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MASTER THESIS

in Sciences of the Language

Submitted and defended by:

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Investigating the Impact of the Use of English as a Medium of Instruction in Teaching Computer Science at the Tertiary Level

Case Study of First-year Computer Science Students at Mohamed Kheider Biskra University

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Declaration

I, Rahma Hadjer, do hereby declare that this present research which is titled" Investigating the Impact of the Use of English as a Medium Instruction in Teaching Computer Sciences at Tertiary Level is my original work and has not previously been submitted for any institution or university for a degree. I also declare that a list of references is provided forward indicating all the sources of the cited and quoted information. It was certified and completed at Mohamed Kheider University of Biskra, Algeria.

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Dedication

*IN THE NAME OF **ALLAH**, MOST GRACIOUS, MOST MERCIFUL*

This modest work is dedicated:

*To **my mom and Dad**, I want to say a big thank you for always being there for me. Your love, sacrifices, and support have made me who I am today, and I'll always be grateful for everything you've done.*

*To **my bestie, AMIRA**: thank you for all the days that you made me feel loved and appreciated I am out of words to tell you how grateful I am to have you.*

*To my **brothers Aymen & Wassim**: Thanks for being the shoulder I can always depend on.*

*To **the person** whom I just want to say thank you for being in my life making me smile encouraging me when I feel defeated comforting me when I am sad. Thank you for always being that one person, I can always count on.*

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Abstract

1. This research seeks to inspect the impact of using English as a medium of instruction (EMI) in the field of computer science. The main issue is that the majority of computer science students have difficulties understanding English. Hence, in this study, we seek to answer the following question The impact of English language usage on the academic achievement of Algerian university computer science students, we hypothesized that the use of the EMI positively affects the academic achievement of Algerian university students studying computer science. To collect data we used descriptive methods on the views of students and teachers, a questionnaire was distributed to first-year computer science students and teachers at the University of Biskra. After the data analysis, the results showed that EMI students and teachers alike appreciate the importance of English and accept it at Biskra University. Moreover, the majority of participants had a poor level of understanding of the language but had positive attitudes toward the use of English as a means of teaching computer science. In light of these findings, this research suggests some educational implications for students, teachers, and policymakers to assist them in the process of adopting EMI in the fields of computer science to enhance their capabilities and to master this language.

Keywords: EMI, Computer Science, English teaching and learning

List of Abbreviations

EMI: English as a medium of instruction

CS: Computer Science

ESP: English for a specific purpose

H: Hypothesis

RQ: Research Question

ECS: Exploring Computer Science

L1: First Language

ACM: Association for Computing Machinery

ICT: Information and Communication Technology

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General introduction

Introduction

The use of English as a means of education plays an important role in shaping academia, particularly in areas such as computer science. Universities around the world integrate English into their curricula to align with the global language of technology and science. This integration of English into a higher level represents a broader trend towards adapting educational practices to the needs of an interconnected world in which English serves as an intercultural bridge and facilitates access to a wide range of knowledge.

The integration of EMI into higher education presents opportunities and challenges, especially in areas where English is not the mother tongue. In computer science, where understanding is crucial, the effectiveness of teaching English is a topic of great importance. With its historical reliance on French and Arabic, the Algerian university system provides a unique framework for studying the impact of EMI in an environment where it is an emerging practice. This research explores the interaction between English teaching, academic performance, participation, and students' experiences - providing a comprehensive examination of the composition of the educational language.

This study highlights the impact of EMI on computer science education in Algeria, distinguishes its effects on students' outcomes, and may resonate beyond the same academic context. By investigating the effects of EMI in an environment where multilingualism is the norm, the research contributes to language policy discourse in higher education and assesses whether switching to English enables or hampers aspiring computer scientists. The results of this investigation indicate that as the international nature of education increases, the impact of EMI in Algerian

universities, especially in the field of computer science, creates challenges but provides opportunities for students to work, teach, and advance better, and we must build this research with wisdom and compassion.

1. Statement of the Problem

Computer science programs are often taught in English. However, this approach will affect the performance of academic students and language skills in computer science programs. Therefore, the problem to consider is whether or not students in computer science programs at the university level are significantly affected by the use of English as a means of education. This research project will guide choices regarding higher education policies while contributing to the discussion on the importance and relevance of using English as an educational tool for computer science students.

2. Aims of the Study

This study aims to explore the effects of the use of English as a medium of education on the academic performance and learning experiences of computer science students at the tertiary level in Algeria. It seeks to assess how English teaching EMI affects students' learning outcomes, their adaptation to language policies, and their overall academic achievements. In addition, the study will assess the perceptions and experiences of both students and teachers regarding the effectiveness and challenges of EMI policies within the higher education sector

3. The Significance of the Study

In the field of education, especially in computer science, research on the effects of the use of English as a means of education is important. The project aims

to raise awareness among university students about the benefits and challenges of computer science teaching for computer science learners. Educational curriculum and techniques can be reviewed based on discoveries to enhance students' learning outcomes. Higher education may consider using English as a means of instruction in their programs to achieve better outcomes since research is centered around its effects on education. Research can provide these individuals with a positive perspective in their field.

4. Research Questions

The goal of this study is to provide answers to the following questions (RQs):

RQ1: What is the impact of the use of the English language in teaching Algerian university students studying computer science, on their academic achievement?

RQ2: How do teachers and students of computer sciences experience how effective they are?

5. Research Hypotheses

Based on the above research questions, the following research hypotheses (H) are proposed:

H1: The use of the English language as a medium of instruction positively affects the academic achievement of Algerian university students studying computer science

H2: Teachers and students of computer science perceive the EMI language policies as a challenge, which affects the effectiveness of teaching and learning.

6. The Research Methodology for the Study

6.1. The Research Approach

This research study follows the descriptive method because it is a suitable methodology that helps gather valid data. A descriptive study describes the impact of EMI in teaching computer science. And it helps in transferring the results into statistics easily. We relied on one research tool presented to two kinds of populations: a students' questionnaire administered to first-year computer science at Biskra University to survey students' viewpoints and experiences regarding their English Language learning. A teachers' questionnaire was presented to teachers to investigate their opinions about how address to the issue of EMI in the field of computer science. Both of the questionnaires are represented in the qualitative method.

6.2. Data Collection Methods

The student questionnaire was distributed to randomly selected first-year computer science students at Biskra University. This questionnaire aimed to assess the significance of the English language as a medium of instruction in computer science and to determine their proficiency levels within their English language learning. Additionally, computer science teachers were randomly provided with questionnaires to explore both teachers' and students' perspectives regarding EMI and its effects on their education. The questionnaire also examines their opinions on how to address the EMI issue within their field.

6.3. Population

The target population used in this study were first-year CS students at the Mohamed Kheider University of Biskra which consists of 20 groups. Each group contains approximately 30 students, so, the whole population consists of 526 students. However, the sample is 45 students who have been selected randomly. And 10 teachers among 64 teachers, to see their viewpoints about the target topic.

6.4. Sample

The sample consists of first-year computer science students, specifically two groups. For the student questionnaire, we randomly selected 45 students as a representative sample. The teacher questionnaire's sample was 10 teachers, who were also randomly chosen to avoid any subjectivity or bias in selection.

7. Structure of the study

Our research study is divided into three main parts; the two first part is theoretical and the third one is practical the theoretical parts focus on a different aspect of EMI the teaching of computer science. the practical part is the fieldwork. Chapter One studies the independent variables that we explore the role of EMI, starting with a general perspective, defining EMI, and discussing its importance. The chapter examines the impact of EMI, recognizing its educational, political, and cultural outcomes. It also reviews various teaching methods in EMI, we emphasize the necessity for clarity, the role of code-switching, and the use of multimedia resources. It then places English within the Algerian context, and also, we also investigate the language relationship with the university sector, the adoption of EMI in Algerian universities, and the policies and curricula that affect language learning.

and we conclude the chapter by addressing specific challenges associated with the implementation of EMI in the field of computer science, such as linguistic competence, cultural barriers, and the need for teacher training. In the second chapter, we talked about the students' perspective, beginning with their prior knowledge of computer science. We identify the different needs of learners in this field, emphasize their significance, and categorize them into cognitive, linguistic, cultural, educational, and technological needs. Also, we present strategies to meet these needs, ranging from personalized learning techniques such as adaptive, project-based, and blended learning to active learning approaches like problem-based and inquiry-based learning, as well as collaborative learning methods including peer teaching, discussion groups, and group projects. We compose the chapter with the challenges that learners encounter in satisfying their educational needs in computer science. The third chapter is fieldwork, which includes the analysis of the questionnaires that were conducted to first-year students and computer science teachers, and their main results of data analysis to conclude with several suggestions and recommendations for both teachers and students in addition to syllabus designers.

Chapter One:

English as a Medium of Instruction

Contents

Introduction

English has become the dominant language of communication globally, used by people from diverse linguistic and cultural backgrounds. The idea of EMI, or using English as a Medium of Instruction, has gained traction in the academic world worldwide, highlighting the importance of English as a lingua franca. The use of EMI in higher education institutions has been a topic of discussion for many years. This chapter explores EMI's significance in the education system by analyzing how English has evolved as a teaching language. Additionally, the chapter covers the development of EMI and the definition and challenges EMI instructors face. It also examines the advantages and effects of using English as a medium of instruction and discusses the role of EMI in the Algerian context.

1.1. Overview of English as a Medium of Instruction Development

This recent development in higher education has drawn the attention of policymakers, content teachers, and language experts, due to its implications and changes within the classroom environment. Topics such as developing appropriate teaching techniques and study materials, interdisciplinary collaboration, professional development for teachers, and assessment methods have been raised by EMI stakeholders. (Tsou & Kao, 2017)

Huang (2018) claims that even in non-English-speaking nations, English has emerged as the primary medium of instruction in many colleges worldwide ‘‘English has become the dominant language of instruction in many universities worldwide, particularly in non-English speaking countries. This trend reflects a growing need for students to have English language proficiency to compete in the

globalized workforce"(p.214) English is now the most commonly used language for teaching in many universities worldwide, even in countries where it is not the primary language, and is an important development in global education. This change has happened because of various factors reflecting the changing nature of international communication, education, and the job market.

One of the primary causes of the shift towards EMI is globalization. As the world becomes more interconnected, English has become the common language that enables people from different linguistic backgrounds to communicate effectively. EMI has gained popularity in higher education institutions, particularly in Asia, due to globalization and internationalization. The rise in the number of international students, faculty, and researchers from diverse linguistic backgrounds has made it essential to have a shared language of instruction and learning to enable communication and access to global resources. EMI serves various educational and social purposes, including preparing students for job opportunities in international settings and facilitating academic success and access. (Lei & Hu, 2022)

1.2. Definition of English as a Medium of Instruction

EMI or English as a medium of instruction, is a method of teaching academic subjects in non-English-speaking countries, despite its narrow focus on non-native speakers, which has led to debates on its application in native English-speaking environments.

The method known as EMI is defined as “the primary use of the English language to teach academic subjects within countries or regions where English is not the first language of the majority” according to (Macaro 2018, p. 19) Despite

the contentious nature of this definition, it has been the foundation for the work of our research group. Discussions focus on the role of English language development in EMI environments and on the current narrow definition of EMI, which excludes English medium educational practices in English-speaking environments. Pecoraro and Malmström (2018) point out that some in the EMI research community seek a broader interpretation of EMI to encompass "contexts in which English is a dominant language and in which English language development is supported and actively worked for" (p. 507). The focus on multilingualism has also led to the emergence of new terminology that aims to shift the focus to the context of education rather than traditional methods of instruction. (Macaro, 2018)

1.3. The Significance of EMI

Non-English-speaking countries reap multiple benefits from incorporating English into education systems. According to Chapple (2015), students gain the opportunity to enhance their English language skills, allowing them to globalize their knowledge base and utilize the world's foremost language in their studies. This not only contributes to improving their academic performance and fostering critical thinking but also bolsters their potential in the job market post-graduation. Kassteen (2013, as cited in Chapple, 2015) suggests that additional advantages of English Medium Instruction (EMI) may include developing intercultural awareness, improving academic performance quality, achieving higher scores on standardized tests, and encouraging creativity. (Elkhayma, 2022)

According to Baso (2014), an Indonesian study that looked into how multinational corporations of employers function in the oil and gas industry found that English is a necessary skill that employers look for in applicants and that they

are prepared to teach newly hired employees " Do not meet the standards" (p. 50). The analysis showed that there can be a discrepancy between the English language curriculum's offerings and the language requirements in the workplace. EMI confers numerous advantages to both students and educators. For teachers, EMI not only opens doors to improved job prospects within their nations but also presents a venue through which they can secure positions abroad, enhancing international career mobility.

