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**Developing Problem-Solving Abilities through Cognitive Intelligence in EFL
Learning**

**Case Study of First-Year Master Students, Department of English, University 8
Mai 1945, Guelma**

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Partial Fulfillment of the Requirements for the Degree of Master in Language and
Culture**

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Dedication

In the name of Allah the most Gracious the most Merciful

I dedicate my dissertation to *my parents*;

To *my mother*, whose unconditional love, unwavering support, and endless sacrifices have shaped me into the person I am today. To *my father*, whose strength, guidance, and wisdom have been the cornerstone of my journey. This work is not just a reflection of my efforts but a tribute to your enduring presence and influence in my life.

To my only brother *Chouaib*.

To my sisters '*Hakima*', '*Wisssem*', and '*Nawel*' who provided me with strength through my most challenging moments.

I want to thank myself for the late nights and hard work that got me here.

Despite the obstacles, I kept going.

I am proud of myself.

Narimene

Dedication

This work is dedicated with genuine appreciation and indefinite thankfulness to:

To the best woman who made me an ambitious girl, who constantly with her wise words, increase my strength and self-confidence, whose satisfaction and love create success for me;

my mother, may God prolong your health and well-being.

To that great man who brought out the best in me and always encouraged me to reach my ambitions, and stood by my side along the way; a man who taught me life in the most

beautiful form and did everything he could and did not skimp *my father*.

To my brothers, *Skander, Amine, Anis*, and *Abdallah*, my steady rib that do not bend.

I would like to thank my husband, my partner in my life for continuously supporting me throughout my journey at university. Thank you for believing in me even when I did not

believe in myself.

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Abstract

The present dissertation explores English as a Foreign Language students' perspectives towards the role of cognitive intelligence in developing problem-solving skills, in relation to language tasks or language-related problems. The mental abilities that are developed through the process of thinking, senses, and experiences are used to tackle and resolve challenges or issues by identifying, analyzing, and implementing solutions. Mastering problem-solving abilities holds great potential for enhancing linguistic proficiency, critical thinking, and overall educational outcomes. However, these abilities are not given enough importance in EFL classroom to develop learners' language outcome. Furthermore, there is a limited of emphasis on enhancing problem-solving skill, despite the use of traditional language teaching methods. This can be due to many reasons as the primary focus in EFL classroom settings is on teaching language rules to students without offering much guidance on how to apply these rules to solve language-related problems. This approach results in the failure to equip students with the necessary tools to apply linguistic knowledge in practical situations. In this regard, the study aims to investigate and analyze the correlation between cognitive intelligence and the development of problem-solving skills in the context of EFL learning. To achieve this aim, a descriptive quantitative research design was used, including the administration of a questionnaire to first-year Master's students, with 48 students taken from 160 students, at the Department of English, University 8 Mai 1945, Guelma. As a result, the compiled data confirm the research hypothesis, which implies that EFL learners are aware of the usefulness of cognitive processes to develop their problem-solving skills. The findings reveal that students use cognitive strategies during their learning process, which they find beneficial in enhancing their problem-solving skills, and they allow them to become more autonomous learners.

Keywords: Autonomous learners, cognitive intelligence, critical thinking. EFL learners' linguistic proficiency, perspectives, problem-solving abilities.

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List of Abbreviations

AI : Artificial Intelligence

CI : Cognitive Intelligence

EFL: English as Foreign Language

EI: Emotional Intelligence

GPS: General Problem-Solver

IQ: Intelligence Quotient

LS: Learning Styles

LTM: Long-Term Memory

PBCs: Problem-Based Cases.

PBL: Problem-Based Learning

PS: Problem-Solving

PT: Personality Trait

STM: Short-Term Memory

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GENERAL INTRODUCTION

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Problem-solving is an intellectual process of the brain. In EFL learning process, the mastery of problem-solving abilities is a crucial skill for developing linguistic proficiency and cognitive development. Problem-solving can be defined as the capacity to identify, analyze, and solve problems. In the context EFL teaching curriculum, students are encouraged to develop awareness and proficiency in cognitive processes such as critical thinking, analysis, and logical reasoning. Additionally, the curriculum focuses on enhancing various aspects of language learning, including vocabulary acquisition, grammar comprehension, and communication skills.

Developing problem-solving abilities becomes evident as learners recognize the importance of cognitive intelligence in tackling and overcoming challenges throughout their language learning journey. Cognitive intelligence involves learning, reasoning, problem-solving, memory, and more. It encompasses how brains process and apply information in a thoughtful and adaptive manner. It is believed that intelligence is closely linked to problem-solving skills. The assumption is that higher intelligence levels correlate with better problem-solving abilities. Therefore, by prioritizing cognitive intelligence in EFL learning, educators create an environment that encourages learners to approach language challenges with a strategic mindset.

Integrating activities that require critical thinking and analytical reasoning into lesson plans, teachers can enable learners to become more adept at problem-solving within the context of language learning. This enhances not only linguistic proficiency but also the cognitive skills that extend beyond language learning. Which enables students to engage with language in diverse ways. However, some researchers argued that there is a need to develop students' cognitive intelligence to enhance their problem-solving abilities and critical thinking skills in the context of EFL Learning. Therefore, the present dissertation seeks to find out the extent to which enhancing cognitive intelligence among EFL learners can improve their problem-solving

abilities, critical thinking skills, and overall linguistic proficiency. To achieve this goal, it is necessary to collect students' perspectives about the cognitive intelligence-focused activities and their perception of how these activities influence their language learning process. This examination will provide insightful data on the impact of cognitive intelligence-focused activities in the EFL curriculum and its role in enhancing students' ability to tackle linguistic problems.

1. Statement of the Problem

In the EFL classroom, where the primary focus is on developing language skills, the development of problem-solving capabilities plays a pivotal role. However, it is noticed that EFL learners at the Department of English, University 8 Mai 1945 – Guelma, face a hurdle which is the limited emphasis on developing problem-solving abilities in EFL learning, despite the recognized benefits. While traditional language teaching methods often focus on grammar and vocabulary, there is a limited attention given to problem-solving skills, this discrepancy hinders learners' ability to effectively deal with real-life situations, communicate fluently, and think critically in English. One reason for this problem is the prevailing belief that language learning should primarily revolve around the teaching of language rules to students in many classroom settings, without guiding them on how to apply these rules to solve language-related problems. This mindset stems from the pressure to achieve high scores on standardized language tests. Consequently, the current study will suggest that prioritizing cognitive intelligence could be effective in developing EFL learners' problem-solving abilities. This study aims to investigate and analyze the correlation between cognitive intelligence and the development of problem-solving skills in EFL learning.

2. Purpose of the Study

This research aims at investigating students' attitudes towards the importance of incorporating cognitive intelligence techniques on developing problem-solving abilities in EFL learning. Therefore, the aims of this research are threefold:

1. To find out students' opinions about the effective language teaching methods that promote problem-solving abilities in EFL learning.
2. To figure out students' opinions about the correlation between cognitive intelligence and problem-solving abilities of EFL learners.
3. To determine the extent to which individual cognitive differences can have an influence on the learning and application of problem-solving skills in EFL learning.

3. Research Questions

The research addresses the following questions:

1. Which language teaching methods are effective in promoting problem-solving abilities in EFL learning?
2. What is the correlation between cognitive intelligence and problem-solving abilities in EFL Learning?
3. To what extent do individual differences in cognitive abilities impact the learning and application of problem-solving skills in EFL learning?

4. Research Hypothesis

In EFL classes, when students attempt to enhance their problem-solving abilities, they typically adopt many ways, such as collaborative activities and critical thinking exercises. Therefore, the research addresses the following hypotheses:

The Null Hypothesis implies that there is no relationship between the variables:

(H0): If cognitive intelligence-based activities are employed in EFL learning, students will not be aware of its significance in improving problem-solving skills.

The Alternative Hypothesis suggests that there is a relationship between the variables:

(H1): If cognitive intelligence-based activities are employed in EFL learning, students will be aware of its significance in improving problem-solving skills.

5. Research Methodology

This research adopts the quantitative descriptive design in order to gather data about the topic under investigation.

5.1. Data Gathering Tool

The study makes use of a students' questionnaire in order to gain insights into the students' perspectives regarding the utilization of specific problem-solving techniques or methods. The questionnaire was administered during the second semester to first-year Master students, at the Department of English, University 8 Mai 1945, Guelma. The questionnaire was answered by students digitally on Google forms. This research tool facilitates the gathering of reliable data concerning students' viewpoints on the relationship between cognitive intelligence and the development of problem-solving skills in EFL learning.

5.2. Population and Sampling

The present study involves selecting a sample of first-year Master students who have voluntarily agreed to participate in completing the questionnaire. The sample consists of forty-eight students (n=48) taken out from 160 students, and that are selected randomly. The reason for selecting this population is based on the premise that first-year Master students possess the requisite characteristics and traits in addition to good EFL learning experience that makes them more suitable for achieving the research objectives and gathering reliable data. The feedback received from the participants provided a better understanding of the topic under investigation

as well as insights into the notion of cognitive intelligence and problem solving abilities and its applications in the EFL classroom.

5.3. Data Analysis

The quantitative descriptive data obtained from the students' questionnaires were analyzed and interpreted. The findings were presented in text and Figures, and the results were reported and summarized to formulate conclusions and provide recommendations.

6. Structure of the Research

The dissertation is organized into two parts: The theoretical part and the practical part. The theoretical part consists of two chapters. The first chapter is entitled *Problem-Solving Abilities in EFL Learning*. Its objective is to offer a comprehensive understanding of the significance of problem-solving skills, strategies, relevant theories, factors affecting learners' problem-solving abilities, cognitive processes tied up to this skill and the application of problem-solving abilities in various language contexts. The second chapter is entitled *Cognitive Intelligence*. It presents definitions of cognitive intelligence, the cognitive processes, and its concepts. The chapter also explores theories of intelligence, the relationship between cognitive intelligence, and emotional intelligence, as well as learning styles and language learning strategies, and finally the relationship between cognitive intelligence and problem-solving abilities. The third chapter accounts for *Students' Attitudes towards the Impact of Cognitive Intelligence on Enhancing Problem-Solving Abilities*. It presents a detailed description and administration of the used methodological approach that involves students' questionnaire, in which the collected data were analyzed, interpreted, and discussed. Finally, conclusions, pedagogical implications, limitations, and future research objectives are drawn based on the study results.

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Introduction

One of the concerns in higher education is developing problem-solving abilities within the domain of EFL learning. Accordingly, there is a growing emphasis on equipping students with practical skills, particularly the ability to efficiently apply acquired knowledge to real-world challenges. This shift in approach does not only enhance students' adaptability in different linguistic contexts but also proves invaluable when tackling classroom exercises and exams that require critical thinking. Hence, this chapter primarily focuses on the definition and the importance of problem solving skills in EFL learning, covering strategies, relevant theories and factors that influence problem solving. One of the major points that this chapter emphasizes and investigates is how these skills can be applied in EFL learning process.

1.1. Definition of Problem-Solving

Problem-solving is a cognitive process of the brain. It refers to the capacity to analyze, understand, and effectively address challenges or obstacles. It has been defined differently by many scholars. According to Krulik and Rudnick (1987), problem-solving is the means by which an individual uses previously acquired knowledge, skills, and understanding to satisfy the demands of an unfamiliar situation. The student must synthesize what he or she has learned, and apply it to a new and different situation (p.4). This approach underscores the use of previously acquired knowledge to tackle unfamiliar challenges. Thus, Reed (1988) said that problem-solving is intricately connected to higher intelligence, it enables individuals to solve a range of problems (p.429). It is an integral aspect of intelligence, which allows individuals to navigate their challenges. Moreover, Thomas (1989) argued that problem-solving involves transforming a problem state into a non-problem state by implementing a preexisting procedure to achieve a goal (p.317). In his work on human-machine interaction, Thomas described problem-solving as the process of converting a problematic situation into a non-problematic state by applying a predefined procedure to accomplish a specific objective.

In the same vein, Martinez (1998) argued that problem solving is a fundamental aspect of human functioning (p.606), because it empowers individuals to overcome obstacles and to advance their understanding of the world.

Problem-solving was the subject of discussion among philosophers before becoming a focus of scientific inquiry. Early research, notably by Newell and Simon in 1972, aimed to outline the problem -solving process as a sequence of steps within higher order, isomorphic problem spaces (i.e., situation where the structure of one problem is similar to another one even though they may look different in the surface). Their concept of a problem space and the development of the general problem solver were pivotal in establishing a foundational framework for understanding problem-solving processes in cognitive science (as cited in Davidson & Sternberg,2003, p.11). This research shed light on how brains handle problems in an organized way.

As mentioned by Carson (2007), problem-solving is only one type of a larger category of thinking skills that teachers use to teach students how to think (p.7). Teachers use various thinking skills to nurture students' capacity for independent and analytical thinking.

Moreover, Rahman (2019) claimed that problem-solving comprises higher order thinking skills such as reasoning, generalization, abstraction, synthesis, association, manipulation, analysis, comprehension, visualization – each needing to be coordinated and managed. This asserts the multifaceted nature of problem-solving, involving not only intellectual abilities but also coordination skills. He added that problem-solving is a process that contains critical thinking and systematic observation to figure out appropriate solution or way to reach the intended objective (p.64). This dynamic process is essential in various aspects of life. Furthermore, Rahman (2019) described problem-solving (PS) as a cognitive process, which interested with accomplishing a goal for which the students do not primarily know a solution

strategy (p.66). This describes problem-solving as a key cognitive process where learners tackle challenges without predetermined methods.

Lastly, the study by Kwe (2020) emphasized the importance of problem-solving skills in academic learning, as it is a cognitive process that allows the learners to use and combine several cognitive functions in an effort to find a solution to a given problem (p.94). Consequently, problem-solving is seen as a cognitive process where learners use different thinking skills to solve new problems.

1.2. The Importance of Problem-Solving

In 1894, Jespersen articulated the importance of practical language application and problem-solving in language learning. Jespersen said that language learning should not only focus on theoretical knowledge but should actively involve learners in applying language skills to real-life situations.

In EFL learning, educators and theorists, including Jerome Bruner, Lev Vygotsky, and John Dewey, emphasized the importance of problem-solving skills. According to Young (1993), understanding Dewey's ecological psychology could help action learning practitioners better comprehend PS strategies (p.45). Furthermore, Jonassen (2011) proposed that problem-solving is generally considered as the most important cognitive activity in everyday and professional contexts (p. 35). That is to say, these abilities can be used in various everyday situations.

Teaching problem-solving skills as pointed out by Belland (2011), encourages students to become more responsible and enhances their capability to solve everyday problems. This approach closely aligns with the broader objective of overcoming barriers that hinder students' progress in achieving their educational goals.

Wokoma (2020) indicated that effective PS is one of the key attributes that separate great leaders from average ones (p. 242). Problem solving distinguishes good leaders from average ones by turning challenges into successes. Moreover, solving problems enhances the learners' soft skills such as decision-making, critical thinking, creativity, and communication.

1.3. Strategies of Problem-Solving

1.3.1. Algorithmic Problem-Solving

Algorithmic problem-solving refers to the process of using algorithms to solve complex problems, Ferreira (2010) argued that an algorithm is a finite sequence of instructions that can be systematically executed in the solution of a given problem (p1). It involves designing step-by-step procedures or methods to solve problems efficiently and effectively.

Similarly, Schneider, Broschat, and Dahmen (2019) claimed that an algorithm is the set of rules or steps that need to be followed to perform a calculation or solve a particular problem (p. 6). Algorithmic problem-solving requires a systematic step-by-step approach. These steps are cyclic, that is to say, it involves a continuous cycle of analyzing and evaluating potential solutions, starting with:

- Identifying the problem or difficulty that needs to be resolved in the EFL learning environment. This may pertain to grammar speaking, listening, writing or any other relevant aspect. Abel (2003) described it as a way to solve a problem, students should create a concrete representation of the problem. Via making it concrete, students can more easily observe critical issues that are often abstract (p.55). In other words, students should make the problem more real by creating a clear picture or example of it. This way, they can better understand it.
- Analyzing the problem, which involves taking a good look at why this problem is happening and searching for what makes it hard to solve.

- Searching for relevant solutions, and brainstorming ideas to tackle the problem.
- Selecting the most appropriate solution considering its advantages and challenges, its feasibility, and how effective it could be.
- Putting the solution into use by making a plan that explains exactly how to make the solution work.
- Checking if the issue is improving. An example of Problem-Solving Model was provided by (Bui, Duong & Nguyen, 2021) in (Figure 1.1).

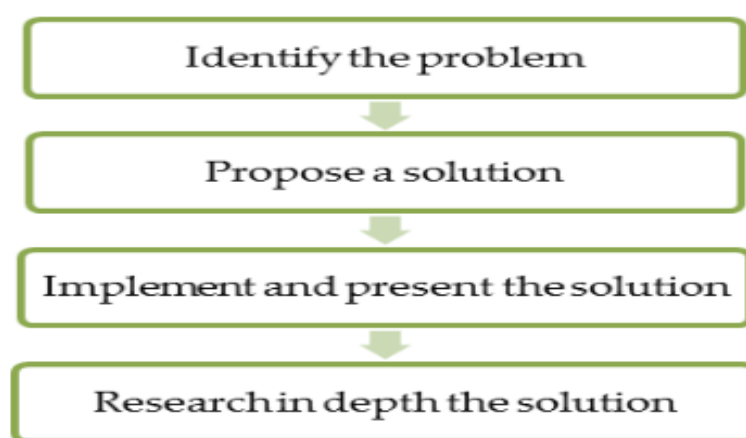


Figure 1.1: Problem-Solving Model

(Adapted from: Bui, Duong & Nguyen, 2021, p.572)

1.3.2. Heuristic Problem-Solving

Heuristic problem-solving is a way of finding solutions by using experience rather than strict rules or procedures. It involves dividing problems into smaller parts.

According to Gigerenzer (2000), the term heuristic, from the Greek, means to find out or discover (p.738). It is like a mental tool that helps in uncovering solutions. In addition, De Carvalho (2003) asserted that the primary goal of a heuristic is to provide help with solving problems by using past experiences (p.15). Heuristics are like quick tricks learned from experience rather than following a systematic or algorithmic approach to help solve problems

easier. Finally, Subedi (2022) asserted that heuristic PS saves the learners' energy and time when making a decision.

1.3.3. Trial and Error Problem-Solving

Kurniasari and Hiltrimartin (2014) defined problem-solving as the use of strategies or techniques such as pattern, working backwards or by trial and error (p. 685). Trial and error is a problem-solving strategy where various solutions are attempted and tested until the correct one is found. This strategy is like when students try different ways to solve a problem and learn from their mistake, they try something, see if it works, and if it does not, they try something else based on what they learned, this keeps going until they find the right answer.

Therefore, heuristics can be seen as a form of trial and error problem-solving because they involve a process of trying different strategies or "rules of thumb" to solve a problem instead of following a single method.

Moreover, Tönnsen (2021) claimed that the quantity of trials depends on the complexity of the problem (p. 304). Simple problems involve a limited number of variables. They require fewer trials to understand due to their uncomplicated nature. In contrast, complex problems are characterized by numerous interconnected variables, necessitating a large number of trials to analyze all the different parts and find appropriate solutions.

Trial and error problem-solving contains elements of both the third and fourth steps of the algorithmic strategy which are: Searching for relevant solutions, brainstorming ideas to tackle the problem and selecting the most appropriate solution, considering its advantages and challenges, its feasibility, and how effective it could be.

1.4. Problem-Solving Theories

Problem-solving theories include the mental strategies learners use to overcome challenges. There are three major theories:

1.4.1. Gestalt Problem-Solving Theory

The Gestalt theory of problem-solving founded by many psychologists such as Max Wertheimer, and Karl Duncker. They argued that problem-solving involves perceiving the problem as a whole rather than focusing on its individual parts. Laurillard (2002) claimed that the core of our perception is that each part exists by virtue of its relation to a whole, and can itself be seen as a whole (p.127). That is to say, each part only makes sense in relation to the whole, and it can also be viewed as a whole itself.

Laurillard said that the essence of Gestalt psychology is to emphasize the structural quality of the way in which we perceive, think about, and feel the world around us. This structural quality is wholeness ('Gestalt' means 'whole') (p.127). Gestalt psychology studies how people perceive the world around them by emphasizing the importance of seeing things as a whole, rather than just individual parts.

Moreover, she added that there are two main difficulties in the employment of Gestalt theory to the kinds of learning and problem-solving that occur in the classroom. Firstly, the researched problem is of a specific character. It is not clear how well the theory can address various kinds of problems. Secondly, focusing on the problem from the student's perception, however; the emphasis should not be only on the content of the problem as given but it includes also the context in which it is given (p. 127, p. 129).

Gestalt theory looks at how students see the problem itself, it focuses on their perception of the problem, students perceive problems not just by their content but also by the context surrounding them. Furthermore, Robertson (2016) stated that the theory requires understanding

an insight into the structure of a problem (p.11). In this theory, understanding the structure of a problem means looking for its overall organization and how its parts relate to each other.

1.4.2. Information Processing Theory

According to Slate and Charlesworth (1988), information processing theory is a theoretical framework of how humans learn and remember (p.2). This theory explains how human brain works when learning new things and remembering them later. Laurillard (2002) asserted that the origins of this approach can be traced to the work of Newell and Simon, who developed a program called 'General Problem-Solver (GPS)' (p.130). Their work demonstrated that cognitive processes could be described in terms of algorithms and heuristics, providing a structured way to understand how humans think, learn, and solve problems.

Accordingly, Laurillard (2002) added that the theory explains how people apply problem-solving strategies and organize the problem to find a specific solution (p.130). Information processing theory focuses on how learners perceive, encode, store, and retrieve information.

- **Perceive:** Taking the information from the environment through the senses.
- **Encode:** According to Brown and Craik (2012), encoding refers to the process of acquiring information or placing it into memory (p.93). Encode involves converting information into a format that can be stored in the memory.
- **Store:** keeping the encoded information in memory.
- **Retrieve information:** Brown and Craik (2012) described retrieve information as the process of recovering previously encoded information (p.93). Retrieve information involves bringing back stored information when needed.

This theory suggests that humans actively process the information they receive. It draws an analogy between the human mind and a computer, showing how both systems analyze incoming data and make decisions about how to use that information.

According to Laurillard (2002), Gestalt theory involves understanding the problems' general structure, suggesting that failures in problem-solving are often due to a failure to recognize the structure of the problem. Information processing theory on the other hand is more concerned with the methods that students use to solve problems and the mechanisms underlying this process (p.128). Gestalt theory suggests that learners solve problems by perceiving them as a whole, while information processing theory focuses on how they tackle problems step-by-step.

1.4.3. Decision-Making Theory

Decision-making theory refers to the systematic study of how students assess problems and generate various solutions. According to Janis and Mann (1977), in decision-making theory, decisional conflict occurs when learners experience conflicting thoughts or feelings about a choice they have to make. It is like having two opposing voices, one supporting the decision and the other not. This conflict can make it challenging for learners to make a clear decision (as cited in Fazli, 2020, p.10). That is to say, if there is no problem with one's normal routine, then there is typically no conflict, and consequently, no decision needs to be made.

Moreover, Shine and Jeong (2021) noted that learners make many connected decisions as they identify evidence and determine causal links during various stages of problem-solving. In this regard, Hoy (2019) provided an example of Decision-Making Action Cycle in in (Figure 1.2).

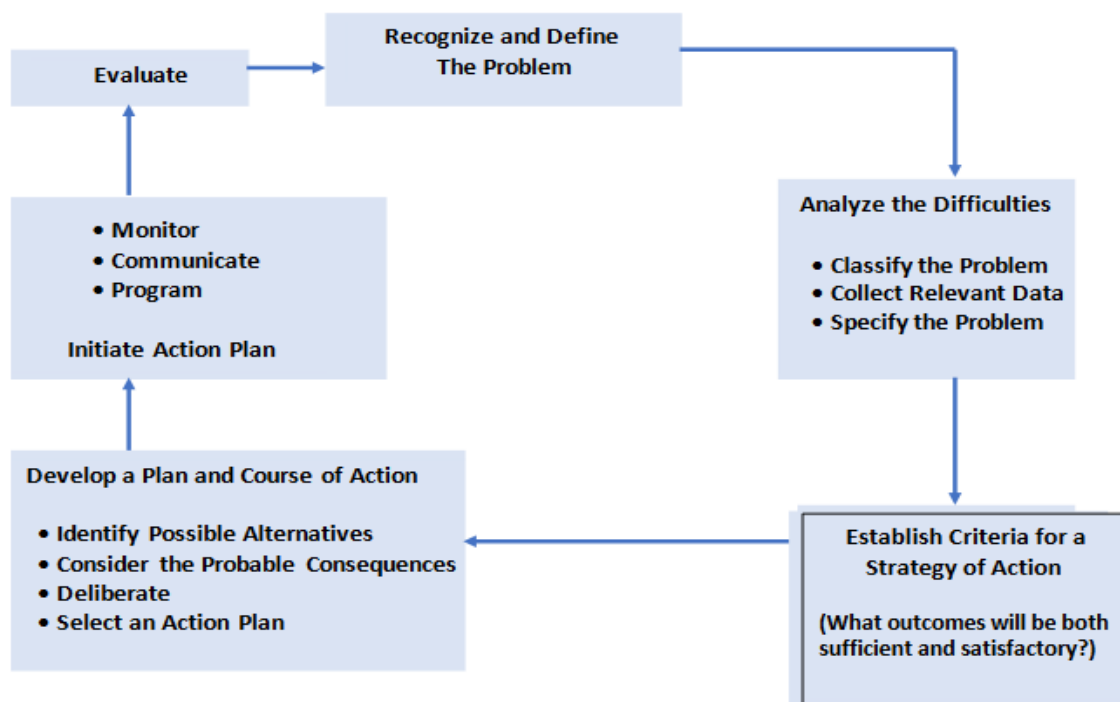


Figure 1.2: Decision-Making Action Cycle

(Adapted from: Hoy, 2019, p.2)

1.5. Cognitive Processes Involved in Problem-Solving in EFL Learning

Problem-solving is not just about following rules to get the right answer. Instead, it is seen as a process where students figure out what steps to take based on logical thinking, apply those steps, and then check if the result makes sense. It is about being sure that the answer they get is reasonable, and that what they have learned can be useful for more challenging problems.

Cognitive processes refer to the mental activities that enable learners to acquire and process information. Problem-solving interacts with various cognitive processes like synthesis, comprehension, abstraction, and analysis.

1.5.1 Analysis

Cope (1877) described analysis as the process of breaking down the objects of knowledge into their ultimate components, to uncover their causes. Additionally, McCarthy (1991) asserted

that analysis refers to the systematic process of breaking down a problem into smaller parts to gain better understanding of it (p.6). Furthermore, analysis helps students identify connections that may not be apparent when considering the topic as a whole. It is a creative process which involves understanding the subject in a thoughtful manner, ensuring a thorough representation that goes beyond ordinary observation.

