

Research Article

Assessing Distance Learning in Higher Education during the COVID-19 Pandemic

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This qualitative study is an investigation and assessment of distance learning in Morocco during the COVID-19 pandemic. This research surveyed 3037 students and 231 professors enrolled in different stages of higher education programs. It aims to investigate the limitations of e-learning platforms and how these activities take place at public and private Moroccan universities during the coronavirus confinement. For this purpose, two structured questionnaires were constructed by researchers from different specialties, and the type of data was based on the responses of students and professors from 15 universities. In this paper, we have used three methods: descriptive analysis, regression analysis, and qualitative response analysis. As a data analytics tool, Microsoft Power BI was used to analyze data, visualize it, and draw insights. In this study, both professors and students stated that online learning is not more interesting than ordinary learning and professors need to provide at least 50% of their teaching in face-to-face mode. Recommendations at teaching and technical levels, such as the need for technical support and training in the use of these tools, were provided to enhance and promote distance education in Morocco. The contribution of this paper comes as a result of data analysis obtained from a survey conducted in some famous Moroccan universities.

1. Introduction

It is now obvious that COVID-19 is changing the lifestyle of human beings around the globe. This outbreak is going to affect our future; the challenge we are facing is trying to understand how this will happen, and get prepared for these changes. This environmental virus is not the first of its kind, but it is certainly the first virus to go global at an incredible speed. This virus made radical changes from one part of the world to the whole globe affecting its healthcare, economy, education, and even beliefs with no distinction between developed and developing countries. It just made all of us locked down for self-security and made all the systems doubtful. In Morocco, since the middle of March 2020, almost 10 million students were out of school because of the

pandemic. Hence, this pandemic, as recognized by the United Nations Education, Scientific and Cultural Organization (UNESCO) on Thursday (5/3), has seriously affected the education system worldwide. More than 100 countries have applied nationwide closure, influencing approximately 90 percent of the world's student population and threatening their future education rights [1].

Schools shutdown did not only affect students, their professors, and their families, it also has extensive economic and societal consequences. Furthermore, it has shed the light on various social and economic issues, including student debt, digital learning, food insecurity, and homeless people as well as access to childcare, healthcare, housing, Internet, and disability services. Therefore, it is necessary for each education division at the regional and national levels to take

protective measures and steps to create flexible and innovative programs, which can be accessed anytime and anywhere, and find smart methods to overcome national examinations [2]. Around the world, several countries are affected by the outbreak of coronavirus disease 2019, which is an infectious disease caused by SARS-CoV-2. As a result, the governments took various steps to face the virus outbreak. To stop the spread of the virus, schools and universities have developed various ways to reach the students via the Internet.

Consequently, different countries worldwide have introduced various solutions during the pandemic to continue education progression [3]. Online libraries support, TV broadcasts, guidelines, resources, video lectures, and online channels were introduced in at least 96 countries. To increase the coverage of the school lessons to the population, ministries of education around the world broadcasted live transmission of lessons through TV channels in different subjects nationwide [4].

At the national level, the e-learning approach has been suddenly implemented to face the dramatic changes due to the coronavirus pandemic. However, the requirements for this nationwide project have not been assessed. The challenge today is to understand and manage processes and rules to regulate the information in time like this. We need to identify the technologies that can be used, how they will be used, how we can manage them, and how can we trust them. These are some issues that have been developed in this study according to four major dimensions: economic, psychological, social, and environmental dimensions.

- (i) The economic dimension: the infrastructures, platforms, hardware, software, tools, Internet, connection debit, etc.
- (ii) The psychological dimension: the change from traditional education to e-learning.
- (iii) The social dimension: the use of technology, its management, its regulation, trust, and security which will change our national and international behaviors as individuals, institutions, and government.
- (iv) The environmental dimension: from home to home, defining what field, medicines, feedback, etc.

Herein, we are interested in studying the behavior of technology and the learner's perception of online learning to deal with this outbreak. E-learning fears are not real because we used to consume education as a tangible service from schools and universities and be in touch with professors and administration. Nevertheless, what we absorb from media, TV, documentaries, and the Internet is more than what we get from classrooms. This article is organized as follows: In Section 1, we define the statement of the problem based on the actual context of COVID-19 and provide a literature review. In Section 2, we present the research methodology followed for the field studies and the analysis of the different level studies and discuss the results based on the four dimensions outlined above. Later on, in Section 3, we discuss the results obtained, expose the limitations of the actual

approach adopted by universities and schools to ensure education continuity, and finally offer some recommendations that the Moroccan higher education should adopt in the actual crisis or when restriction access is required. Section 4 concludes the paper.

In this paper, we show the insights of this ongoing effort by presenting the results of our case study to understand the needs and propose some solutions to overcome the pedagogical problems emerging from this healthcare crisis.

1.1. Statement of the Problem. Morocco, as is currently the case all over the world, has been affected by the COVID-19 pandemic. To control the spread of the virus, several decisions have been declared including containment, state of a health emergency, and closure of schools and universities since last March 16 and for an undetermined duration. In response to this decision, which affects about 10 million students in the twelve regions of the country, distance learning was adopted to guarantee and to complete the course program.