The study of 139 participants from a university in Jakarta, Indonesia suggests a positive link between English language proficiency and job performance. Although respect in the workplace is less influenced by language skills, the importance of English-based education to meet job demands is recognized. Despite concerns that EMI may impair subject knowledge, research suggests that EMI provides an advantage in the professional field. Recognizing the role of English as a global business language, the study suggests that the benefits of EMI are likely to outweigh any disadvantages cited in existing studies (Talaue & Kim, 2020a)

Teaching English in English increases engagement, academic success, and language competency. Retaining a student's first language and receiving instruction in English improves English acquisition and performance. Bilingual programs produce successful multilingual learners, and incorporating native languages promotes motivation and social well-being. English as a Second Language EMI is popular, but more research is needed to evaluate its impact on students' learning and academic performance.

1.4. Impact of EMI

In the last twenty years, higher education institutions globally have been increasingly embracing English as a Medium of Instruction (EMI) to boost their international presence and competitive edge. While EMI certification opens up numerous possibilities, it also comes with challenges, including its potential effects on students' academic outcomes. (Arroyo-Barrigüete et al., 2022)

1.4.1. Educational impact

The use of English as a teaching language has a profound and broad effect on education. EMI serves as a bridge to connect students worldwide and as a tool to ensure that educational institutions remain current with global trends. When English is used in the classroom, students can access a wealth of material that they might not otherwise be able to due to language barriers, particularly in the sciences and technology.

The study by Rajendran Sabapathy Dorasamy examines the impact of English as a medium of instruction on the academic performance of second language learners in KwaZulu-Natal schools. The research found that English does not negatively affect academic performance, but issues like lack of effective language usage, insufficient interaction with native speakers, code-switching, and teacher expertise contribute to substandard results. Factors from the informal setting, such as cultural background, family education levels, student absenteeism, and community resources, also negatively influence academic success. (Ebad, 2014)

1.4.2. Political impact

The use of English as a teaching language in political organizations across the globe has drawn the attention of academics and specialists in language planning and policy. An increasing amount of research on EMI policy and application examines how broad policies are translated into specific actions by 'actors,' like students and instructors.

EMI policies can shape a structure within which participants in finite settings can create an identity for languages and institutions by delineating an 'us versus them' dynamic. In Bangladesh, higher education is split between public and private spheres, with this division characterized by the use of both English and Bengali as EMI in the public sector, and exclusively English in the private sector. From our examination of interview data, we posit that through their linguistic habits and credence, learners and educators construct language and institutional hierarchies, following the principles of self and other categorization, thus reinforcing the overarching separation. We propose that these broad EMI policies, alongside minute practices, have implications for the acquisition of subject matter knowledge and the enhancement of English proficiency among students in an increasingly globalized context where English is often perceived as carrying substantial promise for personal and communal advancement due to its contribution to human capital formation. (Yao, Collins, Bush, Briscoe, & Dang, 2021)

1.4.3. Cultural Impact

English in education significantly impacts cultural exposure, It exposes students to Anglophone cultures, enhances intercultural competence, and promotes

cross-cultural dialogue. This EMI unites students from various language origins, encouraging communication and cooperation across cultural boundaries.

Ouarniki (2023) found that "the use of English as a medium of instruction in Algerian higher institutions involves a complex array of sociolinguistic factors" (p. 45). The integration of English as a Medium of Instruction (EMI) into education systems significantly influences local and global cultures, with its success depending on how well it respects and incorporates these cultural narratives. Birgit Brock-Utne's research, commissioned by Namibia's National Institute for Educational Development in 1995, investigated the status of African languages after Namibia's independence in 1990. This research was expanded by Halla Holmarsdottir in 2000 for her Master of Philosophy thesis, which was supported by the Scandinavian Institute for African Studies. These combined studies reveal the considerable efforts made to establish English as the official language of Namibia, marking a considerable achievement in this endeavor.

Korean students associated it with all aspects of EMI. The interviews revealed international students' frustration with the limited tolerance of Korean language use and the scarcity of interaction in their courses. The literature discusses these findings in the context of English language ownership and emphasizes the importance of Korean and international students developing a collective understanding of the role of English as a lingua franca within EMI classrooms. Using English as a medium of instruction can do more than just teach the language. It can help students learn how to understand and appreciate different cultures, preparing them to work effectively in a diverse world. When they learn to communicate with people from different backgrounds and learn about world

cultures, students can gain the skills they need to work together in international environments, contribute to global discussions, solve complex problems, and increase their opportunities to engage with the nations of the world. (Kim, Tatar, & Choi, 2014)

1.5. Teaching Approaches in EMI

This study examines differences in language use and classroom interactions within EMI engineering management teaching. Data from 21 engineering teachers at seven Turkish universities were analyzed. The study found significant differences in language use and teacher-student interaction based on university type, with lower L1 use and interaction observed at elite institutions. Four distinct patterns of EMI implementation were identified, suggesting that varied implementation across university contexts and within the same department can influence learning outcomes and that learning methodology has an important impact on English language acquisition. (Şahan, Rose, & Macaro, 2021b)

1.5.1. Clarity

The term 'teacher clarity' generally pertains to the understanding and strategies that instructors employ to ensure that their students have a thorough comprehension of the course materials More elaborately, Chesebro and McCroskey (2001, p. 62) describe teacher clarity as the concept that illustrates the process by which "a teacher can activate the desired understanding of course content and procedures in the minds of the students through the use of well-structured verbal and non-verbal messages." This definition aligns with the vision of educational communication experts who see a correlation between teacher clarity and

transparency in teaching methods Based on the concept outlined by Chesebro and McCroskey (2001), it is evident that the use of appropriate verbal and non-verbal messages is essential for achieving clarity in teaching. In other words, teachers aiming for clarity should effectively utilize verbal and non-verbal signals. In their quest to define the attributes of clear teachers, Rodger and his colleagues (2007) indicated that clear teachers speak fluently, organize the course material explicitly, and explain learning topics effectively. (Chesebro & McCroskey, 2001)

Teacher clarity is a concept that extends beyond mere linguistic transparency. It is a crucial aspect of effective teaching that includes the teacher's ability to communicate ideas and subject matter in a way that is easy to understand, but also engaging and accessible to all students. According to Chesbrough and McCroskey, teacher clarity is best achieved by strategically structuring messages that activate understanding.

1.5.2. Code Switching

The term code-switching is defined as the occurrence of "when multilingual speakers switch between different languages" (Galloway & Rose, 2015, p. 32), the multifaceted nature of linguistic practices in EMI settings. It emphasizes that bi- or multilingual behaviors, which include code-switching and translanguaging, are not limited to English-only instruction. These practices play various critical roles in the EMI classroom and, as such, should be recognized and accepted as inherent aspects of multilingual interactions. (N. Galloway & Rose, 2015)

In EMI settings, the blending of languages through code-switching and translanguaging is a key component of multilingual discourse. The work of Satan

and Rose extends prior research on code-switching by exploring modern conceptualizations. They contend that the dynamic use of language prevalent in EMI classrooms aligns more closely with the concept of translanguaging, which illustrates the unrestricted linguistic flow experienced by educators and students alike. By focusing on the linguistic dynamics at Turkish universities, their studies offer fresh insights into the interpretation of language practices within EMI environments. (Şahan et al., 2021a)

1.5.3. Multimedia Resources:

Digital technology and internet networks enhance traditional education methods by converting them into active online educational resources that are easily accessible at any time and from any place. Moreover, advancements in information and communication technology continue to improve the delivery of e-learning content, fostering greater interaction and cooperation between students and teachers. Multimedia technologies facilitate the adaptation of educational materials to various learning objectives, such as learning English as a new language. This adaptability is essential for creating customized educational content that meets the diverse styles and needs of students, which helps make education more effective and boosts student motivation and participation. (Ganan et al., 2014)

Banegas' approach to integrating content and language teaching calls for reflection on the roles of educators both as researchers and participants. It examines educational choices and the development criteria for teaching materials, alongside the evaluation of their application and the perceptions of student teachers using them. The research particularly addresses online learning environments and gathered data from interviews, surveys, and content analysis of educational tools

during the 2019 academic year. the use of multimodal resources adapted texts, and language awareness activities in crafting EMI units. However, they also reveal a spectrum of responses from student teachers, indicating diverse attitudes, perceptions, and levels of engagement with the materials that may not always coincide with the intended goals and beliefs of the educators. (Banegas & Busleimán, 2021)

1.6. The English Language and the University Sector

Technological progress has been pivotal in revolutionizing the teaching and learning of the English language. In the realm of higher education, where there is a significant reliance on a breadth of technological tools and innovations, these institutions must ponder integrating the English language into their curricula. Such integration facilitates learning and presents novel opportunities for breakthroughs and inventions. Researchers like Moursund and Bielefeldt (1999) assert that the fundamental value of technology lies in elevating the quality of life for individuals. As a result, educators and scholars should adopt English to effectively harness these technologies, as the preponderance of technological advancements are grounded in research and studies conducted in English.

Additionally, the English language is a conduit to a wealth of academic and scientific knowledge. It is undeniable that the bulk of scholarly, scientific, medical, and technological publications are available in English, including renowned journals like Elsevier, Nature, Science, and Taylor & Francis. Proficiency in English also affords students from various disciplines greater global opportunities to augment their research endeavors. Moreover, a mastery of English opens up increased job prospects for graduate students across diverse fields, including but not

limited to medical, industrial, and technical sectors, and particularly within international corporations. (Rahmani, 2021)

1.6.1. English in the Algeria Context

In Algeria Research on bilingualism and foreign language acquisition/teaching has historically evolved independently. The theoretical underpinnings of both fields of research are where this division of linked concerns originated. Research on foreign language acquisition has an educational foundation, while research on bilingualism has a sociolinguistic one. The impact of bilingualism on third language acquisition (TLA), one of the most important aspects of third language research, demonstrates how closely related the two fields of study are. Stated differently, scholars have to go beyond the mere interaction of two languages to recognize the connection between bilingualism and foreign language instruction. This definition of bilingual education includes instruction in more than one language, frequently in more than two. (Negadi, 2015)

1.6.2. The Role of EMI in Algerian Universities

The experience of the English language in Algerian higher education is mostly limited to teaching it as a subject, at the Institute of Electrical and Electronic Engineering in Boumerdes, which is unique in adopting the EMI. This approach began in 1976 as a pioneering step at the Institute of Electrical and Electronic Engineering (INELEC), an agreement intended to combine the efforts of the National Company for Industrial Manufacturing and Assembly of Electrical and Electronic Components with an Education Development Initiative. The goal was to create an institute that would provide robust training in electrical and electronic

engineering, inspired by educational models at American universities. (Saidani & Afkir, 2023)

Research on EMI, a strategy in which English is the primary language of instruction, is sparse in the Algerian context. Accordingly, studying the EMI case, especially from the student's perspective, is vital. This survey can help current and future learners, teachers and policymakers equip themselves more effectively to achieve positive outcomes through the adoption of English in higher education, thus improving educational achievements.

1.6.3. Policies and Curriculum Related to Language Learning

EMI was implemented in Chinese, which was launched in the recent year 2001, to raise the level of Chinese awareness in the international arena, thus maximizing its role in the fields of science and technology, advanced education, and economic development. This strategy aims at an educational sector that seeks to customize the skills of students with basic skills to enter the global labor market, by improving their knowledge of their academic specializations and strengthening their linguistic abilities, in speaking English, for their effective communication in a broad-based and versatile society. (Zong, 2023)

1.7. Challenges of Using EMI in Computer Science

Using English as the primary language of instruction might be detrimental to students' learning, and transferring to their native tongue could not be beneficial. Because of communication problems and linguistic challenges, it is easier to manage a bilingual, communication-focused strategy.

