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Navigating the Transition to E-Learning: The Lived Experience of First-Year Upper-Cycle Students at the Higher National School of Computer Science (ESI), Algiers, During the COVID-19 Crisis

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Abstract

The Covid-19 pandemic transformed higher education worldwide, forcing universities to adopt E-learning as the main instructional mode. In Algeria, this transition exposed both opportunities and persistent challenges. The current study investigates the reality of E-learning experience during the pandemic among first-year upper-cycle students (who, at the time of the Covid-19 outbreak in 2020, were in their first-year preparatory cycle) at the Higher National School of Computer Science in Algiers (ESI). A quantitative case study design was employed, using a structured questionnaire administered to 154 students, complemented by informal interviews and classroom observations. Data were analysed with SPSS (Statistical Package for the Social Sciences) through descriptive and inferential statistics. Results indicate that students welcomed E- learning and valued its flexibility, but struggled with connectivity troubles, limited interaction, and insufficient pedagogical adaptation. Motivation was significantly associated with gender, age, device type, and internet access. Overall, students preferred blended learning, suggesting its potential as a sustainable model for Algerian universities.

Keywords: E-learning, Covid-19, Algerian universities, blended learning.

1. General Introduction

The Covid-19 pandemic has radically reshaped higher education worldwide, accelerating the adoption of digital technologies and compelling universities to implement online teaching almost overnight. This abrupt transition underscored both the potential and the limitations of E-learning in different contexts. Globally, E-learning is recognized as a crucial tool for ensuring the continuity of education, offering flexibility and accessibility while supporting student-centred learning approaches (Hadjeris, 2021). Nonetheless, the effectiveness of online learning was reliant on institutional preparedness, digital infrastructure, and the willingness of both teachers and students to adapt.

In Algeria, the pandemic highlighted structural weaknesses within higher education institutions, in respect of both technological infrastructure and pedagogical readiness. Even though the Algerian Ministry of Higher Education initiated digital reforms back in 2006 and partnered with international partners such as Microsoft and Thomson, the causes of E-learning were not significant until the Covid-19 crisis forced this (Bin Herzallah, 2021). The sudden reliance on digital platforms, including Moodle, Zoom, and local initiatives, revealed disparities in internet connectivity, unequal access to devices, and insufficient teacher training, which

significantly hampered the learning process (Arabeche & Soudani, 2021).

The struggles that Algerian universities faced in this transition were technical, pedagogical and social. While instructors struggled to adjust traditional face-to-face instructional methods to virtual environments (Hadjeris, 2021), many students experienced challenges in engaging with course work asynchronously. The ineffective quality of e- learning due to things such as poor internet connection as well as no collaborative learning environment affected the level of isolation and at the same time, compromised the efficacy of their online learning experience (Arabeche & Soudani, 2021). While obstacles of this nature do exist, the pandemic have also resulted in innovation and encouraged universities to think about the purpose of technology in education as a newly adopted instructional approach rather than a temporary solution.

In this context, it is important to examine the reality of E-learning in Algerian universities during the Covid-19 pandemic so as to better understand how institutions respond to external pressures for digitalisation and how students experience those changes. Previous research indicates that the Algerian case is formed by policy frameworks which may be ambitious in nature while existing within limited material conditions of universities (Bin Herzallah, 2021). This tension will impact students' participation, attainment outcomes and satisfaction with their digital learning experience.

The present study seeks to explore this reality through a project-related study of first- year upper-cycle students at the Higher National School of Computer Science in Algiers (ESI). This research project investigates students' perceptions, experiences, and difficulties while also joining the discussion around the future adoption of online education programs in Algeria. The findings will ultimately demonstrate how E-learning can evolve from a short-term remedy to a long-term educational response across Algerian universities.