1.5.2. Synthesis

The process of combining different ideas or information to create a new understanding or solution. According to Cassidy (1983), synthesis involves connecting data obtained through analysis (p.389). In other words, synthesis builds upon analysis. Petrica (2019) claimed that analysis is an artificial separation; while synthesis is an artificial reconstruction (p.2). Generally speaking, analysis is like breaking things apart artificially to understand them while synthesis involves reconstructing those parts into something new, it requires critical thinking and creativity. In problem-solving contexts, synthesis involves combining different strategies and techniques to solve various language challenges.

1.5.3. Comprehension

Comprehension refers to the ability to understand and make sense of information presented in various forms. Nickerson (1985) described comprehension as a primary goal of education (p. 234). It involves not only understanding the literal meaning of the content, but also making connections between different pieces of information. According to Pardo (2004), comprehension as a process through which learners construct meaning by interacting with text through the combination of prior knowledge and previous experience (p.272). Comprehension is the ability to understand and interpret various forms of language input. This includes decoding meaning, making connections between different pieces of information, and drawing

conclusions based on its context. It is an active process that involves connecting facts and relating newly learned information to what is already known.

1.5.4. Abstraction

Kaschek (2004) described abstraction as a method that stores the meaning of a message in memory without retaining the exact words and grammatical structures (p.3). Abstraction refers to the process of simplifying a complex problem by focusing on the essential elements and ignoring the unnecessary details. Abstraction serves as a major cognitive process that helps in comprehension, retention, and application of new knowledge. When learners encounter new information, they abstract the key concepts and principles to understand the subject matter.

1.6. Factors Affecting Problem-Solving Abilities

Getting better at solving problems is not just about learning more words or grammar. It is about a lot of different factors that make learning interesting and sometimes challenging. There are two major factors that influence problem-solving abilities in EFL learners:

1.6.1. Individual Factors

Individual factors refer to the inherent characteristics, traits, and behaviors that distinguish one student from another. This factors can include personality traits, motivation, and learning styles.

1.6.1.1. Personality Traits

Harini, Rosyidi, and Karnati (2018) defined personality trait (PT) as a combination of mental, behavioral, and physical characteristics that are specific for each learner (as cited in Barza & Galanakis, 2022, p. 414). PT are ways of describing learners based on their characteristic patterns of behavior, thoughts, and feelings. They influence how a student interacts with others. McCrae and Costa (2008) claimed that the field has emphasized the stable

nature of traits. In other words, personality traits remain consistent over time. Each students' personality is shaped by a verity of characteristics:

- **Openness:** One of the five basic factors of PT, also known as openness to experience. According to LePine, Colquitt, and Erez (2000), openness to experience involves being broad-minded and having a willingness to engage in new language tasks. Learners with high openness are generally more curious, open to new learning experiences, and have diverse interests.
- **Conscientiousness:** Soto (2018) argued that conscientiousness can be seen in terms of responsibility, productivity, and organization. Conscientiousness is the personality trait that describes how careful a learner is. Students with high conscientiousness are well-organized, responsible, and hard working. Conscientious learners are known for their disciplined approach to learning and their ability to stay focused.
- **Extraversion:** The PT that describes one's level of sociability. Students with high extraversion are often talkative and enjoy being around others, they prefer collaborative learning environment. According to Barza and Galanakis (2022), extraversion is a significant personality trait that is associated with social success and popularity (p.414).
- **Agreeableness:** The PT that describes learners who are friendly, kind, and polite. Soto (2018) asserted that people who are agreeable tend to show empathy towards others and treat them with regard for their personal rights. According to Bradley et al. (2013), agreeableness is socially-oriented and relates to ways individuals interact with each other (as cited in Taufik, Prihartanti, and Abd Hamid, 2019, p.648). Student who are high in this personality trait tend to have an optimistic view of their educational journey.

- **Neuroticism:** A personality trait where learners tend to feel negative emotions like worry, anger, and sadness, which can affect their ability to manage stress and concentrate on their studies.

1.6.1.2. Motivation

What drives learners to keep trying and working towards achieving an intended goal. Guay et al. (2010) defined motivation as the extent to which an individual is willing to exert towards achieving a specific goal (p.71). It is an internal force that pushes a learner to achieve something. Additionally, Filgona et al. (2020) claimed that motivation is the key success in the teaching-learning process (p.117). When students are motivated, they are more engaged in their learning since the more motivated learners are better than the demotivated learners in performance and outcome. Similarly, motivated teachers can create inspiring learning environment that lead to positive outcomes. There are two major types of motivation:

- 1) **Intrinsic Motivation:** Ryan and Deci (2000) argued that intrinsic motivation means doing an activity for its inherent satisfaction (p.56). Intrinsic motivation is the eagerness to participate in activities because they are attractive, enjoyable, and satisfying in themselves, without any external rewards or pressures.
- 2) **Extrinsic Motivation:** This type of motivation involves participating in an activity not for its own sake but to earn a reward or avoid a punishment. According to Legault (2016), this type of motivation is performed in order to attain some other outcome. In EFL learning, extrinsic motivation can appear as studying English to pass an exam, achieve a certification, or communicate with people from different cultures.

1.6.1.3. Learning Styles

Dunn et al. (1981) described learning styles (LS) as a way in which the learner takes in new information and develops new skills. Moreover, Brown (2000) added that LS involves choosing one way of learning over another (as cited in Al-Hebaishi, 2012, p.511). There are three major learning styles:

- Visual learners prefer using images and diagrams to understand information.
- Auditory learners benefit from listening to spoken explanation and discussions.
- Kinesthetic learners learn best through hands-on activities; they can physically interact with materials using movement and tactile experience.

1.6.2. Environmental Factors

Environmental factors refer to the external factors or conditions that can influence a learners' ability to solve problems effectively. These factors are:

1. **Physical Environment:** The surrounding in which learning takes place, including lighting, temperature, and noise level that may hinder concentration and problem-solving abilities. Gilavand (2016) asserted that many studies have shown that noise can cause poor concentration, drop off students in the courses, and even decrease their grades (p.367). This can make it harder for them to solve problems effectively.
2. **Cultural Context:** Culture is something that everybody has; it influences how learners perceive problems by shaping their beliefs and behaviors. Cultural context includes aspects such as language, traditions, and societal norms that affect their way of thinking and solving problems.
3. **Resource Availability:** Having the necessary materials and books empower learners with the tools they need to solve problems. Lapeña et al. (2023) argued that some of the resources that should be made available for learners are physical spaces like classrooms

and libraries (p.86). Access to necessary materials develops autonomous learning and critical thinking among students.

4. **Education System:** When the system includes critical thinking and problem-solving as key components of the curriculum, it equips students with the necessary skills that help them to become creative thinkers. Orluwene and Igwe (2015) proposed that educational system functions as a structure that embraces teachers, students, contents and contexts to achieve set goals (p.85). Teachers play an essential role in facilitating and guiding learning experiences for students. They bring the curriculum to life by employing various teaching strategies designed to meet the diverse needs of learners. However; students are at the core of the educational process. They are not passive recipients of information but active participants who interact with the material, ask questions, make connections, and apply their knowledge. Students' engagement and involvement in the learning process are important for improving their critical thinking skills.

1.7. Adapting Problem-Based Learning for EFL Learners

Problem-based learning (PBL) is a teaching method where students learn through the experience of solving an open-ended and real-life problems.

According to Bielenberg and Gillway (2007), PBL is coined by Howard Barrows in 1960s. Originally used for medical education, it has since been adopted in various disciplines (p.4). PBL is widely implemented in different areas of learning to encourage their PS skills.

In the same vein, Barell (2007) added that PBL engages learners in real and relevant intellectual inquiry and allows them to learn from life situations (as cited in Patrick ,2009, p 41). This learning process helps students to think carefully, using their knowledge to solve problems. Tawfik et al. (2021) claimed that PBL is designed to be a learner-centered curriculum

that gives students the autonomy to solve authentic problems, making it different from traditional teaching methods. That is to say, PBL is a teaching method in which students learn by engaging in real-life and complex problems. Instead of starting with traditional instruction on a given topic, students are presented with a problem and they use their critical thinking. Problem-based learning involves three features: Problem-based cases, learning issues, and problem-based facilitator.

1.7.1. Problem-Based Cases

These are the real-world cases provided to students at the beginning of the learning process. These cases serve as the context of learning experience and help learners apply their knowledge in a practical way. Problem-based cases (PBCs) serve as a dynamic learning tools that bridge the gap between theory and practice. PBCs are real-life situations given to students as examples to show how things work in the real world. These cases also make learning more interesting because learners can relate to them. They encourage students to think critically and find solutions to problems.

Overall, PBCs are important because they make learning more practical and fun. They help students see the connection between what they learn and what they do in real life.

1.7.2. Learning Issues

Students identify the key concepts and questions that they need to investigate in order to solve the problem. These learning issues help them focus on the most relevant information. According to Hmelo-Silver & Barrows (2006), each problem in PBL comes with a suggested list of learning issues, so every teacher knows exactly where the faculty wants students to focus their learning efforts (p. 29). The suggested list of learning issues serves as a guide for both students and teachers ensuring that learning efforts are directed towards particular information.

Generally speaking, by having a clear set of learning issues, students can prioritize their learning tasks and delve deeper into specific topics.

1.7.3. Problem-Based Facilitator

Involves the role of the teacher who supports the students' learning process by guiding their PS techniques. Hmelo-Silver & Barrows (2006) asserted that in PBL, the facilitator is an expert learner, able to provide effective techniques for learning and thinking (p.24). The Facilitators' responsibility not only to impart knowledge but also to guide and model effective learning strategies for learners. That is to say, facilitators empower students to take ownership of their learning process. Barrett (2006) provided an example about ways to be a great PBL Facilitator which will be presented in (Figure 1.3). Meanwhile, (Kök and Duman, 2023) provided an example of Positive Opinions about PBL in (Figure 1.4).

- Be interested and enthusiastic
- Forget lecturing
- Tolerate silence
- Get students talking to each other and not to you
- Make sure the group agree on learning issues before the group ends
- Promote the use of accurate current information resources as students research their learning issues
- Remember the learning outcomes of the case and course
- Establish a good learning environment for the group
- Be yourself

Figure 1.3: Ways to be a Great PBL Facilitator

(Adapted from: Barrett, 2006, p.19)

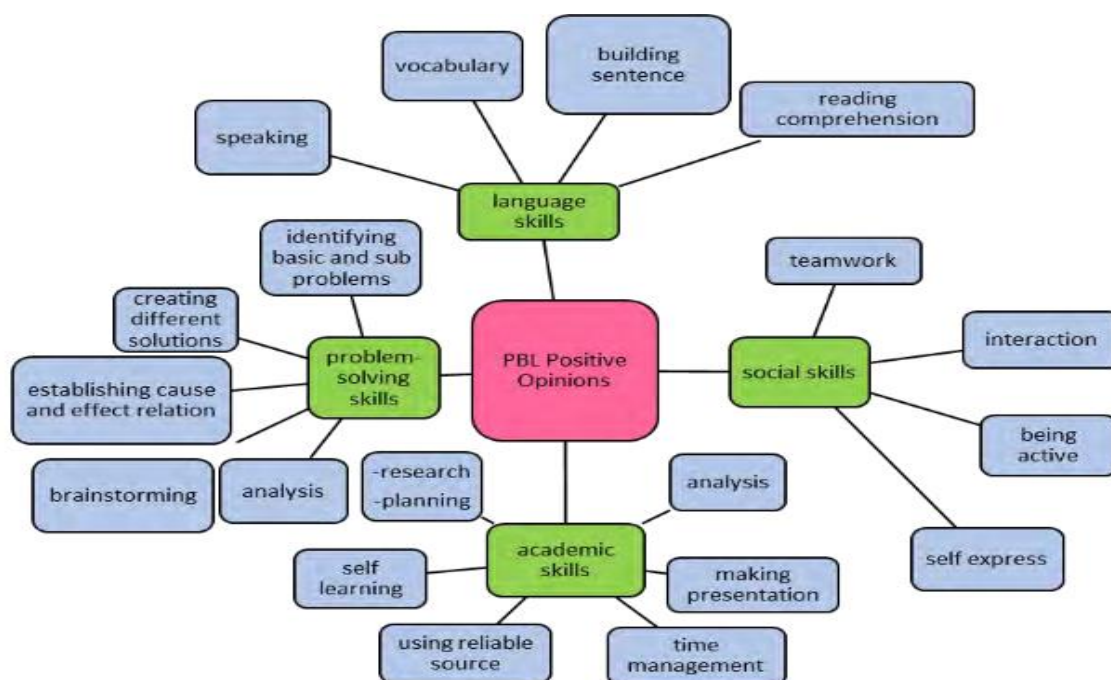


Figure 1.4: Positive Opinions about PBL

(Adapted from: Kök and Duman, 2023, p.161)

1.8. Applications of Problem-Solving Abilities

Developing problem-solving abilities is an important factor for achieving academic success. According to Surur et al. (2021), students who have studied the problem-solving process are more likely to succeed in various stages of life (p. 454). PS provides opportunities for learners to use what they have learned in new situations such as:

1.8.1. Vocabulary Acquisition

When EFL learners come across unfamiliar words, they use problem-solving skills to deduce what these words mean through context clues; i.e., by thinking about the meaning of the whole sentence. According to Ghaemi (2016), problem-solving facilitates vocabulary learning (p. 32). In other words, PS skill helps in the understanding of how language functions within different situations.

1.8.2. Grammar Understanding

According to Murcia (2001), grammar learning is the learning process that make learners understand the way to analyze the meaning, rules, functions, and grammar form. The application off problem-solving skills in grammar comprehension involves the use of activities that require students to work through linguistic challenges. Typically, this approach helps them to understand grammar by analyzing rules, meaning, functions, and forms. Similarly, Apen (2016) argued that teaching problem-solving is one of the appropriate techniques that can motivate the students to learn grammar (p.181). These abilities enable learners to identify the grammatical rules by analyzing the sentence structures.

To sum up, the application of problem-solving to grammar learning as discussed by Murica 2001 and Apen 2016 is an effective strategy. It gets students more involved in a deeper analysis of language helping them to understand the form, function, and meaning of grammar within context. Problem-solving skill pushes learners to think critically and work collaboratively to find solutions to linguistic challenges.

1.8.3. Communication in Real-Life Situation

Learners need problem-solving skills to communicate in real-life situations, such as thinking effectively in conversations and expressing themselves clearly. Pizzini and Shepardson (1992) argued that Problem-solving is a technique which encourage the learners to interact (as cited in Apen 2016, p.184). PS ability allows learners to transfer their knowledge from one subject to another as it helps them to express themselves clearly in conversations and other situations

1.8.4. Reading Comprehension

Reading comprehension is the ability to understand, process, and interpret text. EFL learners face complex texts that require them to use critical thinking and PS to understand the

main ideas. As mentioned by Aloqaili (2012), reading comprehension is related to critical thinking. Critical thinking encourages students to think beyond the literal meaning of the words and delve into the authors' intentions, biases, and underlying messages. In the same sense, Pressley and Afflerbach (2012) stated that applying critical thinking and problem-solving methods can enhance reading skills and comprehension. This method allows students to use their language skills and previous knowledge to decode and gain new information from reading texts.

To sum up, problem-solving skills enable learners to make connections between their existing knowledge and what is presented in the text.

1.8.5. Writing Skills

English writing is one of the most important skills for EFL learners. Sanjib (2017) argued that it is important for students to learn how to write a paragraph, they should know how to write a topic sentence and support sentence. Also they need to know how to write introduction, body, and conclusion (p.64). When writing essays or reports, students use problem-solving skills to brainstorm ideas, organize their thoughts coherently, and revise their writing to improve clarity. PS abilities help learners to become more confident in using English language in different contexts.

Conclusion

In conclusion, problem-solving abilities of EFL learners refer to the skills needed to identify and solve problems successfully. These skills are important in the 21st century as they help students think critically and apply their knowledge in real-life situations. This chapter has covered the definition and importance of problem-solving skills, it discusses various strategies designed to enhance problem-solving skills among EFL learners, such as algorithmic problem-solving, which refers to a step-by-step approach that learners can apply to address problems;

heuristic problem-solving that involves using experience-based techniques for learning; and trial and error problem-solving allows learners to experiment with different solutions to find the most effective one. Furthermore, the chapter shed light on relevant theories, including gestalt problem-solving theory, which focuses on understanding the whole problem structure; information processing theory, which examines how learners perceive, analyze, and store information; and decision-making theory, which explores how choices are made between different solutions. Moreover, this chapter was concerned with factors problem-solving abilities such as individual traits and environmental conditions. Additionally, the cognitive processes involved in this skill and the application of problem-solving abilities in various language contexts. Thus, it is important to include problem-solving tasks in the curriculum. This ensures that EFL learners learn the necessary skills to solve their language problems effectively.

Chapter Two: Cognitive Intelligence

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Introduction

Cognitive Intelligence stands as one of the key factors that influences the learning process. This important aspect of human cognition impacts learners' understanding, retention, and problem-solving abilities. Learners encounter variety of challenges throughout their language learning journey, such as difficulties in understanding complex grammatical structures, learning vocabulary, and communication. These difficulties may become more challenging due to factors such as minimal opportunities to use English language outside the classroom and differences in cultural background. Generally speaking, cognitive intelligence influences how learners handle and tackle these obstacles. This chapter sheds light on the definition of cognitive intelligence, cognitive processes, concepts of cognitive intelligence, theories of intelligence, emotional intelligence, artificial intelligence, the relationships between cognitive intelligence, emotional intelligence, learning styles and language learning strategies in EFL learners, and the relationship between cognitive intelligence and problem-solving abilities.

2.1. Definition of Cognitive Intelligence

Cognitive intelligence refers to the capacity to learn, understand, reason, and solve problems. Linn (1989) claimed that the term traces its origins back over a century ago by the British psychologist Charles Spearman in 1904. Spearman introduced the concept of general intelligence or 'g factor', which serves as the basic of cognitive intelligence. He considered it to be the core of mental energy required for cognitive tasks.

Many studies have found that cognitive intelligence is strongly associated with proficiency in language learning tasks. According to Kaplan and Sadock (1991), cognitive intelligence is the ability to learn, remember information, recall and retrieve information when needed, to reason logically, and to apply knowledge in the resolution of problems (p.175). Moreover, Sternberg (1996) described cognitive intelligence as the combination of numerical, verbal, and spatial abilities

which includes the use of memory, visualizing, verbal relations, word fluency i.e. the ability to produce words easily.

Furthermore, Schaie (2001) claimed that this capacity represents the specialization of general intelligence in the domain of cognition that is based on experience and learning about cognitive processes such as memory (as cited in Côté & Miners, 2006, p.5). Cognitive intelligence is like having specialized knowledge and skills related to thinking, learning, and memory that learners gain through their experiences and education. It involves how well they understand and process information in their minds. In this regard, Akgun et al. (2007) described cognitive intelligence as a concept that involves the interaction between the behavioral, cognitive, and emotional capacities, which evolve and adjust in response to the surrounding environment (p.273). Besides, Saxena and Saxena (2012) described (CI) as a combination of mental skills used for analyzing, writing, reading, logical thinking, and setting priorities (p.50).

Cognitive intelligence is measured by intelligence quotient (IQ) test, which is defined by Matzel and Sauce (2017) as the quantification of an individuals' intelligence compared to others of the same age (p.1). IQ tests, assesses the learners' ability to think, reason, and use information successfully. Additionally, Bayne et al (2019) asserted that cognitive intelligence is the ability to acquire knowledge through thinking, experiencing, and using senses (p.1).

2.2. Cognitive Processes

Cognitive processes refer to the mental operations the brain performs to process information, interact with the environment, and make decisions. Shadiev et al. (2014) asserted that cognitive processes are the mental activities by which knowledge is acquired and understood via reasoning and experiences (p.19). These cognitive processes are essential to understanding and learning. Moreover, Newan (2015) defined cognitive processes as processes of information transfer that take place to connect different pieces of information. These processes include:

2.2.1. Attention

Attention is described as the ability to concentrate on a single object or thought, limiting receptivity by narrowing the range of stimuli. In psychology, James (1890) described attention as the concentration of awareness on some phenomenon to the exclusion of other stimuli. Attention is the act of processing specific information in the environment while filtering out other details. According to Fellrath and Ptak (2015), attention is the cognitive process of selectively focusing on one thing or event by ignoring other things (p.71).

2.2.2. Perception

According to Goldstein (2008), in cognitive psychology, perception refers to the cognitive process of interpreting sensory information to extract meaning from the environment, enabling learners to experience stimuli through their senses and establish a connection between the world and sensory. McDonald (2012) said that perception refers to the neurological process of sensing, selecting, and organizing sensory information, essentially how sensory data is processed for understanding by learners (p.4). Perception involves organizing sensory experiences into an understanding of the surrounding world. It plays a crucial role in forming impressions, making decisions, and solving problems. Generally speaking, perception is a complex process influenced by factors like beliefs, existing knowledge, mental health, and culture. This cognitive process is essential for engaging with the environment and processing sensory information. Furthermore, Erin and Maharani (2018), claimed that perception involves the psychological processes through which individuals interpret experiences gained from the five senses (p.7). These experiences can be processed into either positive or negative perceptions. Thus, perception is the process of obtaining responses involves stages such as selection, interpretation, and reaction.

2.2.3. Reasoning

Reasoning is the process of deducing conclusion from statements. According to Walton (1990), reasoning is the act of inference; it involves the transition from specific premises that are

understood or assumed to be true, to a separate conclusion that distinct from them but following from them. Moreover, Everson (1998) described reasoning as the cognitive process of drawing conclusions or the ability to analyze information, evaluate arguments, and derive logical conclusions from available data (p.65). Reasoning can be deductive, where conclusions are derived from general principles, or inductive, where conclusions are based on specific observations that making inferences based on facts, evidence, or assumptions which involves the use of logic and critical thinking to reach a decision.

2.2.4. Learning

Learning is the process of acquiring new knowledge. According to Knowles (1973), learning is the process of getting knowledge or a new skill (p.211). This process involves learning information through teaching, study, and experience. It is a change in human disposition or capability that persists over time due to experience.

Moreover, Davis and Nickmans (2007) claimed that learning is the process of picking up new knowledge, skills, preferences, understanding, behaviors, values, and attitudes (p.147). It is a fundamental aspect of human cognition that occurs throughout life. Learning is the mechanism through which individuals gain the knowledge, attitudes, and skills that are necessary to meet the demands of life.

2.2.5. Metacognition

Metacognition refers to thinking about one's own thinking" it was introduced as a concept by the scholar John Flavell in 1979. Flavell (1976) claimed that metacognition is the application of the theory of mind to cognitive tasks. It involves recognizing how one learns, solves problems, makes decisions. Metacognition is the knowledge people have about what they know, think, and remember. Livingston (2003) proposed that metacognition refers to the higher-order thinking involved in actively controlling the cognitive processes engaged in learning (p.1). It is about being aware of one's own mental activities, such as planning, monitoring, and evaluating learning

strategies. This active control enhances learning by allowing learners to adapt their approaches based on their understanding of their own cognitive processes. Additionally, Teng (2023) asserted that metacognition can build confidence for learners to improve their language skills (p.187). Metacognition plays a crucial role in enhancing language skills by building learners' confidence. When learners are aware of and can control their own cognitive processes related to language learning, they become more confident in their abilities. This confidence, in turn, motivates them to engage in language learning activities

2.2.6. Critical Thinking

Glaser (1941) claimed that critical thinking is a process that involves skilfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from various sources to guide belief and action. Critical thinking is a disciplined approach that emphasizes clarity, consistency, precision, accuracy and good reasoning. Scriven and Paul (1987) highlighted that critical thinking extends beyond mere acquisition of information. It involves comprehending the logical relationships among ideas and approaching problem-solving in a systematic manner. According to Ennis (1993), critical thinking can be described as the process of engaging in reasonable and reflective thinking, with a focus on determining what to believe or what actions to take (p.41). This cognitive process is essential across various fields for helping learners make informed decisions.

2.3. Concepts of Cognitive Intelligence

2.3.1. Cognition

Cognition refers to the range of mental processes associated with gaining knowledge and understanding through thought, experience, and the senses. Neisser (1967) defined cognition as the processes by which the sensory input is transformed, elaborated, reduced, stored, recovered, and used (p.4). Cognition is involved in everything a human being might possibly do; that every psychological phenomenon is a cognitive phenomenon. In other words, cognition is all about how

the brain takes in information, processes it, stores it, and uses it to understand and interact with the world. Moreover, the mental actions or processes of acquiring knowledge and understanding through thought, experience, and the senses. It includes aspects like awareness and the ability to make evaluations or judgments. This means that cognition involves understanding things, being aware of them, and making judgments based on that awareness.

2.3.2. Memory

Memory, as defined by Eliasmith (2001), serves as the general capacity enabling individuals to interpret the perceptual world and formulate responses to the dynamic changes that take place in the world (as cited in Lutz & Huitt, 2003, p.1). It is implied by this definition that memory is the cognitive faculty that allows individuals to make sense of their surroundings and adapt their behaviors accordingly. In the same sense, Squire (2009) claimed that memory is the faculty of encoding, storing, and retrieving information. This definition implies that the brain processes, retains, and recalls information, indicating that memory is a fundamental aspect of learning and experience.

Psychologists have found that memory includes three important categories: sensory, short-term, and long-term. Each of these kinds of memories have different attributes:

2.3.2.1. Short-Term Memory

Cowan (2008) claimed that short term memory also known as working memory (p.323). According to Voytek and Knight (2010), short-term (or working) memory is the remarkable ability to observe and encode information from the surrounding environment (p.2). Short-term memory (STM) is like a temporary storage space for information that are actively processing. It holds a small amount of information (typically around 7 items or even less) in mind in a short period of time (typically from 10 to 15 seconds, or sometimes up to a minute).

2.3.2.2. Long-Term Memory

According to Greenfield (2000), long-term memory (LTM) is characterized by the capacity to intentionally retrieve specific pieces of information or experiences from the past (p. 81). This implies that the knowledge stored in long-term memory should be called in the future as past knowledge. Additionally, it can last for days, weeks or years.

2.3.3. Intelligence

Wechsler (1939) stated that Intelligence is global capacity of the individual to think rationally, act purposefully, and to deal effectively with the environment. That is to say, intelligence is the ability to use thoughts in smart way to interact with others.

Additionally, Sternberg (1985) defined intelligence as the mental capacity essential for adapting to various environmental contexts, as well as for shaping and selecting from those contexts. Intelligence is the overall cognitive problem-solving skills; it involves different mental abilities such as: calculating, and reasoning. Furthermore, Sternberg (2000) added that intelligence refers to the ability to adapt oneself adequately to relatively new situations in life (p.15). Thus, it is the mental capacity to sustain successful life. In this regard, Legg and Hutter (2006) argued that intelligence is the ability for an information processing system to adapt to its environment with insufficient knowledge and resources.