1.7.3. Language proficiency

Language proficiency is a significant issue with English as a medium of instruction, as it can hinder learners' comprehension of academic material and instructors' ability to clarify ideas. Institutions may create language classes or assistance programs to help improve fluency, but this requires significant time and resource commitment to achieve the required proficiency level.

Educational research identifies four primary challenges for teachers in EMI settings: teacher language competencies, student language proficiency, choice of effective teaching methods, and availability of adequate resources. A significant struggle is the heightened language demand on teachers, as Vinke et al. in 1998 found with Dutch teachers who had to slow their pace and faced limitations in dynamically managing classroom scenarios and language barriers. These difficulties were seen to impede teachers' ability to communicate concepts, find appropriate terms, and express precise ideas, which subsequently could diminish the effectiveness of content delivery and student understanding. Coleman in 2006 drew on Smith's 2004 research that outlined 15 issues prevalent in European higher education EMI programs, focusing on the necessity to improve the English skills of students and staff and the need for a consistent number of content teachers fluent in English, with a particular examination of the Israeli academic context. “It is often the case that academic professors will have high knowledge in one of the contents of the area, not the other language” (Fenton-Smith et al. 2006, p. 203).

1.7.4. Cultural Barriers

Communication techniques might be one aspect where cultural barriers manifest. Standards and practices of communication in academic settings differ across cultures. For instance, the views on challenging a professor or posing questions during lectures vary; in some cultures, this may be frowned upon, while in others, it is commendable. Such variance can lead to differences in engagement and participation levels, impacting educational attainment. Additionally, cultural differences in the understanding of implicit signals, such as facial expressions and body language, can affect the establishment of comprehension and the quality of interactions.

English as a second language speakers face challenges in understanding instructional materials, technical communication, and learning English and programming simultaneously. They prefer simplified English materials, visual methods, culturally neutral code examples, and explanatory dictionaries. They suggest learner-focused design improvements for programming educational resources to make them more accessible. (Golonka et al., 2012)

1.7.5. Teacher training

English is frequently used in higher education to boost global appeal, attract foreign students, and improve academic reputation. However, concerns arise about the shortage of skilled English teachers, but most English-taught program directors are satisfied with their instruction.

Other reviews of the current situation have highlighted the need for a more systematic and precise approach to training teachers on language and methodology.

To overcome the challenges associated with adopting English as a medium of instruction particularly in computer science, teacher preparation becomes a critical factor. Teachers can improve student learning outcomes and foster a more collaborative and inclusive educational environment by acquiring the required linguistic, pedagogical, and cultural skills. (Costales, 2017)

Teachers can be enabled to enhance student results by providing them with the appropriate linguistic, methodological, and intercultural competencies. The perspectives provided by Costales (2017) highlight the significant influence that educational approaches and proficient communication abilities might have on the success of EMI plans.

Conclusion

The use of the English language as a means of teaching is becoming more common in higher education globally. This is due to its widespread usage and rapid growth. Despite the challenges teachers and lecturers face, higher education institutions are keen to offer their programs in English. The use of the English language can greatly affect university rankings and government funding eligibility and is perceived to help institutions compete globally. The chapter also discusses the status of EMI in Algerian higher education.

Chapter Two:

Learners' Needs in Computer Science

Contents

Introduction

Computer science has become required for students as the world grows more electronic. However, as computer science is a discipline that continually evolves, students have diverse demands regarding understanding the subject. While some people may have little to no prior knowledge, others may already possess advanced talents. Furthermore, learners may have various problems with comprehension, skills, and learning styles. This chapter will examine the many demands that students have and how computer science educators can meet those needs. Through implementing this, we can establish an encouraging and productive learning environment where each student is given the chance for success and achievement in computer science.

2.1. Prior knowledge of Computer Science:

The field of computer science is experiencing a notable rise in both the number of graduates and the enrollment rates of courses. As a result, there is a strain on the resources of many educational programs. This escalation is causing concern among educators and administrators about how to manage this swiftly increasing demand. Moreover, there is a significant focus on what the future holds for computer science programs and the role of computer science in academic institutions.

The current trends in computer science enrollment and compares them to past trends. It investigates the factors that have led to a significant increase in interest in this field and how this increase may be related to efforts to expand the pool of experts in the future. Additionally, the study delves into the potential

impacts on students, teachers, and academic institutions as a whole, resulting from the growing demand for computer science education at the undergraduate level. The committee provides recommendations for academic institutions, government organizations, and businesses to manage this expansion and ensure a strong and sustainable future for computer science as a field, as well as the well-being of postsecondary education institutions, and the advancement of the country. (Medicine et al., 2018)

The field of computer science education has been putting in significant effort to increase the participation of students in elementary and high school settings in recent years. Research shows that professional development is essential in helping teachers involve and educate underrepresented groups in computers. This discussion focuses on the professional development program "Exploring Computer Science" (ECS) and the underlying research that supports it. (Park et al., 2009)

ECS professional development works to turn classrooms into incubators for future digital innovators by improving teacher proficiency and offering a curriculum that incorporates current industry trends and societal challenges. Furthermore, these professional development models' scalability offers a chance for broad transformation and provides a model for how educational systems should connect regional efforts with more comprehensive national educational plans. Within this approach, the effectiveness of professional development is evaluated not just by how well teachers perform but also by how much it can advance education as a whole, solidifying computing's position as a national benchmark for education. (Goode, Margolis, & Chapman, 2014)

2.2. Definition of Learner's Needs in Computer Science:

In our exploration of defining CS as a subject, we also realized that the name given to the subject of technologies differs across publications. For example, information science, as a subject, is partly a branch of computer science, but the term is widely used throughout Europe to refer to this discipline. ACM Europe and ACM Europe generally use scientific terminology to "cover the entire set of scientific concepts that make information technology possible" [2 p. 9]. We also recognize the importance of other-facing Newtonian computing such as the digital literacy converter, which can be linked to a curriculum grounded in the academic discipline of computer science. At this point, we have focused only on the core scientific discipline for the sake of its importance to the term computer science regardless of definition. (Webb et al., 2017)

The progress in Information and Communication Technologies (ICTs) and the evolution of advanced digital media have had a significant impact on education and learning. The term "E-Learning" is often used to describe education that uses these modern platforms, especially in the context of technology-enabled distance learning, where technology is essential in creating and sharing educational content. In the beginning, E-Learning systems had limited and inflexible content that did not cater to the varying needs and preferences of learners. They provide the same resources to everyone, regardless of their interests, expertise levels, and learning methods, modern E-Learning systems have overcome these challenges by providing personalized and flexible resources that can meet the unique needs of every learner. (Boulesnane et al., 2022)

A global among experts indicates that a certain approach is becoming crucial in educational programming, merging academic learning with future student success has been explored in recent studies on language learning initiatives. The research in question, conducted at an Indonesian university, focuses on teaching ESP (English for Specific Purposes) to English students. Although the educational program has a two-decade legacy, its graduates appear to have limited English proficiency. A preliminary study utilized a mix of research tools, collecting quantitative data via surveys from a thousand students, and augmenting it with qualitative data from focus groups. Data analysis highlighted strong motivational factors among students for learning English, such as improving international career options, competitiveness in the global job market, excelling in international challenges, increasing cultural understanding, and accessing English materials like magazines and books. (Poedjiastutie & Oliver, 2017)

2.3. Importance of Learner's Needs for Teaching and Learning in Computer Science

Computer science skills are generally defined as a modern-day aesthetic, the desire to create useful but important products through the use of computing. Identifying skills such as creative and computational thinking - which include talent capabilities, engineering systems analysis, English language learning, and understanding human behavior - forms the basis of computer science education curricula. (Giannakos, Pappas, Jakiri, et al., 2017)

The method of teaching CS has shifted from traditional methods to interactive methods in higher education to integrate it into various disciplines in the English language. However,. This study examines learning through the lens of

phonics, which enables teachers to use their own teaching experiences to better understand their students' learning experiences and articulate their language needs. This helps to establish the theoretical basis for this cultural development. Includes findings from empirical research on how students experience collaborative learning in group settings during an initial project-based course in a computer science program. (Booth, 2001)

2.4. Types of Learners' Needs in Computer Science

There are several types of learners' needs in CS:

2.4.1. Cognitive Needs

Namely, Piaget's stages of cognitive development and McCarthy's brain hemispheric cognitive style, impact a person's ability to learn particular programming languages. The proposed theory connects a programmer's cognitive attributes with the cognitive demands of different programming languages. When a programming language's cognitive demands match a student programmer's cognitive abilities, it can increase their motivation, engagement, self-esteem, and sense of accomplishment. This theory also implies that certain programming languages may be more compatible with specific cognitive characteristics. It expands on previous cognitive theory research and the established cognitive demands of computer programming. (White & Sivitanides, 2002)

The theory explores the influence of Piaget's stages of cognitive development and McCarthy's hemispheric method on programming language acquisition, suggesting that matching programmer traits with language

requirements enhances motivation and success, and some languages may be more suitable for learning, English in particular.

2.4.2. Language Needs

In the knowledge sector, he must possess special language skills and obtain an academic classification for the first time. Needs analysis is generally viewed as a step and some of it is relied upon by professionals and course designers for students in a particular academic setting. In this context, you need to research the experience of modifying the data that was conducted to require the English language for female students of the College of Computing and Information Technology at King Abdulaziz University. This study focuses on identifying the vision in addition to the importance of students' English language skills, as it contributes to their skills and level of proficiency in its applications, in addition to their preference for the content of the English language subject. On what students need in English, what they lack, and what they aspire to learn, as well as their assessment of informally accredited language courses. (Fadel & Rajab, 2017)

The study of English for Specific Purposes (ESP) evaluates the linguistic necessities of CS scholars. It examines the integration of linguistics with English methodologies tailored for Science and Technology to meet students' needs. The literature review is intended to address the main aim and the three specific goals of the research. The principal aim is to probe into the English language requirements of undergraduate CS students. Language is crucial to the discipline of CS (Rozenberg & Salomaa, 2012). The shifting landscape of Information Technology calls for updated English language competencies, yet the skillset provided by university Science faculties tends to stay the same (Fareri, Fantoni, Chiarello, Coli,

& Binda, 2020). Continually, new tech-centric terms emerge into the English lexicon, which are often less conventional and grammatically structured. This necessitates novel strategies to manage the dynamic sphere of language (Chen et al. 2013). As a result, the highly formal and structured version of the English language. (Means, 2017)

2.4.3. Pedagogical Needs

The scope of CS education around the world includes preparing students with the computer skills required by the modern digital world. However, preparing students to be effective computing learners requires many computer science teachers to be trained in English proficiency. The different requirements for student qualifications in this area raise questions about their level of effectiveness, especially for people who may lack the knowledge or pedagogical foundation to teach the subject. To overcome this problem, basic knowledge of computer science, or pedagogical content knowledge in this field, must be assessed. The findings highlighted in the tool were effective in assessing the level of knowledge of this content and helped lead to learning experiences that did not have a noticeable impact on their assessments - a discussion of wrestling that may have implications for future research and practice in Higher education. (Yadav & Berges, 2019)

2.4.4. Cultural Needs

Cultural needs are an attempt to understand the support requirements of CS students more comprehensively. It investigates the various academic and non-academic domains where students need support before they enter university, and how these requirements are linked to their performance in core CS subjects. It aims

to explore the factors that contribute to academic success in CS classes and the role that support needs play in this success. (Goode et al., 2014)

Cultural needs also delve into the differences in support requirements between male and female CS students, as well as those based on residency status. It seeks to understand the varying needs of these groups and how they are associated with academic outcomes. By looking at these differences, the study aims to identify any potential barriers to success that may exist and to provide recommendations for how these barriers can be overcome. Overall, is an important step towards understanding the support needs of CS students and how they can be addressed to help improve academic outcomes. By providing a more nuanced understanding of these needs, it is hoped that universities and educators can better support students in their academic endeavors and help them achieve their full potential. (Menekşe et al., 2020).