Before the COVID-19 outbreak, the government created in 2017 "Morocco Digital 2025," a digital development agency whose mission is to elaborate on a digital strategy for the next 25 years. Very recently, Morocco has launched its first Interactive Digital Center (IDC Morocco). In this context, the Ministry of Education developed various platforms, to implement distance learning during the state of a health emergency. Two national television channels have been also used to reach students with difficult access to the Internet. Accompanying the learning tasks, psychosocial counseling services were provided by some universities through phone to help students to manage their quarantine.

1.2. Literature Review. In the context, many studies aiming at assessing distance education during the period of COVID-19 in multiple countries have been recently conducted [5–7]. Most of them have shown that the school closures have provided clarity on different issues regarding access to education, as well as more socioeconomic problems that affect people across communities, but their impact is more severe specifically on low-income families [1]. In such a situation, moving from traditional to online education would be the right option. However, the availability of information technology equipment and Internet coverage and speed are essential [4]. As almost all of the studies were undertaken during the first weeks of the outbreak, it appears that making a conclusion on the quality of online learning needs future studies, as the main goal was to continue the education in any possible way [4]. They conclude that online education would be useful in the future. Therefore, learners will work more independently, which will have the benefit of getting new skills, especially in the case of students with special needs. In the same way, the qualification of the teachers was affected positively by moving their assignment to the new way of the lessons and becoming more learning facilitators [4, 8]. To get more effectiveness in open learning, the authors show that the success of these changes depends strongly on the development of information and communication

technologies [8]. A study on a strategy for engaging remote learners was undertaken in Indian medicinal schools [9]. They have shown that good teaching or a teacher cannot be substituted by technology; it can only be used in special circumstances like COVID-19. The knowledge needed for the adoption of digital technology during the pandemic period is also studied [10]. The work is focusing on the gateway for digital learning in mathematics education during the COVID-19 period. Authors have shown that the adoption of digital learning would stimulate the growth of digital learning in mathematics and could be a positive response to such a situation.

Emergency remote education (ERE) is a temporary shift in the delivery of education to an alternative mode of delivery, due to crisis circumstances (e.g., pandemics, wars, local conflicts, and other types of natural disasters) [11, 12]. This involves the use of full distance learning solutions for teaching or education, which would otherwise be delivered face-to-face or as blended or hybrid lessons and which will revert to this format once the crisis or emergency has subsided.

Thus, the main objective in these circumstances is not to recreate a solid education system, but rather to provide temporary access to teaching and teaching aids in a quicker way, that is, to set up and make them readily available, reliably in an emergency or crisis. In this context, some countries are responding to school and university closures in times of crisis by implementing models, such as mobile learning [13, 14], and analyzing the essential factors affecting the intention to use mobile learning applications based on a comparison between the university's adopters and non-adopters, radio, blended learning, or other contextually more feasible solutions [15, 16].

Furthermore, online learning differs slightly from emergency remote education; in fact, online learning is an interdisciplinary field that has evolved over time and has served well to meet learning needs and to guide open educational practices [17, 18]. In this sense, online learning and emergency remote education are not the same thing.

From this perspective, several research works have emerged. In [17], the authors proposed hypotheses and recommendations to define a decent framework for emergency remote education. Almaiah and Almulhem [19] proposed a conceptual system using Delphi to face e-learning system based on some factors like acceptance when the authors deal with the acceptance of the e-learning system in higher education applying a UTAUT model [20].

Based on the analysis conducted by Almaiah et al. on the critical challenges and factors influencing the e-learning system during COVID-19 pandemic [21], the authors concluded that, for accepting e-learning system, the universities must take into account the following categories: (1) technological factors, (2) e-learning system quality factors, (3) cultural aspects, (4) self-efficacy factors, and (5) trust factors. Almaiah and Mulhem also reported that the design and content are major factors that support the use of an e-learning system [19].

Furthermore, a study was carried out on 31 countries around the world to determine the various measures taken to

face this period of crisis and to set up an emergency remote education system [22].

2. Methodology

In response to the coronavirus confinement, Morocco was among the first countries to switch to distance learning to ensure continuing education to students. However, this disruptive move did not allow much preparation for schools and universities to apprehend dimensions that make an e-learning platform a success. On the other hand, after coronavirus, nothing will be the same, including the way we are delivering education to our students. We need to be aware of the key factors that need to be considered, so university management, professors, and students apprehend e-learning platforms in a good manner.

In this study, we focus our research on one question: What are the limitations of e-learning platforms in Moroccan higher education during the coronavirus confinement?

Sampling. Since e-learning platforms are collaborative tools where two parties are involved, we addressed the question from two different points of view: professors and students. A quantitative case study [23, 24] approach was adopted because the purpose of this work is to find out the limitations faced by professors and students when using e-learning platforms. Because of this unplanned situation and thus the confinement, a convenience sampling [25] was used to rapidly characterize those limitations. However, to be able to generate more representativeness, we targeted participants from different regions in Morocco, different universities, different disciplines, and different levels in higher education. The sample size in total is 3037 students and 231 professors from 15 universities.