2.4. Theories of Intelligence

There are different theories about intelligence, none of which agree with each other. Every approach to thinking comes up with its own different perspectives and assumptions.

2.4.1. Faculty Theory

Pal, Pal and Tourani (2000) described the Faculty theory as the oldest theory regarding the nature of intelligence, which flourished during 18th and 19th century. According to this theory, mind is made up of different faculties like reasoning, imagination, and memory. These faculties are considered independent of each other (p.181). This theory suggests that intelligence consists of a

set of distinct mental abilities or faculties. These faculties are believed to include perception, memory, understanding and reasoning.

2.4.2. Gardner's Theory of Multiple Intelligence

Howard Gardner's Theory of Multiple Intelligences proposes that intelligence is not a single, fixed trait, but rather a set of distinct cognitive abilities. According to Pal, Pal and Tourani (2000), intelligence is multifaceted and can be categorized into different types or modalities. He proposed the existence of eight distinct intelligences, each representing a different way of processing information and solving problems. These intelligences are:

- **Linguistic Intelligence:** Gardner (2011) suggested that linguistic intelligence is crucial for effective communication and functioning in the world. (as cited in Morgan, 2021, p.126). This type of intelligence involves skills in understanding and using language including knowing the meanings of words (semantics), the sounds of language (phonology), how words are structured into sentences (syntax), and the social rules of language use (pragmatics).
- **Logical Intelligence:** The ability to think critically, solve problems systematically. It involves breaking down complex problems and draw conclusions based on facts and evidence. Terrill (2018) argued that learners with logical intelligence demonstrate proficiency with numerical concepts and data analysis. They employ both inductive and deductive reasoning (p.5).
- **Spatial Intelligence:** According to Maier (1998), spatial intelligence is the ability to orientate oneself, to move in space, and to be able to think, plan and represent it. Maier described spatial intelligence as the capacity to navigate physical space, understand ones' orientation within it, and engage in cognitive processes such as thinking, planning, and representing spatial information. Spatial intelligence involves understanding physical

space, maintaining awareness of one's location within it, and employing cognitive abilities to being able to work with spatial concepts.

- **Bodily-Kinesthetic Intelligence:** involves the ability to use one's body to solve problems, or present ideas. It encompasses skills related to physical coordination. Sujitha and Thanavathi (2022) asserted that bodily-kinesthetic intelligence is the capacity that allows learners to use their body in expressing ideas and feeling (p.18).
- **Musical Intelligence:** The ability to produce and analyse rhythm and sound. It involves the ability to understand and create music. It includes skills such as the capacity to express oneself through music.
- **Interpersonal Intelligence:** The capacity to understand and interact with other people. It involves skills such as empathy, communication, and the ability to relationships with others. According to Sadiku et al. (2020), Interpersonal intelligence refers to the aptitude for connecting with and handling relationships with others (p.2). Sadiku et al. (2020) provided a summary of Interpersonal Intelligence in (Figure.2.1).

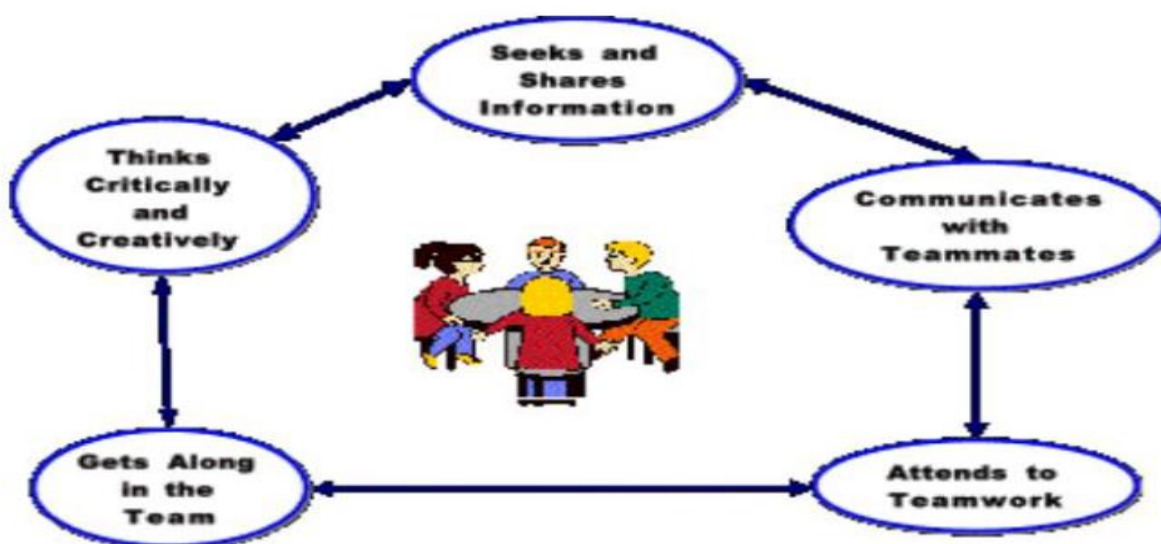


Figure 2.1: Interpersonal Intelligence

(Adapted from: Sadiku et al. 2020, p.2)

- **Intrapersonal Intelligence:** Intrapersonal intelligence, as described by Rubio (2002), is the capacity to know oneself, including recognizing emotions, personal strengths and weaknesses, and the ability to solve internal conflicts that disturb psychological balance (as cited in Palenzuela & Reina 2014, p. 146). That is to say, intrapersonal intelligence involves an individuals' capacity to understand themselves. This includes being able to recognize their own emotions, as well as being aware of their personal strengths and weaknesses. In this regard, Sadiku et al. (2020) provided an example of Intrapersonal and Interpersonal Intelligence in (Figure 2.2).



Figure 2.2: Personal Intelligence (Intrapersonal and Interpersonal Intelligence)

(Adapted from: Sadiku et al. 2020, p.2)

- **Naturalistic Intelligence:** According to Terrill (2018), this form of intelligence pertains to the natural world. Naturalistic intelligence, as described by Howard Gardner in his theory of multiple intelligences, refers to the ability to understand, appreciate, and interact effectively with the natural world.

2.4.3. Sternberg's Triarchic Theory

According to Blesch (2012), the theory is made up of three sub-theories that attempt to explain the relationship between intelligence and the internal and external world of the individual (p.2). Sternberg's Triarchic Theory of Intelligence, proposed by psychologist Robert Sternberg,

suggests that intelligence can be divided into three distinct components: analytical intelligence, creative intelligence, and practical intelligence.

- **Analytical Intelligence:** Analytical intelligence involves the ability to analyse, evaluate, and solve problems using logical and systematic approaches in terms of analytical intelligence, Sternberg (1988) emphasized inductive reasoning, which is the type of thinking required for tasks such as series completion and analogies (p.3). Inductive reasoning involves making generalizations based on specific observations or evidence.
- **Creative Intelligence:** The ability to think creatively and generate new ideas. According to Haniah, Nursalam, and Wahyuddin (2023), creative intelligence is the ability of the mind to generate new and improved ideas and methods for tasks, as well as to connect different concepts together (p.1921). Creative intelligence involves perceiving and thinking with increased freedom, less restricted by past experiences or learned conventions.
- **Practical Intelligence:** Practical intelligence refers to the ability to apply knowledge and skills in real-world situations. Sternberg (2000) define practical intelligence as one of three ‘broad kinds of abilities’ or ‘domains of mental processing’ (p.31). Practical intelligence involves adapting to different environments. Sternberg and Grigorenko (2003) provided the following summary of Triarchic Theory in (Figure 2.3)

Analytical	Creative	Practical
(a) analyze	(a) create	(a) apply
(b) critique	(b) invent	(b) use
(c) judge	(c) discover	(c) put into practice
(d) compare and contrast	(d) imagine if . . .	(d) implement
(e) evaluate	(e) suppose that . . .	(e) employ
(f) assess	(f) predict	(f) render practical

Figures 2.3: Sternberg’s Triarchic Theory

(Adapted from: Sternberg & Grigorenko 2003, p.216)

2.5. Emotional Intelligence

Emotional intelligence (EI) is the capacity to be aware of, control, and express one's emotions. Salovey and Mayer (1990) described emotional intelligence as a form of social intelligence that involves the capacity to observe and discern one's own and others' feelings and emotions as cited in Goleman, 2006, p.2). This insight aims to inform ones' cognition and behavior. According to Serrat (2017), emotional intelligence is the ability to manage the emotions of one's self, of others, and of groups (p.329). Emotional intelligence, as understood by many scholars, involves managing both one's own emotions and those of others. This holistic view emphasizes the importance of emotional awareness and regulation in personal, interpersonal, and social contexts.

2.5.1. Theory of Emotional Intelligence

According to Goleman (1995), Emotional Intelligence involves abilities like self-motivation, mood regulation, empathy, and hope. The key areas include understanding one's own emotions, managing them, motivating oneself, and handling relationships. Moreover, Goleman (2002) described Emotional Intelligence as the ability to read and understand one's emotions as well as recognize their impact on others.

Goleman (1998) claimed that there are four areas of Emotional Intelligence:

- **Self-Awareness:** Morin (2011) claimed that self-awareness represents the capacity of becoming the object of one's own attention. It is the ability to recognize and understand one's own emotions, drives, and their effects on others.
- **Self-Management:** It involves being able to adapt to changing situations, manage stress, and maintain a positive outlook even in challenging circumstances. According to Goldfried and Merbaum (1973), self-management is the process of making conscious decisions to take actions that align with one's own goals and desired outcomes (p.12). Self-Management involves planning and organizing life in a way that helps achieve what one wants, all based on individual choices. Moreover, Opatha (2010), self-management involves intentionally

and systematically organizing and directing one's life to achieve personal goals efficiently, without wasting time, energy, or available resources (p.807).

- **Social-Awareness:** Social awareness is the ability to accurately interpret the emotions of others and understand social dynamics. According to Idrus et al. (2010), Social awareness is defined as the understanding of a contextual situation at a present time. In this regard, Chen and Sawhney (2010) added that social awareness involves understanding and responding to the needs and emotions of others within an organizational or group setting (p.105). It involves building positive relationships through engaging with others and conveying positive emotions.
- **Relationship Management:** The capacity to handle interactions with others to build and maintain positive connections. According to Barsade (2002), relationship management involves taking into account ones' emotions, the emotions of others, and the context to manage social interactions successfully. In other words, relationship management is used to influence others to make good decisions.

2.6. Artificial Intelligence

Wartman and Combs (2018) defined artificial intelligence(AI) as the ability of machines or computers to think and act as humans do. AI focuses on specific cognitive functions such as, reasoning, learning, critical thinking, and abstraction. Accordingly, Saleh (2019) noted that artificial intelligence is intelligence demonstrated by machines, contrasting with the natural intelligence displayed by humans. These capabilities enable machines to perform tasks and make decisions in a way that resembles human thought processes, as opposed to the innate intelligence that humans possess. Moreover, Mohammed and Watson (2019) described artificial intelligence as the skillful imitation of human behavior or mind by tools or programs.

2.7. The Relationships Between Cognitive Intelligence, Emotional Intelligence, Learning Styles and Language Learning Strategies in EFL Learners

Schmitt (2002) proposed that successful language learning is supported by a rich and varied personalised range of learning strategies. According to Aghasafari (2006), cognitive intelligence which involves critical thinking, and memory retention, is closely linked to better language learning outcomes. In language learning, CI impacts a learners' ability to understand grammar rules, memorize vocabulary, and solve language problems. On the other hand, emotional intelligence plays a vital role in influencing EFL learners' motivation, self-regulation, and social interactions during language learning. Pishghadam (2009) investigated the relationship between emotional intelligence and students' achievement in English (p.23). The findings showed that positive emotions enhance access to one's existing knowledge, imagination, and creativity. Accordingly, Gregersen, and MacIntyre (2014) claimed that this emotional competence enables learners to manage stress, anxiety, associated with language learning challenges. Moreover, learning styles are the preferred ways in which students learn. They can be visual, auditory, kinesthetic. While language learning strategies are the specific techniques and approaches that learners use to learn and improve their language skills. The relationship between learning styles and language learning is mediated by the use of language learning strategies. Learners with higher scores in certain learning styles tend to employ more strategies, which impacts their language learning outcomes.

To sum up, the relationships between cognitive intelligence, emotional intelligence, learning styles, and language learning strategies are complex and interrelated. Cognitive intelligence, emotional intelligence, learning styles, and language learning strategies are all contribute to successful language learning in EFL learners. Cognitive intelligence helps in understanding grammar rules and memorizing vocabulary, while emotional intelligence influences motivation and social interactions during language learning. Learning styles affect how learners engage with

materials, and language learning strategies mediate this relationship, impacting language learning outcomes.

2.8. The Relationship between Cognitive Intelligence and Problem-Solving Abilities

Cognitive intelligence is the mental capacity that enables learners to perceive, process, understand, and apply information. It involves a range of skills, including attention, memory, reasoning, critical thinking, and decision making. EFL learners use cognitive processes to understand and enhance their own learning experience. Newell and Simon (1972) described it as the cognitive processes required to solve real-world problems. At the core of these cognitive processes, learners rely on attention to concentrate on relevant information and filter out distractions. Moreover, it is pointed out by Karpicke and Roediger (2008) that memory plays a pivotal role by retrieving relevant knowledge and experiences stored in the mind, providing a foundation for problem-solving strategies. Furthermore, reasoning and critical thinking guide learners in identifying problems, and evaluating various solutions. Equally important, decision-making helps learners to evaluate various options, predict different outcomes, and make informed choices.

The application of cognitive processes supports the development of metacognition, where learners become aware of their own learning processes. Metacognition enables them to take control of their learning by setting goals.

Problem-solving abilities are a practical application of these processes to overcome obstacles and find solutions to complex issues. Wang and Chiew (2010) argued that problem-solving interacts with many cognitive processes such as abstraction, decision making, and analysis (p.1). Furthermore, there is a positive influential relationship between cognitive intelligence and problem-solving abilities. According to Sari et al. (2020), when dealing with a problem, learners use a variety of cognitive strategies including procedural knowledge (p.404). This procedural knowledge involves understanding the step-by-step processes or algorithms required to accomplish

a task or solve a problem. Generally, problem-solving skills develop through a combination of cognitive processes, learning experiences, and practice. In this regard, Rosa (2020) stated that problem-solving abilities play a critical role in encouraging innovation and creativity among learners (p.53). The development of problem-solving skills enables students to become autonomous learners and equips them with the competencies needed to succeed in both their personal and professional domain.

To sum up, cognitive intelligence can develop problem-solving skills in EFL learning by enhancing various mental functions. Sari et al. (2020) said that strong cognitive abilities equip learners with the tools to tackle language learning challenges (p.408). This problem-solving approach is not just about using existing knowledge; the act of grappling with language learning challenges itself strengthens their cognitive abilities. As learners face difficulties, they develop their critical thinking through problem-solving strategies which are Algorithmic, Heuristic, and trial and error problem-solving. Also, they improve their memory by learning from mistakes, and ultimately develop stronger cognitive skills, enabling them to better overall language learning.

Conclusion

In conclusion, chapter two reveals that cognitive intelligence is an integral aspect of human learning and problem-solving. It refers to various mental processes including attention, perception, critical thinking, learning, and metacognition. These processes enable learners to process and internalize new information, and also equip them with the necessary skills for complex problem-solving. Cognitive intelligence is underpinned by three major concepts which are essential in shaping a learners' capacity to decode and engage with their learning environment. Moreover, intelligence has three basic theories that help teachers to combine various methods and techniques in teaching and students to become more active to opt for many different means of learning. Additionally, students should be aware about new concepts like: emotional intelligence, artificial intelligence. Therefore, these concepts together may enhance the efficiency of language learning.

Also, the learners' preferred methods of learning the language play a substantial role in their linguistic proficiency and their ability to apply language skills in real-world situations. Furthermore, the chapter examines the relationship between cognitive intelligence and emotional intelligence, which together influence a learners' approach towards learning styles and strategies. Lastly, the chapter considers how cognitive intelligence aids individuals in applying problem-solving techniques to overcome linguistic barriers.

Chapter Three

The Importance of Cognitive Intelligence on Developing Problem-Solving Abilities in EFL Learning

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Introduction

Chapter three describes the adopted methodology that allows testing the research hypothesis. The purpose of this chapter is to present, analyze, and interpret the data obtained from the field of investigation. Its aim is to assess students' attitudes towards the impact of cognitive intelligence on enhancing problem-solving abilities. The data is collected through a quantitative procedure, which enables answering the research questions and confirming the research hypothesis. Following a descriptive method, a questionnaire has been conducted. Thus, the present chapter provides a detailed description of the data collection process, which involves the research design questionnaire administration, and discussion of findings. At last, conclusions are formulated about the investigated research problem.

3.1. Methodological Approach

Examining the influence of cognitive intelligence on developing problem-solving abilities requires employing a quantitative design that involves a *students' questionnaire* used to answer the research questions and test the hypothesis.

According to Aliaga and Gunderson (2002), quantitative research methods aim to understand and explain issue or phenomena through collecting data in numerical form and analyzing it using mathematical techniques.

Additionally, Rana and Luna (2021) pointed out that quantitative method is the collection and analysis of numerical data to answer scientific research questions. It is used to investigate causal relationship between two or more variables, average, summarize, and make predictions as well as generalizing results to wider population (p.2). The quantitative design process uses a deductive approach which involves starting with a theory or hypothesis and then collecting data to test or confirm it. This method helps researchers to systematically analyze data and draw conclusions based on established hypotheses.

To sum up, quantitative method offers several benefits, including the ability to provide detailed statistics, conduct thorough investigations into various phenomena, and ensure objective and reliable interpretation of data.

3.2. Description of The Students' Questionnaire

A questionnaire is a research tool consists of a series of questions used to gather information from respondents. Rani and Roops (2012) defined the questionnaire as a set of questions asked to individuals to gather statistically useful information about a particular subject. A questionnaire is a research instrument which can be used in any type of research, it serves as invaluable tool for gathering quantitative data in a consistent and standardized manner.

Questionnaires are designed with a clear purpose aligned with the research objectives. They are commonly adopted as a research tool when the study necessitates a descriptive design. According to Krosnick (2018), using a questionnaire is an efficient way to gather information quickly and accurately. It simplifies the data collection process, particularly when dealing with a large number of respondents. Additionally, questionnaires are cost-effective and can provide valuable information for research or surveys.

Therefore, the current study makes use of a questionnaire in order to get accurate and objective results. The employment of the questionnaire is highly advantageous for providing answers to the questions that contribute to confirm the research hypothesis.

Eventually, administering the questionnaire is intended to broaden the understanding of the students' perspectives towards the development of problem-solving abilities through cognitive intelligence.

3.2.1. Aims of The Students' Questionnaire

The purpose of the students' questionnaire is to assess their knowledge about the impact of cognitive intelligence on developing problem-solving abilities. The questionnaire aims are threefold:

- 1) To have an overview about the students' background about problem-solving skills.
- 2) To figure out students' perspectives towards the role of cognitive intelligence in the learning process.
- 3) To find out the students' opinions about the impact of cognitive intelligence on developing their problem-solving skills.

3.2.2. Students' Questionnaire Administration

The study takes place at the Department of English, University 8 Mai 1945, Guelma in the second semester. Online questionnaire was administered through Google Forms to First-year Master students, because the students were on spring break, and it took them three weeks to return to their classes. The data were obtained anonymously to encourage respondents to answer questions openly and truthfully.

The questionnaire is made up of 43 questions divided into four sections, each section is designed to gather a specific type of information. The students were asked to tick the appropriate box or to give additional clarifications when necessary to two open-ended questions and 31 close-ended questions. The 10 follow up questions were used to justify their answers.

The first section is entitled *General Background*, consists of eight questions that aim to capture the participants' background. This includes their gender, the years devoted to studying English language including their level and choice of major, and the primary aim behind their English language journey. The second section is about *EFL Learners' Problem-Solving skills*

and it contains seventeen questions. This section covers the most prominent strategies and methods of problem-solving, its importance, the cognitive processes involved in overcoming language barriers. Moreover, the section deals with the factors that impact EFL learners' problem-solving abilities, considering both internal cognitive mechanisms and external influences. The third section focuses on *Cognitive Intelligence* which consists of eleven questions dealing with the importance of cognitive intelligence, various types of intelligence, the significance of emotional intelligence, and the impact of cognitive intelligence on language learning strategies. Finally, the fourth section is accounts for students' views about *The Relationship Between Problem-Solving skills and Cognitive Intelligence*, which consists of seven questions all about the impact of cognitive intelligence on developing problem-solving skills.

3.2.3. Population and Sampling

The participants involved in the research are First-year Master students, they were chosen randomly and willingly agreed to participate in the research. The chosen sample consists of 48 students taking out from 160 students. They showed motivation and curiosity to gain thorough understanding of the topic being investigated. The sample was selected for several reasons. Firstly, their extensive experience with problem-solving skills learned over three years of university study. Moreover, their involvement in the study might help them uncover new methods for thinking critically. Consequently, the learners would be aware of the role of cognitive intelligence on developing problem-solving skills.

3.2.4. Findings

The following section provides a detailed description of the questionnaire results. The collected data were analyzed, interpreted, and presented in figures.

a. Section One: General Information

This section focuses on collecting basic personal information of the EFL learners, such as their age, gender, as well as their proficiency in English and reasons for choosing to study the language.

Question 1: What is your gender?

a. Male b. Female

Figure 3.1 shows that the highest majority of the sample are females (75%), while males represent only (25%) of the sample. This because the number of females enrolled in EFL studies is more than male students'. Moreover, the results imply that the data gathered for the research would be dominated by the female students' point of views.

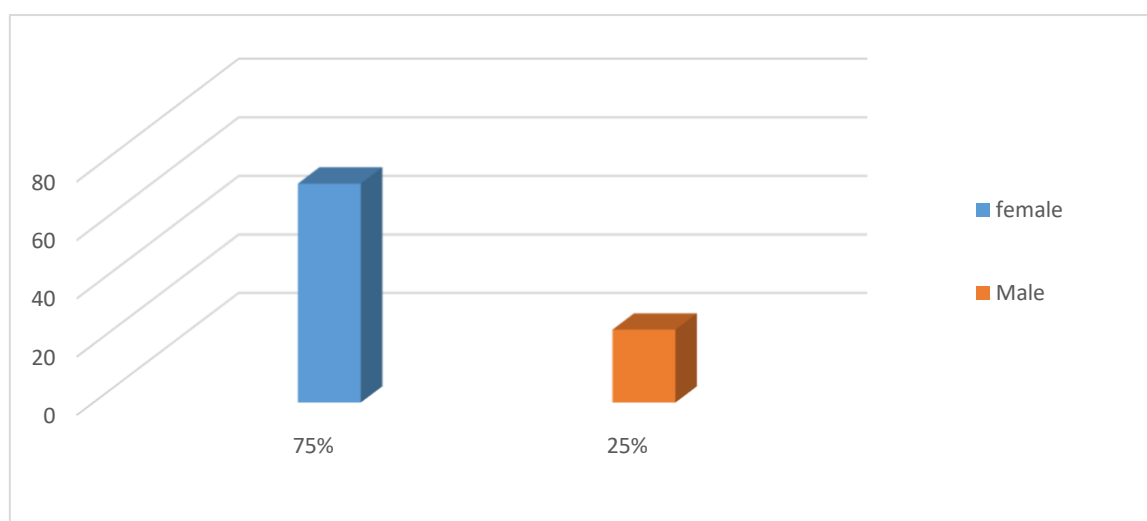


Figure 3.1: Students' Gender

Question 2: What is your age?

As shown in the Figure 3.2, the majority of the sample (55%) are older than twenty-one years (Master One students). While (45%) of the learners surveyed are twenty-one years. The EFL students' age range indicates that they received almost equal opportunities to learn English over the years.

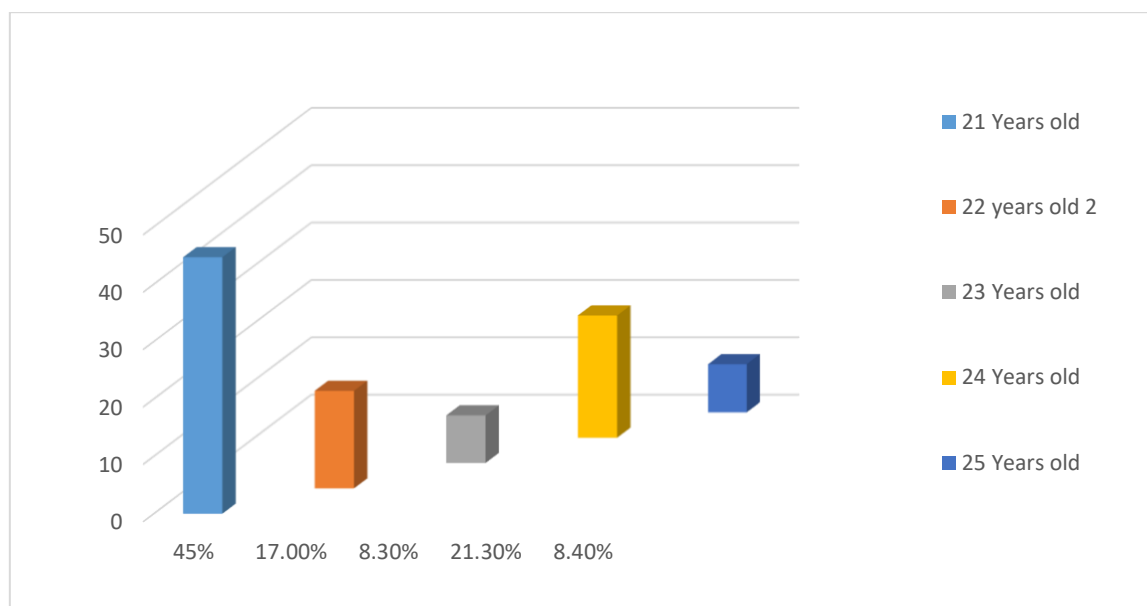


Figure 3.2: Students' Age

Question 3: What is your English level?

a. Beginner

b. Intermediate

c. Advanced

According to the results shown in the Figure 3.3, the majority of students (52%) have declared that their level in English is advanced. While (42%) have been determined to be intermediate. Only a minimal number, specifically (6%) admitted that they are at the beginner stage of English language learning. Overall, the results show that the majority of the sample are satisfied with their level in English, and they serve as a good sample for the present research.