2. Literature Review

2.1. Global Perspectives on E-learning during Covid-19

The Covid-19 pandemic triggered an extraordinary global shift from face-to-face instruction to online teaching, often termed "emergency remote teaching" (ERT). This term should be distinguished from planned online education, as it was rushed into place to facilitate educational continuity during lockdowns. Educational institutions demonstrated tenacity by pivoting educational provision, meanwhile the crisis highlighted inequalities in tech and digital resources existed around the globe (Hadjeris, 2021). In developed countries such as the United States, enrolment in online learning programs had already been steadily rising before the pandemic, with more than 6.36 million students engaged in distance education by 2016 (Bin Herzallah, 2021). However,

the pandemic accelerated this trend, reinforcing online platforms as integral components of higher education.

Around the world, the global shift to sustainable E-learning poses many challenges to the implementation of digital learning. The most significant challenge relates to the digital divide, as access to effective internet connection, computers, and digital platforms varied tremendously across nations and sometimes within nations (Hadjeris, 2021). More prosperous states were able to rely on developed infrastructures, while less wealthy countries had to rely on less complex low-tech solutions like televised and radio lessons, putting large cohorts of learners at a disadvantage.

In the second instance, pedagogical challenges arose, because the quick transition to online courses often meant that traditional teaching practices moved into digital formats with no rethinking of those traditional practices. As O'Neill, Singh, & O'Donoghue (2004, as cited in Hadjeris, 2021), state, effective online teaching requires transformation on physical, cultural and managerial levels, something that was typically not done in the early stage of the pandemic. Most teachers were frequently not ready to redesign a course for online delivery, in addition, many teachers received no preparation in digital pedagogies.

Third, challenges related to student motivation and engagement created significant barriers to achieving desired learning outcomes. The absence of face-to-face contact often diminished students' sense of community and responsibility toward their peers, while simultaneously heightening feelings of isolation (Arabeche & Soudani, 2021). Moreover, the shift to asynchronous online learning, which largely relied on uploading documents and recorded lectures, frequently failed to provide interactive opportunities—an essential element for sustaining student motivation. Research confirms that interaction between learners and instructors, as well as among peers, tends to be limited in E-learning environments (Boling et al., 2012). This lack of interaction has been associated with social isolation (Leal Filho et al., 2021). Nevertheless, the literature presents mixed findings: some studies suggest that E-learning can enhance communication through alternative channels (Moy & Ng, 2021), whereas others report that it undermines communication and reduces its quality compared to traditional settings (Kurniawati & Noviani, 2021).

On the other hand, the absence of physical interaction in E-learning environments has made assessment a particularly challenging issue (Daradoumis et al., 2013). Yet, assess- ment remains a fundamental component of online education (Jalali et al., 2018). In fact, assessment practices in virtual contexts have generated considerable debate. Administer- ing traditional examinations remotely has proven difficult, raising concerns related to ac- ademic integrity and equity. As a result, many institutions have turned to alternative forms of evaluation, including open-book exams, continuous assessment, and project-based learning. While such approaches offer opportunities for innovation, they also demand significant adjustments to institutional policies and teaching practices (Hadjeris, 2021).

Thus, the global engagement in E-learning by all institutions due to Covid-19, revealed both the potential for digital transformation of higher education and the possibility of broadening inequalities related to systemic issues.

2.2. The Algerian Context

Although Algeria began E-learning development long before the pandemic, it was not fully developed until the crisis expedited its adoption. The Ministry of Higher Education and Scientific Research established a national E-learning program as early as 2006 through partnerships with multinational organizations such as Microsoft and Thomson. This created 4,000 online courses, predominantly focused on ICT skills (Bin Herzallah, 2021). Overall, the rationale for reform in these new initiatives was to widen access, reduce overcrowded universities, and position Algerian higher education institutions closer to international standards. However, the implementation of E-learning could not keep pace because of insufficient infrastructure, poor internet connectivity, and insufficient teacher training (Bin Herzallah, 2021).