Questionnaire. Two structured questionnaires were constructed by researchers from different backgrounds. In addition to demographic issues, four themes were considered in the conception of the questions: the experience of using e-learning platforms before the outbreak of coronavirus, the reliability of ICTs, several factors were identified, and the content and use of the platforms. Based on the literature review and the objectives of the study, the first set of questions was formulated by two members of the research team, and then three meetings were held prior to individual analysis to discuss each question, to ensure its adequate alignment with the expected objective, and also to refine the grammatical and semantic features of the question to avoid any misleading understanding [25, 26]. The two anonymous questionnaires were created using Google form. They have been tested, and then a mail has been sent to the two categories of participants. A small text explaining the purpose of the questionnaires was included into the mail; we also asked professors to relay the link regarding student's questionnaire to their students.

Data analysis. To identify the limitations of the platforms and find out any relationship that could exist

TABLE 1: Gender of participants.

	M	F
Professors	74.70%	25.30%
Students	46.5%	53.5%

between the different studied variables, three methods were followed: descriptive analysis, regression analysis [27], and quantitative response analysis. As a data analytics tool, Microsoft Power BI [28] was used to analyze data, visualize it, and draw insights.

2.1. Field Studies. The survey was based both on existing literature and on specific experiences, which teachers and students reported during the first month of teaching, during the closure of classroom lessons according to the precautionary measures regarding social distancing described by the World Health Organization (WHO), to control the spread of the virus from one person to another. Through the survey, we oriented the questions toward (1) pre-COVID-19 skills in distance education, (2) use of different educational tools and techniques, (3) practical challenges, and (4) potential effects on learning outcomes.

In this article, we use three methods: descriptive statistics, regression analysis, and qualitative response analysis.

2.2. Participants. During this survey, we have asked professors and students from 15 Moroccan universities in different domains. Three thousand thirty-seven students and two hundred thirty-one teachers from different higher education cycles participated in this study using the online survey technique. The distribution of the genders of participants is presented in Table 1.

2.3. Analysis of Professor's Results. It seems evident that the age of the professors is specified to better focus our analysis and to understand the various issues related to distance education. In general, professors over the age of 50 find it difficult to follow technology and thus to adopt distance learning platforms or social networks (Table 2).

According to Table 3, the distribution of teachers' specialties was relatively good, with a clear dominance of scientific fields.

Table 4 illustrates the distribution of the students by class among the different participating teachers.

2.3.1. Previous Experience with Distance Education. We first asked the respondents about their experience of digital education provided exclusively online. Also, all academics have engaged in some form of distance learning using basic learning platforms such as Moodle. The question was, "Have you ever given distance courses before confinement?" The response shows a limited experience among the respondents. The results show that only 27.7% had done so at least once before. Then, we asked the participants if they had followed training courses around the distance learning platforms

TABLE 2: Distribution by age.

Tranche (year)	20-30	30-40	40-50	50-60	>60
Repartition (%)	14.4%	27.1%	18.1%	27.1%	17.2%

TABLE 3: Distribution by specialty.

Specialties	Percentage of participants (%)
Computer science	26.8
Biology	13.2
Chemistry	12.7
Physics	11.8
Mathematics	7.3
Economics	7.3
Electric engineering	2.7
Geology	2.3
Mechanics	1.4
Finance	1
Process engineering	1
Industrial engineering	1
Languages	1
Others	10.5

TABLE 4: Distribution of students by class.

Number of students	Percentage
20-40	53.6
40-100	28.2
100-500	24.5
500-1000	14
>1000	1.8

before confinement. The answer shows that the majority (64.36%) of the courses have never undergone training around distance learning platforms. We also asked the participants if their establishments have e-learning or MOOC platforms, and the answer shows that the majority (79.1%) of establishments did not have such a platform before confinement. Formerly, we asked the participants if they had previous experience in the teaching scenarios adopted in distance education. Again, the answer shows that the majority (70.6%) of teachers do not have such experience. Afterward, we asked the participants if they have the prerequisites for the use of e-learning platforms. The response shows that the majority (66.3%) have the prerequisites for the use of this type of platform.

2.3.2. Distance Learning Platforms during Confinement. To start with, we asked the participants if they give distance courses during this confinement period using platforms dedicated to such a goal. The answer shows that the majority (92.08) of teachers give distance courses. Then, we asked them to specify the platforms used. Table 5 illustrates the responses collected.

The results are relatively obvious; nearly 54.7% of the respondents said that they used Moodle and 48.4% used Microsoft Teams. Further behind, albeit still in sight, come new programs or features that were not commonly used before, such as Zoom, Google Classroom, and YouTube.

TABLE 5: Rate of use of distance learning platforms.

Platforms	Rate (%)
Moodle	54.7
Microsoft Teams	48.8
Zoom	23.9
Google Classroom	15.9
YouTube channels or other	17.4

Nevertheless, some others use digital learning platform specialists such as Blackboard, Edmodo, Altissia, and eCampus. We note that most of the teachers combine several platforms (including Moodle, Microsoft Teams, Zoom, and WhatsApp) in order to make the courses available to students. Therefore, we asked the teachers if they are satisfied with the use of these different platforms, and the answer shows that more than half (52.43%) of participants are partially satisfied, while 41.62% are completely satisfied. When asking the participants why they combine different platforms, the reasons were the complementarity (55.6%), utility (48.4%), freeware (48.4%), ease of use (47.7%), and documentation (15%).