2.4.5. Technological Needs

The role of technology in various sectors, particularly in education and computer science. It highlights the growing preference for technological tools over traditional teaching methods and recognizes a gap in research regarding these tools' use in education. The goal is to improve educational productivity and pedagogy while increasing interaction between teachers and students through the right selection and implementation of technology.

Technology has played a pivotal role in changing how we approach education, research, and work. It has also transformed how we manage information and knowledge. In modern times, technology tools have been widely used in

education, especially in computer science, to meet global standards. Educators generally agree on the importance of using technological tools in education. Still, there is a lack of comprehensive research that analyzes the effectiveness of each tool in the educational process. However, studies have shown that teaching with technology is generally as effective or more effective than traditional methods. The integration of technology in education aims to improve current practices and enhance educational advancement. Educators must carefully select the appropriate tools to create a more innovative learning environment for students. (Quratulain et al., 2019)

2.5. Strategies of Learners' Needs in Computer Science

To ensure successful computer science education, it is important to implement strategies that focus on providing a solid technical base and developing many skills that can adapt to the constantly changing nature of the industry.

2.5.1. Personalized Learning

Personalized learning is becoming more prevalent in online computer science education due to its ability to customize pace and instruction based on the individual needs of students from diverse backgrounds. Thought Lab is an emerging personalized learning platform for computer science education that caters to the various needs of students with different backgrounds by adjusting the pace and instruction of online courses. While typical hands-on laboratory experiments in the field have not extensively considered individual student behaviors and performance in customization efforts, Thought Lab fills this gap by offering tailored experiences in a cloud-based environment. It identifies students' learning styles from their

activities and adapts the educational content accordingly, which enables teachers to use learning strategies that improve learning efficiency and quality. The platform also predicts student performance, facilitating timely changes to the teaching approach, such as providing extra help or more advanced challenges based on the pace of individual learners. An evaluation conducted with an advanced cybersecurity class at Arizona State University showed that Thought Lab effectively determines learning styles and contributes to heightened student engagement, deeper comprehension, increased effort in practical projects, and overall enhanced learning outcomes. (Deng et al., 2018)

2.5.1.1. Adaptive Learning

Adaptive learning aims to customize the educational journey for each student individually. In the sphere of Computer Science Education, adaptive learning systems can offer tailored lessons, practice drills, and assessments that draw upon the student's existing knowledge, along with their strong and weak points. Some scholarly reviews have examined adaptive learning technologies, yet specific evaluations of the methods in adaptive systems for computer science education are scant. Our broad aim is to discern the computing techniques integrated into adaptive learning systems to enable adaptive computer education at the tertiary education level. (Barbosa et al., 2023)

The concept of adaptive learning is based on the belief that each student's path to knowledge is unique. Recognizing this, adaptive learning seeks to mold learning into a personal experience, where the contours of learning are shaped by the learner's academic history and abilities.

2.5.1.2. Project-based Learning

Project-based learning (PjBL) is commonly used in the teaching of technical and computer science disciplines, providing advantages such as real-world implementation of technical concepts, direct programming experience, teamwork, and insights into more nuanced aspects of project management. However, coordinating multiple projects can lead to complications, and it may be difficult to apply uniform evaluation criteria. To address these concerns, the authors identify four key elements critical to the success of PjBL in the field of computer science:

1. Students often face challenges during the early stages of a project.

2. Students' level of enthusiasm for finishing a project can vary greatly.

3. The dynamics of teacher-student interaction are influenced by various elements, such as the teacher's knowledge regarding the project, or the student's reluctance to ask questions that may seem uncomplicated outside of the project.

4. The original concept or founding idea of the project itself. (Pucher & Lehner, 2011)

2.5.1.3. Blended Learning

Blended learning, which combines traditional in-person teaching with technology, is on the rise in higher education due to technological advancements. However, a successful blend requires more than just merging these elements; it needs a solid learning theory and effective educational strategies. Additionally, to explore and refine blended learning practices, a design-based research methodology involving repetitive cycles of identifying issues, redesigning, and evaluating is essential. This study focuses on the application of a blended learning model to an

introductory Java programming course. It details the design, implementation, and evaluation of the framework, along with its effects on improving the learning process in computer programming. (Hadjerrouit, 2008)

The integration of blended learning in Higher education has gained traction with the advent of modern technology. Nevertheless, for it to be truly effective, it's vital to base this approach on well-founded educational theories and teaching methodologies.

2.5.2. Active Learning

In teaching computer science students to enhance their mathematical and algorithmic reasoning skills, there are significant challenges. In the winter of 2013, an innovative educational framework was introduced for a course that combines computer science theory with practical algorithmic tasks and activities to boost mathematical thinking and cooperative problem-solving. This framework was inspired by the Massachusetts Institute of Technology's successful "Technology-Enabled Active Learning" (TEAL) approach used for teaching physics. Additionally, motivational tactics commonly employed by game designers were incorporated into the model. The preliminary results from the classroom implementation show that students found the course to be more interactive and motivating than other similar courses. (Pirker et al., 2014)

2.5.2.1. Problem-Based Learning

In many computer science academic courses, the emphasis is solely on technical aspects. However, graduates must have a strong foundation across diverse domains and learn collaboratively. To address this issue, we propose a course plan

based on problem-based learning (PBL). Our plan consists of two parts: a trial evaluation and a three-year tracking of our students. also provide reports on how PBL improves student learning after we fully adapt to PBL. Finally, we offer a summary of our PBL teaching journey, discussing the practical challenges of implementing foundational pedagogical shifts and nurturing staff support, as well as ongoing refinement of our PBL instruction. Additionally, we discuss some strategies we have adopted to overcome the well-known challenges associated with PBL instruction. (Queirós, 2014)

The core of our approach to education in computer science has been to shift the focus from purely technical content to a holistic curriculum where emphasis is placed not only on individual learning but also on collaborative and interdisciplinary efforts. To foster well-rounded graduates, we recognize the necessity of laying down fundamental concepts across a spectrum of disciplines. Our educational strategy elaborates on the structured design of our courses, rooted in PBL. The transformation to PBL did not happen overnight; it was methodically planned and executed in two primary phases.

2.5.2.2. Inquiry-based Learning

Inquiry-based learning can enhance science teaching by allowing students to participate in real investigations and gain a more accurate view of scientific pursuits. However, it is not commonly used due to factors like insufficient time, lack of tools, difficulty integrating abstract concepts, and teacher experience. With the development of computer technologies, integrating inquiry-based learning can be easier, but it is crucial to recognize its limitations and use it as a supportive tool. (Kubieck & Kubieck, 2005)

2.5.3. Collaborative Learning

Their enhancement and support through technology is a poignant question regarding these innovative instructional techniques. Historically, computer-based activity, both in educational settings and beyond, has been centered on designing software for individual use. However, recent inquiries by researchers have shifted towards exploring common practices and artifacts that help groups coordinate their activities, focusing on crafting new supportive technologies (Bødker & Pederson, 1991). This burgeoning field, known as Computer-Supported Cooperative Work (CSCW), posits that computers can aid in facilitating and redefining group member interactions (Gallagher & Kraut, 1990). The term 'groupware' has been introduced to denote software aimed at the group rather than individual use (Stefik & Brown, 1989). Research in this domain has kindled an interest in the educational potential that CSCW can offer, often referred to as Computer-Supported Collaborative Learning (CSCL), which narrows the focus to harnessing collaborative technology in educational settings. (Koschmann, 1994)

2.5.3.1. Peer Teaching

The increasing number of students enrolling in computer science programs has made it challenging to manage the growing numbers in introductory computer science courses. To address this issue, peer teaching has emerged as a promising approach. Peer teaching is adaptable and can scale according to enrollment numbers. However, implementing a large-scale peer teaching program can lead to pedagogical and logistical difficulties. To investigate these issues, we developed an online platform called "My Digital Hand" to monitor individual peer-to-peer teaching interactions. This tool was implemented in three different universities with

extensive computer science courses. The data collected highlighted the educational and logistical challenges encountered on a large scale, providing insights into potential solutions. Using this data, we enhanced "My Digital Hand" to its second version, further refining the support for peer-to-peer teaching. (Smith et al., 2018)

2.5.3.2. Discussion Group

According to the results of a discussion group, it was determined that organized discussion forums offer a better learning environment. This is because they provide clear guidelines and prompts that help students engage in in-depth and focused discussions. The structure of these forums also helps streamline students' thought processes, resulting in more meaningful conversations. Conversely, unstructured forums used by the control group lacked direction and guidance, leading to less effective learning experiences. These findings highlight the importance of using a structured approach to online discussions in virtual classrooms to achieve better engagement and learning outcomes. (Tibi, 2018)

Discussion group suggests that structured discussion forums enhance the learning experience by offering clear guidelines and prompts that promote detailed, focused discussions. These structured forums support students' thinking and foster more meaningful conversations. In contrast, the control group's unstructured forums lacked guidance and organization, which led to less effective learning. the importance of conducting well-organized online discussions in virtual classrooms to boost student involvement and achieve learning goals.

2.5.3.3. Group Project

Computer science students' retention and graduation rates at California State University Los Angeles (CSULA), while also enhancing their learning experience. They have developed a strategy based on small-group support, which involves offering three software development groups that students can join, each led by a graduate teaching assistant under the faculty's guidance. This approach provides students with mentorship beyond traditional classroom lectures and promotes a hands-on experience that is crucial in the tech industry. It also encourages a sense of belonging and investment in their education, leading to a stronger commitment to their studies and reducing the likelihood of dropout. Ultimately, this proactive engagement with the educational material could potentially transform the academic journey for many students, equipping them with the necessary tools to excel in their academic and future professional endeavors. (Guo, 2008)

2.6. Challenges Faced by Learners' Needs in Computer Science

The teaching effectiveness of computer science teachers and helping them overcome current challenges, is crucial to enhance their support and resources. This can be achieved through specialized workshops, sharing of experiences among teachers, and providing advanced educational materials. Continuous curriculum development and practice-based training can help these educators keep up with the rapid advancements in information technology and further strengthen the educational community for computer science. (Yadav et al., 2016)

2.6.1. Learning Syntax

Denny et al have been completed on students using Java programming language within an online programming platform. It was concluded that the results of the programming work sent to the platform contained syntax errors, which led to a lack of mastery of the rules of writing in Java. In the studies that have been carried out, Denny has analyzed and classified its causes and the different levels that learners face. (Ahadi, Lister, Lal, & Hellas, 2018)

The intelligibility of programming languages can influence students' learning experiences. Studies have shown that languages resembling English are easier for beginners to understand than those based on traditional constructs. This is particularly relevant for beginners. Other studies have explored the challenges of learning object-oriented programming in complex contexts, highlighting the frequency of errors and their prevalence among beginners. Denny et al.'s research on students using Java programming on an online platform found syntax errors leading to a lack of mastery.

2.6.2. Problem-solving

Scientists first started conceptualizing computing environments in the early 1960s that could solve complex problems and interact with users in a human-like manner. However, most of these attempts were unsuccessful due to the lack of technology available at the time to support Problem-Solving Environments (PSEs) in computational science. By the 1990s, high-performance computing devices and a deeper understanding of computational science principles allowed for the realization of PSEs. The term "problem-solving environment" may have different

meanings for different experts, but it generally refers to a computer system equipped with computational tools to address a specific set of challenges, including sophisticated problem-solving methods, automatic or semi-automatic selection of these methods, and easy integration of new problem-solving approaches. Although rudimentary PSEs emerged early in computing history, their potential abilities in the future could be groundbreaking for science and the economy. (Gallopoulos et al., 1994).

Scientists projected computers that could interact with humans in a human-like manner and solve complicated problems, a lack of technology and knowledge of computational science principles was impeding their fulfillment. PSEs have the potential to transform both science and business thanks to their advanced problem-solving techniques, automatic or semi-automatic selection, and simple integration of new ideas.