The Covid-19 pandemic accelerated the deployment of digital platforms across Algerian universities. In April 2020, the Ministry instructed institutions to switch to online teaching using Moodle as the principal learning management system (LMS). Teachers were asked to upload lecture notes and course materials, while students were given accounts to access them (Hadjeris, 2021). However, in practice, most online teaching was asynchronous and limited to the distribution of simplified materials rather than interactive learning. Teachers often lacked the technical training and resources necessary to integrate innovative tools, while students faced connectivity issues that hindered their participation.

Empirical studies confirm that the challenges of Algerian E-learning are multifaceted. Arabeche and Soudani (2021), in a survey of 544 university teachers, found that although more than 80% provided online courses during the pandemic, nearly 70% were doing so for the first time. Most of the participants recognized Moodle as very easy to navigate, but thought it, at least, was underwhelming with regard to collaboration and connecting with the students. The biggest technical barriers are the quality and speed of the internet connection and how long 'uploads' can take (Arabeche & Soudani, 2021). Similarly, Hadjeris (2021) saw that inadequate infrastructure, reliance on conventional pedagogical practices, and limited student access to internet resources limited the potential of any type of online learning.

Notwithstanding these concerns, the pandemic underscored the need for digital transformation in Algerian higher education. Researchers imply future reform may need to focus on teacher professional development and on ICT infrastructure accompanied with contexts for developing digital pedagogy (Bin Herzallah, 2021), or otherwise Algeria becomes likely to be trapped in the cycle of educational inequality and impede Sustainable Development Goal 4 (SDG4) ensure inclusive and equitable quality

education and promote lifelong learning opportunities for all by 2030 (UNESCO, 2015, as cited in Hadjeris, 2021).

2.3. E-learning in Language Education

Language learning has unique opportunities and challenges on technological platforms. Learning a language in a digital environment is different because, language education uniquely requires the integrated development of the four skills; listening, speaking, reading and writing. It also depends on interactive communication and real- time feedback. However, technology-based platforms do not yet provide a fully communicative environment equivalent to that of traditional classrooms.

According to research, teaching English online in Algeria during the pandemic was limited to both infrastructural factors as well as pedagogical factors. Teachers often only use Moodle and related online platforms to post lecture notes or written tasks and, therefore, did not focus on interactive speaking and listening activities (Hadjeris, 2021). This limited teachers' ability to promote communicative competence, a key component of English as a Foreign Language (EFL) situations.

Additionally, there were no support systems available to practice skills such as oral expression that require real-time interaction. Some instructors attempted to use Zoom or Google Classroom and other platforms that had synchronous components, but they lost the ability to engage with their students due to slow connectivity and a lack of digital resources available to students (Arabeche & Soudani, 2021). Digital platforms allowed students to learn from examples and materials found online in a less confined manner, through multimedia, e-books, and virtual exercises, which can help develop reading and writing skills. Also, exposure to online interactions in English—chat, discussion boards, social media—may provide opportunities for further language practice and exposure beyond the classroom. As Bin Herzallah acknowledges (2021), e-learning can provide flexibility in a student-centred manner that can increase both autonomy and motivation.

3. Methodology

3.1. Research Design

This research follows a quantitative design with elements of descriptive analysis. Its main objective is to measure perceptions, challenges, and attitudes of both students and teachers towards E-learning during the Covid-19 pandemic. The quantitative design is a valid means of collecting standardized data from a large amount of participants which allows for statistical analysis and broader conclusions (Creswell & Creswell, 2018). A structured questionnaire was adopted to enhance the reliability of the data collection process, while descriptive and inferential statistics using SPSS were conducted to ensure the validity of the findings.

3.2. Case Study Approach

A case study framework is employed to provide an in-depth understanding of E- learning within a specific institutional and disciplinary context—namely, the English module for first-year preparatory cycle students at the Higher National School of Computer Science in Algiers. Case studies are particularly valuable in educational research because they allow the researcher to examine phenomena in real-life settings while taking into account contextual factors (Yin, 2018).