2.3.3. Use of Platforms. To get a clear idea about the use of different platforms, we asked participants to specify for which reasons they use these platforms, and the answer is shown in Table 6.

According to the responses, we note that the majority (94%) of the teachers make the resources (courses, practical work, tutorials, corrections, etc.) available to the students and in parallel (53.8%) provide courses in a video conference. However, 49.7% provide supervision of projects via these platforms. Moreover, 43.7% assess their students remotely using quizzes and assignments. In addition, 41.2% of the participants set up a distance training program, and finally 14.6% ensure the defense of distance projects. Afterward, we asked the participants to specify the type of assessments carried out for students in distance. The answer was as follows.

As can be seen from Table 7, most of the participants depend on the work to be done (75.3%) to assess the level of learning among students. Others depend on quizzes, group projects, distance presentations and talks, and oral tests. However, 13.9% do not provide any type of evaluation.

2.3.4. Materials Used. Not forgetting the materials used to provide the distance courses, we asked the participants to specify the materials used for this purpose. The response provided is illustrated in Figure 1.

2.3.5. Platforms Assessment. To evaluate the e-learning platforms used, we focused on four criteria: bandwidth and connectivity, ergonomics, ease, and practicability. Figure 2 illustrates the results obtained.

As depicted in Figure 2, we notice that the platforms are average regarding the different criteria set beforehand, which explains the dissatisfaction of some participants.

2.3.6. Evaluation during the Confinement Period. The question that currently arises is, is it possible to take exams remotely? Despite the ministerial note, which prohibits the taking of remote exams, we asked the question in this survey, to know the feedback of the participants. The answer clearly shows that 64.4% of teachers say that it is not feasible to set exams for students from a distance.

2.3.7. Distance Learning in the Future. We took the opportunity to get feedback from the participants regarding the possibility of setting up a hybrid education system. For this reason, we asked the participating teachers to mention the percentage of courses that can be provided remotely. The answer is presented in Figure 3.

We notice that 70% of the participants can provide approximately between 20% and 60% of their distance learning courses.

2.3.8. Workload during Confinement Period. In order to quantify the workload during this confinement period, we asked the participants to specify how much it increased compared to face-to-face courses. The answer to this question shows an increase of 50% by 43% of participants, 25% by 25.9% of participants, 75% by 21.2% of participants, and 100% by 9.8% of participants.

2.3.9. Expectations of E-Learning Platforms. Finally, we asked the participants about their expectations with regard to distance learning; the answers included the following:

- (i) Establishing a suitable infrastructure.
- (ii) Providing a distance learning platform offering simulators adapted to each training sector.
- (iii) Dealing with the problem of instant interaction with a high number (>30) of students, making the use of large files possible with software use license.
- (iv) Ease of accessibility especially for students, more specialized training preparation on the proper use of the platform, good generalization to all educational activities and scientific research, complementarity with all university courses.
- (v) Making the video conference routine (equipping all the lecture halls in this direction with a technician in charge of the equipment or making it easy to handle and automatic).

2.4. Analysis of Student's Results. The distribution of student disciplines was relatively good, with dominance in scientific fields (Table 8).

The distribution of the degrees offered is relatively good, with a dominance of the first university cycle (Table 9).

The age of the sampled students generally varies between 19 and 24 years (Figure 4).

2.4.1. Previous Experience with Distance Education. We first asked the students about their experience with distance

TABLE 6: Reasons behind the use of distance learning platforms.

Tasks	Percentage
Submitting resources (courses, practical work, tutorials, corrections, etc.)	94
Providing video conference courses	53.8
Project management	49.7
Evaluating students (quizzes, homework, etc.)	43.7
Establishing a training program (resources and activities scheduled over time)	41.2
Ensuring the defense of projects (PFA, PFE, etc.)	14.6

TABLE 7: Types of assessments performed.

Tasks	Percentage (%)
Work to be done (homework, practical work, tutorials, etc.)	75.3
Quizzes	29.4
Group projects	24.2
Remote presentations and presentations	21.1
Oral tests	5.2
Any	13.9

education. The question was, “Before confinement, did you take courses online?” The answer shows a limited experience among the students interviewed. Only 34.6% had done so at least once before.

2.4.2. Internet Connection Quality. The students were then asked to rate the quality of the Internet connection during the confinement period. The question was, “Describe the quality of your Internet connection during the confinement period.” The answer shows that the quality of the Internet connection is below average and sometimes poor (Figure 5). Surprisingly enough, some students do not even have Internet access.

2.4.3. Involvement of Teachers. In order to measure the teachers’ involvement in distance education, we interviewed the students about five main axes:

- (i) Clarity of instructions.
- (ii) Quality of course material and videos.
- (iii) Responsiveness to questions.
- (iv) Listening.
- (v) Assessment of the work carried out.

Figure 6 illustrates the obtained results.

Based on the responses, we find that the students are satisfied with four axes (i, ii, iii, iv). On the other hand, the result is different regarding the evaluation of the work extracted, for which we notice an appreciation below the average (Figure 6).