2.6.3. Grasping Abstract Concepts

As our society has become increasingly connected and digitized, computers and algorithms are playing a bigger role in helping people complete their daily tasks. However, not everyone has direct experience with the digital realm and may find it challenging to understand the full extent and impact of digitization. The concept of digitization is complex and abstract, making it tough to comprehend. In our research paper, we argue that having a tangible understanding of digitization is crucial to fully appreciating the essence and future of a digitized community. This understanding should involve cognitive approaches that move beyond logical reasoning, challenge established narratives, and shift from preparing for the future to embracing innovation. We emphasize the importance of a diverse understanding

of digitization, particularly in the education sector, and discuss how a varied outlook is necessary to equip individuals to engage with a digitized society. (Dufva & Dufva, 2019).

Conclusion

This chapter on learner's needs in computer science likely addressed the various requirements that students have when engaging with computer science education. It may have touched upon the importance of catering to different learning styles, providing practical experience through hands-on projects, ensuring access to current technology and resources, and the need for supportive learning environments that encourage problem-solving and critical thinking skills. It probably highlighted the significance of adaptive learning pathways that can accommodate individual paces and preferences, as well as the role of mentorship and collaboration in fostering a deeper understanding of the subject matter. Understanding and addressing these needs is essential for the development of competent and confident computer science professionals who are prepared to tackle the challenges of our increasingly digital world.

Chapter Three:

Data Analysis and Results

Contents

Introduction

In chapter three, the research methodology and data analysis are detailed, including the research approach, population and sample of the study, data gathering tools, students' questionnaire, data analysis, and discussion and interpretation of the results. The research approach involves a qualitative method to explore the impact of using English as the language of instruction for teaching computer science at the tertiary level. The study focuses on first-year students and computer science teachers at Mohamed Kheider University of Biskra. Data is collected through questionnaires from both students and teachers. The students' questionnaire comprises fifteen questions, including closed and open-ended questions. The questionnaire was validated through feedback from a supervisor. The data analysis section provides an overview of the findings from the students' questionnaire, including demographic information and students' exposure to English language modules

3.1. Research Approach

The present research seeks to explore the effects of utilizing English as the language of instruction for teaching computer science at the treaty level. Accordingly, the researcher has adopted a descriptive method in line with the study's nature. Therefore, a qualitative approach is being utilized to collect the required data.

3.2. Population and Sample of the Study

The research focuses on first-year students and computer science teachers at Mohamed Kheider University of Biskra. A total of 45 students participated in a questionnaire, while 10 computer science teachers were also questioned.

3.3. Data Gathering Tools

For this study, qualitative data from teachers and students is collected using two questionnaires.

3.4. Students' Questionnaire

3.4.1. Description of the Questionnaire

The student survey consists of fifteen questions, including both yes/no questions and open-ended questions to gather feedback and suggestions on the effectiveness of EMI in computer science.

3.4.2. Administration of the Students' Questionnaire

This questionnaire was created for first-year Computer Science students at Biskra University and distributed in printed form. Forty-five students participated in the questionnaire, which was specifically tailored for a descriptive study that did not necessitate a large sample size. First-year students were chosen because they are just beginning to study computer science and have had a year of exposure to the English language at university.

3.4.3. Validating the Students' Questionnaire

The questionnaire was sent to the supervisor after creating the initial version. It was then revised and adjusted based on the supervisor's feedback.

3.5. Data Analysis

3.5.1. Analysis of Students' Questionnaire

Section One: General Information

Item one: Specifying Gender

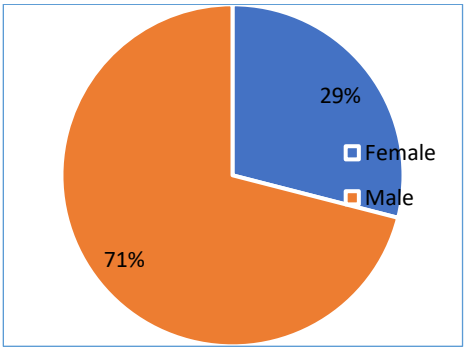

Figure 1 Students' Gender

Based on the information in the Figure, it is evident that there are more female students than male students. Of 45 participants, 13 (29%) are female, while 32 (71%) are male. This indicates a 42% difference between the number of male and female students, showing that there are more male students than female students in the field of computer science.

Item two: Specifying age:

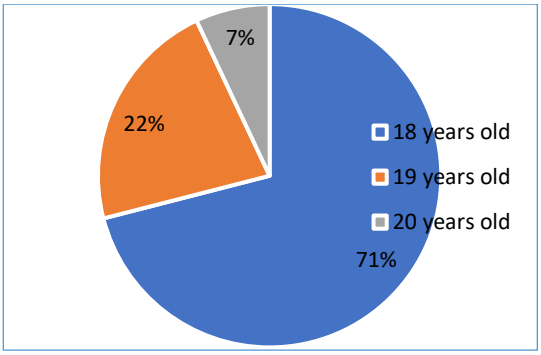

Figure 2 Students' Age

The data reveals that the majority (71%) of incoming computer science students are 18 years old. As the age increases to 19 years (22%) and 20 is the smallest group (7%), there is a sharp decline in the percentage of students in this age group. This suggests that the majority of students entering the computer science field are relatively young, with a significant drop-off in the number of older students.

Item three : How long have you been studying English?

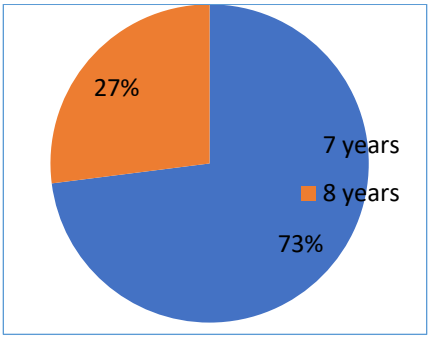

Figure 3 Student's Experience

The data shows that 73% of the students have been learning English for 7 years, while 27% have been studying it for 8 years. This suggests that the majority of students in the computer science program have been learning English for 7 years.

Section Two: English as a Medium of Instruction

Item four: Are you exposed to modules using the English language?

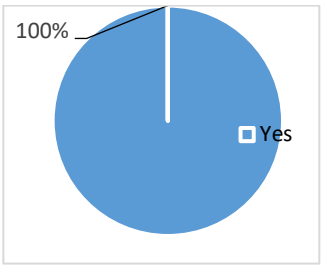

Figure 4 Students' Exposure to English

Based on the findings in Table 2, all of the students reported being exposed to modules delivered in English. This suggests that they have some level of familiarity with the English language instruction and learning methods.

- If yes, how many modules do you study in English?

All students who answered "yes" in the questionnaire reported that they had been exposed to all the modules offered in the program. In other words, these students do not have any credits or parts of the program that they did not participate in or learn from; they have gone through all the educational departments available to them

Item Five: How do you assess your level of comprehension in English?

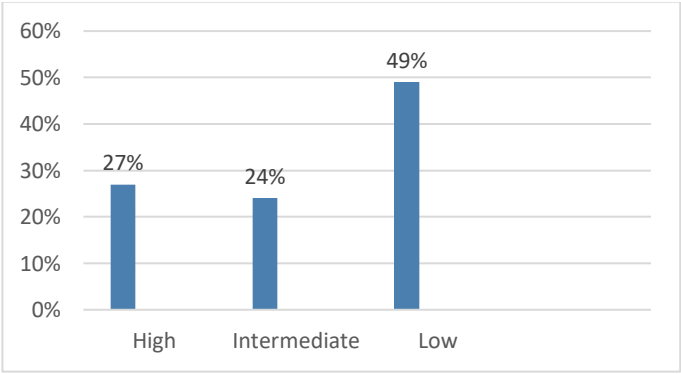

Figure 5 Student's Level of Comprehension in English

The majority of students indicated a low proficiency level of 49% in this language, while a smaller percentage (24%) expressed an intermediate level of

understanding. This suggests that most students are satisfied with their progress and have achieved their goals.

Item Six: Are you familiar with the use of English in teaching at university in your major (specialty)?

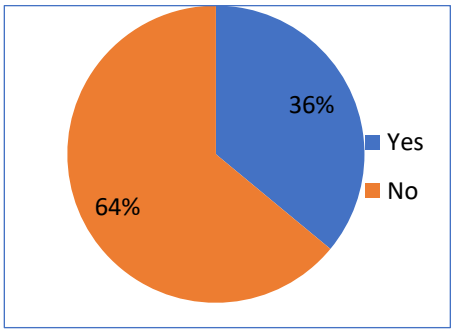

Figure 6 Student's Knowledge of EMI

According to the table above, (64%) asserted that they do not know what is meant by the term EMI. However, (36%) of the students indicated that they are familiar with the term EMI. This reveals that the majority of learners are not familiar with the term EMI.

Item Seven: Do you agree that English should be used in the computer sciences?

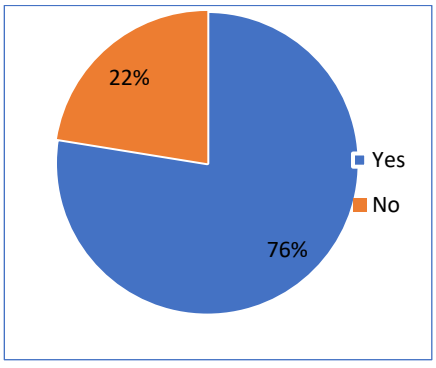

Figure 7 Student's Opinion Towards English

The vast majority (78%) agreed, whereas only a minority (22%) of the respondents disagreed. This indicates that most students favor using English as the primary language for teaching computer science, while some are against the idea

Justification:

The students who agreed felt that English is highly significant and is the most commonly used language globally. Many students mentioned that developed nations rely on this language for computer science. In contrast, others pointed out that it allows them to pursue education or employment in foreign language settings or international companies, leading to improved career prospects.

Item Eight: How significant is it to use English in the computer sciences?

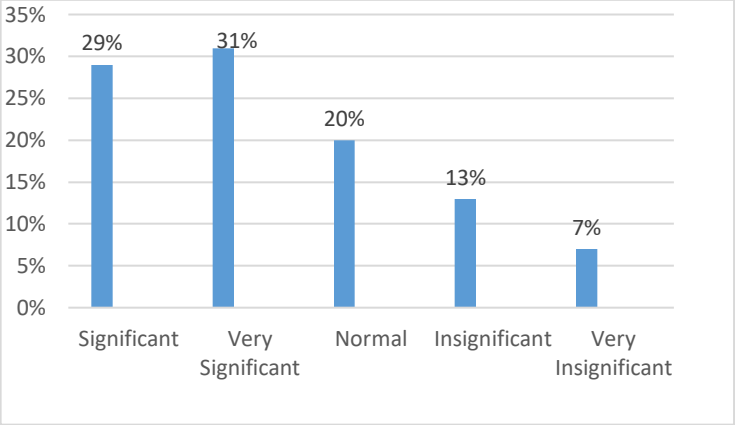

Figure 8 Importance of EMI

The data in figure 8 indicates that most students believe that using English as a medium of instruction (EMI) is highly important, while others consider it to be a standard practice. This suggests that they are interested in using English and recognize its value in computer-related fields.

Item Nine: To what extent will Algeria benefit from English in computer science?

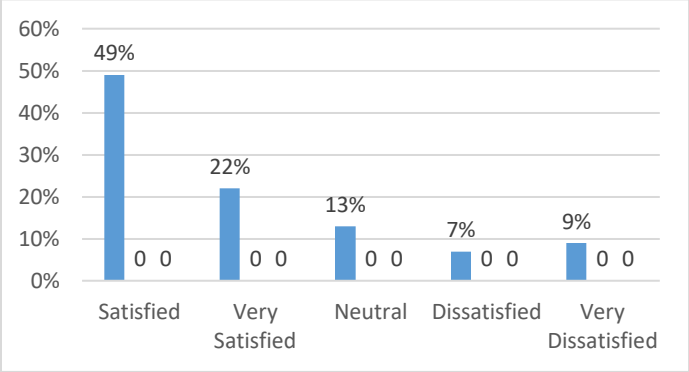

Figure 9. Adopting EMI in Computer Science in Algeria

The majority of the students said that it is satisfactory for Algeria to apply it. So, this indicates that they have mastered the benefits of adopting this language as a medium of instruction in computer science for Algeria. However, few of the participants were dissatisfied, and few of them were very dissatisfied. This also signifies that the majority of students have positive attitudes toward using EMI in the Algerian context.

