi.org/10.1186/s41039-017-0062-8

Priyanka, G. K., Asyiah, D. N., & Febriani, N. T. (2017). *Seventh Graders' Needs Analysis towards EFL*.

Qian, K., & Tang, J. (2018). Researching mobile-assisted English language learning among adult distance learners in China: Emerging practices and learner perception of teacher role. *International Journal of Computer-Assisted Language Learning and Teaching*, *8*(3). https://doi.org/10.4018/IJCALLT.2018070101

QuillBot's New Grammar Checker Uses Cutting-Edge AI to Perfect Your Writing: The AI writing platform now has an arsenal of productivity-enhancing tools that are already changing the way the world writes. (2021, March 18). *PR Newswire*. https://www.proquest.com/wire-feeds/quillbots-new-grammar-checker-uses-cutting-edge/docview/2502213967/se-2?accountid=202267

Rahimi, E., van den Berg, J., & Veen, W. (2015). Facilitating student-driven constructing of learning environments using Web 2.0 personal learning environments. *Computers and Education*, *81*. https://doi.org/10.1016/j.compedu.2014.10.012

Reiland, R. (2017). Is artificial intelligence the key to personalized education?". *Smithsonian Magazine*.

Resch, O., & Yankova, A. (2019). Open knowledge interface a digital assistant to support students in writing academic assignments. *EASEAI 2019 - Proceedings of the 1st ACM SIGSOFT International Workshop on Education through Advanced Software Engineering and Artificial Intelligence, Co-Located with ESEC/FSE 2019*. https://doi.org/10.1145/3340435.3342723

Richards, J. C. (2001). *Curriculum development in language teaching*. Cambridge university press.

Richards, J. C. (2013). Curriculum approaches in language teaching: Forward, central, and backward design. *Relc Journal*, *44*(1), 5–33.

Richterich, R., & Chancerel, J. L. (1977). Identifying the Needs of Adults Learning a Modern Language. *Journal of Women s Health*.

Robinson, P. (1991). Needs analysis. *ESP Today*.

Robson, C. (2002). A Resource for Social Scientists and Practitioner. *Regional Surveys of the World*.

Russell, S., & Norvig, P. (2010). Artificial Intelligence A Modern Approach Third Edition. In *Pearson*. https://doi.org/10.1017/S0269888900007724

Ryan, P., Luz, S., Albert, P., Vogel, C., Normand, C., & Elwyn, G. (2019). Using artificial intelligence to assess clinicians' communication skills. *BMJ (Online)*, *364*. https://doi.org/10.1136/bmj.l161

Saidouni, k. (2019). The Effect of Mobile-Assisted Language Learning on Developing EFL Students' Speaking Skill: The Case of Second Year Students of English at Batna -2 University. (DOCTORATE THESIS). Batna -2 University. Batna. Algeria.

Samad, I. S., & Ismail, I. (2020). ELSA Speak Application as a Supporting Media in Enhancing Students' Pronunciation Skill. *MAJESTY JOURNAL*, *2*(2). https://doi.org/10.33487/majesty.v2i2.510

Schoonen, R., Snellings, P., Stevenson, M., & van Gelderen, A. (2009). Towards a blueprint of the foreign language writer: The linguistic and cognitive demands of foreign language writing. In *Writing in Foreign Language Contexts: Learning, Teaching, and Research*.

Seedhouse, P. (1995). *Needs analysis and the general English classroom*.

Sellam, A. K., & KESKES, S. (2016). *Anxiety in Algerian students speaking EFL: The case of third year (Annaba University)*.

Shaalan , Iman El-Nabawi Abdel Wahed. (2018). The Effect of Game-Based Feedback on Improving EFL Learners' Reading Comprehension and Raising Autonomy. *Scientific Journal of the Faculty of Education - Assiut University*, *34*(10). https://doi.org/10.12816/0054979

Shafaei, A. (2012). Computer Assisted Learning : A Helpful Approach in Learning English. *Frontiers of Language and Teaching*, *3*.