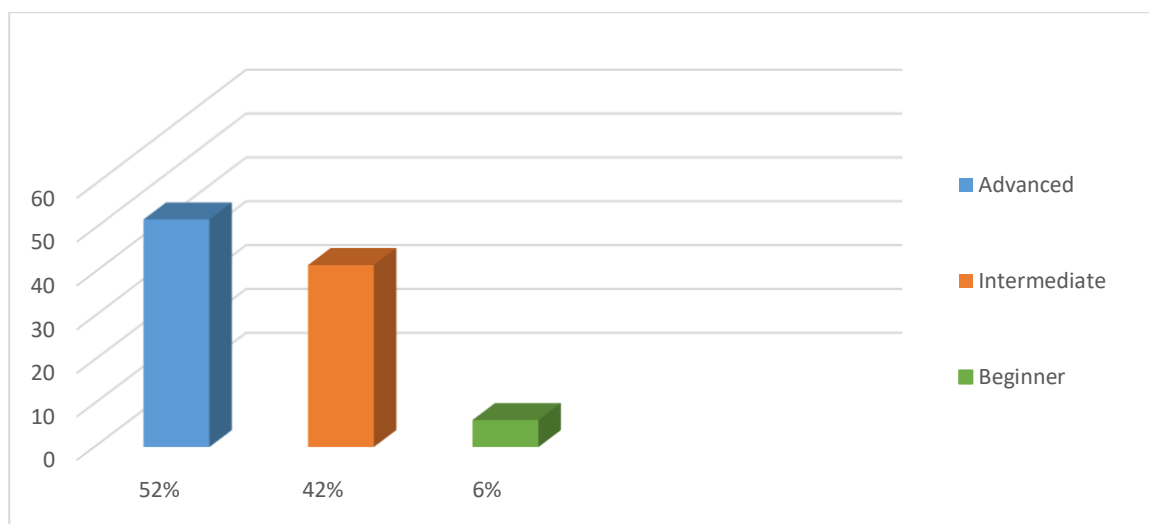


Figure 3.3: Students' Level of English

Question 4: How long have you been studying English?

The results show diverse answers about the time devoted to study English ranging from ten to 15 years. Figure 3.4 shows that the majority of the participants (70.5%) have been studying English for 11 years including this year. This timeline of 11 years covers their academic experiences from middle school through to high school and extends to their university studies. Additionally, (18.9 %) of the respondents studied English for 10 years. Probably they did not include the current year in their count. The rest of the sample (10.6%), however; reported that they have been studying English for more than 11 years, which indicates more exposure to learn English over the years.

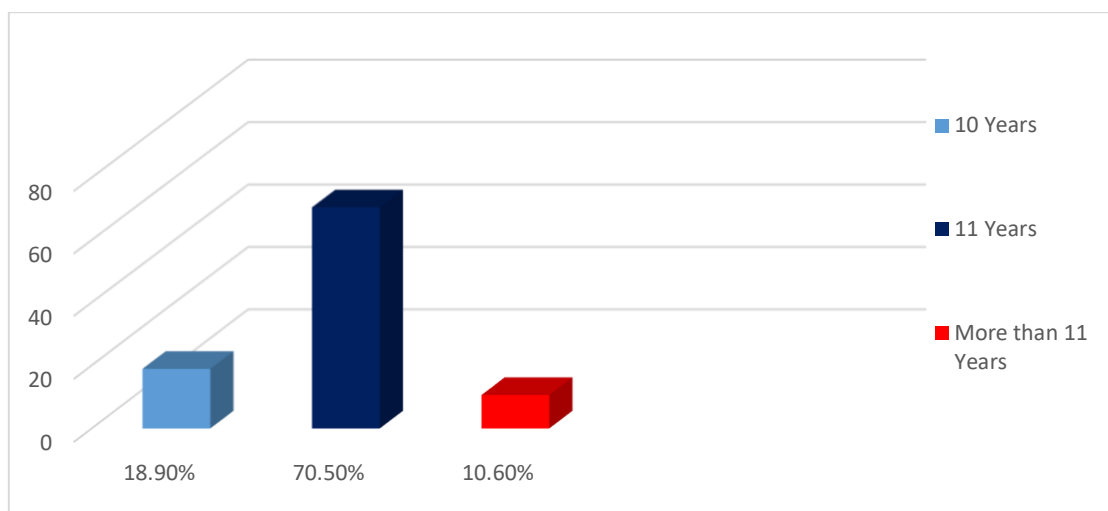


Figure 3.4: Students' Experience in Studying English

Question 5: Is studying English at the university your own choice?

a. Yes

b. No

Based on the information presented in the Figure 3.5, (83%) of the research sample claimed that studying English was their personal choice. Whilst, only (17%) said it was not their choice. The results suggest that nearly the whole sample chose to study English on their own because they are likely to be motivated to study it in university and are eager to improve their English language skills.

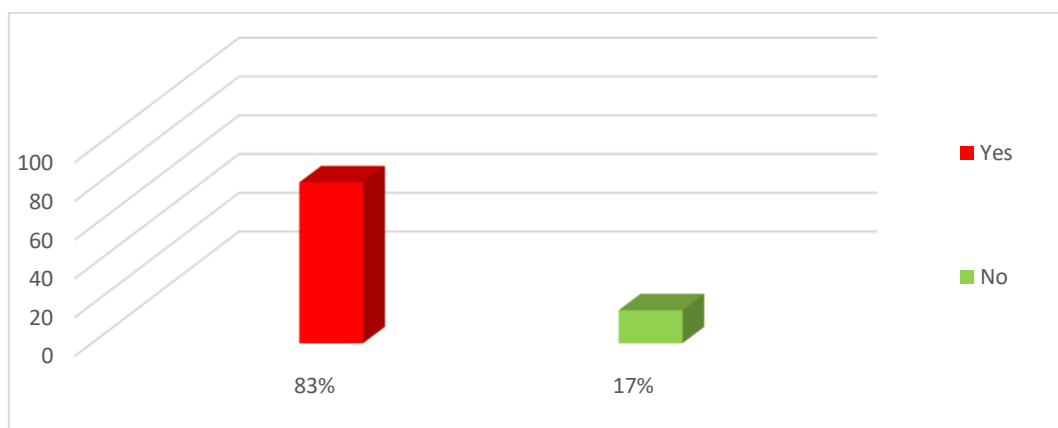


Figure 3.5: Students' Choice of English

Question 6: Whatever your answer, please justify

In relation to the previous question, many students added few reasons for learning English.

The answers are summed up as follows:

- Many students chose English because they loved the language since childhood.
- They find it interesting and easy to study.
- Some were influenced by their parents' choice.
- English is considered the first language in the world and highly required.
- It offers access to more opportunities and knowledge.
- Good grades in English influenced some students' decision.
- Personal circumstances or not being accepted into their first choice led to choosing English.

Question 7: What is your aim behind learning English? (more than one option)

- a. To get a degree in English
- b. To communicate with English-speaking friends
- c. To improve communication skills for travel purposes
- d. Others

This question was asked to learners to understand their reasons for learning English. Figure 3.6 shows that (37.08%) of the population favored option *a*, indicating that their aim behind learning English is to get a degree in English. This means that the main reason is to finish university with an English qualification. Furthermore, (19.12%) of the learners picked option *b*. This option suggests that some respondents are motivated to learn English for social reason, specifically to communicate with English-speaking friends. In addition, 23 students i.e.

(25.83%) selected option *c*. This choice emphasizes the practical side of learning English for traveling, this indicates that learners want to improve their English for traveling. Additionally, (17.97%) selected option *d*. ‘Others’ which means they are learning English for different reasons that are not mentioned in the options.

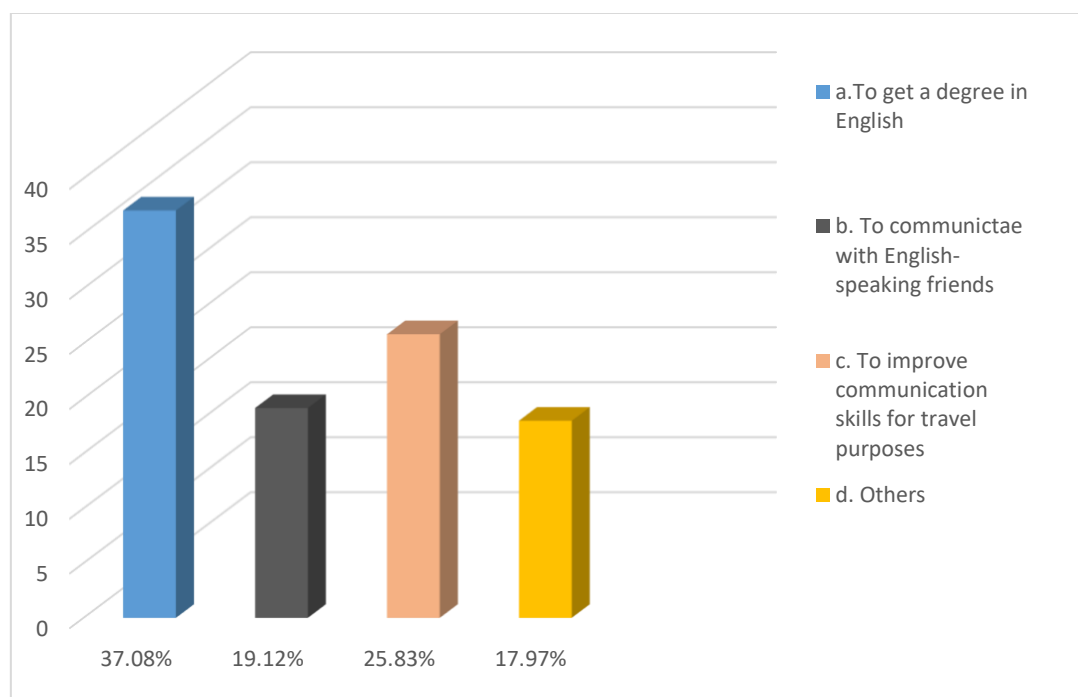


Figure 3.6: Students' Aim behind Learning English

Question 8: If others, please specify

In accordance with the previously answered question, many students added few aims behind learning English. Their answers are summed up as follows:

- Some learners want to become English teachers.
- Others wish to be able to read various resources on different subjects, indicating a desire for broader access to information.
- A love for English culture motivates them to learn the language.
- Recognizing English as the universal language, suggesting they want to engage in global communication.

- Some aim to improve their proficiency in the four language skills: speaking, listening, reading, and writing.
- There are those who want to learn English to start a business with international partners.
- Several learners want to teach the language, showing a passion both for English and for education.
- To understand new ideas and knowledge from other nations.
- Watching American series.

b. Section Two: Problem-Solving Skills in EFL Learning

This section aims at gathering data about EFL learners' competences and techniques regarding problem-solving abilities.

Question 9: As an EFL learner, how do you attempt to handle a language problem?

a. By finding solutions

b. By ignoring it

Figure 3.7 shows that the entire sample (N=48) attempt to handle a language problem by finding solutions, which is a logical answer. Thus, learners employ problem-solving strategies when faced with language challenges.

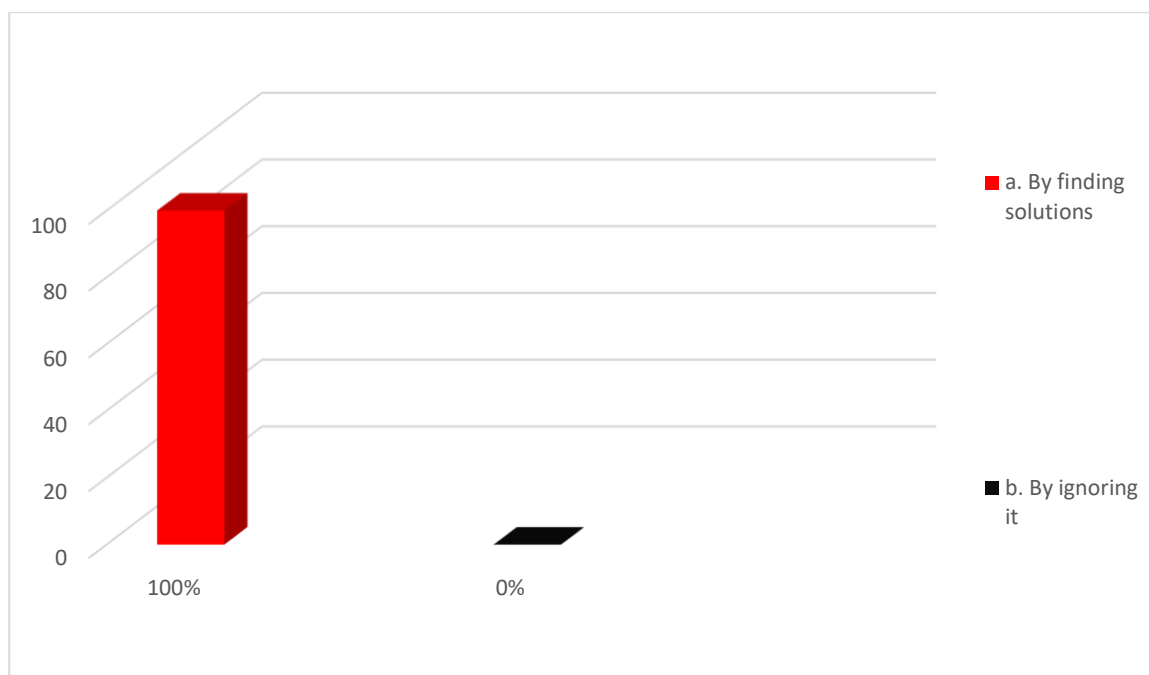


Figure 3.7: Students Attitudes towards Strategies Employed by EFL Learners to Handle Language Problems

Question 10: What kind of language problems do you encounter? (more than one option)

a. Vocabulary		f. Reading	
b. Grammar		g. Writing	
c. Spelling		h. pronunciation	
d. Cultural cues		i. Speaking	
e. Listening		j. Communication	

The aim behind this question is to identify the various language problems faced by learners. The results shown in Figure 3.8 reveal that the largest reported problem is cultural cues. Around (22.20%) indicated ‘Cultural cues’ as a problem area. This suggests that learners struggle with understanding idiomatic expressions, and social norms, which are essential for

communication in real-world contexts. Approximately (21%) selected the option of 'Vocabulary' as a language problem, this indicates that learners struggle with understanding and using words, difficulties with vocabulary could stem from limited exposure to English language contexts. Learners may struggle to recall words in conversation or while reading and writing. This what is hinder their ability to understand written and spoken texts. It is observed in Figure 3.8 that (10.60%) of the students selected 'grammar' as a language challenge. This could be attributed to the complexity of English grammar rules and the difficulty in applying them correctly. Moreover, Communication was mentioned by approximately (10.50%) of learners as an area of concern.

Moreover, about (10%) of learners mentioned 'Listening' as a challenge, this involves difficulties in understanding spoken language, such as accents, or unfamiliar vocabulary. Additionally, (7%) of respondents selected option 'i' speaking, that is to say, they encounter difficulties in expressing themselves verbally. Similarly, (7%) opted for the choice 'writing' reflecting challenges in organizing ideas and structuring sentences. Poor writing skills can affect their academic performance.

Around (6.40%) of learners face issues with pronunciation. This means they have trouble speaking English clearly and correctly. They might find it hard to make certain sounds or use the right rhythm when speaking. These pronunciation problems can cause misunderstandings and make communication more difficult.

Finally, 'Reading' was identified as a problem by (1%) of learners. This could indicate difficulties in comprehension, or applying reading strategies.

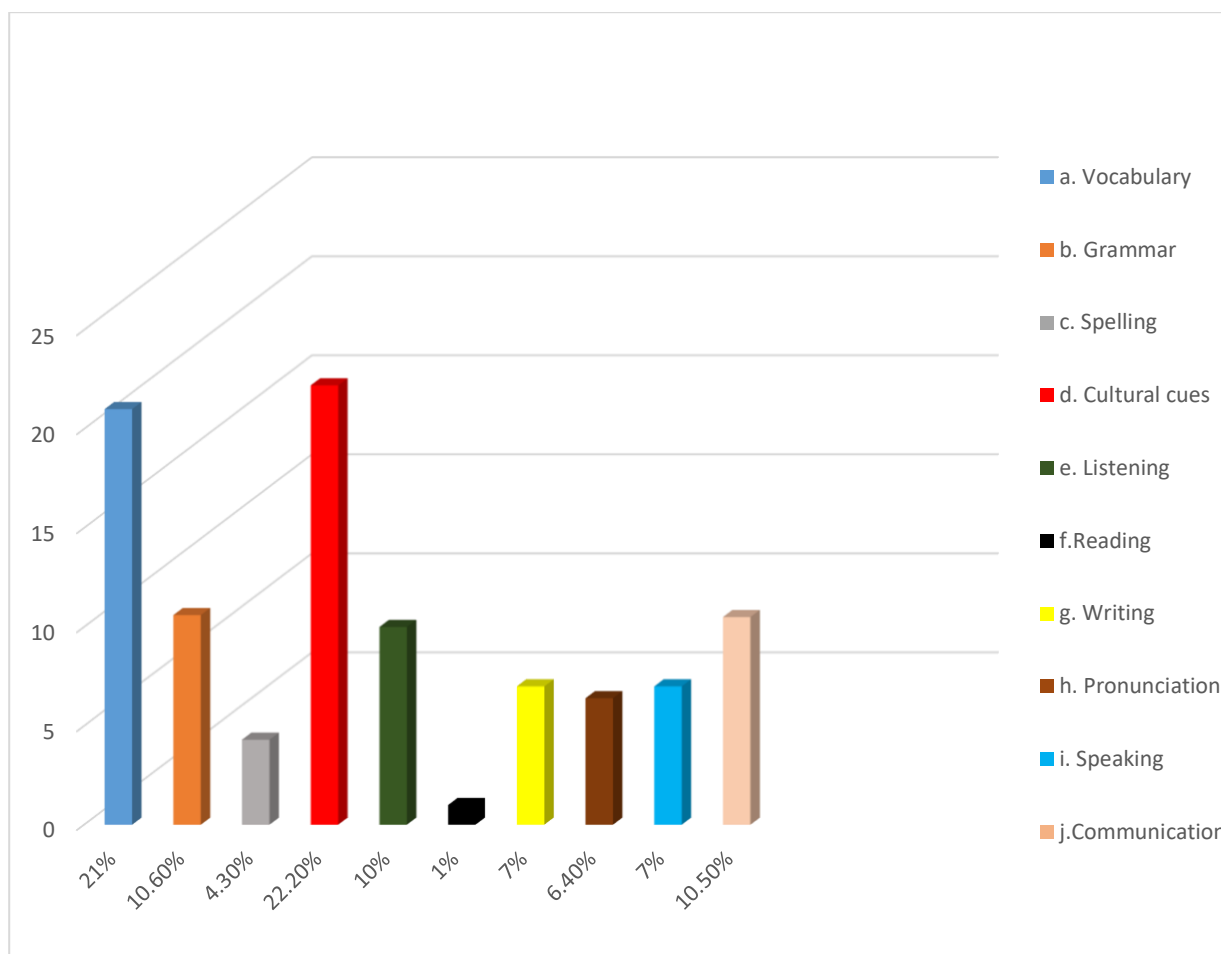


Figure 3.8: Types of Language Problems Encountered by EFL Learners

Question 11: Do you think that it is important to have problem-solving skills?

a. Yes	
b. No	

The aim of this question is to detect the importance of problem-solving skills in language learning. The majority of participants (80.90%) find that it is important to have problem-solving skills. This suggests that learners value the ability to tackle challenges and overcome obstacles in their language learning journey. Conversely, a smaller percentage (19.10%) indicated that they do not consider problem-solving skills to be important in language learning due to a lack

of awareness i.e., some participants might not fully understand how problem-solving skills contribute to language learning and may underestimate their significance or different learning preferences (Figure 3.9).

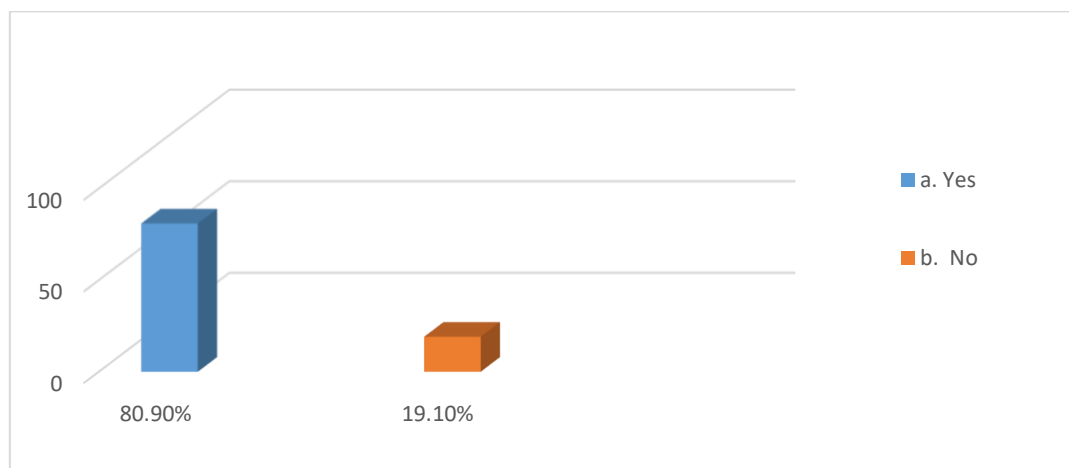


Figure 3.9: The Importance of Problem-Solving in Language Learning

Question 12: If yes, please justify

Based on the previous question, the participants collectively voiced their opinions on the importance of problem-solving skills, their answers are summed up as the following:

- Problem-solving skills help students solve their problems effectively.
- They keep the brain active and engaged.
- Having these skills boosts confidence in solving problems.
- Mastery of language requires the ability to address and correct mistakes.
- Problem-solving fosters personal growth and development.
- Lack of problem-solving skills can impede progress.
- Essential for providing practical solutions to real-life issues.
- Problem-solving keeps the mind sharp and prepares individuals for future challenges.
- They enable learners to handle any problem they encounter.
- Problem-solving helps identify weaknesses for improvement.

- Ignoring problems can make them more difficult to be solved later on.
- Problem-solving enhances cultural understanding.
- It is crucial for achieving mutual understanding in communication.
- These skills promote self-reliance and resilience in facing difficulties.
- Continuous learning and development are facilitated by problem-solving abilities.
- They empower individuals to find solutions to workplace problems.
- Problem-solving skills are applicable in everyday situations

Question 13: When you have a problem, which strategy do you use to solve it? (select more than one).

a. Algorithmic problem-solving: Designing step-by-step procedure	
b. Heuristic problem-solving: Using experiences rather than strict rules /procedures	
c. Trial and error problem-solving: Using strategies as pattern, working backwards or trial and error i.e. try different ways and learn from one's mistakes	

As it is shown in Figure 3.10, a large number of the participants (40.33%) opted for the choice 'c' trial and error problem-solving involving strategies like pattern recognition, working backward, or simply trying different solutions and learning from mistakes. This preference suggests that the majority of learners are inclined to use a hands-on approach, likely because it allows them to actively engage with the problem and learn from the process, which can lead to a deeper understanding. Moreover, (30.63%) of learners select algorithmic problem-solving, where they design a step-by-step procedure to address a problem. This probably suggests that a significant portion of learners feels comfortable with structured approaches and enjoys the clarity of following a defined set of instructions to reach a solution.

Finally, (29.04%) of learners go for heuristic problem-solving, which relies on using experiences rather than following strict rules or procedures. This indicates that nearly as many learners trust in their ability to draw upon past knowledge and prefer a more flexible approach to problem-solving that allows for creativity.

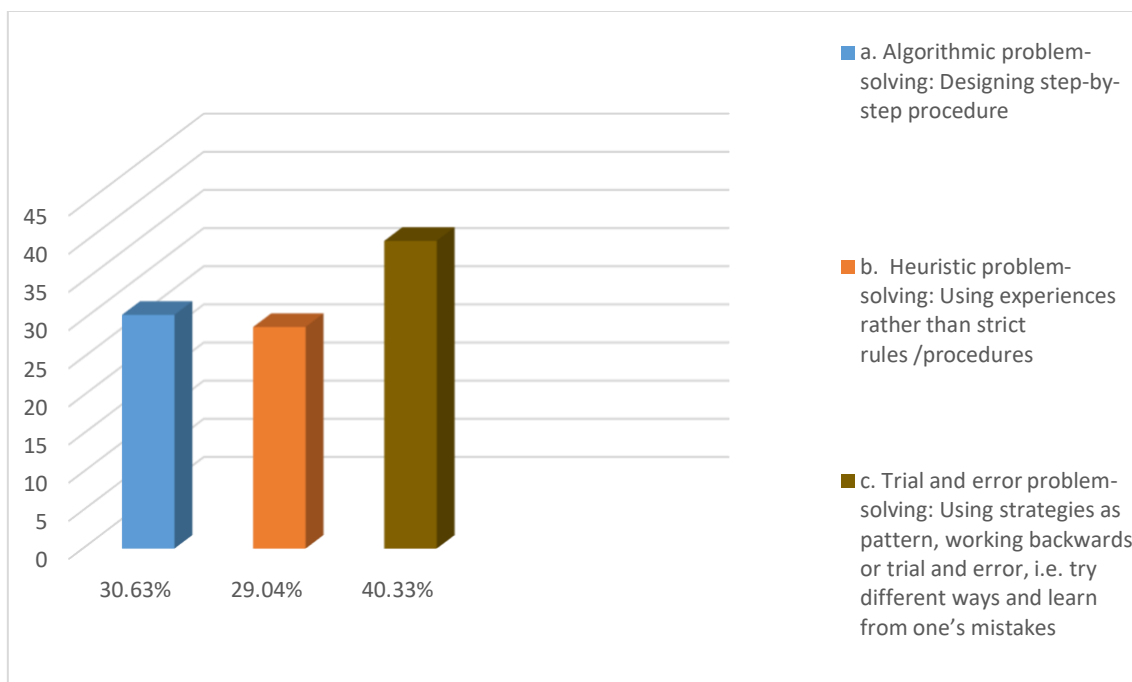


Figure 3.10: Problem-Solving Strategies Used by Learners

Question 14: Which method do you think is more appropriate to deal with problems?

a. Gestalt method: Seeing the problem as a whole and trying to reorganize your understanding of it.

b. Information processing: Breaking down the problem into smaller parts for analysis.

c. Decision-making: Using mental strategies such as comparing and analyzing.

As demonstrated in Figure 3.11, over half of the learners, precisely (53.20%) appear to favor the information processing approach to problem-solving where the problem is broken down into smaller parts for better analysis. Furthermore, (25.50%) of learners chose the decision-making method. Students probably appreciate structured thought processes and logical

reasoning to guide their decisions when facing problem. Lastly, (21.30%) of learners select the Gestalt method, which involves seeing the problem as a whole and attempting to reorganize their understanding of it. This implies that learners believe in the importance of understanding the big picture to find a solution, they value the holistic approach.