3.3. Population and Sample

The target population consists of approximately 195 first-year upper-cycle students enrolled at the Higher National School of Computer Science in Algiers. However, due to accessibility and participation constraints, only 154 students took part in the study. The sample includes both male and female students aged between 18 and 22 years, representing a typical cohort of Algerian university entrants. The sample size is deemed sufficient to allow meaningful statistical analysis, particularly for descriptive purposes, though generalisations should be made cautiously.

3.4. Research Tools

3.4.1. Questionnaire

The main research instrument is a structured questionnaire designed to gather quantitative data on students' experiences with E-learning. It is divided into three sections:

Section A: Demographic Information (gender, age, access to internet and devices).

Section B: E-learning Experiences (accessibility, frequency of use, perceived challenges).

Section C: Attitudes and Perceptions (motivation, effectiveness, preference for blended learning).

The questionnaire uses a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to measure attitudes, supplemented by a few multiple-choice and open-ended questions for clarification.

3.4.2. Interviews and Observation

Although the questionnaire is the primary tool, informal interviews with instructors and brief classroom observations (both physical and virtual) were also conducted. These complementary methods provided contextual insights into the teaching practices and students' behaviours.

3.5. Data Collection Procedures

The questionnaire was distributed both electronically (via Google Forms) and in paper form to ensure maximum participation, given the varied access to internet among students. Participation was voluntary, and students were assured of confidentiality and anonymity. Data were collected over a three-week period during the first semester of the academic year 2021–2022. In addition, informal interviews with six English instructors were conducted to gather complementary qualitative insights.

3.6. Data Analysis Techniques

The data collected from the questionnaire were coded and entered into SPSS for analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) were employed to summarise students' responses. Inferential statistics, including Chi-square tests and t-tests where applicable, were used to examine relationships between demographic variables (e.g., gender, internet access) and perceptions of E-learning. Open-ended responses were thematically analysed to capture recurring issues and suggestions.

This mixed use of descriptive and inferential analysis provides both a broad overview of students' experiences and insights into patterns that may inform future policy and practice.

4. Data Analysis & Discussion

This chapter presents the findings of the field study, which investigated the perceptions and experiences of first-year upper-cycle students at the Higher National School of Computer Science in Algiers regarding E-learning during the Covid-19 pandemic. The data were collected through a structured questionnaire designed to explore students' access to technology, their engagement with online platforms, and their overall attitudes toward online learning. While the previous chapter offered a theoretical overview of E-learning globally and in Algeria, this section provides empirical evidence of how students actually experienced online education.

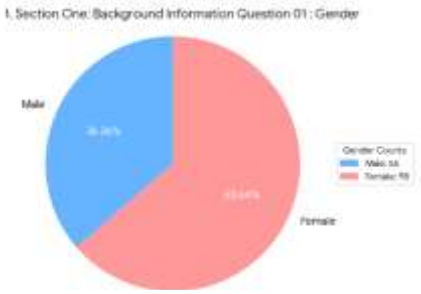
The analysis is structured into three sections. The first part introduces the demographic characteristics of the respondents. The second part presents findings on students' experiences with E-learning, focusing on infrastructure, access, and challenges. The third part examines students' attitudes and perceptions toward online learning, particularly regarding its effectiveness in the English module. The discussion links these findings with the broader literature to provide a critical interpretation of the results.

4.1. Data Analysis

4.1.1. Section One: Background

Information Question 01 : Gender

Gender	Number	Percentage
Male	**56**	**36.36%**
Female	**98**	**63.64%**

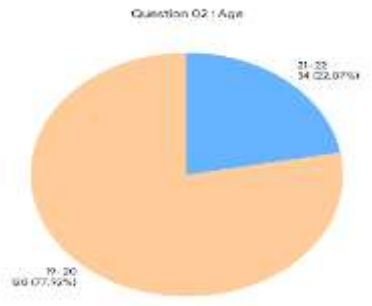


Total	**154**	**100%**

The sample reflects a predominance of female students (63.64%), which is consistent with general enrollment trends at ESI. This distribution suggests that female perspectives are likely to have a stronger influence on the overall findings.