Sharifi, M., Azizifar, A., Jamalinesari, A., & Gowhary, H. (2015). The Effect of Rosetta Stone Computer Software on Vocabulary Learning of Iranian Elementary EFL Learners. *Procedia - Social and Behavioral Sciences*, *192*. https://doi.org/10.1016/j.sbspro.2015.06.037

Sharples, M., Adams, A., Alonzie, N., Fergusen, R., FitzGerald, E., Gaved, M., McAndrew, P., Means, B., Remold, J., Rienties, B., Roschelle, J., Vogt, K., Whitelock, D., & Yarnell, L. (2015). Innovating Pedagogy 2015: Open University Innovation Report 4. In *Innovating Pedagogy 2015: Open University Innovation Report 4* (Vol. 4).

Shawar, B. A., & Atwell, E. (2007). Fostering Language Learner Autonomy Through Adaptive Conversation Tutors. *Corpus Linguistics*.

Silverman, D. (2013). Doing Qualitative Research: A Practical Handbook, SAGE Publications.Doing Qualitative Research: A Practical Handbook. In *SAGE Publications*.

Slater, M. (2009). Place illusion and plausibility can lead to realistic behaviour in immersive virtual environments. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1535). https://doi.org/10.1098/rstb.2009.0138

Slater, M., Pertaub, D. P., Barker, C., & Clark, D. M. (2006). An experimental study on fear of public speaking using a virtual environment. *Cyberpsychology and Behavior*, *9*(5). https://doi.org/10.1089/cpb.2006.9.627

Sönmez, H. (2019). An Examination of Needs Analysis Research in the Language Education Process. *International Journal of Education and Literacy Studies*, *7*(1). https://doi.org/10.7575/aiac.ijels.v.7n.1p.8

Spector, J. M., & Ma, S. (2019). Inquiry and critical thinking skills for the next generation: from artificial intelligence back to human intelligence. *Smart Learning Environments*, *6*(1). https://doi.org/10.1186/s40561-019-0088-z

Srichanyachon, N. (2014). The barriers and needs of online learners. *Turkish Online Journal of Distance Education*, *15*(3). https://doi.org/10.17718/tojde.08799

Stachowicz-Stanusch, A., & Amann, W. (2018). Artificial intelligence at universities in Poland. *Scientific Quarterly "Organization and Management"*, *2*(42).

Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., Hirschberg, J., Kalyanakrishnan, S., Kamar, E., Kraus, S., Leyton-Brown, K., Parkes, D., Press, W., Saxenian, A., Shah, J., Tambe, M., & Teller, A. (2016). Artificial Intelligence and Life in 2030 One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel. In *Stanford University*.

Sunil, L., & Saini, D. K. (2013). Design of a recommender system for web based learning. *Lecture Notes in Engineering and Computer Science*, *1 LNECS*.

Sutiman, Yudantoko, A., Yudianto, A., Solikin, M., Adiyasa, I. W., Suaib, N. M., Sholichin, F., & Irawati, D. A. (2020). Needs analysis for the development of interactive virtual reality-based educational media on combustion engine mechanical technology. *IOP Conference Series: Materials Science and Engineering*, *979*(1). https://doi.org/10.1088/1757-899X/979/1/012006

Tai, T. Y., & Chen, H. H. J. (2020). The impact of Google Assistant on adolescent EFL learners' willingness to communicate. *Interactive Learning Environments*. https://doi.org/10.1080/10494820.2020.1841801

Tai, T. Y., Chen, H. H. J., & Todd, G. (2020). The impact of a virtual reality app on adolescent EFL learners' vocabulary learning. *Computer Assisted Language Learning*. https://doi.org/10.1080/09588221.2020.1752735

Tarone, E., Yule, G., & Yule, G. (1989). *Focus on the language learner: Approaches to identifying and meeting the needs of second language learners*. Oxford University Press Oxford.

Tatalovic, M. (2018). Ai writing bots are about to revolutionise science journalism: We must shape how this is done. *Journal of Science Communication*, *17*(1). https://doi.org/10.22323/2.17010501

TeachOnline. (2018). Ten Facts About Artificial Intelligence in Teaching and Learning. *Contact North Nord - Tools and Trends*.

Teimouri, Y., Goetze, J., & Plonsky, L. (2019). SECOND LANGUAGE ANXIETY and ACHIEVEMENT. *Studies in Second Language Acquisition*, *41*(2). https://doi.org/10.1017/S0272263118000311

Thrasher, T. (2021). The impact of virtual reality on L2 French learners' language anxiety and oral comprehensibility: An exploratory study. *CALICO Journal*.