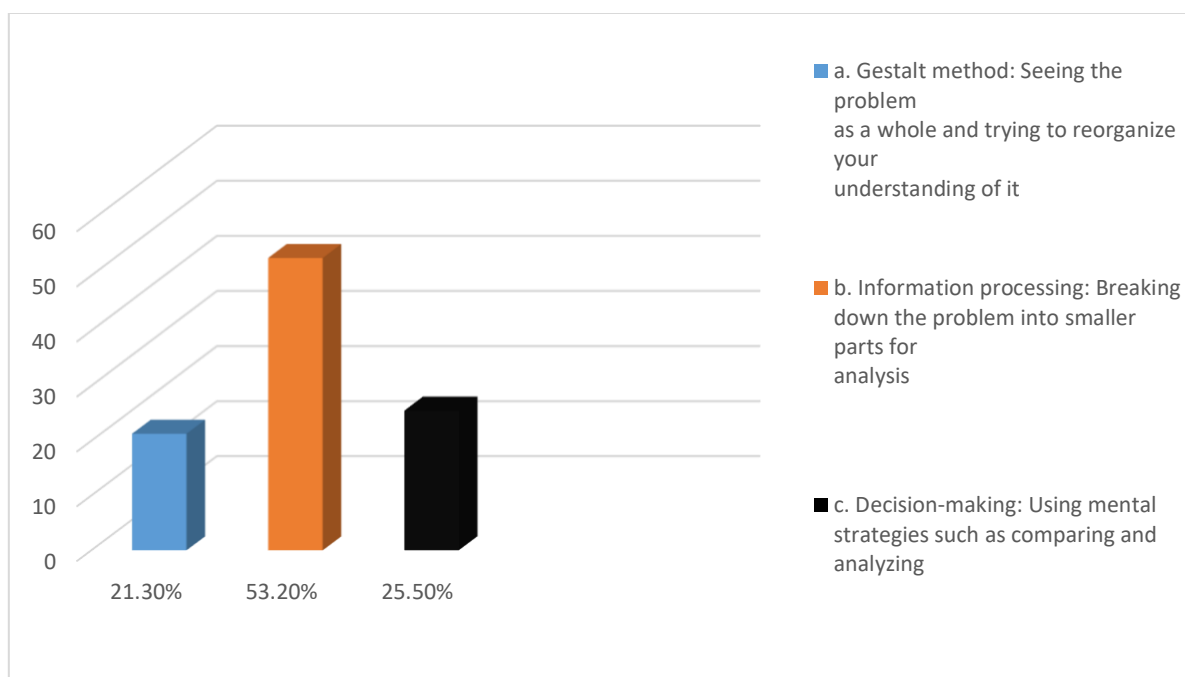


Figure 3.11: Preferred Problem-Solving Methods Among Learners

Question 15: According to your knowledge, your problem-solving skill is concerned with:

a. Overcoming language barriers		d. All of them	
b. Improving critical thinking abilities in understanding and analyzing a phenomenon		e. None of them	
c. Enhancing comprehension by making use of the learned knowledge to deal with the challenge		f. Others	

Figure 3.12 shows that the largest option, with (31.28%) is enhancing comprehension by making use of learned knowledge to deal with challenges. Learners who choose this appreciate the practical application of knowledge and understand that real-world problem-solving requires drawing on what one has learned previously. Similarly, an equal percentage, (31.28%) of learners, opted for 'All of them'. They see problem-solving as a multifaceted skill that involves a combination of overcoming language barriers, critical thinking, and the application of knowledge.

In addition, more than ten learners (24.96%) chose improving critical thinking abilities in understanding and analyzing a phenomenon as their answer. This suggests a belief that the core of problem-solving lies in the ability to think deeply about an issue. Others (10.94%) picked option *a*. 'Overcoming language barriers'. This indicates that a minority of students believe that their problem-solving skills involve overcoming language barriers.

Finally, only (1.54%) chose 'Others' they may consider different or additional aspects that were not listed in the options provided. Finally, none of the learners selected 'None of them' which suggests a general agreement on the proposed options.

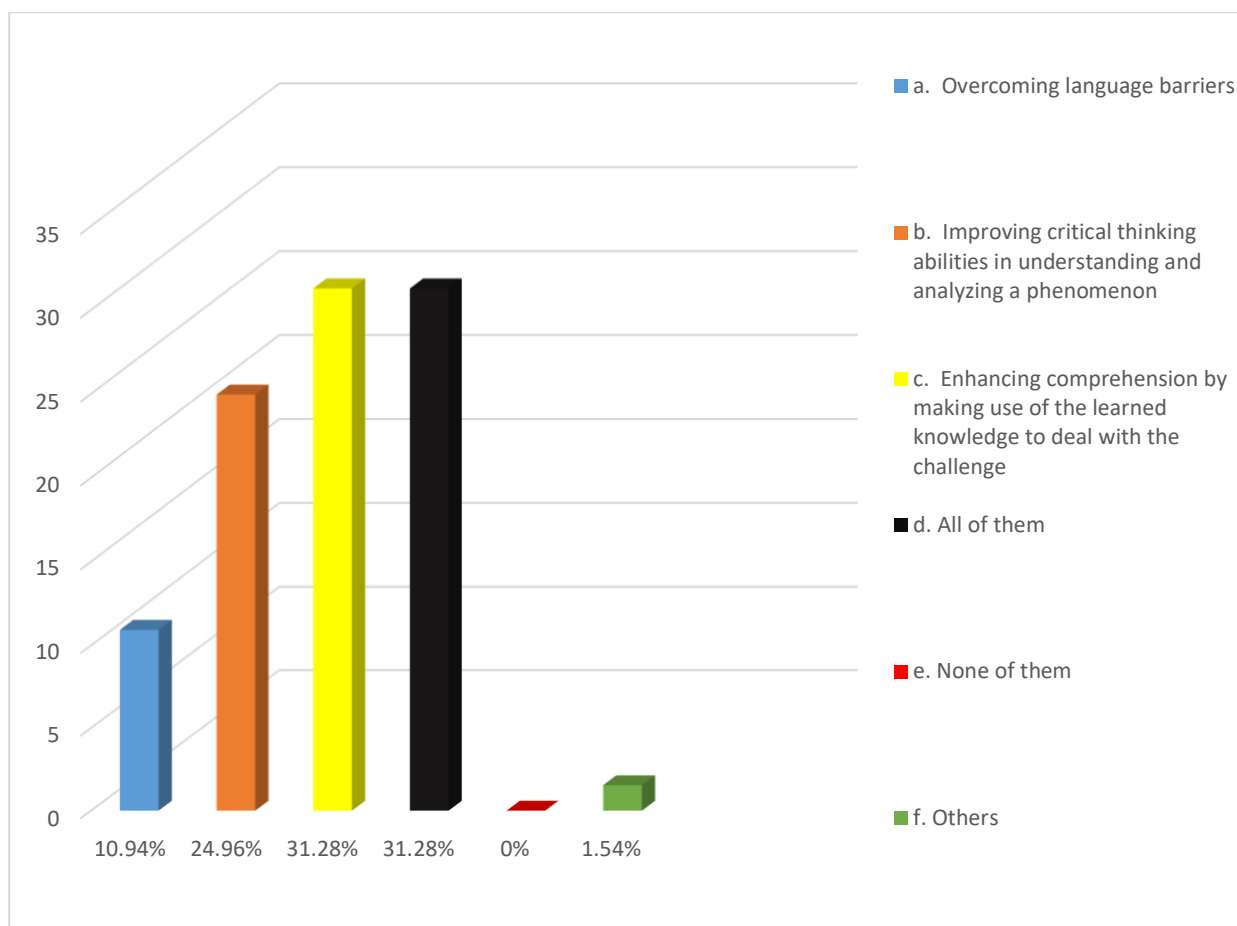


Figure 3.12: Students' Concerns of Problem-Solving

Question 16: If others, please justify

In response to this question, it appears that students have added more information.

According to their answers. Problem-solving skill is concerned with:

- Face and fix all language problems.
- The application of knowledge.
- When learning a language, the suggestion is that problems should be faced, analyzed.
- Adapting to various challenges with creativity

Question17: When learning English, which cognitive process do you find most helpful in problem-solving?

a. Synthesis: Combining different ideas or information to create a new understanding or solution	
b. Comprehension: Understanding various forms of language contexts	
c. Abstraction: Simplifying complex problems by focusing on essential elements.	
d. Analysis: Breaking down a problem into smaller parts for better understanding	

This question aims to gain insights into which cognitive processes learners find most effective in problem-solving. The findings expressed in Figure 3.13 show that the majority of the respondents (28.40%) prefer analysis, which involves breaking down complex language problems into smaller parts. This choice indicates that this approach prioritizes systematic problem-solving, where students analyze language challenges to understand each element before synthesizing them into a whole. Some students (23%) stated that ‘synthesis’ is the most helpful cognitive process in problem-solving. learners who chose synthesis skilled at constructing new ideas from various pieces of information. Other students (27%) chose ‘Comprehension’. They found understanding various forms of language contexts most beneficial. This result might suggest that these learners prioritize a thorough understanding of language components before attempting to use them in practice, which can be especially important for reading comprehension and listening skills. The minority of the students (21.60%) chose ‘Abstraction’. Probably because they can focus on the most important parts without getting distracted by extra details.

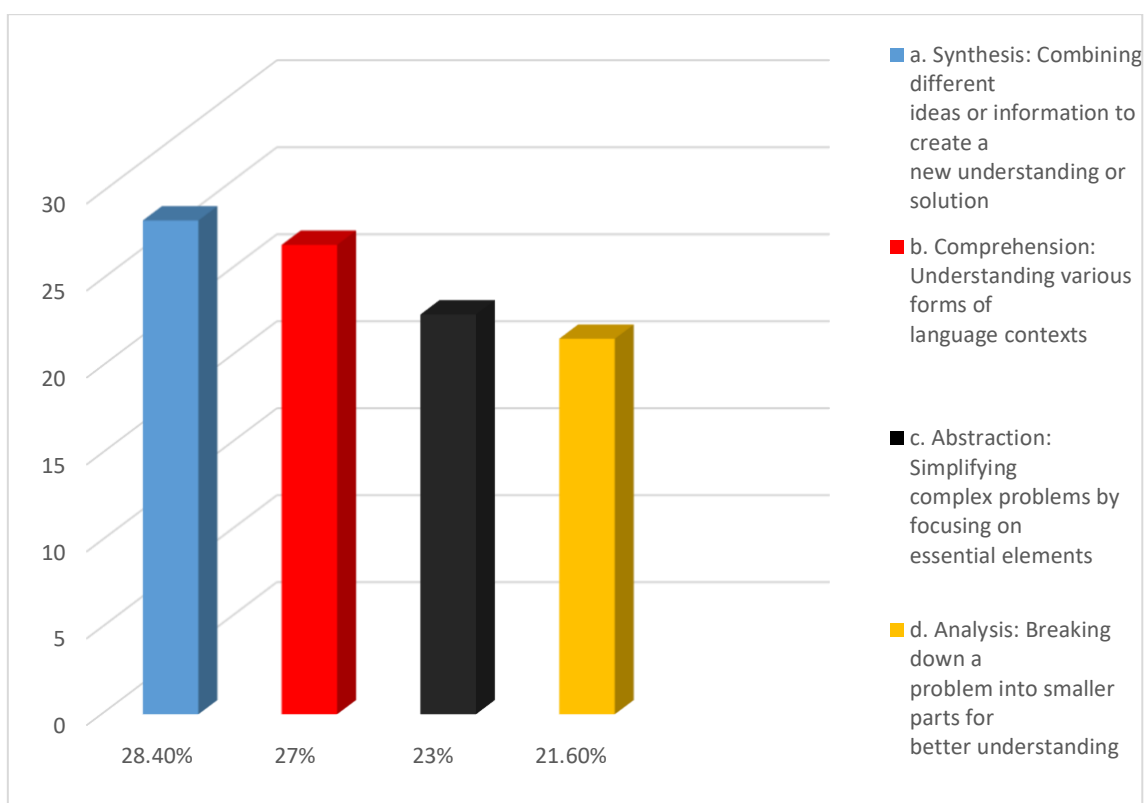


Figure 3.13: Preferred Cognitive Processes in Problem-Solving for English Language Learning

Question 18: Which individual factor (s) do you believe has/have the greatest influence on problem-solving abilities? (more than one).

a. Personality traits, i.e., behavior, thoughts, and feelings that influence how a student interacts with others		d. All of them	
b. Motivation: Internal/ external motives that urge the learner to study the language.		e. None of them	
c. Learning styles, i.e., visual, auditory, and kinesthetic		f. Others	

The question seeks to determine students' opinions and perspectives concerning the influence of individual factors on problem-solving abilities. According to *Figure 3.14*, one-third of the students (30%) point to motivation as the most significant influence on problem-solving. This implies that their desire to learn, prompted by internal satisfaction or external rewards is important to learn the language. Other respondents (28.20%) claimed that personality traits such as behavior, thoughts, and feelings influence how a student interacts with others and solves problems. Besides, (21.60%) of respondents said that an individuals' learning style whether they are visual, auditory, or kinesthetic affects their problem-solving abilities. Their preferred way of processing information helps them understand and retain language concepts. Moreover, (18.9%) of learners feel that all the listed factors influence problem-solving abilities. Learners see problem-solving as a skill influenced by a combination of various internal and external factors. A very small percentage (1.30%) suggest that there are additional factors beyond those listed that influence problem-solving abilities. Finally, no students chose option *e*. 'None of them', indicating that learners generally believe the listed factors do have some impact on their ability to solve problems when learning a language.

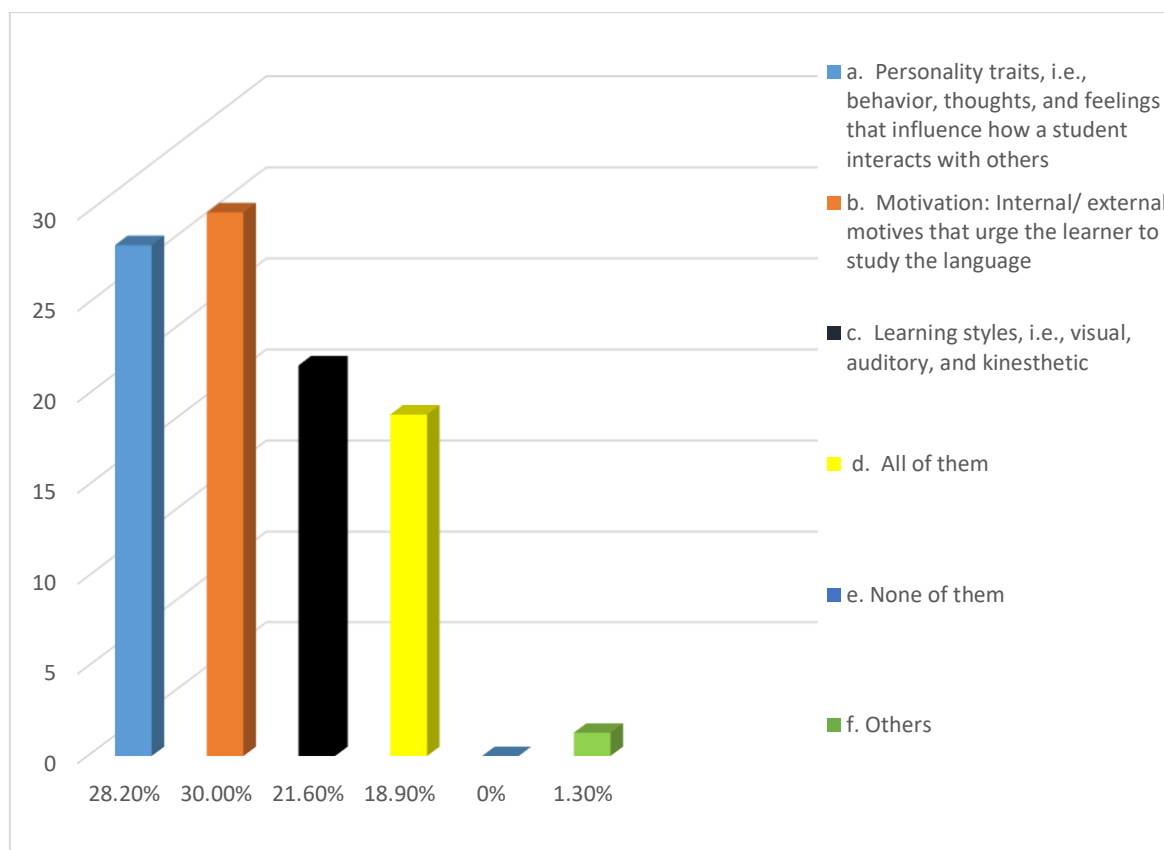


Figure 3.14: Individual Factors Influencing Problem-Solving Abilities

Question 19: If others, please specify

Based on the answer of the previous asked question, the learners who select the option ‘Others’, their answers are summed up as the following:

- Memory was mentioned by one student, suggesting the role of cognitive functions in problem-solving.
- Two responses mentioned Personality and Psychology of the students.
- Dependence on personal factors was also added with remarks like ‘Depends on one's personality and experiences' and "Responsibility and self-awareness’.
- One learner pointed out anxiety.

Question 20: What are the environmental factors that influence problem-solving abilities?

- a. Physical environment such as lighting, temperature, and noise
- b. Cultural context i.e., language and societal norms
- c. Resource availability i.e., access to books and materials
- d. Education system

As it is demonstrated in Figure 3.15, the highest percentage of students (32%) claimed that *cultural context* including language and societal norms influences their problem-solving skills. Probably because these aspects shape the way problems are understood and solved. However, some of the informants (30%) identified the *education system* itself as a significant factor. Students see the structure, curriculum, and quality of educational institutions as key components that equip them with problem-solving skills. The first half of learners (19%) took option *a* ‘Physical Environment’ such as lighting, temperature, and noise. This implies that physical learning space can affect learners’ ability to focus and think critically. The other half (19%) took option *c* ‘*Resource availability*’ such as access to books and materials. Learners believe that having the necessary tools and information is essential for solving problems.

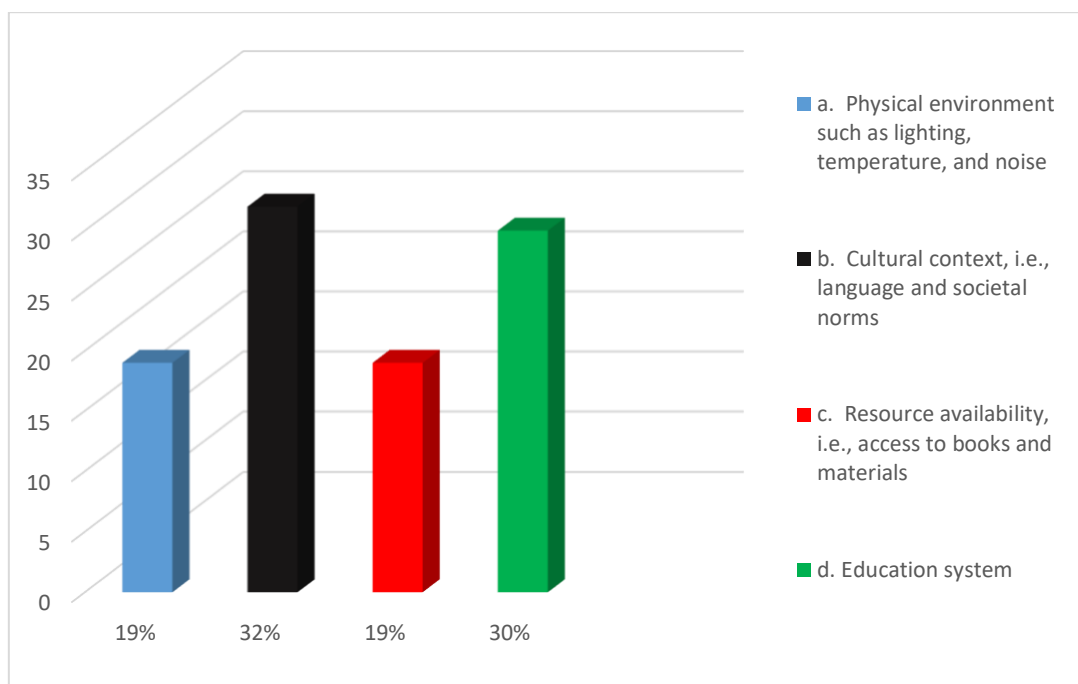


Figure 3.15: Environmental Factors Influencing Problem-Solving Abilities

Question 21: Have you ever heard about problem-based learning?

a. Yes

b. No

In response to this question, a considerable number of the students (58.30%) revealed that they are knowledgeable about PBL. They have experienced problem-based learning in their curriculum or have been exposed to its concepts during their education. On the other hand, twenty students (41.70%) chose option b 'No' which may indicate a lack of awareness about PBL in their educational environment.

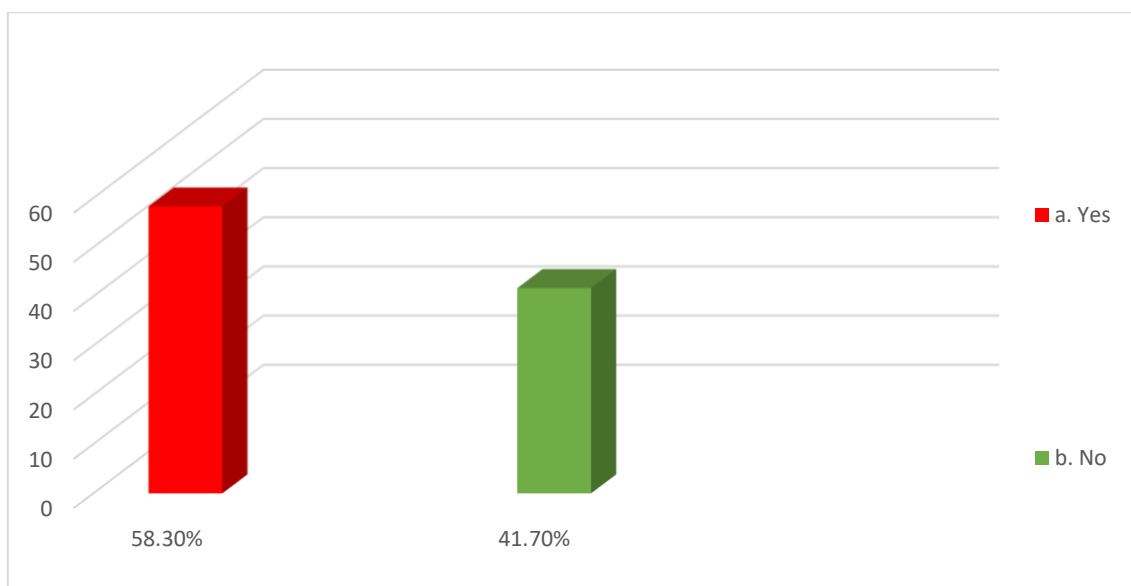


Figure 3.16: Students' Awareness about Problem-Based Learning

Question 22: To what extent do you agree with this statement 'Problem-based learning is a teaching method in which students learn by actively engaging in real-life and complex problems'?

a. Strongly disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly agree

The purpose of this question is to determine learners' agreement level with the statement 'Problem-based learning is a teaching method in which students learn by actively engaging in real-life and complex problems'. It is observed in Figure 3.17 that a large number of informants with (43.80%) selected option d 'Agree' because they recognize the value of engaging with real-life and complex problems as an effective learning method. Moreover, few informants (33.30%) selected option c 'Neutral'. Learners are either undecided or may lack sufficient

knowledge or experience with PBL to form a viewpoint. Additionally, (14.60%) of learners strongly agree with the statement. This indicates that they might have had positive experiences with problem-based learning. Furthermore, (6.3%) of informants strongly disagree with the statement which could be due to a belief in more traditional methods.

Lastly, only (2%) of learners disagree. Probably because they do not find PBL effective.

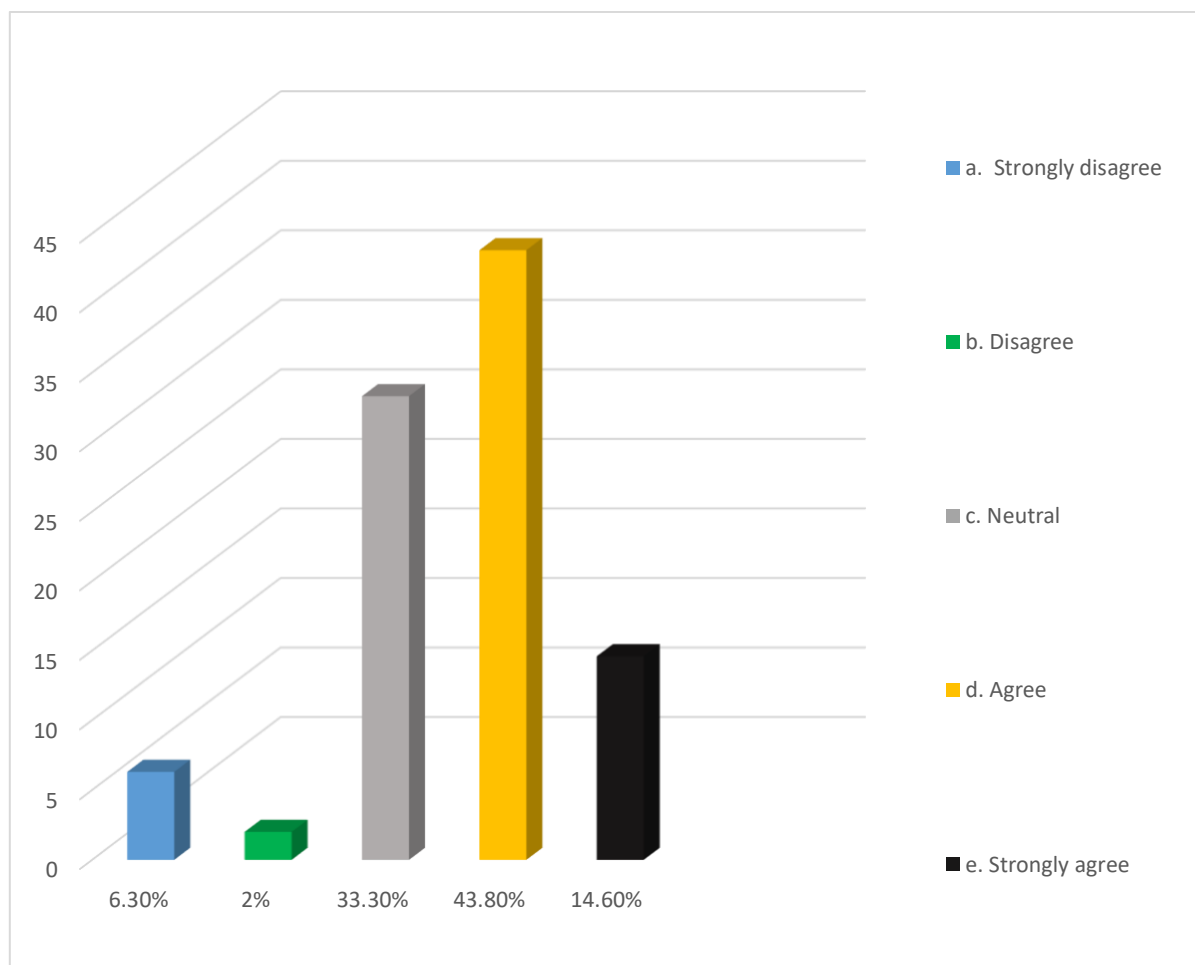


Figure 3.17: Learners' Agreement Level with the Statement 'Problem-Based Learning is a Teaching Method in which Students Learn by Actively Engaging in Real-Life and Complex Problems'

Question 23: When learning English, problem-solving abilities play the most significant role in:

a. Understanding vocabulary in context.	
b. Applying grammar rules.	
c. Communicating effectively in real-life situations.	
d. Understanding complex reading passages.	
e. Improving writing skills.	