Section Two: Learner's Needs in Computer Science

Item ten: In which language do you prefer to study?

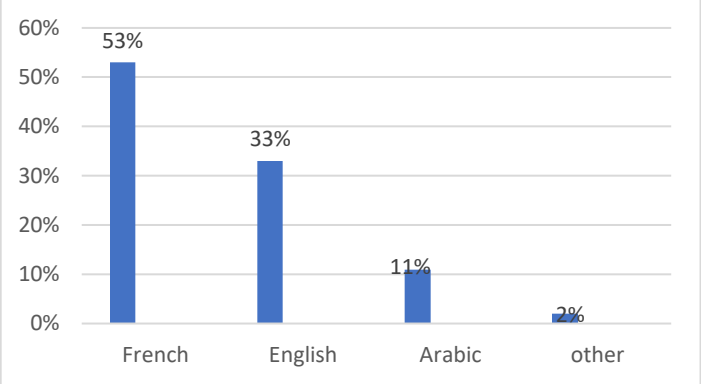

Figure 10 The Preferred Language for Students

According to the data in Table 10, 53% of the students have expressed a preference for French as their language of choice, while 33% have indicated a preference for English. Additionally, 11% of the participants have shown a greater inclination towards Arabic.

Item Eleven: What language/s do you use in your field of learning?

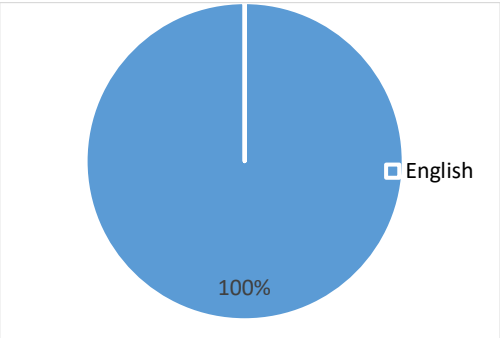

Figure 11 The Language Use for Students

This table indicates that all students, which amounts to 100%, use the language or languages specified in their field of learning.

Item twelve: Do you agree with switching to English?

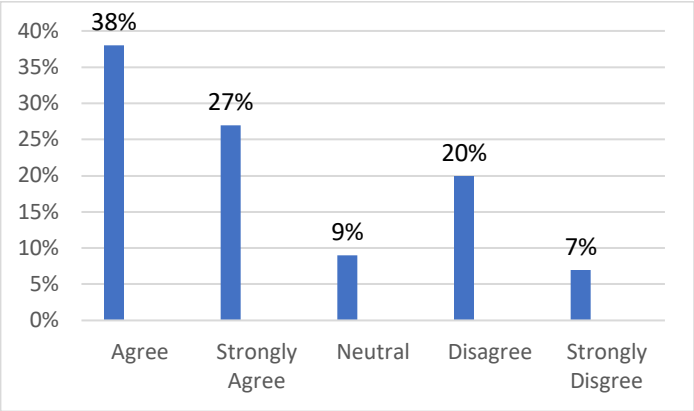

Figure 12 Student's Switching to English

When acknowledging. to transition to English, the majority, 38%, were in favor of the change, while 20% disagreed and 7% expressed strong disagreement. This indicates that most participants have a good understanding of the potential impact of using English to enhance the education process.

Item Thirteen: Do you face any problems in your courses because of your English language level?

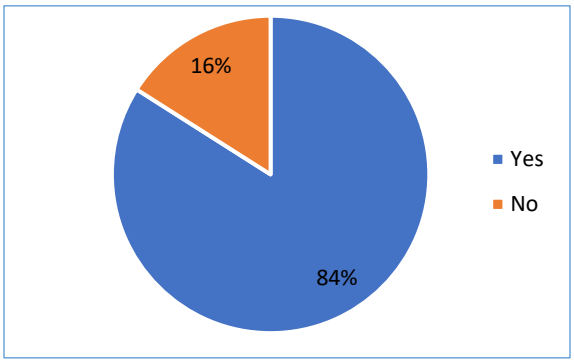

Figure 13 Student's Problem Toward Their Level

The data from Figure 13 suggests that students face challenges in their academic courses because of their English language skills. The results show that most students agree with this, while others report having difficulties with their English proficiency.

If yes, what are they?

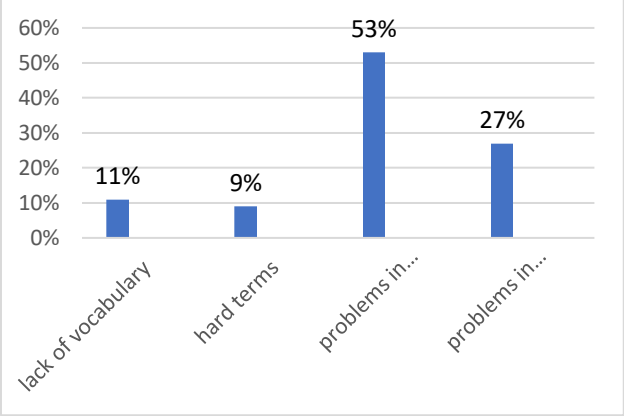

Figure 14 Student's Difficulties in English

The data suggests that 11% of the surveyed individuals struggle due to a limited vocabulary, while 9% find it challenging to understand difficult terms. Most of the student's significant issue is comprehension, which affects 53% of respondents, indicating that more than half of them have difficulties grasping information. Lastly, 27% of individuals have trouble with pronunciation

Item fourteen: Do you think that using English as a medium of instruction will be beneficial?

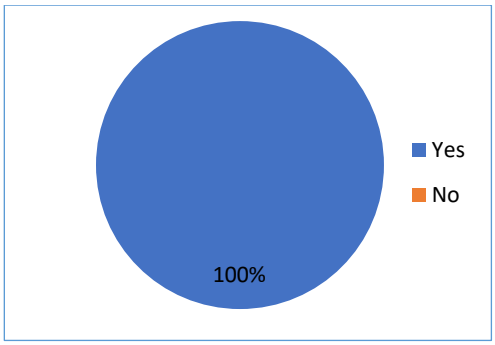

Figure 15 Benefits of Using EMI

The findings describe responses from a questionnaire focused on assessing students' awareness of the benefits of using English as a language of instruction. It states that all the respondents, without exception, showed a strong preference for English to be used as the medium of instruction in their academic environment. The

100% figure clarifies that the entire group of survey participants unanimously preferred English. Their strong preference suggests that student is convinced that using English will be advantageous to their educational experience.

If yes, what are the benefits?

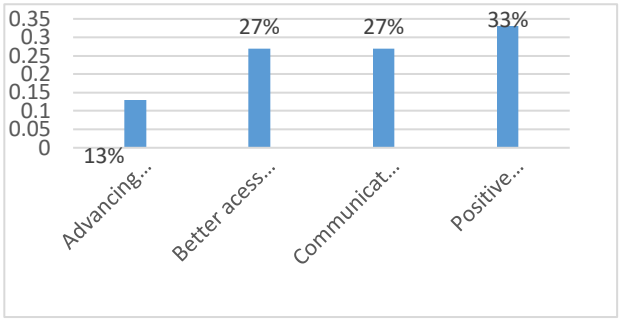

Figure 16 EMI Benefit

The data presented in Table 16 indicates that some students support the idea of elevating the university ranking. Other students believe that using English as the primary language of instruction provides improved access to scientific articles, and facilitates communication with other universities. A majority of students feel that using English has a positive impact on the broader community. Additionally, a significant portion of the participating students acknowledged the numerous advantages of using English as a medium of instruction, including those mentioned previously. A few participants argued that the main benefits are improved access to scientific articles and communication with other universities. Other students agreed that enhanced access to scientific articles enables communication with various universities and has positive effects on the broader community. This suggests that all students recognize the benefits of using English as a medium of instruction.

Section Four: Further Suggestions

In response to the previous question, participants in the sample were asked to add comments about the research topic. Few students responded to this part, while the majority left it blank, possibly feeling that the previous questions covered all their ideas about the topic.

Some participants who answered the question provided comments about the topic. They mentioned that it is an interesting topic, while others found it difficult. Some enjoyed answering the questionnaire, and some simply wished the researcher good luck. Others emphasized three main points: the importance of the English language and its global status, and the benefits of using English as a medium of instruction in computer science.

Their suggestions can be summarized as follows:

-The department should offer more English classes from the beginning of university studies, as studying English only once a week is not sufficient.

- Universities should provide educational courses and services to improve students' English proficiency.

- English should be introduced in primary school.

- English language classes should be increased.

- English should be promoted in all fields, not just scientific ones.

- Engaging in conversations with native speakers and colleagues both inside and outside the classroom.

- Watching movies, listening to podcasts and music.

- Listening to audiobooks.

- Using a dictionary when encountering a difficult word and practicing its pronunciation.

- Using language learning applications to practice the language.

In general, it seems from the above suggestions and comments that students are aware of and appreciate the important role that English plays in the world.

3.6. Discussion and Interpretation of Students' Questionnaire

The sample for this questionnaire consists of 45 first-year participants in Computer Science at Biskra University. This group comprises 71% males and 29% females, indicating a higher interest in Computer Science among males. The study's conclusion is based on the participants' responses to the questionnaire.

In section two, which focuses on English as a medium of instruction, all informants (100%) mentioned exposure to one module in English. They also expressed satisfaction with their English language proficiency. However, 49% of students reported having a low level of English, leading to difficulties in achieving their learning goals. Despite this, the majority (31%) believe it is very important to apply English as a medium of instruction in computer science.

Additionally, 78% of students agreed to use English as a medium of instruction in computer science, citing easy learning and understanding, better job opportunities, access to scientific articles, and improved global communication. Most also expressed the opinion that it would be beneficial for Algeria to adopt English as a medium of instruction.

Moving on to the third section, 38% of students are open to transitioning to the English language, despite facing difficulties, particularly related to vocabulary.

They believe that courses delivered in English would be more interesting and beneficial for them. As a result, they recommend integrating English from primary school and providing English courses in universities.

In summary, the majority of students have a positive attitude towards using English as a medium of instruction in computer science, despite encountering challenges, especially with pronunciation. They are motivated and interested in using English, which makes integrating the English language into Algerian universities more challenging, as it requires comprehensive reforms, including increasing English language classes across all fields, not just in computer science.

3.7. Teachers' Questionnaire

3.7.1. Description of the Questionnaire

This questionnaire is composed of three. The first section contains three items as general information, and the second section concerns the impact of EMI on students learning and engagement; it includes five items. The teachers' questionnaire involves both open and close-ended questions that attempt to gather their perspectives concerning the effectiveness of EMI in teaching computer science at the tertiary level.

3.7.2. Administration of the Teachers' Questionnaire

The questionnaire was created for computer science teachers at Biskra University in the form of a printed version. Ten teachers participated in the research, which aimed to investigate the impact of EMI on teaching computer science at the tertiary level. This research method was used to collect data from computer science teachers who teach English at the tertiary level.

3.7.3. Analysis of Teachers' Questionnaire

Section One: General information

Item one: Teachers' experience

The question specifically asks for the duration of their teaching experience in terms of years. Based on the results you provided, here is the breakdown: 2 teachers reported having 3 years of teaching experience in computer science at the university level. 3 teachers reported having 5 years of teaching experience, 4 teachers reported having 7 years of teaching experience, and 1 teacher reported having 2 years of teaching experience. Most of the teachers involved have a moderate to substantial amount of teaching experience, with the majority having taught for more than 5 years. The highest group count is teachers with 7 years of experience, which suggests that there is a solid core of experienced educators. Moreover, the presence of those with less experience, like the one teacher with 2 years and those with 3 years, means there is also a fresh perspective and potentially a recent engagement with contemporary teaching methods or recent academic training.