Timms, M. J. (2016). Letting Artificial Intelligence in Education out of the Box: Educational Cobots and Smart Classrooms. *International Journal of Artificial Intelligence in Education*, *26*(2). https://doi.org/10.1007/s40593-016-0095-y

Tran, N., Cori, P., Morales, A., & Johnson, E. (2020). *PLATICA: Personalized Language Acquisition Training & Instruction Chatbot Assistant*.

Tucker, C. R. (2018). Creatively Teach the Common Core Literacy Standards With Technology: Grades 6-12. In *Creatively Teach the Common Core Literacy Standards With Technology: Grades 6-12*. https://doi.org/10.4135/9781483395036

Tzotzou, M. D. (2014). A "Process-oriented" View of Needs Analysis Procedures towards Enhancing the Humanistic Approach to EFL Learning. *Παιδαγωγική Επιθεώρηση*, 58.

Umam, A. (2016). The importance of needs analysis in curriculum development for ESL/EFL classroom. *English Journal*, *19*(2).

Underwood, J. (2017). Exploring AI language assistants with primary EFL students. In *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017*. https://doi.org/10.14705/rpnet.2017.eurocall2017.733

Underwood, J., & Luckin, R. (2011). What is AIED and why does Education need it. *Reporte Para El Programa de Investigación En Enseñanza y Aprendizaje: Aprendizaje Mejorado Con Tecnología–Inteligencia Artificial En La Educación. Reino Unido. Recuperado de Http://Tel. Ioe. Ac. Uk/Wp-Content/Uploads/2011/06/Telaied_whyaied. Pdf*.

Unesco. (2019). Artificial intelligence in education: challenges and opportunities for sustainable development. *Working Papers on Education Policy, 7*.

Usher, E. L., & Pajares, F. (2008). Self-efficacy for self-regulated learning: A validation study. *Educational and Psychological Measurement*, *68*(3). https://doi.org/10.1177/0013164407308475

van Harmelen, M. (2006). Personal learning environments. *Sixth International Conference on Advanced Learning Technologies*, 815–816.

Vatanartiran, S., & Karadeniz, S. (2020). A Needs Analysis for Technology Integration Plan: Challenges and Needs of Teachers. *Contemporary Educational Technology*, *6*(3). https://doi.org/10.30935/cedtech/6150

Walker, M., Stent, A., Mairesse, F., & Prasad, R. (2007). Individual and domain adaptation in sentence planning for dialogue. *Journal of Artificial Intelligence Research*, *30*. https://doi.org/10.1613/jair.2329

Wang, R. (2019). Research on artificial intelligence promoting English learning change. *3rd International Conference on Economics and Management, Education, Humanities and Social Sciences (EMEHSS 2019). Atlantis Press*.

Wang, Y. (2021). Educational management system of colleges and universities based on embedded system and artificial intelligence. *Microprocessors and Microsystems*, *82*. https://doi.org/10.1016/j.micpro.2021.103884

Wang, Y. J., Shang, H. F., & Briody, P. (2013). Exploring the impact of using automated writing evaluation in English as a foreign language university students' writing. *Computer Assisted Language Learning*, *26*(3). https://doi.org/10.1080/09588221.2012.655300

Wang, Z., Guo, Y., Wang, Y., Tu, Y.-F., & Liu, C. (2021). Technological Solutions for Sustainable Development: Effects of a Visual Prompt Scaffolding-Based Virtual Reality Approach on EFL Learners' Reading Comprehension, Learning Attitude, Motivation, and Anxiety. *Sustainability*, *13*(24), 13977.

Waqar, M. M., Aslam, M., & Farhan, M. (2019). An intelligent and interactive interface to support symmetrical collaborative educational writing among visually impaired and sighted users. *Symmetry*, *11*(2). https://doi.org/10.3390/sym11020238

Warschauer, M., & Ware, P. (2006). Automated writing evaluation: Defining the classroom research agenda. *Language Teaching Research*, *10*(2), 157–180.

Watanabe, Y. (2006). A needs analysis for a Japanese high school EFL general education curriculum. *Second Language Studies*, *26*(1).