The aim of this question is to figure out the significance of problem-solving abilities in English language learning. As it is displayed in Figure 3.18, the majority of the students (31.50%) acknowledged that problem-solving abilities play the most significant role in communicating effectively in real-life situations. This is because communication involves understanding the context, and think critically, all of which require problem-solving skills. Some respondents (25%) opted for ‘Understanding vocabulary in context’. This suggests the role of problem-solving skills in understanding how words are used in different contexts. Thus, (19.90%) of learners claimed that problem-solving skills are useful for understanding difficult texts. PS skills can make challenging texts more manageable. There are (14.10%) of respondents who selected option *b* ‘Applying grammar rules’ because problem-solving helps in analyzing and using correct grammatical structures. Finally, only (9.90%) opted for ‘Improving writing skills’, being able to think critically about how to express ideas clearly is important.

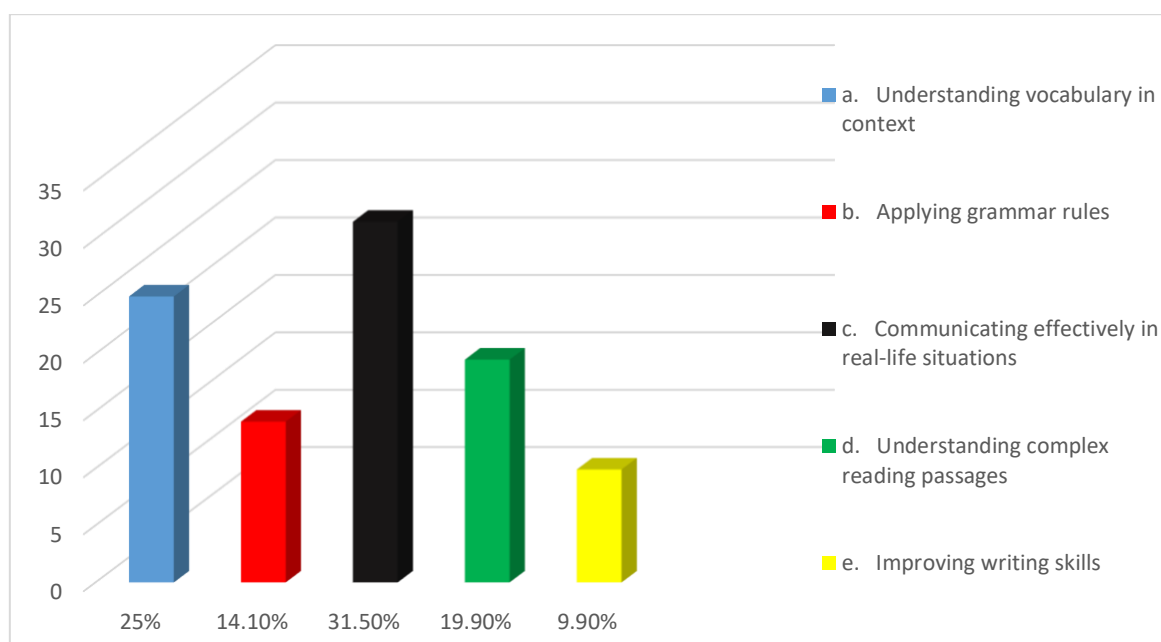


Figure 3.18: Significance of Problem-Solving Abilities in English Language Learning

Question 24: Do you think it is important to integrate problem-solving tasks in the language teaching process?

a. Yes

b. No

The majority of the students (91.70%) reacted positively (Yes) that it is important to integrate problem-solving tasks in the language teaching process. Probably because they recognize that problem-solving tasks can enhance their critical thinking. A minority (8.30%) disagreed with this item (No) as shown in Figure 3.19. They may prioritize traditional methods or believe that problem-solving tasks might complicate language learning rather than facilitate it.

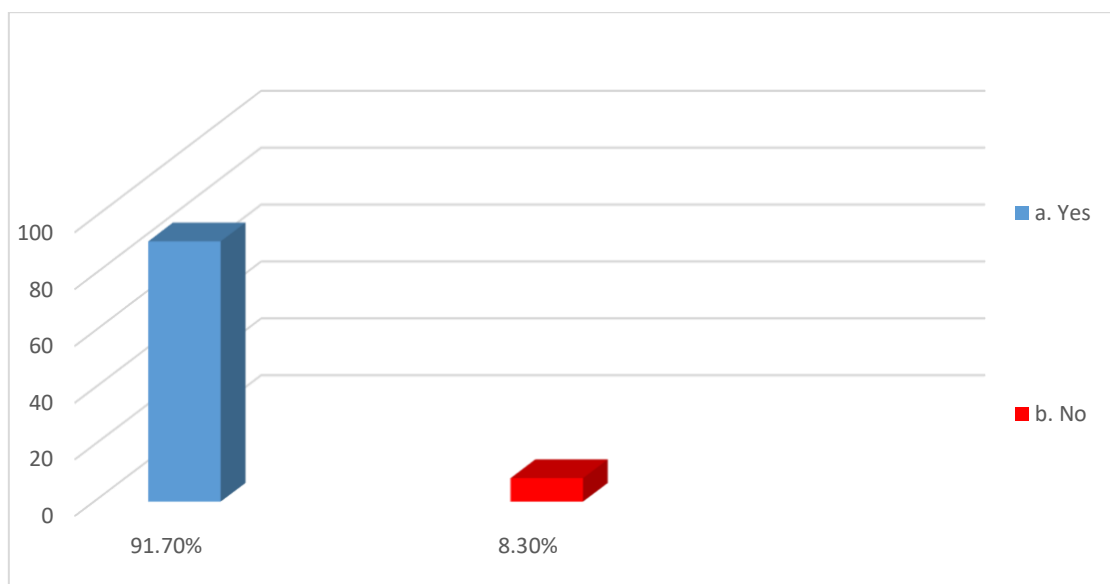


Figure 3.19: Students' Perception about The Importance of Integrating Problem-Solving Tasks in Language Teaching

Question 25: If yes or no, please justify

The respondents were asked to justify their answers as a response to question 24 which implies the importance of integrating problem-solving task in language teaching. Their answers are summed up as the following:

- Overcoming language challenges through practice.
- Making learning more effective.
- PS tasks encourages critical thinking, promotes active engagement, and provides practical application of language in real-life situations.
- Teaching students to solve problems easily
- Enhancing proficiency and real-life communication readiness.
- Developing critical thinking of learners.
- Understanding vocabulary and applying grammar.
- Encouraging learners to think more and relate to the language.
- Understanding and solving problems through language instruction.

- Making learners self-autonomous and able to deal with learning struggles.
- The integration of problem solving tasks in the language teaching process is a must and a need to meet the learning objectives successfully and to ensure that learners will become effective English speakers and communicators as well as writers, this type of tasks has a significant impact on the learning outcomes since it makes students in real life situations and teach them how to deal, react and interact with such problems and use the language correctly, fluently and appropriately. So the teacher has to carefully select problem solving tasks and incorporate them within the course content.
- Make students familiar with problems that they face in real life situations.
- The essence of problem solving in education is first of all to acquire methods of gaining new knowledge independently based on application of existing knowledge and skills. Thus, it is quite logical that this approach is particularly productive in teaching foreign languages to teachers of various subjects.
- Enabling teachers to effectively address classroom challenges.
- Problem-solving skills are vital for teachers because they enable them to effectively address challenges in the classroom, foster critical thinking in students, and create a dynamic and engaging learning environment.

c. Section Three: Cognitive Intelligence

This section aims to measure students' knowledge about cognitive intelligence to think critically and solve problems effectively.

Question 26: Which of the following definitions describes best Cognitive Intelligence?

- a. The ability to learn and adapt to new situations.
- b. The capacity for logical reasoning and problem solving.
- c. A combination of cognitive abilities such as memory, attention, and reasoning.

This question probes the students to understand the meaning of cognitive intelligence. The Figure 3.20 shows that more than one of the third participants (39.5%) stated option *b*, which implies that students with higher cognitive intelligence are likely to exceed in tasks that require logical thinking and finding effective solutions to problems. According to the findings, (37.5%) of students selected option *c*, this suggests that cognitive intelligence is based on remembering and recalling information, stay focusing and thinking logically to solve problems. Furthermore, (22.9%) of students chose option *a*, which admitted that cognitive intelligence is based on having mental power that helps to understand and adjust to different circumstance allowing people to learn throughout lives, because they recognize the essential link between cognitive intelligence and the ability to comprehend and navigate various situations.

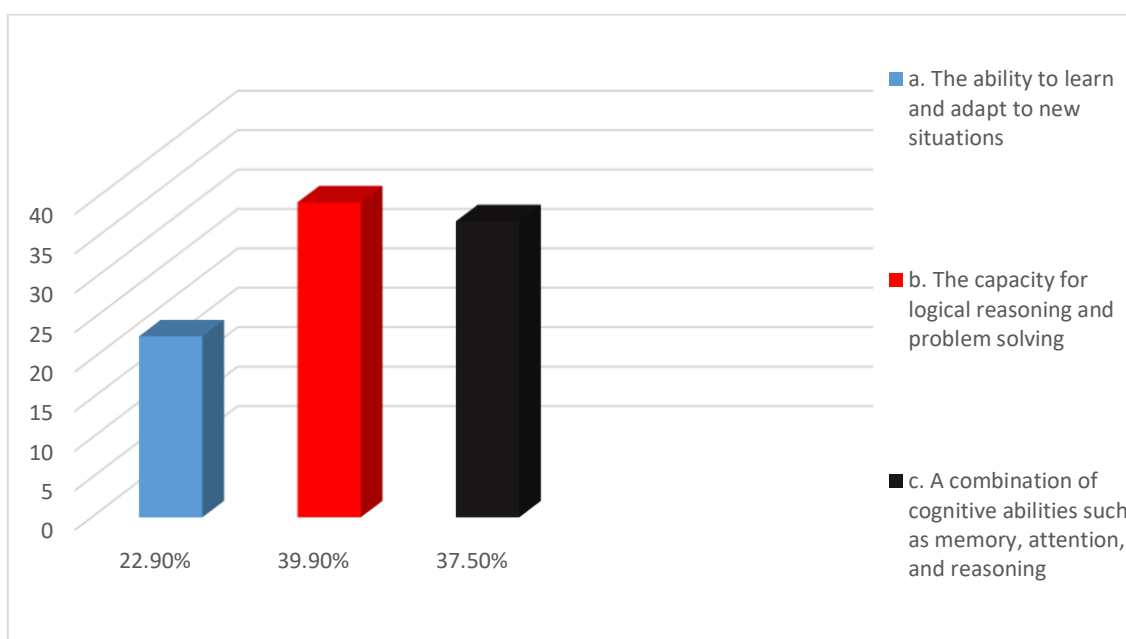


Figure 3.20: Students' Perceptions towards Cognitive Intelligence

Question 27: What are the characteristics of an intelligent learner?

a. Curiosity for knowledge	
b. Thinking Critically	
c. The willingness to learn from failures	

This question aims to assess how students perceive intelligent learner. As it is observed in the Figure 3.21, a large number of the informants (72.90%) believe that critical thinking is the main character of an intelligent learner. That is to say, learners do not just accept things at face value, instead, they question, examine, and seek deeper understanding to find the best solutions for their language problems. Moreover, (14.6%) chose option c, ‘the willingness to learn from failures’, which means to see failures as opportunities for growth learning and understanding that failure is a natural part of the learning process in order to use it as a chance to reflect, adapt, and improve the self. While, the minority (12.50%) think that learn and discover new things is the main character. So, this curiosity fuels their motivation to learn and helps them develop a deeper appreciation for the world around.

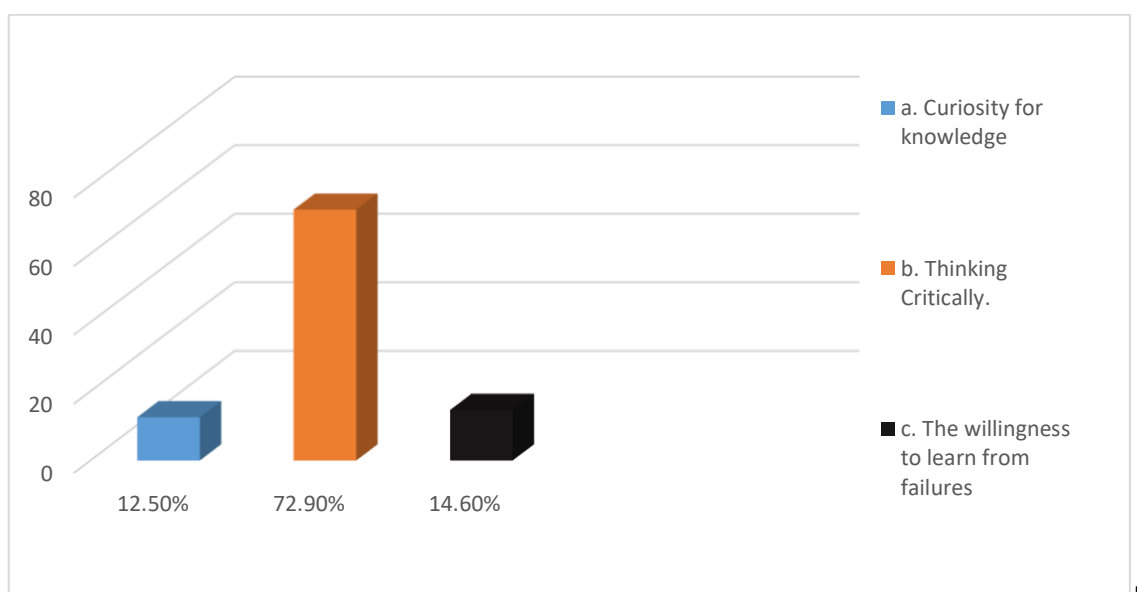


Figure 3.21: Important Characteristics of an Intelligent Learner.

Question 28: How would you evaluate your memory skills in terms of keeping and

Remembering information?

a. Very good.

b. Good.

c. Average

d. low.

This question aims to see how students evaluate their memory skills. As shown in Figure 3.22, the majority of the informants (52.10%) believe that their memory skills are good. This implies that memory allows students to assess their own learning progress. Moreover, strong memory skills are essential for academic success and real-life problem-solving situations. Furthermore, (27%) of other informants, think their memory skills are average. That is to say, these students have a lack of effective learning strategies. Additionally, a (12.5%) of learners opted for having a very good memory skill. This denotes that it is very important skill to assess their memory abilities, they can actively work on enhancing their learning and problem-solving capabilities. Whilst, a minority (8.30%) revealed their evaluation of memory skill between average and low. Probably because these students have a lack of effective study strategies, difficulty in retaining information or having external factors like: stress and fatigue that can also impact their memory performance.

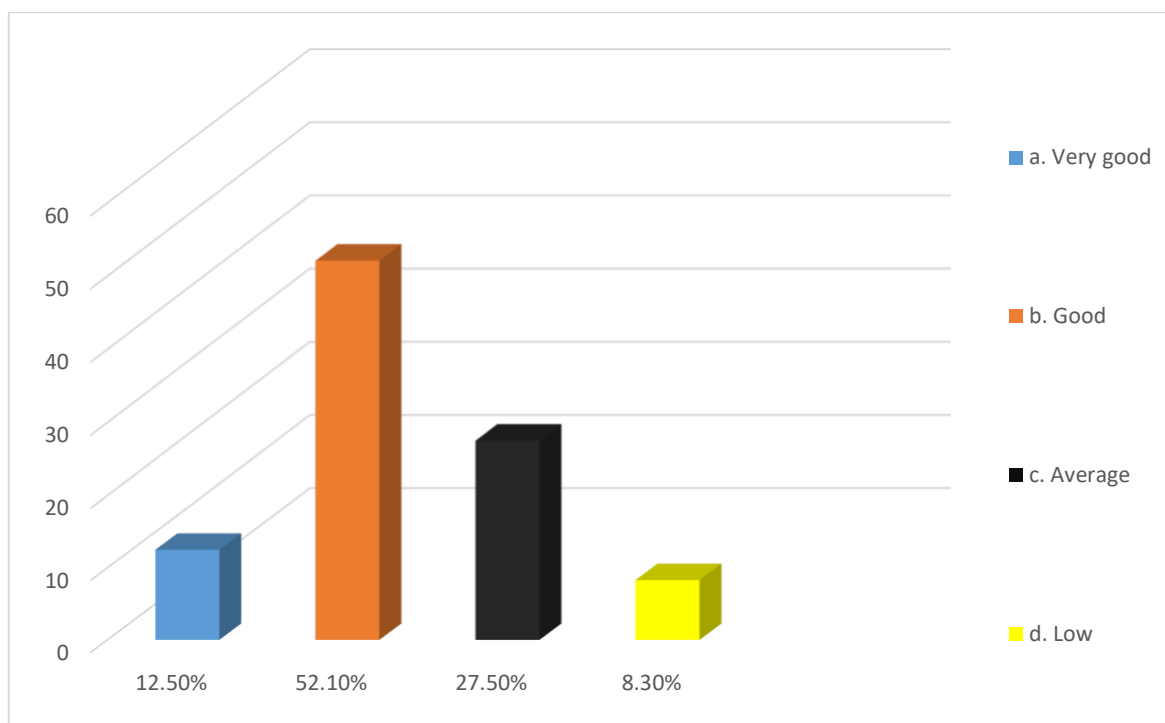


Figure 3.22: Students' Evaluation on Memory Skills

Question 29: What strategy do you use to enhance your memory?

- a. Listen to audio
- b. Write notes down.
- c. Talk out loud
- d. others

The purpose of this question is to discover which strategy the students use to retain and recall information to enhance their memories. Figure 3.23 demonstrates that the majority of the students (46.80%) chose to write notes. This strategy allows to organize and structure the information in a way that makes sense to the student. In other words, writing notes is a hands-on approach, it helps them to visualize the information.

A large number (25.3%) chose the strategy of listening to audio. Probably because auditory learning enables them to better retain and recall information through listening. The rest

of the informants (24.6%) opted for ‘Talk out loud’ as their memory strategy, perhaps because it helps to reinforce memory via the articulation of thoughts. Lastly, a minority of students (1.30%) use other methods not listed in the options provided.

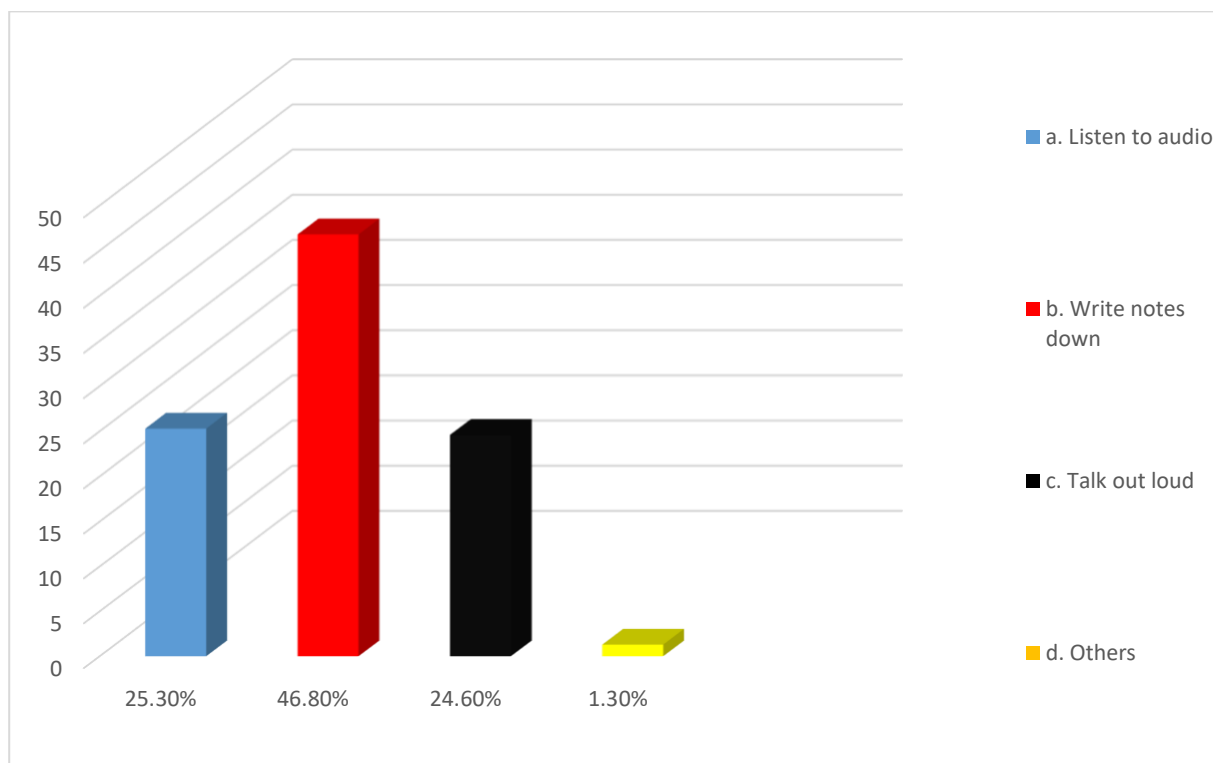


Figure 3.23: Strategies to Increase Students' Memory

Question 30: If others, please justify.

In the relation to the previous question, one student mentioned other ways to enhance their memory which are:

- Memorization
- Brainstorming
- Reading

Question 31: Do you consider yourself: (select more than one)

a. Linguistically intelligent: The ability to master and use languages effectively	
b. Spatially intelligent: The ability to think abstractly in multiple dimensions.	
c. Musically intelligent: Sensitivity to rhythm involving musical skills.	
d. Logically intelligent: The ability to analyze problems logically.	
e. Bodily-kinesthetic intelligent: The ability to use or control body movement skillfully.	
f. Interpersonally intelligent: The ability to interact with others effectively.	
g. Intrapersonal intelligent: Sensitivity to one's own feeling.	
h. Natural intelligent: Understanding nature's nuances, distinguishing between elements of nature.	

The aim of this question is to help learners recognize their own strengths and preferences in how they process and learn new information. The figure 3.24, shows that the majority of participants (17.70%) selected option g; that based on having a strong sense of self-awareness and understanding their own thoughts. A huge number of students (16.30%) chose option d; 'Logically intelligent', probably because they are adept at reasoning, and drawing logical conclusions. The same number of the participants (16.30%) selected option e; which implies that they have a strong connection between their minds and bodies. Also, they are able to learn through movement. Additionally, a large number of participants (14.90%) selected option a; which indicates that they may feel confident in their language skills, such as vocabulary, grammar, and pronunciation. Furthermore, a number of (14.20%) chose option b; which means that they enjoy thinking abstractly in multiple dimensions. The other (8.50%) of participants selected option c; which denotes that they can understand music on a deeper level, and may

have a strong sense of rhythm. Small number of students (7.80%) chose option f; they have a natural ability to understand different social situations. Finally, only six students (4.3%) perceive themselves to have a strong connection or understanding of nature.

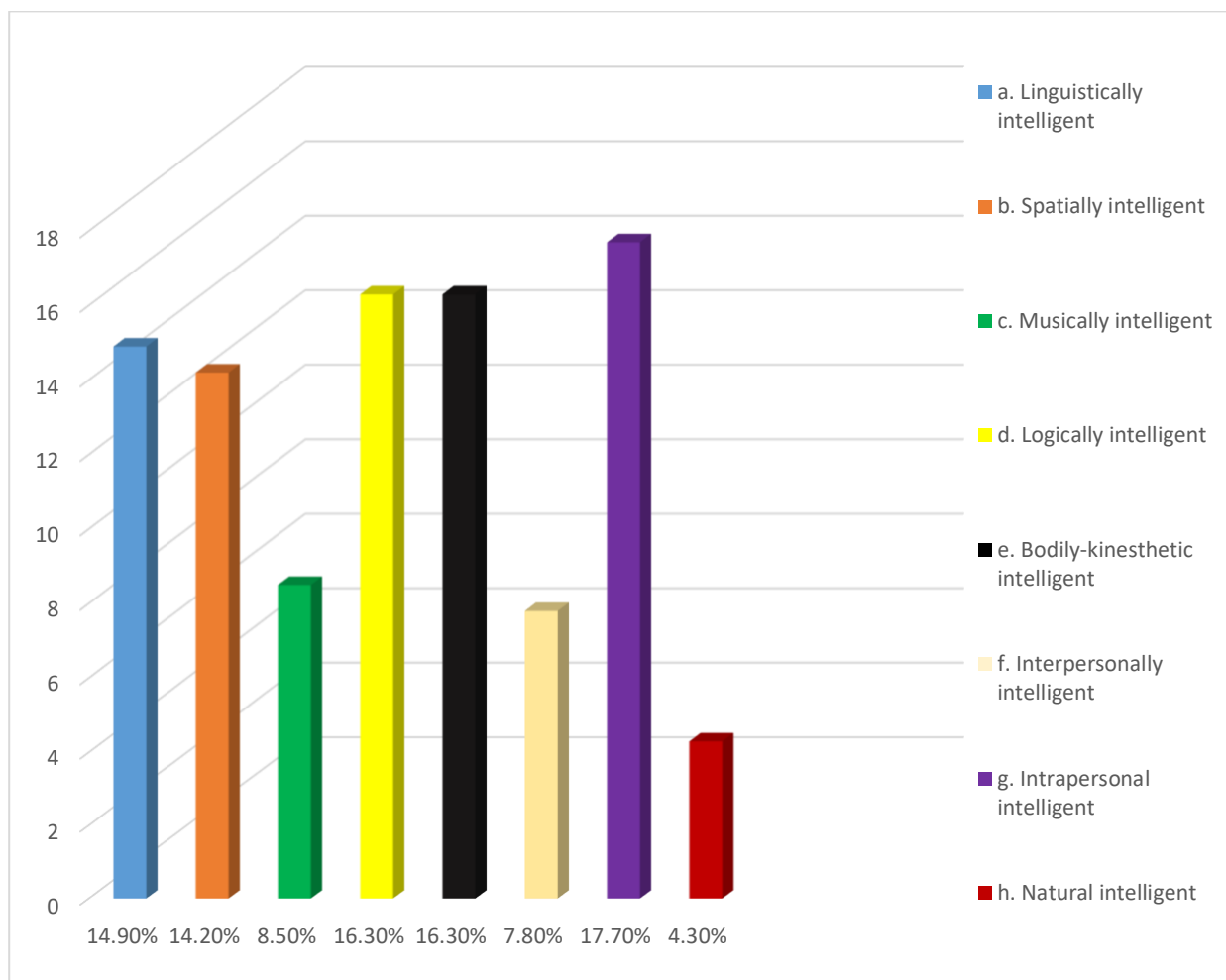


Figure 3.24: Types of Intelligence

Question 32: Do you think the combination of analytical, creative, and practical intelligence enhances cognitive performance in various aspects of life?

a. Analytical intelligence	The ability to collect and analyze information.	Yes	No	
b. Creative intelligence	The ability to discover new ways of understanding and solving problems.	Yes	No	
c. Practical intelligence	The ability to apply acquired knowledge to real-world situations.	Yes	No	

The findings expressed in Figure 3.26 show that the majority of the respondents (39.60%) select option a. ‘Analytical intelligence’. Probably because this type of intelligence relates to critical thinking and problem-solving, which are important for solving different language problems. Some students (29.20 %) recognize the value of ‘Practical intelligence’, because it equips them with the tools to apply what they have learned to daily tasks and real-life problems, bridging the gap between theory and practice. Lastly, the rest of learners (31.20%) opt for b. They believe that ‘Creative intelligence’ is beneficial, because it involves the ability to produce new solutions and viewpoints, which can be also beneficial in both personal and professional aspects.