2.4.4. Use of Materials Produced by Professors. Afterward, we asked the students if they use the supporting materials produced by the professors during confinement. The question asked was, “During confinement, do you use professors’ course materials?” The answers are represented in Figure 7.

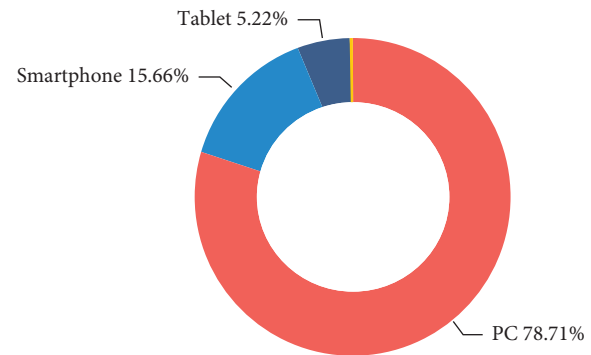


FIGURE 1: Materials used.

Then, we asked the following question: “During this period of confinement, are the supporting materials of the courses produced by the professors enough or not?”

The answers to these two questions show that students use other supporting materials in parallel with those produced by their professors, 35.08% of students are not satisfied with the materials produced by professors, and only 13.08% are satisfied (Figure 8).

2.4.5. Teaching Methods Preferred by Students. In order to assess the preferred teaching methods among students, we asked the following question: “What do you prefer for the follow-up of your courses at a distance?” The answer shows that 55.95% of students prefer recorded courses and 28.09% prefer video conferences, while 15.95% prefer the materials to be downloaded (PDF, DOC, etc.) (Figure 9).

2.4.6. Distance Evaluation. In order to find out what students think about taking the exams at a distance, we asked the following question: “During the confinement period, do you think you would be able to take the exams from a distance?” The result reflects the fact that the majority (81.45%) of students are unable to take exams remotely (Figure 10).

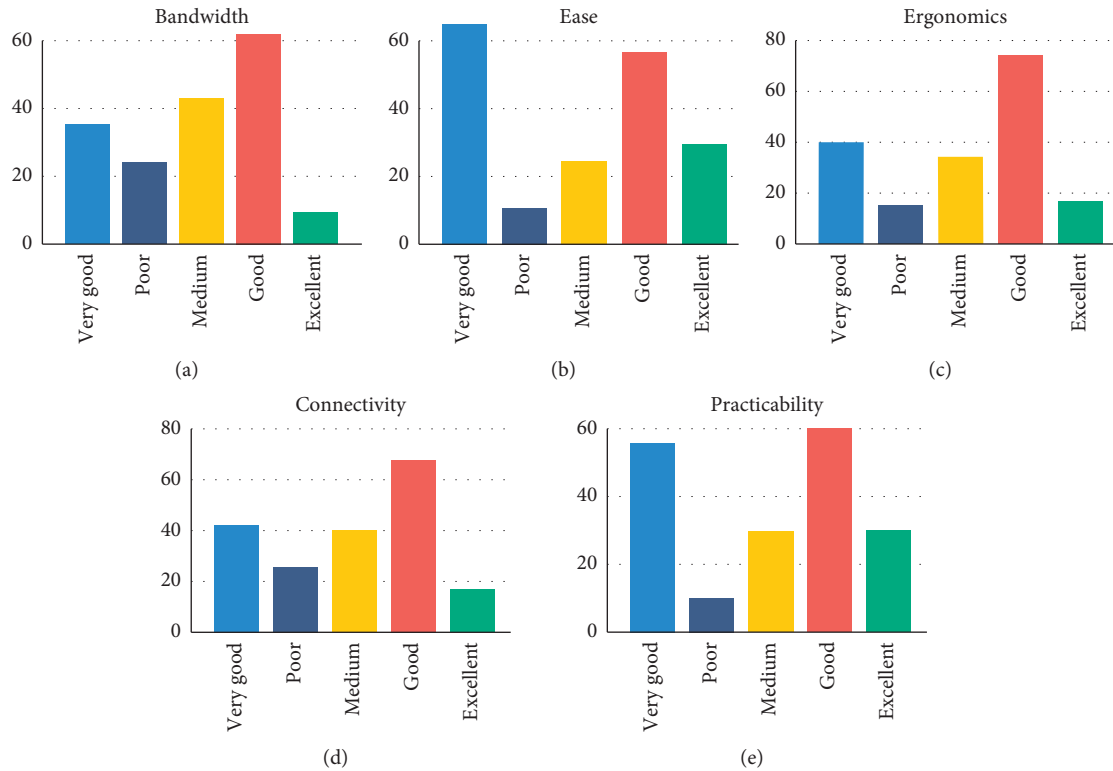


FIGURE 2: Platforms assessment.