Wehner, A. K., Gump, A. W., & Downey, S. (2011). The effects of Second Life on the motivation of undergraduate students learning a foreign language. *Computer Assisted Language Learning*, *24*(3). https://doi.org/10.1080/09588221.2010.551757

West, R. (1994). Needs analysis in language teaching. *Language Teaching*, *27*(1), 1–19.

Wible, D., Kuo, C. H., Chien, F. Y., Liu, A., & Tsao, N. L. (2001). A Web-based EFL writing environment: Integrating information for learners, teachers, and researchers. *Computers and Education*, *37*(3–4). https://doi.org/10.1016/S0360-1315(01)00056-2

Wible, D., Liu, A. L. E., & Tsao, N. L. (2011). A browser-based approach to incidental individualization of vocabulary learning. *Journal of Computer Assisted Learning*, *27*(6). https://doi.org/10.1111/j.1365-2729.2011.00413.x

Widodo, H. P. (2017). Approaches To Needs Analysis in Esp Curriculum Development. *The European Journal of Applied Linguistics and TEFL*, *18*(3).

Wilkins, D. A. (1972). *Linguistics in language teaching* (Vol. 111). Edward Arnold London.

Wu, S., Reynolds, L., Li, X., & Guzmán, F. (2019). Design and evaluation of a social media writing support tool for people with dyslexia. *Conference on Human Factors in Computing Systems - Proceedings*. https://doi.org/10.1145/3290605.3300746

Wu, T. T., Huang, Y. M., Chao, H. C., & Park, J. H. (2014). Personlized English reading sequencing based on learning portfolio analysis. *Information Sciences*, *257*. https://doi.org/10.1016/j.ins.2011.07.021

Xia, P. (2020). Application Scenario of Artificial Intelligence Technology in Higher Education. *Advances in Intelligent Systems and Computing*, *1017*. https://doi.org/10.1007/978-3-030-25128-4_29

Xie, H., Zou, D., Lau, R. Y. K., Wang, F. L., & Wong, T. L. (2016). Generating Incidental Word-Learning Tasks via Topic-Based and Load-Based Profiles. *IEEE Multimedia*, *23*(1). https://doi.org/10.1109/MMUL.2015.91

Xu, K. (2021). Needs analysis of chinese english majors in egp courses. *Journal of Language Teaching and Research*, *12*(3). https://doi.org/10.17507/jltr.1203.16

Xue, J. (2021). On the Innovation of Foreign Language Teaching in the Era of Artificial Intelligence. *ACM International Conference Proceeding Series*, *PartF171546*. https://doi.org/10.1145/3461353.3461355

Yang Hye Jin. (2018). Efficiency of Online Grammar Checker in English Writing Performance and Students' Perceptions. *Korean Journal of English Language and Linguistics*, *18*(3). https://doi.org/10.15738/kjell.18.3.201809.328

Yang, L., Tong, Y., & Siyuan, X. (2019). The Efficacy of Using Liulishuo for Spoken English Ability—Taking the Practice of Liulishuo in North China Electric Power University (Baoding) as an Example. *International Education Studies*, *12*(4). https://doi.org/10.5539/ies.v12n4p244

Yang, P., Liou, H., & Chang, J. S. (2009). WriteAhead: An Abstract Writing Assistant System for Academic Writing. *CONFERENCE ON ENGLISH TEACHING AND LEARNING IN THE ROC*, 864.

York, J., Shibata, K., Tokutake, H., & Nakayama, H. (2021). Effect of SCMC on foreign language anxiety and learning experience: A comparison of voice, video, and VR-based oral interaction. *ReCALL*, *33*(1). https://doi.org/10.1017/S0958344020000154

Yu, S., Zhou, N., Zheng, Y., Zhang, L., Cao, H., & Li, X. (2019). Evaluating student motivation and engagement in the Chinese EFL writing context. *Studies in Educational Evaluation*, *62*. https://doi.org/10.1016/j.stueduc.2019.06.002

Yuan, A., Coenen, A., Reif, E., & Ippolito, D. (2022). Wordcraft: Story Writing With Large Language Models. *27th International Conference on Intelligent User Interfaces*, 841–852.

Zafari, S., Heidari Tabrizi, H., & Chalak, A. (2020). The effect of employing critical needs analysis on Iranian intermediate learners' speaking skills improvement. *Journal of English Language Pedagogy and Practice*, *13*(26), 49–74.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education–where are the educators? *International Journal of Educational Technology in Higher Education*, *16*(1), 1–27.