Generally speaking, the majority agreement suggests that a combination of analytical, creative, and practical intelligence contributes to enhanced cognitive function. This combination enables learners to adapt across different situations.

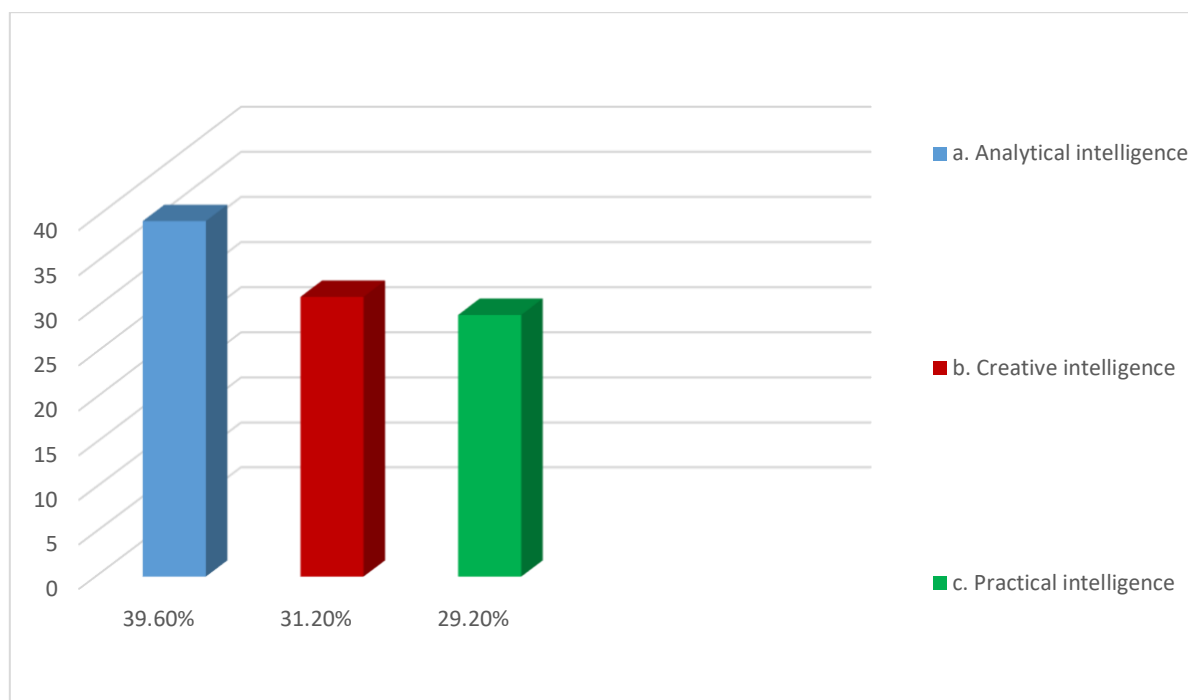


Figure 3.25: Learners' Attitudes towards the Impact of Different Approaches of Intelligence on Cognitive Intelligence

Question 33: If emotional intelligence is defined as the capacity to understand your own emotions and to manage the emotions of others, how do you perceive the relationship between emotional intelligence and cognitive intelligence?

- a. They are interlinked.
- b. They operate independently.
- c. Their relationship varies depending on the individual.

The question aims to understand the relationship between cognitive intelligence and emotional intelligence in order to get how these two types of intelligence interact and influence each other. As observed in the Figure 3. 26, the majority of participants (50%) select option c. This indicates that learners' capacities to understand emotions can vary from one student to another. A large number of students (29%) chose option b, which could suggest that they consider each type of intelligence to be distinct and separate in influencing their behaviors and

overall intelligence. Finally, only ten students (20.8%) choose option a. This implies that emotions positively influence their cognitive abilities. Learners see emotional intelligence as complementary to cognitive processes such as reasoning and problem-solving.

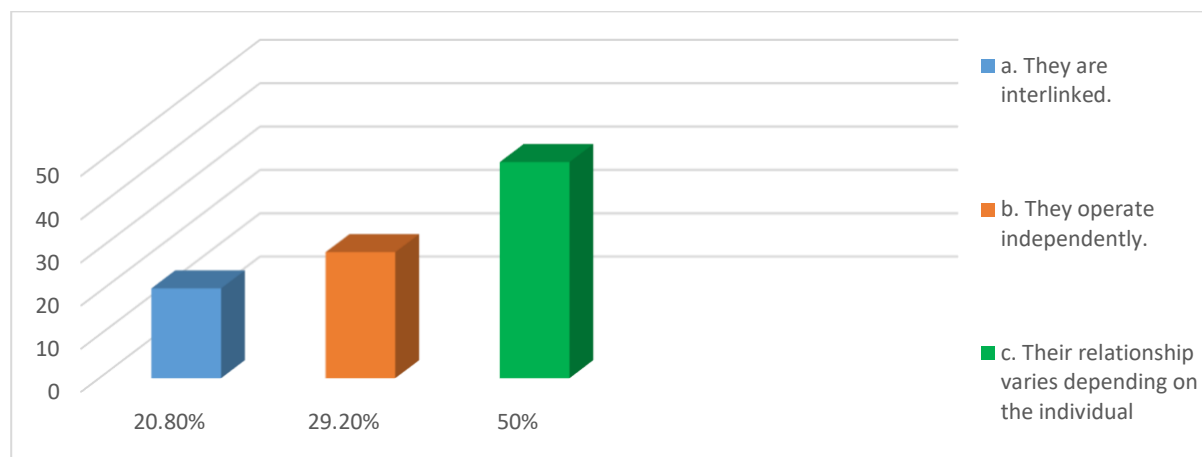


Figure 3.26: Students' Perception of the Relationship between Emotional Intelligence and Cognitive Intelligence.

Question 34: In your opinion, how does artificial intelligence support cognitive Intelligence to perform complex tasks?

a. By quickly processing large amounts of data	
b. By identifying some details that may not be apparent to humans	
c. By making decisions like humans	
d. Others	

The purpose of this question is to assess learners' understanding of how artificial intelligence enhances cognitive intelligence in the performance of complex tasks. As it is demonstrated in Figure 3.27, more than half of the respondents (56.3%) selected option a. 'Processing large amounts of data'. This denotes that artificial intelligence is useful for doing complex tasks based on work in fast way.

More than third students (37.5%) choose the option of identifying some details that may not be apparent to humans. This means that Students appreciate how artificial intelligence can identify details that may not be apparent to humans. which can be especially useful when dealing with vast amounts of information. However, only (6.30%) of the students contradicted the others, they believe that AI supports cognitive intelligence by making decisions like humans. Finally, no one chose ‘Others’, all respondents believe the provided options were sufficient to answer the question.

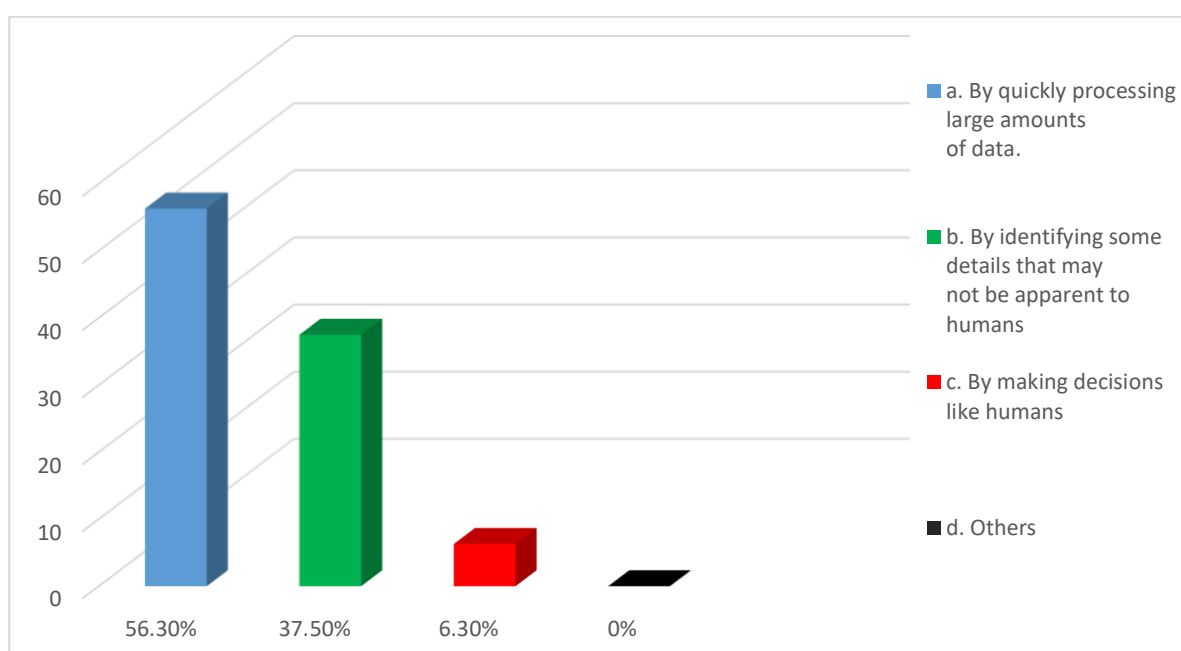


Figure 3.27: The influence of Artificial Intelligence on Cognitive Intelligence for the Performance of Complex Tasks

Question 35: If others, please justify.

In relation to the previous question, no one chose the option d. ‘Others’ which means there is no other additional responses.

Question 36: How might cognitive intelligence impact language learning strategies?

a. By influencing how learners process and comprehend linguistic information.

b. By shaping problem-solving approaches when encountering language barriers.

c. By identifying the strategies students use to practice and apply language skills.

This inquiry analyses how cognitive intelligence might affect the ways learners process language information. High proportion of respondents (43.80%) selected option a. probably because they are aware about the strong connection between cognitive intelligence and the ability to understand linguistic information. Other respondents (36.90%) opted for *b*, they understand that cognitive intelligence can impact learners' ability to develop effective problem-solving strategies when faced with language barriers. Furthermore, (9.30%) of learners pick option c, they see a direct correlation between cognitive intelligence and practical application of language learning strategies.

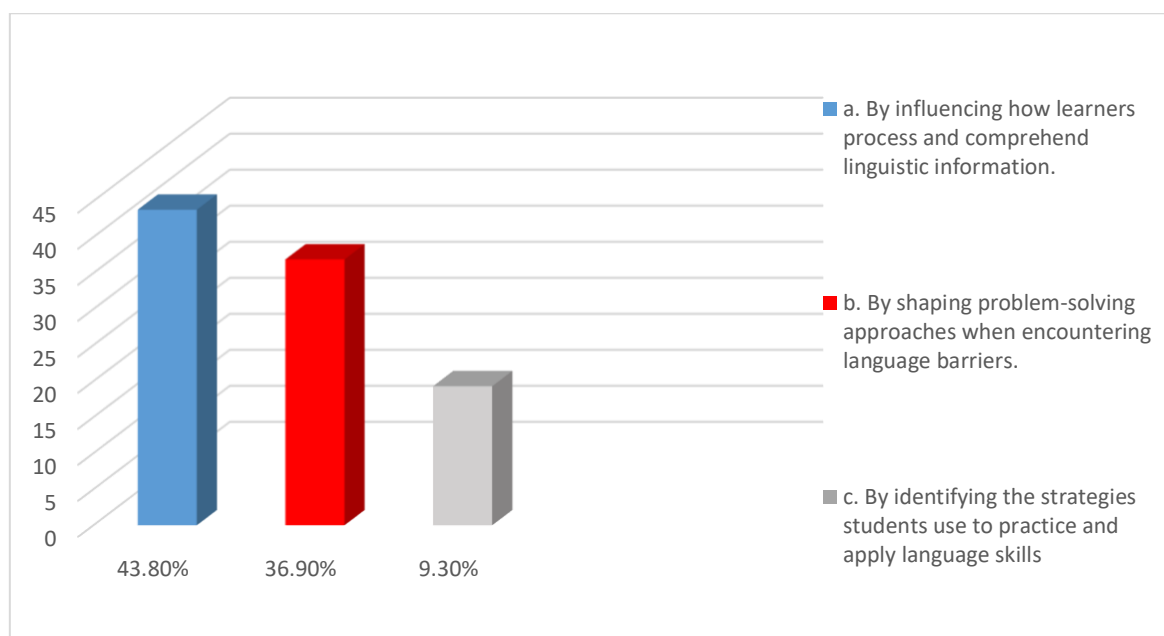


Figure 3.28: The Influence of Cognitive Intelligence on Language Learning Strategies

d. Section Four: Relationship between Problem-Solving and Cognitive Intelligence.

This section aims to figure out students' views about the relationship between cognitive intelligence and problem-solving abilities.

Question 37: Cognitive intelligence can influence EFL learners' problem-solving abilities by enhancing their ability to solve problems effectively. To what extent do you agree:

a. Totally disagree	
b. Disagree	
c. Neither agree nor disagree	
d. Agree	
e. Totally agree	

This question aims to figure out the influence of cognitive intelligence on EFL learners' problem-solving abilities. In Figure 3.29, the majority of learners (60%) selected the option 'Agree', probably because they have observed strong connections between cognitive intelligence and problem-solving when learning English. Additionally, (15%) of learners selected 'Totally agree'. They might have perceived cognitive intelligence as an important factor that impacts EFL learners' ability to solve their problems efficiently. Moreover, (14.6%) remain neutral with 'Neither agree nor disagree'. This indicates that the relationship between cognitive intelligence and problem-solving abilities in EFL learners maybe influenced by various other factors. Additionally, (10.4%) 'Totally disagree' with the statement. They might have other ideas about what helps the most. Finally, no learners chose 'Disagree'.

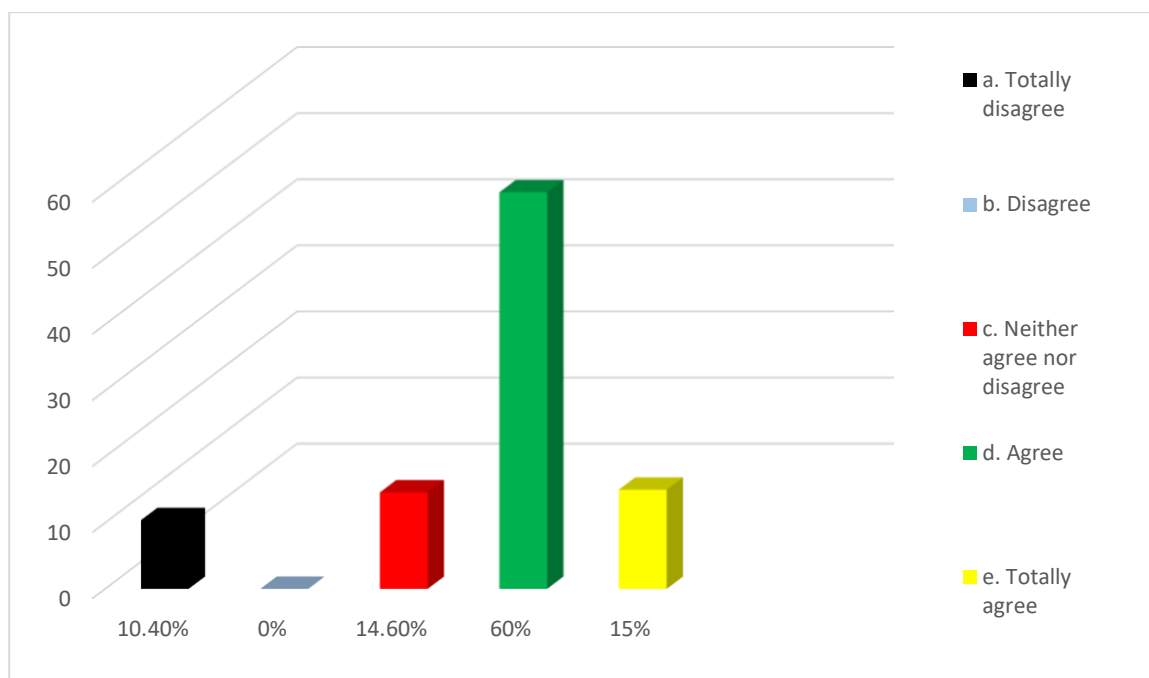


Figure 3.29: The Influence of Cognitive Intelligence on EFL Learners' Problem-Solving Abilities

Question 38: Did you know that cognitive strategies are mental processes learners use to learn, remember, and solve problems?

a. Yes

b. No

The aim of this question is to detect students' knowledge towards the role of cognitive strategies in learning. In Figure 3.30, the majority of learners (89.6%) are aware of cognitive strategies as mental processes used for learning and solving problems. This high percentage suggests that most learners are informed about or have been taught how to apply these strategies in their education. On the other side, about (10.4%) chose 'No'. They might not be familiar with these mental tools or they have not realized they are using them when learning or solving problems.

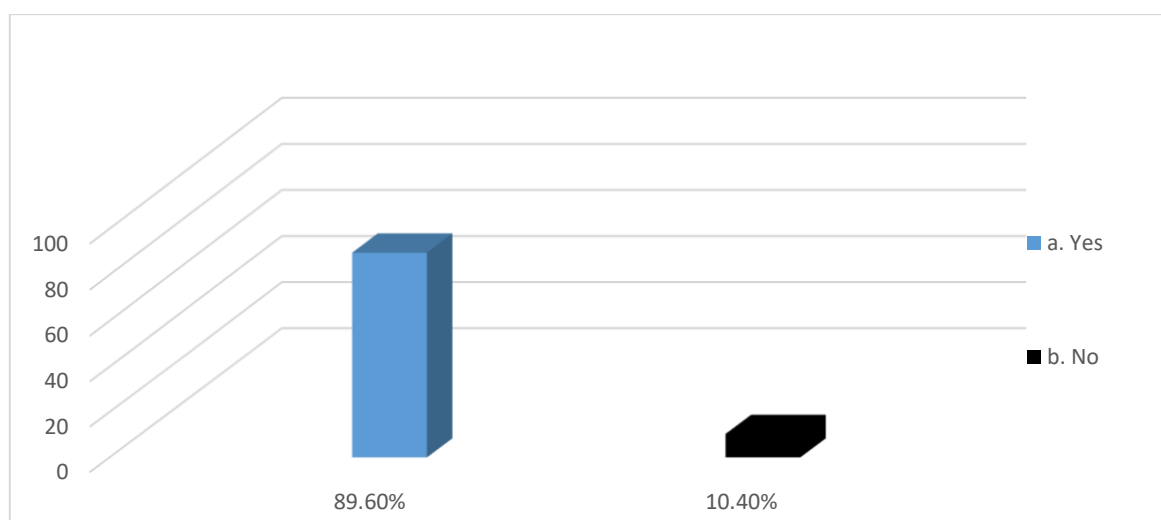


Figure 3.30: Learners' Perception towards the Role of Cognitive Strategies in Learning

Question 39: When attempting to solve language problems, which of the following cognitive processes do you use?

- a. Cognitive intelligence b. Critical thinking
- c. Memory retention d. Synthesizing information

The purpose of this question is to identify the specific cognitive processes learners use when they face challenges in language learning. According to Figure 3.31, the majority of the students (54.20%), selected option b. 'Critical thinking', probably because it involves the ability to analyze, reason, and evaluate information, which are essential processes when solving language problems. Whereas, other informants (25%) opted for choice *a*; which denotes that cognitive intelligence involves the overall mental abilities such as logical reasoning and problem-solving skills. Meanwhile, the findings show that some informants (14.5%) chose option *c*. Memory retention; this group recognizes the importance of remembering and recalling information when learning a new language. Finally, only (6.3%) went for *d*. 'Synthesizing information'. They believe that the combination of various pieces of information into a coherent whole is a key step in understanding and solving language problems.

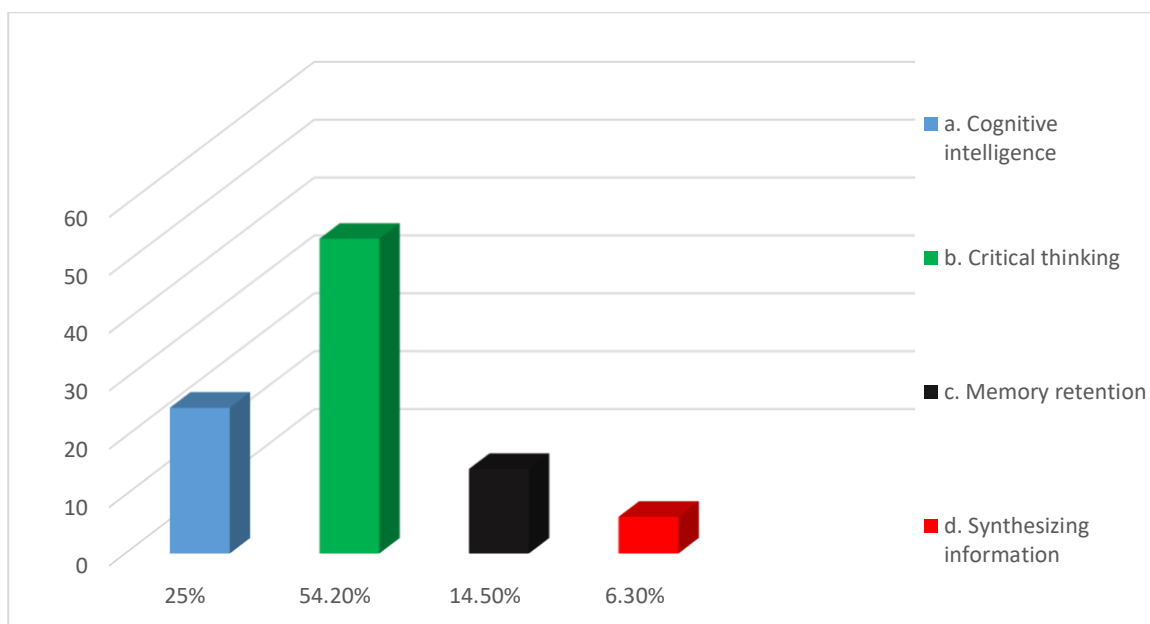


Figure 3.31: Cognitive Processes Used in Problem-Solving

Question 40: Critical thinking helps in solving problems by promoting systematic analysis of solutions.

a. Yes

b. No

The aim of this question is to assess learners' understanding of how critical thinking aid in problem-solving. As demonstrated in Figure 3.32, a significant number of participants (66.70%) selected option *a*. They believe that critical thinking promotes systematic analysis of solutions and aids in problem-solving. This probably indicates that these learners either experienced the benefits of critical thinking, or have been educated on the importance of this skill in analyzing and solving language problems. while others (33.3%) chose option *b*., which may reflect a lack of understanding of the statement that critical thinking is beneficial for problem-solving.

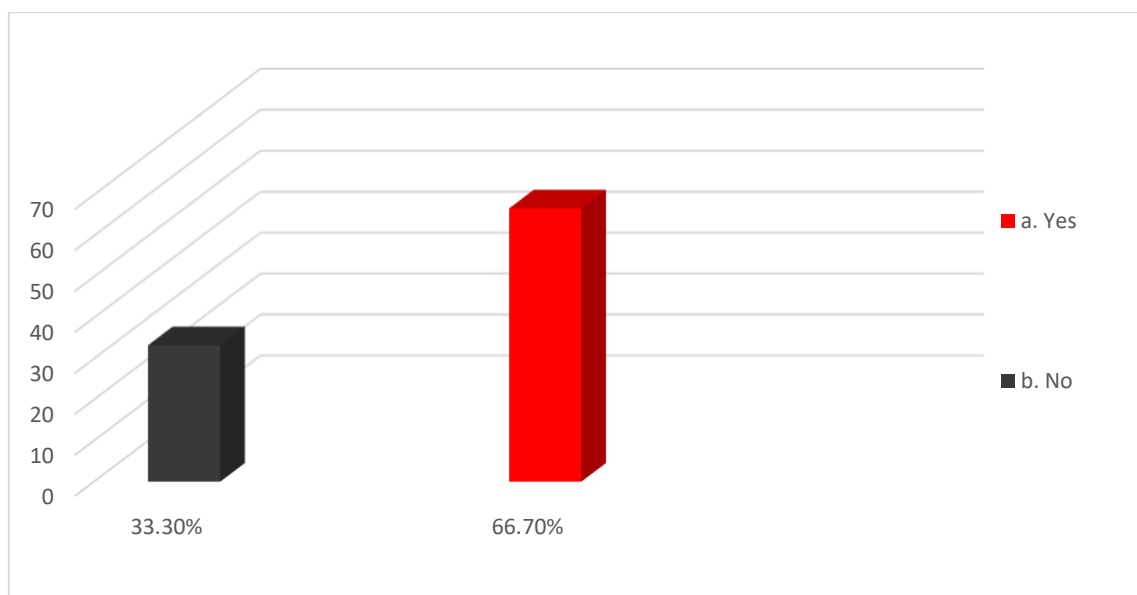


Figure 3.32: The Importance of Critical Thinking

Question 41: If yes, please justify

The students were asked to provide arguments regarding the previous question. Their answers are summed up as the following:

- Critical thinking helps in solving problems by choosing the more relevant and appropriate answer.
- Critical thinking helps to examine different perspectives, gather relevant information, and make informed decisions.
- Critical thinking promotes systematic analysis of solutions by encouraging individuals to evaluate evidence, consider alternative perspectives, and make informed judgments.
- It helps organize ideas logically, structuring thoughts.
- Critical thinking can clarify issues by linking concepts together.
- Critical thinking is a systematic method for identifying and investigating problems. It helps to determine the causes of a particular problem or event and to understand the relationship between these causes and their effects on the system.