Question 02 : Age

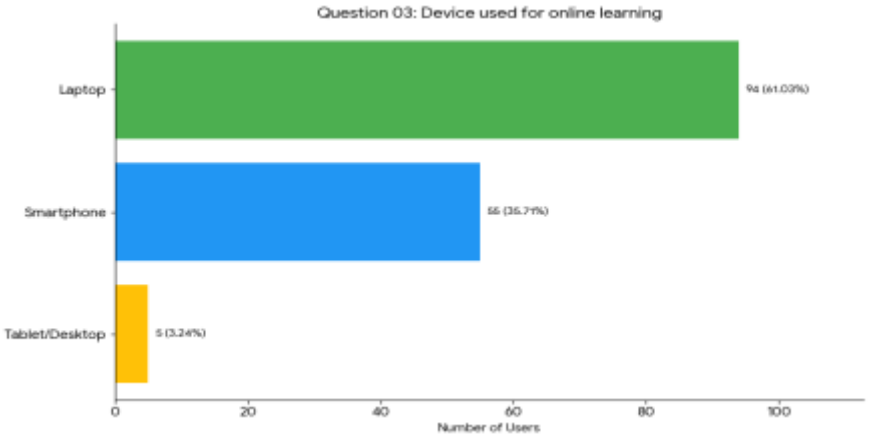
Age Group (years)	Number	Percentage
19–20	**120**	**77.92%**
21–22	**34**	**22.07%**
Total	**154**	**100%**



Most respondents (77.92%) were between 19 and 20 years old, reflecting the typical age range of first-year upper-cycle students at ESI.

Question 03: Device used for online learning

Device	Number	Percentage
Laptop	**94**	**61.03%**
Smartphone	**55**	**35.71%**
Tablet/Desktop	**5**	**3.24%**
Total	**154**	**100%**

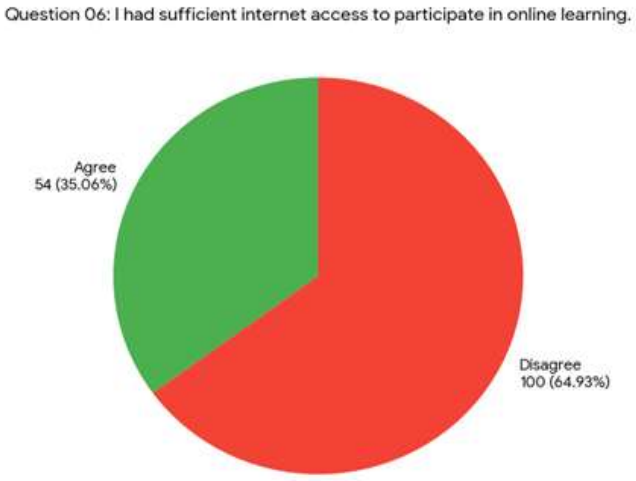


Since ESI students are required to have laptops for their studies, the majority relied on them for online learning (61.03%), which allowed them to access advanced features of platforms such as Moodle.

4.1.2. Section Two: E-learning Experiences

Question 06: I had sufficient internet access to participate in online learning.