Zhang, J., Ozer, H., & Bayazeed, R. (2020). Grammarly vs. face-to-face tutoring at the writing center: ESL student writers' perceptions. *Praxis: A Writing Center Journal*, *17*(2).

Zhang, R., & Zou, D. (2020). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. In *Computer Assisted Language Learning*. https://doi.org/10.1080/09588221.2020.1744666

Zhang, Y. (2022). Construction of English Language Autonomous Learning Center System Based on Artificial Intelligence Technology. *Mathematical Problems in Engineering*, *2022*.

Zhang, Z. (Victor). (2020). Engaging with automated writing evaluation (AWE) feedback on L2 writing: Student perceptions and revisions. *Assessing Writing*, *43*. https://doi.org/10.1016/j.asw.2019.100439

Zou, B., Liviero, S., Hao, M., & Wei, C. (2020). Artificial Intelligence Technology for EAP Speaking Skills: Student Perceptions of Opportunities and Challenges. In *Technology and the Psychology of Second Language Learners and Users*. https://doi.org/10.1007/978-3-030-34212-8_17

Appendices

Appendix A

The Pre-Study Questionnaire

- Please indicate the extent to which you agree or disagree with each of the statements about your English learning by circling the number that matches your opinion.

1= Strongly agree; 2= Agree; 3= Neutral; 4=Disagree; 5= Strongly disagree

No.	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

	Motivation	Hsu (2005); Swatevacharkul (2009)				
01	I'd like English to be used as much as possible in my country.	1	2	3	4	5
02	If English were not taught at my university, I'd try to take English classes somewhere else.	1	2	3	4	5
03	I learn English because I find it very interesting.	1	2	3	4	5
04	I learn English because it will help me to be successful in my life.	1	2	3	4	5
05	I'd like to have friends from English-speaking countries.	1	2	3	4	5
	Anxiety	KAYA,M (1995). Gardner (1988)				
06	It embarrasses me to volunteer answers in our English class.	1	2	3	4	5
07	I never feel quite sure of myself when I am speaking in our English class.	1	2	3	4	5
08	I always feel that the other students speak English better than I do.	1	2	3	4	5
09	I get nervous and confused when I am speaking in my English class.	1	2	3	4	5
10	I am afraid the other students will laugh at me when I speak English.	1	2	3	4	5
	Metacognitive skills	Dang (2012). Yang (2007)				
11	I reflect on what I learn and look for something important.	1	2	3	4	5
12	I plan how I learn English.	1	2	3	4	5
13	I set my goals in learning English.	1	2	3	4	5

14	I make my schedule so I'll have enough time to study English.	1	2	3	4	5
15	I notice my mistakes and use that information to improve.	1	2	3	4	5
16	After I get my English work back, I always read it again to correct my mistakes.	1	2	3	4	5
17	I put great effort into learning English.	1	2	3	4	5
	Metacognitive knowledge	Cotterall (1999). Hsu (2005); Dixon (2011)				
18	I know my strengths and weaknesses in learning English.	1	2	3	4	5
19	I'm responsible for the success of my English learning.	1	2	3	4	5
20	I understand my own personality.	1	2	3	4	5
21	To learn English well, it's important to know one's personality, motivation, personal needs, expectations, learning styles, my strengths, weaknesses, etc., in English.	1	2	3	4	5
22	There are a lot of opportunities to learn English in Barika.	1	2	3	4	5
	Opportunities outside the classroom					
23	I have family members that I can practise English with them	1	2	3	4	5
24	I have friends that I can practice English with them	1	2	3	4	5
25	I have the ability traveling to an English-speaking country	1	2	3	4	5
26	I have the ability to practice in an English course outside the university.	1	2	3	4	5
	Using AI in learning					
27	I use artificial intelligence to help me in learning English	1	2	3	4	5
28	I'am aware of what artificial intelligence may introduce to me concerning my English learning	1	2	3	4	5
29	Do you use/did use any of these AI applications/ software in your English learning? (Put your choice in a cercle) Grammarly / Turnitin AI-Dungeon Mirror AI / gweek/ correct spelling ELSA/ Placetta/ Rossetta Stone/ Memrise Replica/ Lyra/ Anima Google Semantics / Words AI Google Assistance/ Siri-Appel Andy Envision AI Busuu Jini IELTS speaking practice Others : …………………………….					