The analysis aims to solve the underlying problems and bring about improvements in the affected processes.

- Critical thinking makes the learner think out of the box. He or she can put many other solutions to one problem. The importance of the critical thinking has a relation with how the individual use it.
- Critical thinking encourages learners to examine problems from various angles, assess the evidence, and consider alternative solutions before making decisions. It promotes logical reasoning and helps avoid biases or assumptions that might lead to flawed conclusions.

Question 42: Do you think developing both cognitive intelligence and problem-solving can help to: (select more than one).

a. Motivation	
b. Social interaction	
c. Self-regulation	
d. Autonomous learner	
e. Self-confidence	

The aim of this question is to investigate various benefits of developing both cognitive intelligence and problem-solving skills. Students' views are presented in Figure 3.33 in which most of the students (23.30%) believe in becoming an 'Autonomous learner', probably because they see how cognitive intelligence and problem-solving skills promote independence in learning. Secondly, (22.40%) of learners selected 'Motivation' because developing these skills can increase eagerness to learn and solve various language problems. When they have the ability to think critically, they feel more capable and motivated to solve problems.

Moreover, around (21.50%) chose option *c*. They believe that enhancing cognitive intelligence and problem-solving skills helps in managing thoughts and emotion, leading to better focus. Other informants (19%) feel that these developments build self-confidence. This indicates that solving problems reinforces learners' belief in their own abilities and competences.

Finally, another group of the students (13.80%) declared that developing both cognitive intelligence and problem-solving can help in 'Social-interaction'. These skills can improve learners' ability to communicate and interact with others in various social settings.

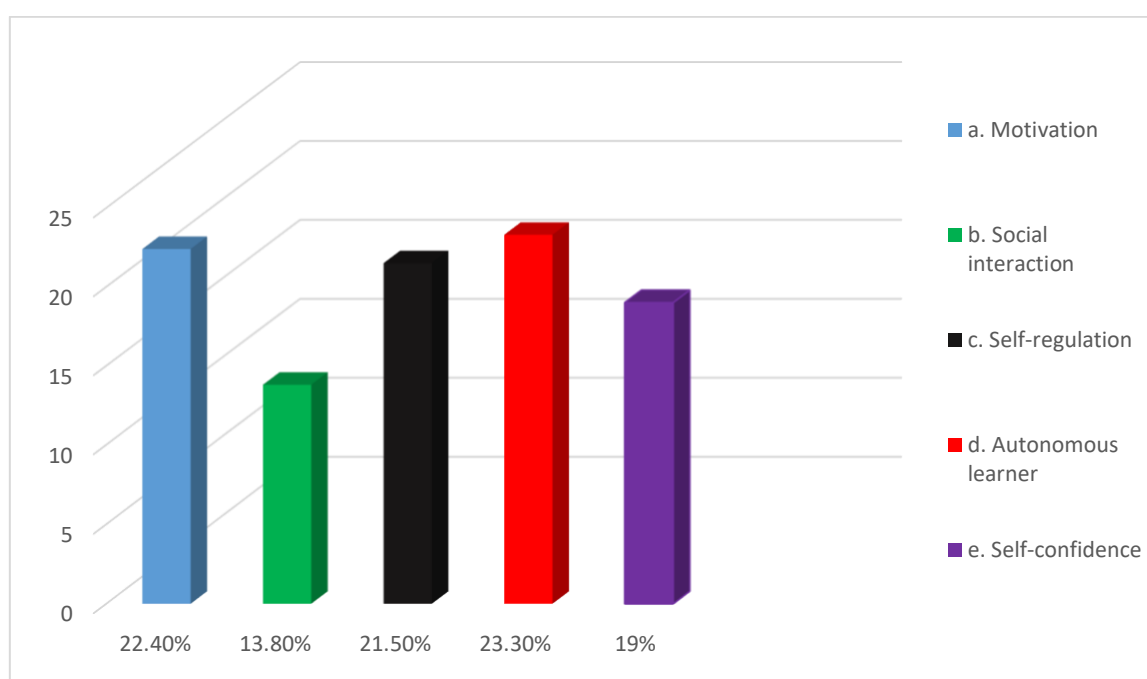


Figure 3.33: Benefits of Cognitive Intelligence and Problem-Solving

Question 43: If you have further suggestions, please feel free to share:

The informants (N=3) provided additional recommendations related to the investigated research examined them. Their responses are presented as follows:

- Problem-solving is a very important skill that should not overlooked.

- Problem-solving skills should be enhanced because they play a significant role in language learning.
- It is important to shed light on the role of the learners and his or her perception of the learning process.

3.2.5. Students' Questionnaire Summary of Results

The quantitative data from the students' questionnaire showed that the development of problem-solving abilities is a significant concern for first year Master students. This study investigates EFL students' attitudes towards the impact of cognitive intelligence on enhancing problem-solving skills, revealing that greater cognitive abilities correlate with improved language learning process.

The compiled data of section one that dealt with students' background information revealed that female students dominated the sample, implying their eagerness to learn about the topic. It is observed that EFL students had nearly equal opportunities for learning English, with the majority being older than twenty-one years, yet they believe their level to be advanced. The study found that most of the participants had been studying English for 11 years, and identified various motivations for learning English among the participants, including obtaining an English degree, social interaction, travel, and other unspecified reasons.

Section two represents the students' knowledge about problem-solving skills in EFL learning. It outlines data on learners' competences and techniques in addressing language-related problems. The majority of the students tend to be more aware of the importance of problem-solving skills. When facing language difficulties, the participants claimed that they make an effort to find solutions rather than ignoring them. They tend to prefer trial and error problem-solving strategy, where they try different solutions and learn from their mistakes, which suggests a preference for hands-on learning. The section covers various linguistic

challenges faced by learners. Cultural cues stand out as the most reported issue, with a notable number of learners finding it hard to understand idiomatic expressions and social norms. Additionally, the majority are inclined towards using the information processing approach, which involves breaking down problems into smaller parts for analysis. Besides, learners believe that individual and environmental factors influence their problem-solving abilities, motivation is seen as the drive that pushes them to become more engaged in learning. The combination of personal and circumstantial factors is acknowledged by them as profoundly affecting their overall capacity to solve language problems. Moreover, when facing problem-solving tasks, learners find different cognitive processes helpful according to their personal preferences and learning styles. Some learners find that analysis, which involves deconstructing the problem into more manageable parts, to be the most helpful approach. In regards to problem-based learning, a majority of the students are familiar with the concept. They perceive problem-based learning as an educational method where students tackle real and complex problems.

Section three focuses on assessing students' understanding of cognitive intelligence, particularly their ability to think critically and solve problems effectively. Many students with higher cognitive intelligence excel in tasks that require logical thinking and finding solutions to problems. They recognize the importance of critical thinking in language learning, where questioning, examining, and seeking deeper understanding are key traits of an intelligent learner. The findings indicate that memory plays a significant role in assessing learning progress and solving real-life problems. Moreover, learners tend to be more aware of the importance of taking notes, they perceive it as a practical strategy that helps them visualize information. Students also acknowledge the impact of emotional intelligence, as it relates to understanding emotions and enhancing cognitive performance. Additionally, many students believe that artificial intelligence which processes large amounts of data, can be beneficial for complex tasks and working efficiently. In this regard, learners are aware of the strong connection between

cognitive intelligence and the ability to understand linguistic information. Generally speaking, cognitive intelligence plays a crucial role in processing and understanding language, it allows learners to communicate and interpret linguistic cues.

The analysis of section four indicates a positive correlation between cognitive intelligence and the development of problem-solving abilities in EFL learning. Cognitive intelligence is essential for solving problems effectively in learning English. Accordingly, most learners agree that it has a strong influence on their ability to tackle language issues. In this regard, the majority of the students understand that cognitive strategies are the mental processes they apply for learning, remembering, and problem-solving. When attempting to solve language problems, EFL learners primarily rely on various cognitive processes such as critical thinking, memory retention, and synthesizing information. Critical thinking enhances problem-solving abilities through the systematic analysis of solutions. Furthermore, developing both cognitive intelligence and problem-solving skills is believed to support various aspects of learning and personal growth. Students feel that these skills can enhance their abilities to become autonomous learners, increase motivation, improve self-regulation, build self-confidence, and facilitate better social interaction.

To sum up, the development of problem-solving abilities is a significant concern for the First-year Master students who were involved in the research. They recognize the importance of cognitive intelligence and critical thinking in solving language challenges. Thus, EFL learners believe that developing these abilities can contribute to various aspects of their learning and personal development, such as autonomy, motivation, self-regulation, confidence, and social interaction.

Conclusion

The obtained data from students' questionnaire displays the average use of cognitive intelligence in developing problem-solving skills. On the one hand, students should learn to be mindful about exploring different solutions to language-related problems. On the other hand, teachers should provide opportunities for students to tackle linguistic challenges independently and incorporate problem-solving tasks and activities into their curriculum. The questionnaire findings show a creditable performance in expanding their answers towards the positive correlation between cognitive intelligence and problem-solving abilities in EFL learners.

Pedagogical Implications

The essential concern of this study is to introduce students to the importance of cognitive intelligence in enhancing problem-solving skills in EFL learning. In this respect, the most frequent problems of First-year Master students can be summarized in three major points. Firstly, learners often struggle with applying complex grammar rules and vocabulary in practical language usage, which may affect their understanding of how to transfer learning from the classroom to real-world contexts. Secondly, students tend to be uninterested in learning due to an overly repetitive and non-interactive teaching approach that fails to engage them or relate the material to their interests and real-life situations. Thirdly, some students lack awareness of the significance of cognitive strategies in learning and fail to apply them effectively.

The findings have a decisive influence in drawing learners' attention to the significance of developing cognitive intelligence and critical thinking skills to overcome language barriers and improve learning outcomes. The conducted research served as a pivotal contributor in raising learners' awareness to the use of cognitive processes such as critical thinking, memory retention, and problem-solving techniques in language learning. Accordingly, learners would be equipped enough to employ these cognitive strategies to tackle language challenges more effectively and become autonomous learners. Furthermore, learners should be able to identify the most hindering factors that cause difficulty to apply problem-solving strategies such as algorithmic, heuristic, and trial and error problem-solving in their language learning process. On this basis, English teachers should optimize teaching methods that encourage active cognitive engagement and incorporate problem-solving exercises in the curriculum by providing students with explicit instruction on how to enhance their problem-solving abilities.

Up to this point, EFL students consider problem-based learning as an important educational method for tackling real and complex language problems. However; what those students tend to be ignorant about is that this strategy could be used to enhance not only their

academic performance but also their cultural competence by applying language skills in diverse social interactions. Finally, since traditional teaching methods cannot be interfered with in the curriculum, teachers might provide students with some suggestions on how to ameliorate their learning techniques and cognitive processes to enhance their problem-solving skills and language learning proficiency.

Recommendations for Further Research

It is recommended that further research should be undertaken in the following areas:

- Conducting research on the effectiveness of specific teaching methodologies or language learning interventions in improving students' problem-solving skills in EFL contexts.
- Investigating teachers' perspectives and practices towards the use of technology in the classroom and its effectiveness in enhancing EFL learners' cognitive abilities and motivation.
- Searching for other factors that may influence EFL learners' problem-solving skills.

Limitations of the Study

This research has a number of shortcomings that should be considered. These are:

- Lack of time to support the questionnaire with classroom observation.
- Teachers' perspectives towards the topic under investigation would provide more understanding of the significance of applying cognitive intelligence based activities to help develop EFL students problem-solving skills.

General Conclusion

The present study was carried out to explore research on the role of cognitive intelligence in developing problem-solving skills among EFL learners. The primary goal of this inquiry is to figure out the correlation between cognitive intelligence and problem-solving skills. Secondly, the research intends to find out the teaching methods that are most effective in developing problem-solving abilities, in addition to assess the impact of individual cognitive differences on the learning and application of problem-solving skills in EFL learning. The practical study provided useful findings extracted from the students' questionnaire administered to forty-eight (N= 48) EFL students in order to test the research hypothesis and answer the research questions. Students demonstrate a clear understanding of the importance of cognitive processes, particularly critical thinking, in addressing language-related challenges. The findings indicate a positive correlation between cognitive abilities and language learning success. The collected data demonstrated that EFL students are aware of the role played by cognitive intelligence to enhance problem-solving abilities by equipping learners with the necessary tools to analyze, evaluate, and respond to language challenges in a structured and strategic manner. Based on the achieved results, problem-solving in language learning is not limited to linguistic problems. It also includes the ability to adapt to new cultures, and understand different perspectives. These are crucial factors for communication that go beyond grammar rules or vocabulary lists. According to the findings, the relationship between cognitive intelligence, emotional intelligence, learning styles and language learning strategies can help students gain a deeper understanding of the meaning and importance of these concepts. Investigating the manner in which cognitive intelligence can improve language learning efficacy. Thus, this research highlights the value of pedagogical approaches that are designed to engage students in tasks requiring analysis, synthesis, and evaluation. Furthermore, the application of the quantitative descriptive method in this study permitted accomplishing well founded results, and allowed to

figure out a set of incontrovertible interpretations about the research hypothesis and the asked questions. The results obtained can encourage teachers to incorporate problem-solving tasks and activities into their curriculum. Providing opportunities for students to tackle linguistic challenges independently. Moreover, teachers play a crucial role in developing a supportive learning environment that promotes experimentation and collaboration.

To sum up, the concluded results in the present study are very beneficial to make students mindful about exploring different solutions to language-related problems.

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Appendix A

Students' Questionnaire

Investigating EFL Students' Attitudes towards the Development of Problem-Solving Abilities through Cognitive Intelligence

Dear students,

You are kindly invited to answer the following questionnaire of a Master dissertation research. This study is carried out to investigate EFL learners' attitudes towards the development of problem-solving abilities through Cognitive Intelligence. It has the aim of examining the relationship between Cognitive Intelligence and the advancement of problem-solving abilities. Your answers would be very helpful to realize this aim. Your responses will be treated with great care and confidentiality.

Thank you for your cooperation.

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2023- 2024

Section One: General Information

1-What is your gender?

- a. Male b. Female

2- What is your age?

.....

3-What is your English level?

- a. Beginner b. Intermediate c. Advanced

4- How long have you been studying English?

.....

5- Is studying English at the university your own choice?

- a. Yes

- b. No

6-If yes or no, please justify

.....

7-What is your aim behind learning English? (you can select more than one).

- a. To get a degree in English

- b. To communicate with English-speaking friends

- c. To improve communication skills for travel purposes.

- d. Others

8-If others, please specify

.....

Section Two: Problem-Solving Skills in EFL Learners

9- As an EFL learner, how do you attempt to handle a language problem?

a. By finding solutions

b. By ignoring it

10- What kind of language problems do you encounter?

a. Vocabulary		f. Reading	
b. Grammar		g. Writing	
c. Spelling		h. Pronunciation	
d. Cultural cues		i. Speaking	
e. Listening		j. Communication	

11-Do you think that it is important to have problem-solving skills?

a. Yes	
b. No	

12-If yes, please justify

.....

.....

13-When you have a problem, which strategy do you use to solve it? (you can select more than one).

a. Algorithmic problem-solving: Designing step-by-step procedure	
b. Heuristic problem-solving: Using experiences rather than strict rules /procedures	
c. Trial and error problem-solving: Using strategies as pattern, working backwards or trial and error, i.e. try different ways and learn from one's mistakes	

14- Which method do you think is more appropriate to deal with problems?

a. Gestalt method: Seeing the problem as a whole and trying to reorganize your understanding of it.

b. Information processing: Breaking down the problem into smaller parts for analysis.

c. Decision-making: Using mental strategies such as comparing and analyzing.

15- According to your knowledge, your problem-solving skill is concerned with

a. Overcoming language barriers		d. All of them	
b. Improving critical thinking abilities in understanding and analyzing a phenomenon.		e. None of them	
c. Enhancing comprehension by making use of the learned knowledge to deal with the challenge.		f. Others	

16-If others, please justify

.....

17- When learning English, which cognitive process do you find most helpful in problem-solving?

a. Synthesis: Combining different ideas or information to create a new understanding or solution	
b. Comprehension: Understanding various forms of language contexts.	
c. Abstraction: Simplifying complex problems by focusing on essential elements.	
d. Analysis: Breaking down a problem into smaller parts for better understanding.	

18- Which individual factor (s) do you believe has/have the greatest influence on problem-solving abilities? (you can select more than one).

a. Personality traits, i.e., behavior, thoughts, and feelings that influence how a student interacts with others		d. All of them	
b. Motivation: Internal/ external motives that urge the learner to study the language.		e. None of them	
c. Learning styles, i.e., visual, auditory, and kinesthetic		f. Others	

19- If others, please specify.....

.....

20- What are the environmental factors that influence problem-solving abilities?

- a. Physical environment such as lighting, temperature, and noise
- b. Cultural context i.e., language and societal norms
- c. Resource availability, i.e., access to books and materials
- d. Education system

21- Have you ever heard about problem-based learning?

a. Yes

b. No

22-To what extent do you agree to this statement ‘Problem-based learning is a teaching method in which students learn by actively engaging in real-life and complex problems’?

a. Strongly disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly agree

23- When learning English, problem-solving abilities play the most significant role in:

a. Understanding vocabulary in context	<input type="checkbox"/>
b. Applying grammar rules	<input type="checkbox"/>
c. Communicating effectively in real-life situations	<input type="checkbox"/>
d. Understanding complex reading passages	<input type="checkbox"/>
e. Improving writing skills	<input type="checkbox"/>

24-Do you think it is important to integrate problem-solving tasks in the language teaching process?

a. Yes

b. No

25-If yes or no, please justify

.....

Section Three: Cognitive Intelligence

26- Which of the following definitions describes best Cognitive Intelligence?

- a. The ability to learn and adapt to new situations.
- b. The capacity for logical reasoning and problem-solving
- c. A combination of cognitive abilities such as memory, attention, and reasoning

27- What are the characteristics of an intelligent learner?

a. Curiosity for knowledge	<input type="checkbox"/>
b. Thinking Critically	<input type="checkbox"/>
c. The willingness to learn from failures	<input type="checkbox"/>

28- How would you evaluate your memory skills in terms of keeping and remembering information?

- a. Very good
- b. Good
- c. Average
- d. Low

29- What strategy do you use to enhance your memory?

- a. Listen to audio.
- b. Write notes down
- c. Talk out loud
- d. others

30- If others, please justify

.....
.....

31-Do you consider yourself: (you can select more than one)

a. Linguistically intelligent: The ability to master and use languages effectively.	
b. Spatially intelligent: The ability to think abstractly in multiple dimensions.	
c. Musically intelligent: Sensitivity to rhythm involving musical skills.	
d. Logically intelligent: The ability to analyze problems logically.	
e. Bodily-kinesthetic intelligent: The ability to use or control body movement skillfully.	
f. Interpersonally intelligent: The ability to interact with others effectively.	
g. Intrapersonal intelligent : Sensitivity to one’s own feeling.	
h. Natural intelligent :Understanding nature’s nuances, distinguishing between elements of nature.	

32- Do you think the combination of analytical, creative, and practical intelligence enhances cognitive performance in various aspects of life?

a. Analytical intelligence	The ability to collect and analyze information.	Yes		No	
b. Creative intelligence	The ability to discover new ways of understanding and solving problems.	Yes		No	
c. Practical intelligence	The ability to apply acquired knowledge to real-world situations.	Yes		No	

33- If emotional intelligence is defined as the capacity to understand your own emotions and to manage the emotions of others, how do you perceive the relationship between emotional intelligence and cognitive intelligence?

- a. They are interlinked
- b. They operate independently
- c. Their relationship varies depending on the individual

34-In your opinion, how does artificial intelligence support cognitive Intelligence to perform complex tasks?

a. By quickly processing large amounts of data	
b. By identifying some details that may not be apparent to humans	
c. By making decisions like humans	
d. Others	

35. If others, please justify

.....
.....

36- How might cognitive intelligence impact language learning strategies?

- a. By influencing how learners process and comprehend linguistic information
- b. By shaping problem-solving approaches when encountering language barriers.
- c. By identifying the strategies students use to practice and apply language skills.

Section Four: Relationship between Problem-Solving and Cognitive Intelligence

37-Cognitive intelligence can influence EFL learners' problem-solving abilities by enhancing their ability to solve problems effectively. To what extent do you agree:

a. Totally disagree	
b. Disagree	
c. Neither agree nor disagree	
d. Agree	
e. Totally agree	

38- Did you know that cognitive strategies are mental processes learners use to learn, remember, and solve problems?

a. Yes

b. No

39-When attempting to solve language problem, which of the following cognitive processes do you use?

a. Cognitive intelligence b. Critical thinking

c. Memory retention d. Synthesizing information

40-Critical thinking helps in solving problems by promoting systematic analysis of solutions

a. Yes

b. No

41- If yes, please justify

.....

42- Do you think developing both cognitive intelligence and problem-solving can help to:

(select more than one).

a. Motivation	
b. Social interaction	
c. Self-regulation	
d. Autonomous learner	
e. Self-confidence	

43- If you have further suggestions, please feel free to share:

.....
.....
.....
.....

Thank you for your cooperation

Résumé

La présente dissertation explore les perspectives des étudiants d'anglais langue étrangère quant au rôle de l'intelligence cognitive dans le développement des compétences de résolution de problèmes, qu'ils soient liés à des tâches linguistiques ou autres. Les capacités mentales développées par le processus de la pensée, des sens et des expériences sont utilisées pour relever et résoudre des défis ou des problèmes en identifiant, en analysant et en mettant en œuvre des solutions. La maîtrise des capacités de résolution de problèmes offre de grandes possibilités d'amélioration des compétences linguistiques, de la pensée critique et des résultats éducatifs en général. Cependant, on n'accorde pas suffisamment d'importance à ces capacités dans les cours d'anglais langue étrangère pour développer les résultats linguistiques des apprenants. En outre, l'accent n'est pas mis sur l'amélioration de ces compétences, malgré l'utilisation de méthodes traditionnelles d'enseignement des langues. Cela peut être dû à de nombreuses raisons, comme l'accent mis dans les classes de langue anglaise sur l'enseignement des règles linguistiques aux étudiants sans offrir beaucoup de conseils sur la façon d'appliquer ces règles pour résoudre des problèmes liés à la langue. Par conséquent, cette approche ne pas doter les étudiants des outils nécessaires pour appliquer les connaissances linguistiques dans des situations pratiques. À cet égard, l'étude vise à étudier et à analyser la corrélation entre l'intelligence cognitive et le développement des compétences en matière de résolution de problèmes dans le contexte de l'apprentissage de l'anglais langue étrangère. Pour atteindre cet objectif, un plan de recherche descriptif et quantitatif a été utilisé, comprenant l'administration d'un questionnaire aux étudiants de première année de maîtrise, auprès de 48 étudiants choisis parmi 160 étudiants, au Département d'anglais, Université 8 mai 1945, Guelma. En conséquence, les données compilées confirment l'hypothèse de recherche, qui implique que les apprenants d'EFL sont conscients de l'utilité des processus cognitifs pour développer leurs compétences en résolution de problèmes. Les résultats révèlent que les étudiants utilisent des stratégies cognitives au cours

de leur processus d'apprentissage, ce qui leur permet d'améliorer leurs compétences en matière de résolution de problèmes et de devenir des apprenants plus autonomes.

Mots-clés : Apprenants autonomes. Aptitudes à la résolution de problèmes. Intelligence cognitive. Pensée critique. Perspectives de compétence linguistique des apprenants de la langue anglaise.

المخلص

تستكشف هذه الأطروحة وجهات نظر طلاب اللغة الإنجليزية كلغة أجنبية تجاه دور الذكاء المعرفي في تطوير مهارات حل المشكلات، فيما يتعلق بالمهام اللغوية أو غيرها. وتستخدم القدرات العقلية التي يتم تطويرها من خلال عملية التفكير بالحواس والخبرات لمعالجة وحل المشكلات أو المشاكل من خلال تحديد وتحليل وتنفيذ الحلول. ينطوي إتقان قدرات حل المشكلات على إمكانات كبيرة لتعزيز الكفاءة اللغوية والتفكير النقدي والنتائج التعليمية بشكل عام. ومع ذلك، لا تحظى هذه القدرات بالأهمية الكافية في الفصول الدراسية للغة الإنجليزية كلغة أجنبية لتطوير الحصيلة اللغوية للمتعلمين. علاوة على ذلك، هناك تركيز محدود على تعزيز هذه المهارة على الرغم من استخدام طرق تدريس اللغة التقليدية. وقد يرجع ذلك إلى أسباب عديدة منها التركيز الأساسي في الفصول الدراسية للغة الإنجليزية كلغة أجنبية على تعليم قواعد اللغة للطلاب دون تقديم الكثير من الإرشادات حول كيفية تطبيق هذه القواعد لحل المشاكل المتعلقة باللغة. ويؤدي هذا النهج إلى الفشل في تزويد الطلاب بالأدوات اللازمة لتطبيق المعرفة اللغوية في المواقف العملية. وفي هذا الصدد، تهدف هذه الدراسة إلى استقصاء وتحليل العلاقة بين الذكاء المعرفي وتنمية مهارات حل المشكلات في سياق تعلم اللغة الإنجليزية كلغة أجنبية. ولتحقيق هذا الهدف، تم استخدام تصميم البحث الكمي الوصفي، بما في ذلك إدارة استبيان لطلاب السنة الأولى ماستر، مع 48 طالبا مأخوذين من 160 طالبا، بقسم اللغة الإنجليزية، جامعة 8 ماي 1945، قالمة. ونتيجة لذلك، تؤكد البيانات المجمعة فرضية البحث، والتي تعني أن متعلمي اللغة الإنجليزية كلغة أجنبية يدركون فائدة العمليات المعرفية لتطوير مهاراتهم في حل المشكلات. تكشف النتائج أن الطلاب يستخدمون استراتيجيات معرفية أثناء عملية التعلم، والتي يجدونها مفيدة في تعزيز مهاراتهم في حل المشكلات، وتسمح لهم بأن يصبحوا متعلمين أكثر استقلالية.

الكلمات المفتاحية: المتعلمون المستقلون. الذكاء المعرفي. التفكير النقدي. منظور الكفاءة اللغوية لدى متعلمي اللغة

الإنجليزية كلغة أجنبية. قدرات حل المشكلات.