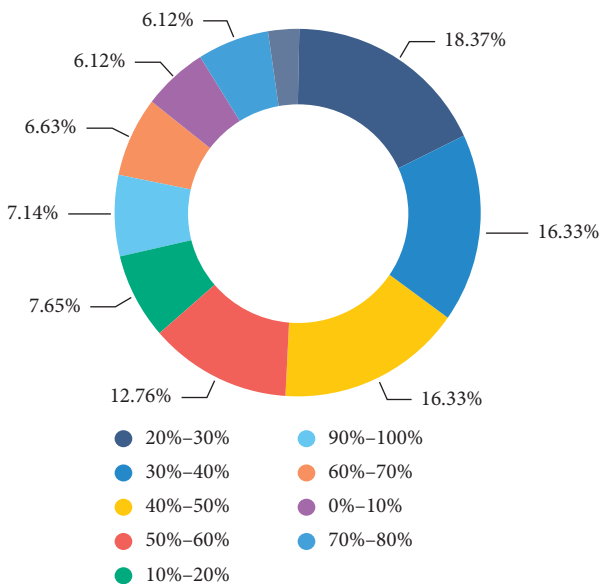


FIGURE 3: Course rates that can be provided remotely.

2.4.7. *Work Timetable.* To get an idea of how students manage their working time during this confinement period, we asked whether they work as in face-to-face classes, or they adjust their schedules according to their availability. The results are presented in Figure 11.

2.4.8. *Preferred Type of Education.* In order to figure out the type of teaching preferred among students, we asked them to

TABLE 8: Student participation rate by discipline.

Disciplinary	Participation rate (%)
Computer science	22.46
Chemistry	18.72
Physics	18.28
Biology	8.21
Finance	4.99
Geology	3.51
Economy	3.18
Mathematics	1.89
Industrial management	1.85
Industrial engineering	1.55
Electrics	1.44
Trade	1.00
Marketing	0.74
Mechanics	0.41
Law	0.37
Other	11.39

specify the preferred type (distance, hybrid, face-to-face). The answer shows that the majority (69.65%) of students prefer face-to-face teaching (Figure 12).

2.4.9. *Resources Used to Better Understand the Course.* To find out the resources used by the students during the confinement period to follow the courses remotely, we asked them the following question: “What materials do you use to follow your studies remotely during the confinement period?” As you may notice, it is a multiple-choice question.

TABLE 9: Distribution of diplomas prepared by students.

Prepared diploma	Percentage of diplomas prepared (%)
Bachelor	39.78
Engineer	28.09
Master	11.98
Specialized technician	6.04
Preparatory breaks	4.36
Professional license	3.84
Specialized masters	2.30
Doctorate	1.18
Senior technician	1.12
Executive master	0.75
BSc	0.56

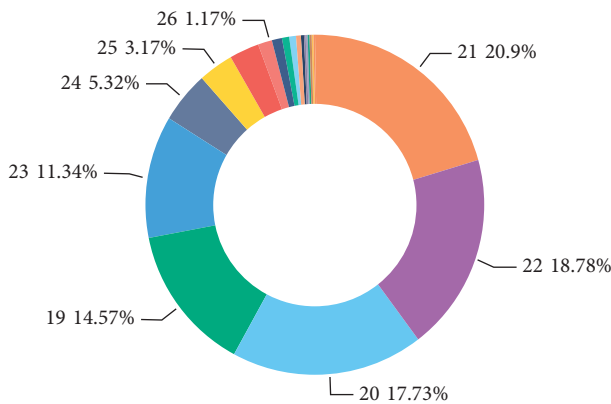


FIGURE 4: Age distribution of students.

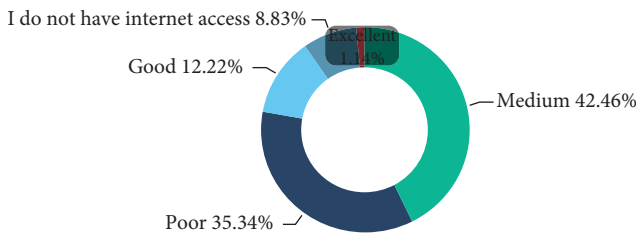


FIGURE 5: Internet connection quality.

Following the responses, the resources were classified as follows:

- (i) YouTube video search with 60.81% of the votes.
- (ii) PDF and Word materials produced by the professor with 60.8% of the votes.
- (iii) Videos produced by the professor with 49.40% of the votes.
- (iv) Online books or documents with 23.05% of the votes.
- (v) Web tutorials with 3.9% of the votes.
- (vi) Others with 0.12% of the votes.

2.4.10. *The Devices Used to Follow the Studies from a Distance.* In order to know the devices most used to follow studies from a distance during the confinement period, we

asked the students to specify them. The answer shows that PCs and smartphones are the most used, with

- (i) 66.8% for PCs.
- (ii) 66% for smartphones.
- (iii) 3.4% for television.
- (iv) 2.8% for tablets.
- (v) 1.6% using no devices.

2.4.11. *Expectations of Distance Education.* To have a clear idea about students' expectations for distance education in the future, we asked the participants to reveal them clearly. The responses show that their expectations are distributed as follows:

- (i) Course materials with 49.2% of the votes.
- (ii) Interactive courses with 45.6% of the votes.
- (iii) Courses with certifications with 37.3% of the votes.

3. Discussion

Morocco, like most countries in the world, when affected by the SARS-CoV-2 pandemic, decided to stop the presential learning and all the universities adopted e-learning, messenger, social media to guarantee the pedagogical continuity.