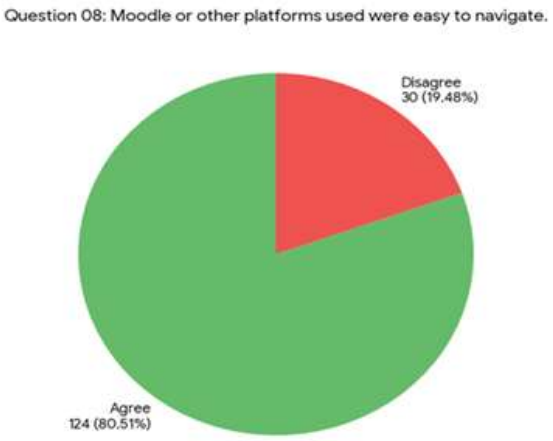
- **Agree:** 54 (35.06%)
- **Disagree:** 100 (64.93%)



Two-thirds of the students reported inadequate internet access, reflecting Algeria's infrastructural challenges (Hadjeris, 2021), particularly among those residing on campus.

Question 08: Moodle or other platforms used were easy to navigate.

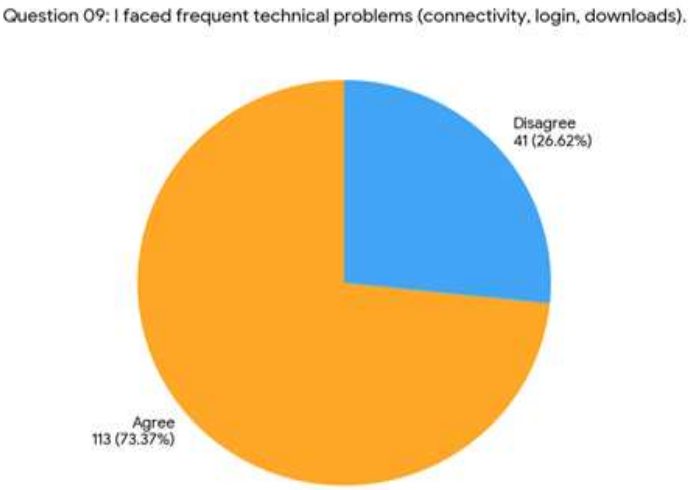
- **Agree :** 124 (80.51%)
- **Disagree:** 30 (19.48%)



Findings show that the overwhelming majority of students (80.51%) were already familiar with navigating platforms, as they were studying computer science and had been using them even before the pandemic.

Question 09: I faced frequent technical problems (connectivity, login, downloads).

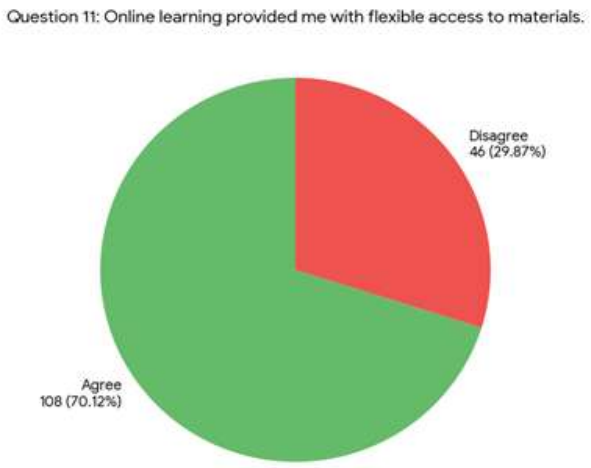
- **Agree:** 113 (73.37 %)
- **Disagree:** 41 (26.62 %)



Technical obstacles remain the most recurrent complaint, highlighting the digital divide.

Question 11: Online learning provided me with flexible access to materials.

- **Agree :** 108 (70.12%)
- **Disagree :** 46 (29.87%)