Appendix B

The Pre-Study Questionnaire Validity, Pearson Correlation

Number of items	Pearson	Number of items	Pearson
Motivation section		Metacognitive skills	
1	.408**	1	.457**
2	.604**	2	.476**
3	.714**	3	.460**
4	.642**	4	.195*
5	.529**	5	.732**
		6	.636**
		7	.483**
Anxiety section		Opportunities	
1	.432**	1	.099
2	.379*	2	.623**
3	.500**	3	.471**
4	.479**	4	.440**
5	.111*		
Metacognition knowledge		AI for learning familiarity	
1	.739**	1	.754**
2	.707**	2	.781**
3	.754**		
4	.422**		
**. Correlation is significant at the 0.01 level (2-tailed).			
*. Correlation is significant at the 0.05 level (2-tailed).			

Appendix C

The Pre-Study Questionnaire Reliability, Cronbach's Alpha

The section	Number of items	Cronbach's Alpha
Motivation	5	.776
Anxiety	5	.758
Meta-cognitive skills	7	.692
Meta-cognitive knowledge	4	.832
Opportunities	4	.663
AI familiarity	2	.847
Total	29	

Appendix D

The Pre-Study Questionnaire Results

Items		Strongly disagree	disagree	neutral	agree	strongly agree	Mean	Std. Deviation
Section one: Motivation								
"I'd like English to be used as much as possible in my country"	Frequency	1	3	7	11	19	4.0732	1.08144
	Percent	2.4	7.3	17.1	26.8	46.3		
"If English were not taught at my university, I'd try to take English classes somewhere else."	Frequency	0	1	11	14	15	4.0488	.86462
	Percent	00	2.4	26.8	34.1	36.6		
"I learn English because I find it very interesting."	Frequency	3	3	5	14	16	3.9024	1.22076
	Percent	7.3	7.3	12.2	34.1	39.0		
"I learn English because it will help me to be successful in my life."	Frequency	1	3	9	11	17	3.9756	1.08369
	Percent	2.4	7.3	22.0	26.8	41.5		
"I'd like to have friends from English-speaking countries."	Frequency	1	3	7	17	13	3.9268	1.00971
	Percent	2.4	7.3	17.1	41.5	31.7		
Total							**3.9854**	**.76862**
Section two: Anxiety								
"It embarrasses me to volunteer answers in our English class."	Frequency	7	5	15	9	5	3.0000	1.24499
	Percent	17.1	12.2	36.6	22.0	12.2		
"I never feel quite sure of myself when I am speaking in our English class."	Frequency	4	5	12	9	11	3.4390	1.28547
	Percent	9.8	12.2	29.3	22.0	26.8		
"I always feel that the other students speak English better than I do."	Frequency	7	9	6	11	8	3.0976	1.41076
	Percent	17.1	22.0	14.6	26.8	19.5		
"I get nervous and confused when I am speaking in my English class."	Frequency	8	1	8	15	9	3.3902	1.39424
	Percent	19.5	2.4	19.5	36.6	22.0		
"I am afraid the other students will laugh at me when I speak English."	Frequency	6	11	9	9	6	2.9512	1.30290
	Percent	14.6	26.8	22.0	22.0	14.6		
Total							**3.1756**	**0.94783**

Section three: Metacognition skills								
"I reflect on what I learn and look for something important."	Frequency	9	16	13	3	0	2.2439	.88827
	Percent	22.0	39.0	31.7	7.3	00		
"I plan how I learn English."	Frequency	2	2	10	19	8	2.2927	1.00608
	Percent	4.9	4.9	24.4	46.3	19.5		
"I set my goals in learning English."	Frequency	8	16	11	3	3	2.4390	1.11912
	Percent	19.5	39.0	26.8	7.3	7.3		
"I make my schedule so I'll have enough time to study English."	Frequency	9	14	7	10	1	2.5122	1.16452
	Percent	22.0	34.1	17.1	24.4	2.4		
"I notice my mistakes and use that information to improve."	Frequency	11	20	3	3	4	2.2439	1.22026
	Percent	26.8	48.8	7.3	7.3	9.8		
"After I get my English work back, I always read it again to correct my mistakes."	Frequency	9	13	13	6	0	2.3902	.99695
	Percent	22.0	31.7	31.7	14.6	00		
"I put great effort into learning English."	Frequency	10	12	12	5	2	2.4286	1.12927
	Percent	24.4	29.3	29.3	12.2	4.9		
Total							**2.3571**	**1.02544**