Therefore, and to measure the impact of this decision on our education community (students, professors, administrators, etc.), we have launched quantitative and qualitative studies by publishing a survey and analyzing the different answers exposed in the previous section. This research may be considered an added value to the existing literature devoted to identifying the main factors that can promote both student and professor usage of e-learning [21]. In developing countries like Jordan and Saudi Arabia, Almaiah et al. mentioned that the use of e-learning is not limited to the infrastructure issues [19, 21], However, in the geographically disadvantaged areas with poor to no reliable Internet coverage, the question of how education must be continued rose [22].

Based on the analyzed data for the major themes, we classify the answers for both stakeholders (students and professors) in Table 10.

According to these results, students are not satisfied with the distance learning provided by the professors. In addition, technical challenges are one of the main reasons [13, 29] for abandoning the transition to online education; this ranges from equipment to Internet connection issues or the availability of platforms. The technical challenges of the students also play a role. The lack of digital skills is expressed by insecurity in the use of new technologies in such a short time. However, the speed with which this move to online instruction is expected to happen is unprecedented and staggering [11].

The fact that the overhaul of teaching takes time and demands physical and mental performance (several hours in front of the screen) is also mentioned. Pedagogical insecurity seems to play a role, in the case where interactive teaching

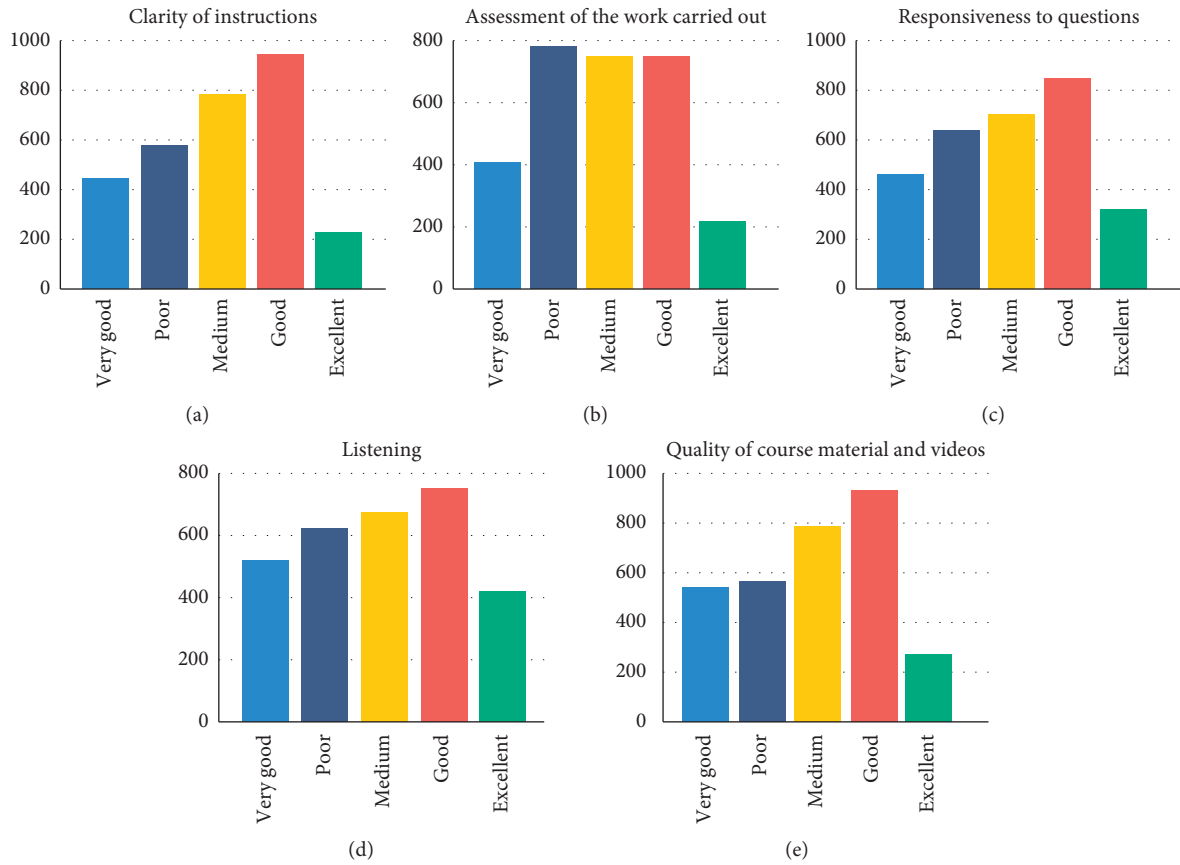


FIGURE 6: Involvement of professors.