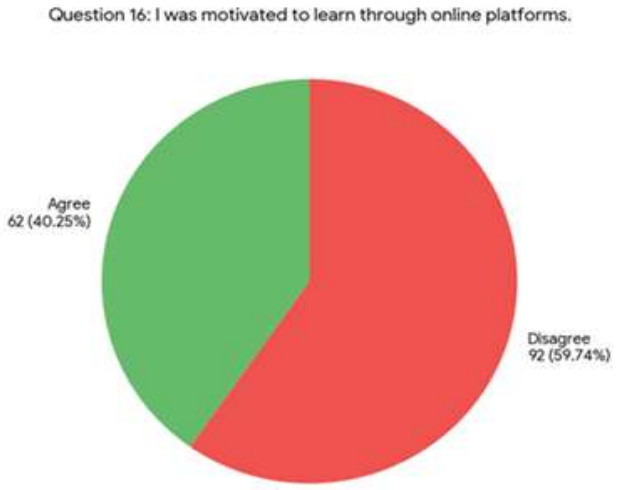


Flexibility was perceived positively by most respondents (70.12%), suggesting that students value autonomy even amidst difficulties.

4.1.3. Section Three: Attitudes and Perceptions

Question 16: I was motivated to learn through online platforms.

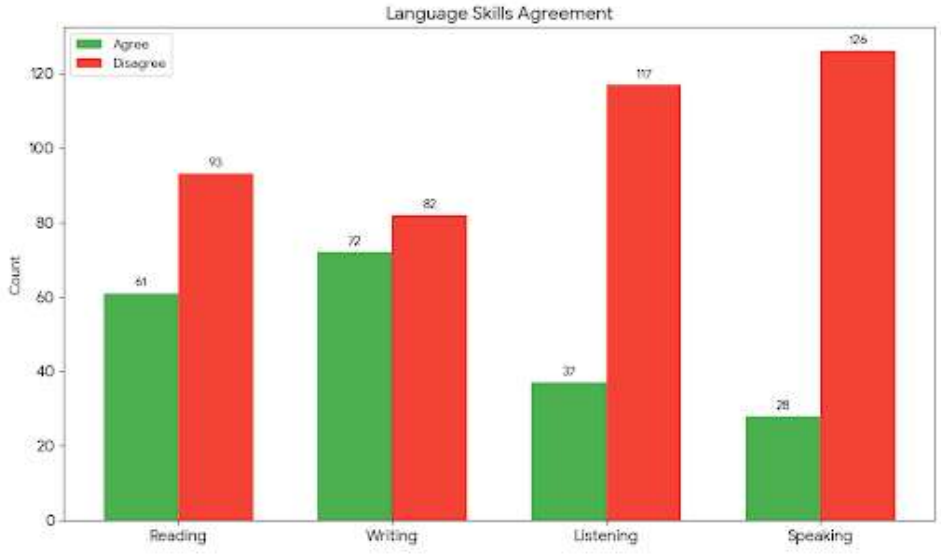
- **Agree :** 62 (40.25%)
- **Disagree :** 92 (59.74%)



A majority reported low motivation, aligning with concerns in the literature that online settings reduce engagement (Hadjeris, 2021).

Question 18–21: Effectiveness of online learning in developing skills

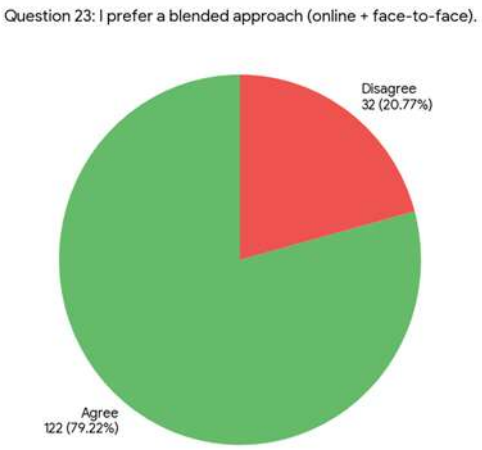
- **Reading:** 61 agree (39.61%), 93 disagree (60.38%)
- **Writing:** 72 agree (46.75%), 82 disagree (53.24%)
- **Listening:** 37 agree (24.02%), 117 disagree (75.97%)
- **Speaking:** 28 agree (18.18%), 126 disagree (81.81%)



While reading and writing benefited somewhat from online learning, oral skills (speaking, listening) suffered significantly. This confirms that synchronous interaction is difficult to replicate online.