Item two: Teachers' Qualification

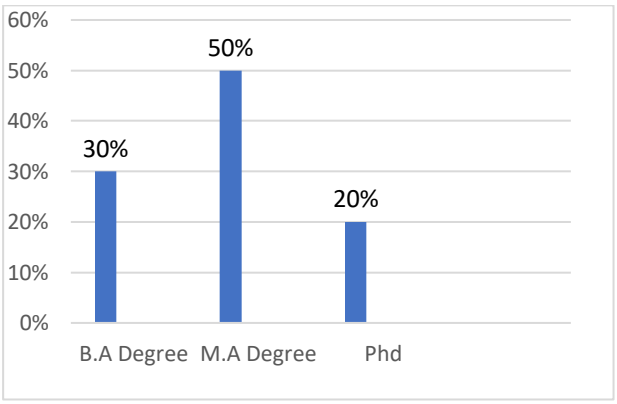

Figure 17 Teachers' Qualification

The Figure above demonstrates that 30% of the teachers hold a B.A. degree, 50% possess an M.A. degree, and 20% have a PhD. This suggests that the majority of teachers have an M.A. degree, indicating a substantial presence of highly skilled and experienced individuals in this sample

Section Two: Impact of EMI on Students 'Learning Engagement

Item three: To what extent do you adapt your lesson plans and teaching strategies to satisfy the needs of students with different levels of English language proficiency?

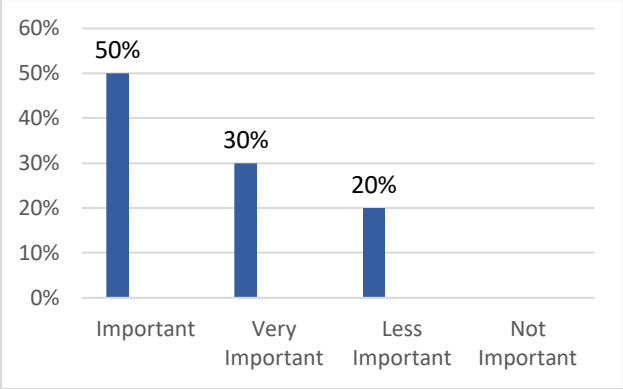

Figure 18 The Importance of EMI

The results above show that the majority of teachers (50%) consider EMI to be important. Additionally, 30% believe that it is very important, while another 20% % perceive it as less important. Furthermore, no one of the respondents stated that EMI is not important. This indicates that EMI is significant for the effectiveness of using English in computer science

Item four: What is the primary language used by most of your students? (Select one or more)

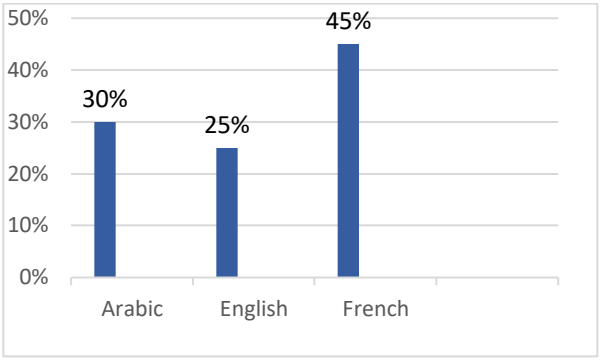

Figure 19 The Primary Language of Students

Students are observed to have varying primary languages. The majority of the students, constituting 45%, speak Arabic as their primary language. The second most prevalent language is French, spoken by 30% of the students. English is the primary language for 25% of the student population, which makes it the third most common language spoken by students. This distribution highlights the linguistic diversity within the group, with Arabic being the leading mother tongue.

Item Five: How do you assess the impact of EMI on first-year students' learning outcomes in computer science?

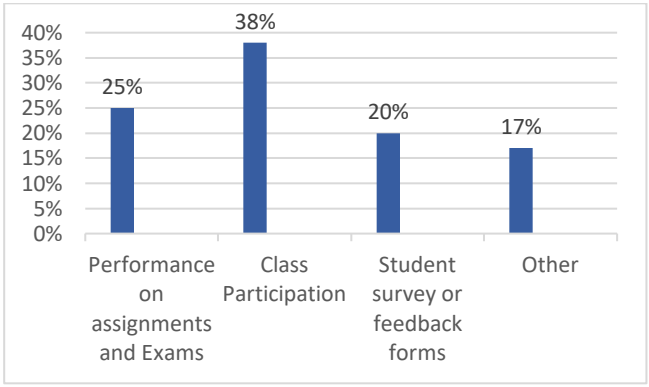

Figure 20 The Impact of EMI on First-Year Students

The assessment examined various elements contributing to learning results. Tests and quizzes made up 17% of the assessment, evaluating students' capacity to

apply their knowledge and problem-solving abilities. Participation and discussions played a significant part, comprising 38% of the assessment, as they gauged student involvement, critical thinking, and teamwork skills. Feedback forms represented 26% of the assessment, enabling students to offer input on the effectiveness of the EMI method and the quality of instruction. Lastly, the remaining 20% was allotted to other factors that could impact learning outcomes, including attendance, coursework, and practical projects. This detailed analysis aimed to offer a comprehensive overview of the influence of EMI on computer science learning outcomes, taking into account various aspects of student performance and involvement.

Item six: Describe any strategies or techniques you use to promote effective communication and participation in your EMI classroom

- In an EMI classroom setting, teachers suggest various methods to facilitate effective communication and involvement, especially in the field of computer science for first-year students.

- Pair programming and project-based learning are recommended to foster English communication and collaboration among students.

- Introducing specific technical terminology in English can help students become more at ease with the language used in computer science literature and discussions.

- Offering additional support sessions focused on language development can benefit students who may struggle with English, including vocabulary expansion and tailored conversational practice related to computer science.

- Integration of language learning technologies and computer science educational software that support interactive learning is encouraged.

- Delivering content through diverse media such as video tutorials, podcasts, and infographics can encourage students to ask questions and express their ideas in English.

- Grouping students with varying language proficiency levels can lead to peer teaching.

- Developing assessments that promote the use of English while considering learners' language development stages is recommended, for instance, using oral presentations to evaluate both computer science concepts and language skills.

- Providing constructive feedback on both content knowledge and language use can help guide students in their progress.

- Demonstrating awareness and sensitivity to the diverse cultural backgrounds of students can help alleviate anxiety and boost confidence.

Section Three: Student's Needs and Challenges

Item seven: How does using English as a medium of instruction affect students' understanding of computer science concepts?

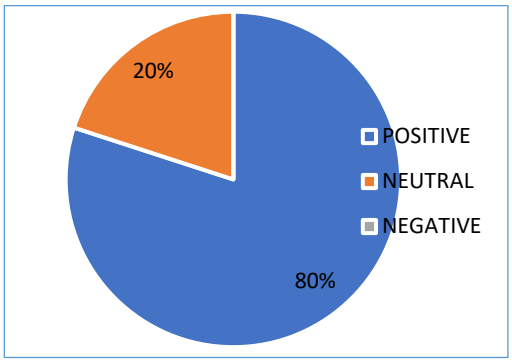

Figure 21Assessing the Impact of English as a Medium of Instruction on Students

This analysis of the data reveals that 80% of the results were favorable, indicating that students may have a better understanding of computer science topics when they are taught in English. The remaining 20% of the feedback was neutral, suggesting a lack of strong positive or negative opinions about the use of English as the language of instruction. No negative feedback was documented in the analysis. Overall, the data indicates that using English as the language of instruction to teach computer science concepts has predominantly positive effects on understanding.

Item eight: Do you observe any specific challenges or difficulties students face in comprehending computer science terminology in English?

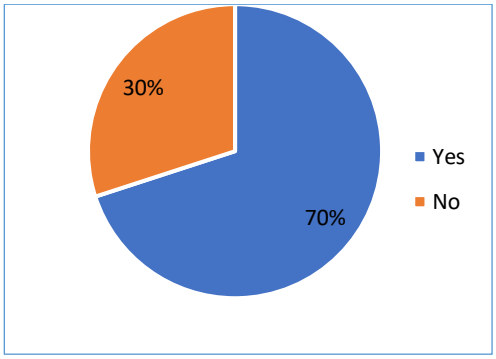

Figure 22 Challenges of Comprehending Computer Science Terminology in English

A significant majority of educators, 70%, have observed struggles among students with the English computer science terminology. This suggests that the issue

is fairly widespread and likely impacts a majority of students across different demographics and educational backgrounds.

- The remaining 30% of educators did not identify these difficulties among their students, indicating that there may be factors such as higher proficiency in English, and different teaching methodologies.

If yes, please provide examples of challenging terms and explain the nature of the difficulties.

Justification:

- Many first-year students find computer science challenging because it's a new subject, similar to math and physics.

- Understanding computer science terms in English can be difficult for students. Abbreviations and acronyms

- Computer science has its specialized vocabulary, including jargon and acronyms, often in English. This can make it hard for students to understand.

- Technical terms represent complex concepts, and students with lower English proficiency may struggle to fully understand them due to language nuances.

- Students with lower English proficiency may find it harder to keep up with lectures and reading materials.

- Computer science terms have specific meanings within the field that might be confusing for non-native English speakers.

- Some English computer science terms have cultural references or idiomatic expressions that might be hard for non-native speakers to understand.

- problem-solving operations.

- In programming, this term describes the ability of a single function or a class to operate in different ways depending on the context or inputs.

Item nine: Based on your experience, do you think EMI is beneficial for teaching computer science at the tertiary level?

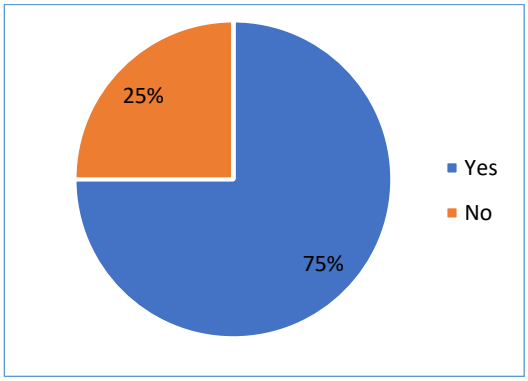

Figure 23 The Benefits of EMI in Tertiary Level

The data here indicates the opinions of teachers regarding the use of EMI tertiary-level Computer Science education. According to the figures, a clear majority, representing 75% of the teachers, affirm the benefits of employing English in their instruction. This majority could suggest that these teachers recognize the advantages, which might include improving students' language proficiency, facilitating access to a wider array of resources typically available in English, and better preparing students for a globalized workforce, the remaining 25% do not see the benefits of EMI or may even see potential disadvantages, such as linguistic challenges for non-native English speakers or the possible marginalization of local languages and perspectives in education.

-Please provide a detailed explanation for your answer, including any specific strengths or weaknesses you have observed with EMI.

Justification:

-Preparing students to participate in the global job market is important, as most tech companies use English as their working language.

-Ensuring that students are familiar with the terminology and concepts they will encounter in professional settings, as these are often articulated in English.

-English is often considered the lingua franca of the computer science field.

-EMI grants access to a vast array of educational resources and research papers.

-EMI facilitates international collaboration between students and academics.

-It is easier to participate in conferences, workshops, and collaborative projects with peers from around the world with EMI.

-EMI enables students to engage directly with the global research community.

However, there are weaknesses to consider, such as:

-It can create an additional layer of challenge for non-native English speakers, potentially widening the educational gap between students based on language proficiency.

-In environments where EMI is adopted in a region where English is not the native language, it may be difficult.

-The necessity to provide additional language support for both students and faculty may strain institutional resources.

-The subtleties of language may lead to a loss of nuance in topics where cultural contexts are significant, potentially leading to a less rich educational experience.

-Class discussions may become superficial due to the students' limited ability to express complex ideas in English.