Section four: Metacognition Knowledge								
"I know my strengths and weaknesses in learning English."	Frequency	0	8	6	14	13	2.2195	1.10707
	Percent	0	19.5	14.6	34.1	31.7		
"I'm responsible for the success of my English learning."	Frequency	2	1	7	17	14	2.0244	1.03653
	Percent	4.9	2.4	17.1	41.5	34.1		
"I understand my own personality."	Frequency	2	6	5	15	13	2.2439	1.19959
	Percent	4.9	14.6	12.2	36.6	31.7		
"To learn English well, it's important to know one's personality, motivation, personal needs, expectations, learning styles, my strengths, weaknesses, etc., in English."	Frequency	2	2	7	14	16	2.0244	1.10652
	Percent	4.9	4.9	17.1	34.1	39.0		
Total							**2.1280**	**1.08415**

Section five: Opportunities outside the classroom								
I have family members that I can practise English with them	Frequency	4	7	14	12	4	2.8780	1.12239
	Percent	9.8	17.1	34.1	29.3	9.8		
I have friends that I can practice English with them	Frequency	5	6	6	15	9	2.5854	1.32241
	Percent	12.2	14.6	14.6	36.6	22.0		
I have the ability traveling to an English-speaking country	Frequency	7	6	4	12	12	2.6098	1.48118
	Percent	17.1	14.6	9.8	29.3	29.3		
I have the ability to practice in an English course outside the university.	Frequency	4	9	8	10	10	2.6829	1.33115
	Percent	9.8	22.0	19.5	24.4	24.4		
Total							**2.6890**	**1.28304**

Section six: Using AI in learning								
I am aware of what artificial intelligence may introduce to me concerning my English learning	Frequency	0	0	0	5	36	4.88	.331
	Percent	0	0	0	12.2	87.8		
I use artificial intelligence to help me in learning English	Frequency	0	0	0	3	38	4.93	.264
	Percent	0	0	0	7.3	92.7		
Total							**4.90**	**.279**

Do you use/did use any of these AI applications/ software in your English learning? (Put your choice in a cercle)	Items		Frequency	Percent
	ELSA		3	7.3
	Busuu		2	4.9
	Others (Duolingo)		2	4.9

Appendix E

The Needs Analysis Questionnaire

The purpose of this questionnaire is to examine your English language needs as learners. Please be as accurate as possible since the success of this research depends upon it.

1. What is your gender?   Male ☐   Female ☐
2. Why do you want to learn English?
   a) To help me in communication. ☐
   b) To help me in employment. ☐
   c) To help me in travelling abroad. ☐
   d) To help me in dealing with technology. ☐
   e) To help me feel confident. ☐
   f) I learn English only to meet the desires of my parents, get a diploma. ☐
   g) I learn English to become an English teacher. ☐
3. Whenever I practice English, I face difficulties in:
   a) Speaking. ☐
   b) Writing. ☐
   c) Listening. ☐
   d) Reading. ☐
   e) Grammar. ☐
   f) Vocabulary. ☐
   g) Pronunciation. ☐
4. Pronunciation. Which of the following do want or need to study more?
   a) Speaking. ☐
   b) Writing. ☐
   c) Listening. ☐
   d) Reading. ☐
   e) Grammar. ☐
   f) Vocabulary. ☐
   g) Pronunciation. ☐
5. Choose the statements that best describe your English linguistic needs?
   a) To become more fluent in speaking English. ☐
   b) To pronounce words in English correctly. ☐
   c) To be able to speak with others. ☐
   d) To learn English grammar for being able to form English sentences correctly ☐
   e) To enlarge my English vocabulary in general. ☐
   f) To learn from English authentic reading materials. ☐
   g) To improve my English writing. ☐
   h) To understand what others say to me in English. ☐
   i) To be able to transcript audio in English. ☐