Question 23: I prefer a blended approach (online + face-to-face).

- **Agree :** 122 (79.22%)
- **Disagree :** 32 (20.77%)



A strong preference for blended learning reflects a recognition of both the flexibility of online modes and the interactive richness of in-person teaching.

4.2. Discussion

The findings indicate a complicated picture of E-learning among students. Positive aspects included flexibility and accessibility, and many students had a positive overall experience and indicated increased autonomy in managing their studies. However, negative aspects emerged as well, such as infrastructure limitations, students' lack of motivation to pursue the course, and the limited effectiveness of the online learning platforms like Moodle and Teams in fostering oral language development.

These findings uphold national studies that describe poor internet connectivity, a lack of

professional training for teachers, and a lack of interactive pedagogy as major impediments of online language teaching and learning (Bin Herzallah, 2021; Arabeche & Soudani, 2021). Given students' high demand for blended learning, it is suggested that while reforms should move away from E-learning, they should not abandon online teaching altogether, but instead find ways to adapt online teaching from E-learning to hybrid teaching to capitalize on students' requests for flexibility and the immediacy afforded by the technology.

5. Conclusion

The purpose of this study was to examine the reality of E-learning in Algerian universities during the Covid-19 pandemic, specifically, the experience of first-year students at the Higher National School of Computer science in Algiers. We discovered in the literature that the pandemic catalysed the shift from emergency remote teaching to more sustainable forms of E-learning around the world, but challenges remain, including the digital divide, pedagogical alignment, and student motivation (Hadjeris, 2021). In Algeria, although national policies had previously promoted the integration of information and communication technologies (ICTs) into higher education, the pandemic exposed systemic limitations in infrastructure, training, and digital culture (Bin Herzallah, 2021; Arabeche & Soudani, 2021).

The field study corroborated these theoretical understandings. The quantitative results indicated that students appreciated the flexibility of taking courses online but found struggles with lack of internet access and myriad technical issues. The inferential analysis also indicated that gender, age, internet access and type of device used did not apply are fundamental reasons that shape the motivation profiles of students, and further demonstrated how socio-demographic and structural inequities restrict the possibility of success for E-learning. While reading and writing skills showed some improvement in online environments, students reported that listening and speaking skills development was severely lacking. This clearly shows that replicating communicative interaction in an online environment was particularly challenging.

The study concludes that E-learning is a double-edged reality within the context of Algerian universities; on the one hand, it fosters flexibility, autonomy and accessibility, but its potential benefits are always diminished by structural, pedagogical, and socio- demographic barriers. The predominant choice of blended learning (79.22%) indicates the way forward—Algerian higher education must get to hybrid models that capitalize on the strengths of conventional and digital pedagogies.

6. Recommendations

Based on the findings, the following recommendations are proposed:

1. Infrastructure Improvement: The Ministry of Higher Education should prioritise upgrading internet connectivity in universities and providing affordable student access packages to reduce digital inequalities.

2. Device Accessibility: Universities should explore laptop loan schemes or subsidies to minimise students’ over-reliance on smartphones, which limit interactive learning.

3. Teacher Training: Continuous professional development programmes should be established to equip instructors with digital pedagogical skills, particularly in using online platforms to foster interaction and collaboration.

4. Curriculum Adaptation: For language departments, online curricula must integrate synchronous activities (e.g., video conferencing, breakout rooms) to enhance oral communication skills, which were found to be the weakest area.

5. Blended Learning Models: Universities should institutionalise blended learning as a permanent teaching mode, combining online flexibility with the face-to-face richness of interaction.

6. Student Support Services: Online learning support centres should be created within universities to provide technical assistance, digital literacy workshops, and academic counselling.

By addressing these areas, Algerian universities can transform E-learning from temporary solution into an adopted educational approach.

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