-Students who have not had the benefit of quality English language education in their earlier schooling might struggle with the demands of EMI, thus creating a barrier to their full participation and learning.

Item ten: What kind of support or resources would you find helpful in overcoming these challenges and enhancing your EMI teaching practices?

- Providing regular training for teaching staff on EMI pedagogy, including strategies for effectively delivering content to non-native English speakers and engaging all students in English.

- Offering language assistance for both students and staff, such as on-site English language tutors, writing centers, and language learning software, to build their language proficiency.

- Ensuring access to high-quality, language-level appropriate teaching materials including textbooks, multimedia resources, and other teaching aids designed for EMI.

- Utilizing language learning technologies, such as translation apps or programs that aid in comprehension, as well as educational platforms that enhance interactive learning.

- Creating support networks for EMI educators to share experiences and teaching methods.

- Developing curricula that integrate language development into subject content

- Implementing varied and fair assessment strategies that accurately measure content knowledge without disadvantaging those with lower language proficiency.

- facilitate language practice and cultural exchange, enriching the EMI experience.

- Providing dedicated staff to counsel students struggling with language barriers, homesickness, or cultural adjustment in EMI environments.

What suggestions or recommendations would you offer for improving the effectiveness of EMI in teaching computer science at the tertiary level?

To enhance the effectiveness of EMI for teaching computer science at the tertiary level, it is suggested to provide additional language classes specifically tailored to computer science terminology and communication. This will help non-native English-speaking students improve their proficiency.

Moreover, methods such as project-based learning and problem-solving workshops, which emphasize collaboration and communication, should be encouraged. These approaches will give students practical language practice within their field of study Additionally, organizing training sessions for all staff and faculty

to understand and bridge cultural differences is recommended. This can enhance classroom dynamics and communication.

3.8. Discussion and Interpretation of the Results:

The sample for this questionnaire consists of ten computer science teachers of English at Biskra University. Out of these teachers, 50% have achieved an M.A. degree and 20% have a PhD. The teaching experience of the participants ranges from 2 to 7 years, indicating that they are both qualified and experienced in the field.

Additionally, 50% of the teachers believe that English-medium instruction is important in the field of computer science. Furthermore, the majority of the students (45%) speak Arabic as their primary language. The teachers also evaluated the effect of English-medium instruction on computer science learning outcomes for first-year students, with assignments and exams, discussion and participation, and feedback forms playing significant roles in the evaluation. 20% of the evaluation was allocated to other factors that may influence learning outcomes.

Another significant point from this study is that 70% of educators have observed struggles among students with English computer science terminology. Additionally, 50% of the teachers are examining the benefits of EMI in tertiary computer science education. Some suggestions mentioned by teachers to reduce EMI include facilitating training sessions for all staff and faculty to understand and bridge cultural differences and encouraging methods like project-based learning and problem-solving workshops to emphasize collaboration and communication.

3.9. Summary of the Findings:

The research findings were obtained by analyzing questionnaires completed by both teachers and students. The insights gathered from the respondents helped us achieve our research aims and were beneficial. Additionally, the findings of educators noticed students had difficulties with English terminology in computer science. Half of the faculty are exploring the advantages of EMI at the tertiary level. To improve EMI effectiveness, suggestions from the teachers include offering training sessions for staff to address cultural differences and adopting interactive learning methods, such as project-based learning and problem-solving workshops to foster collaboration and communication skills Furthermore, emphasizing the importance of English as a Medium of Instruction (EMI) in computer science. This research aimed to explore the perspectives of teachers and students regarding EMI and its impacts on their education. It also sought to identify their opinions on how to address the issue of EMI in their field. Furthermore, the results indicated that students' English proficiency is at a low level and needs improvement. As a result, the findings validated and confirmed our proposed hypothesis.

Conclusion

This chapter focused on the fieldwork of the current study. It began with a discussion of the theoretical background of the research methodology. Additionally, the chapter aimed to describe the results gathered through two questionnaires administered to both students and teachers. The researcher analyzed the data to investigate the impact of using English in teaching computer science. The results of this research confirmed our hypothesis and achieved the objectives of this study.

General Conclusion

General Conclusion

The conclusion of research on the effect of using English as a teaching medium in computer science instruction at tertiary institutions reveals that English plays a role in this academic context. Insights from questionnaires filled out by both students and teachers confirm the significance and the impact of EMI in computer science education.

The analysis of the responses indicates that the perspectives of teachers and students are critical to understanding EMI's role and impact on their academic journey. The research succeeded in bringing these perspectives to light, providing meaningful insights into the general attitude toward English language education. Additionally, the results show a clear agreement that while English is critical in this field, significant enhancement of the student's language proficiency is necessary.

Thus, the results validate that current levels of English proficiency among students are insufficient and that focused efforts to improve language skills are needed to transform the benefits of EMI. The results of the adoption of systematic approaches to addressing the language challenges associated with the initiative by suggesting enhanced linguistic support and targeted instruction. A better comprehension of computer science and preparing students for more academic research and career opportunities in an English-dominant global market hinge on these improvements.

Recommendation

Based on the analysis of the data and the findings of the study, some pedagogical recommendations can be proposed for teachers and students:

- Improve your English proficiency, particularly technical vocabulary related to computer science, to fully comprehend the course material.
- Actively participate in class discussions and projects to acclimate to the use of English in a technical context.
- Utilize additional English-language resources, such as textbooks, journals, and online materials, to broaden your understanding of the subject matter.
- Use simple English and avoid idiomatic expressions that could confuse students who are non-native speakers.
- Adapt teaching techniques to include more collaborative and inclusive approaches that cater to students with different levels of English proficiency.
- Conduct surveys or interviews to understand the challenges faced by students and the effectiveness of EMI.

Limitation of the Study

During the search process, we faced a variety of challenges. One such requirement was to change the way we collected data, along with the challenge of finding students to study. We had originally planned to monitor students in the classroom environment, but due to time constraints, we could not implement this method to secure very reliable data. Furthermore, we considered interviewing

teachers as an alternative to using the questionnaire. However, time constraints prevented us from taking this approach as well.

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Appendices

Appendix One: Students' questionnaire

Mohamed Kheider University of Biskra

Faculty of Letters and Foreign Languages

Department of Foreign Languages

Section of English

Students' Questionnaire

Dear students,

This questionnaire aims to gather valuable information about the experiences and perspectives of computer science students regarding the use of English as the medium of instruction in their tertiary education. Your honest and insightful responses will contribute significantly to understanding the impact of English as a of medium instruction (EMI) on computer science learning and identifying the needs of learners in

Prepared by: Rahma Hadjer **Supervised:** Mr. AOUNALI Walid

2023/2024

Section One: General Information

1. Specify your gender.

□ Male

□ Female

2. Specify your age.

   - ……years

3. How long have you been studying English?

   - ……years

Section Two: **English as a Medium of Instruction**

Definition of EMI: it refers to using English to teach subjects in educational settings where it is not the student's native language.

4. Are you exposed to modules using the English language?

   □ Yes □ No

   If yes, how many modules do you study in English?

- ……

5. How do you assess your level of comprehension in English?

   □ High □ Intermediate □ Low

6. Are you familiar with the term EMI?

   □ Yes □ No

7. Do you agree that English should be used in the computer sciences?

   □ Yes □ No

   If yes, why?

- ……

8. How significant is it to use EMI in the computer sciences?

   □ Significant □ Very Significant □ Normal □ Insignificant □ Very insignificant

9. To what extent will Algeria benefit from EMI in computer science?

□ Satisfied □ Very Satisfied □ Neutral □ Dissatisfied □ Very Dissatisfied

Section Two: Learners' Needs in Computer Science

10. In which language do you prefer to study?

- ……

11. What language/s do you use in your field of learning?

- ……

12. Do you agree with switching to English?

□ Agree □ Strongly Agree □ Neutral □ Disagree □ Strongly Disagree

13. Do you face any problems in your courses because of your English language level?

□ Yes □ No

If yes, what are they?

□ Lack of vocabulary □ Hard terms □ Problems in comprehension □ Problems in pronunciation

14. Do you think that using English as a medium of instruction will be beneficial?

□ Yes □ No

If yes, what are these benefits?

□ Advancing University ranking

□ Better access to scientific articles

□ Communication with other universities

□ Positive influence on the wider community

15. What are your suggestions for improving the effectiveness of EMI in computer science education?

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Thank you for your collaboration

Appendix two: teachers' questionnaire

Teachers' Questionnaire

Dear teachers,

This questionnaire aims to gather insights from Computer Science (CS) instructors on their experiences and perspectives regarding the use of English Medium of Instruction (EMI) for first-year students. Your valuable responses will contribute to understanding the impact of EMI on teaching and learning computer science at the tertiary level.

1. How long have you been teaching computer science at the university level?

• ..... years.

2. What is your level of proficiency in English?

□ B. A Degree □ M. A Degree □ PhD

Section 2: Impact of EMI on Students' Learning and Engagement

3. To what extent do you adapt your lesson plans and teaching strategies to satisfy the needs of students with different levels of English language proficiency?

□Important □Very important □Less important □Not important

4. What is the primary language used by most of your students? (Select one or more)

□ Arabic □ English □ French

5. How do you assess the impact of EMI on first-year students' learning outcomes in computer science?

Performance on assignments and exams.

Class participation and discussions.

Student surveys or feedback forms.

Other

6. Describe any strategies or techniques you use to promote effective communication and participation in your EMI classroom.

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Section Three: Student's Needs and Challenges

7. How does using English as a medium of instruction affect students' understanding of computer science concepts?

Positive. Neutral. Negative.

8. Do you observe any specific challenges or difficulties students face in comprehending computer science terminology in English?

 Yes No

• If yes, please provide examples of challenging terms and explain the nature of the difficulties.

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……

9. Based on your experience, do you think EMI is beneficial for teaching computer science at the tertiary level?

 Yes No

• Please explain your answer, including any specific strengths or weaknesses you have observed with EMI.

……

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10. What kind of support or resources would you find helpful in overcoming these challenges and enhancing your EMI teaching practices?

……

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……

11. What suggestions or recommendations would you offer for improving the effectiveness of EMI in teaching computer science at the tertiary level?

……

……

……

Thank you for taking the time to complete this questionnaire

الملخص

تهدف هذه الدراسة لمعرفة مدى تأثير استخدام اللغة الإنجليزية كوسيلة للتعليم في مجال علوم الكمبيوتر. الاشكالية الرئيسية هي أن غالبية طلاب علوم الكمبيوتر يواجهون صعوبات في فهم تلقين الدروس باللغة الإنجليزية. ومن ثم طرحنا في هذه الدراسة الأسئلة التالية: ما هو تأثير استخدام اللغة الإنجليزية في تدريس طلاب الجامعات الجزائرية الذين يدرسون علوم الكمبيوتر، على تحصيلهم الأكاديمي ؟ افترضنا أن استخدام اللغة الإنجليزية كوسيلة للتعليم يؤثر بشكل إيجابي على التحصيل الأكاديمي لطلاب الجامعات الجزائرية الذين يدرسون علوم الكمبيوتر. ولجمع البيانات عن آراء الطلاب والمعلمين، وزع استبيان على طلاب ومدرسي علوم الحاسوب في السنة الأولى في جامعة بسكرة. بعد تحليل البيانات، أظهرت النتائج أن الطلاب والمدرسين المستخدمين للغة الإنجليزية على حد سواء يقدرون أهمية اللغة الإنجليزية يقبلونها في الجامعات الجزائرية. علاوة على ذلك، كان لدى غالبية المشاركين مستوى ضعيف من فهم اللغة ولكن كان لديهم مواقف إيجابية تجاه استخدام اللغة الإنجليزية كوسيلة لتدريس علوم الكمبيوتر. في ضوء هذه النتائج، يقترح هذا البحث بعض الآثار التعليمية للطلاب والمعلمين وواضعي السياسات لمساعدتهم في عملية اعتماد اللغة الإنجليزية كلغة تعليم في مجالات دراسة علوم الكمبيوتر القدرات المعززة نحو هذه اللغة.