6. Choose the statements that best describe your opinions on what are the activities you prefer.
   a) I prefer to learn from the activities that resemble the daily life situations. ☐
   b) I like to learn English through problem-solving activities. ☐
   c) I like learning English through projects such as "making an interview with a colleague or a person" or "making a report about any issue", "making a blog ☐
   d) I prefer oral tests only. ☐
   e) I prefer written tests only. ☐
   f) I prefer oral and written tests. ☐
   g) I like to introduce new topics every day in school broadcasting. ☐

7. Choose the statements that best describe your preferred learning style.
   a) I prefer to perform the activities individually. ☐
   b) I prefer to perform the activities in small groups. ☐
   c) I prefer to perform the activities in big groups. ☐
   d) I prefer to have the ability to choose that exercise that suits me. ☐
   e) I wish the use of other resources besides the handouts. ☐
   f) I prefer the use of only the handouts. ☐

8. Choose the statements that best describe your opinions on what you prefer your teacher do
   a) I need that the teacher translates the difficult words for me. ☐
   b) I prefer getting the meaning of words from the text and to guess the meaning ☐
   c) I wish that the teacher gives me the opportunity to speak in English in class. ☐
   d) I wish that the teacher gives me the opportunity to correct my errors myself. ☐
   e) I prefer to collect information about a certain topic from different sources. ☐
   f) I wish to learn English in a special lab instead of the classroom. ☐
   g) I prefer that the teacher corrects my errors in the class. ☐
   h) I prefer to learn grammar through examples. ☐

9. What are the difficulties that face you in your English learning in Barika university?
   a) I feel bored in English class because I know all the information before. ☐
   b) I feel frustrated in English class as I cannot match with my classmates. ☐
   c) I feel frustrated when getting corrected by my peers in the classroom. ☐
   d) I feel low self confidence in my English language abilities. ☐
   e) I feel anxious whenever I use English language in front of others. ☐
   f) The teacher does not encourage me to learn. ☐
   g) The teacher does not care for the differences between the learners. ☐
   h) The teacher does not facilitate the language learning. ☐

10. Suggestions for better learning of the language:
    a) I wish more practice in language skills (writing, reading, speaking, listening) ☐
    b) I wish to learn more new words in the different fields. ☐
    c) I wish to use more audio-visual materials. ☐
    d) I want to apply to the use of smart technology. ☐
    e) I need to communicate more with my colleagues and teacher in class. ☐
    f) I recommend the use of learning games. ☐
    g) I recommend the use of authentic materials ☐

Appendix F

Sampled Articles' References

Chen, X., Zou, D., Cheng, G., & Xie, H. (2021, July). Artificial intelligence-assisted personalized language learning: systematic review and co-citation analysis. In *2021 International Conference on Advanced Learning Technologies (ICALT)* (pp. 241-245). IEEE.

El Shazly, R. (2021). Effects of artificial intelligence on English speaking anxiety and speaking performance: A case study. *Expert Systems*, *38*(3), e12667.

Kim, N. Y. (2019). A study on the use of artificial intelligence chatbots for improving English grammar skills. *Journal of Digital Convergence*, *17*(8), 37-46.

Li, J. (2021, May). Research on AI-assisted Hybrid Teaching for English Writing. In *2021 International Conference on Computers, Information Processing and Advanced Education (CIPAE)* (pp. 309-312). IEEE.

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial. *Heliyon*, *7*(5), e07014.

Tai, T. Y., Chen, H. H. J., & Todd, G. (2020). The impact of a virtual reality app on adolescent EFL learners' vocabulary learning. *Computer Assisted Language Learning*, 1-26.

Wang, R. (2019, June). Research on artificial intelligence promoting English learning change. In *3rd International Conference on Economics and Management, Education, Humanities and Social Sciences (EMEHSS 2019). Atlantis Press*.

Xue, J. (2021, March). On the Innovation of Foreign Language Teaching in the Era of Artificial Intelligence. In *2021 the 5th International Conference on Innovation in Artificial Intelligence* (pp. 140-144).

Yongjuan, C. (2020, December). Application of Artificial Intelligence Technology in English Learning Platform. In *2020 International Conference on Information Science and Education (ICISE-IE)* (pp. 508-511). IEEE.

Zhang, Y. (2022). Construction of English language autonomous learning center system based on artificial intelligence technology. *Mathematical Problems in Engineering*, *2022*.