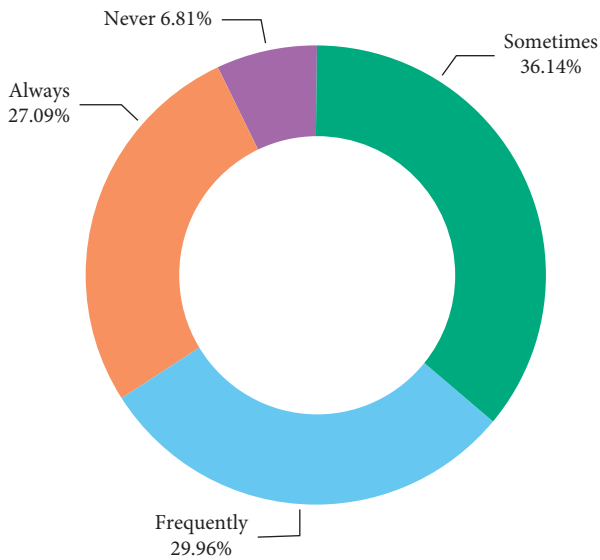


FIGURE 7: Use of materials produced by professors.

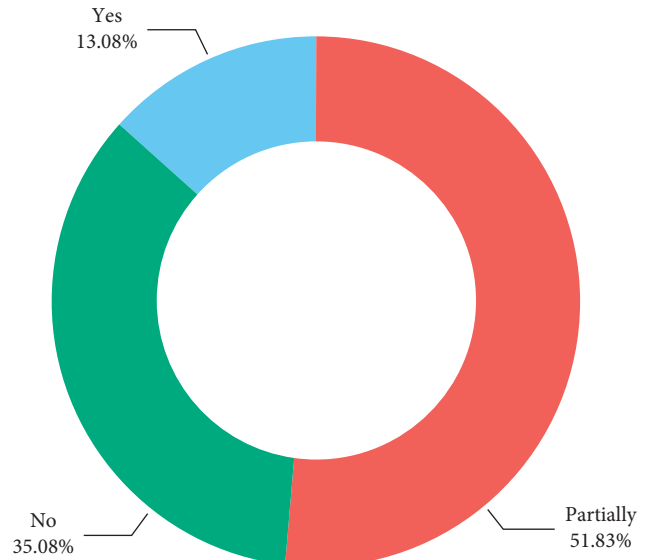


FIGURE 8: Satisfaction with the supporting materials produced by the professors.

must be converted into interactive online teaching. Therefore, the following can be said:

- (i) Distance education must be intelligently combined with face-to-face teaching, because the student relationship with the professor is essential, and distance education, paradoxically, strengthens it. As

concluded by Bozkurt and Sharma [17], it is not an option, but an obligation that involves more than simply uploading educational content; rather, it is a learning process that provides learners agency, responsibility, flexibility, and choice.

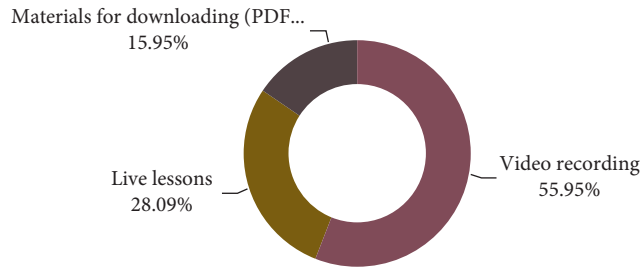


FIGURE 9: Teaching methods.

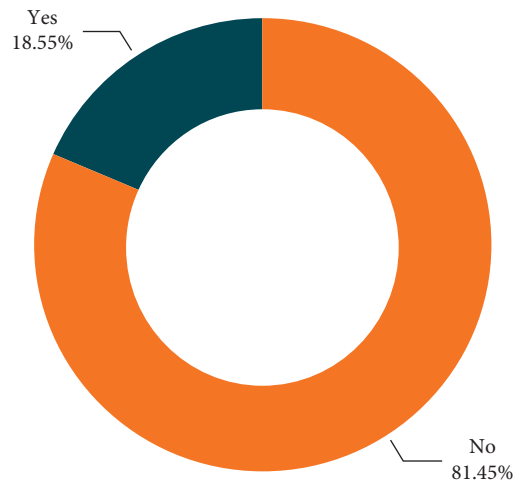


FIGURE 10: Distance exam.

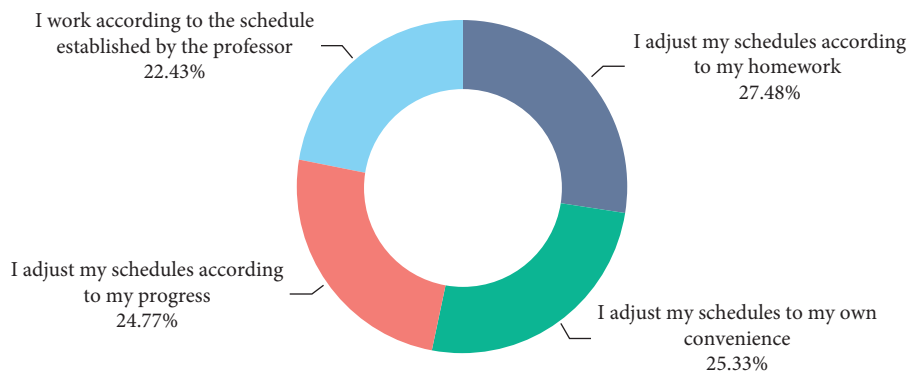


FIGURE 11: Work timetable.

- (ii) The professors and learners, who had a new distance learning experience following the COVID-19 crisis despite themselves, stood out for their adaptability, which was rapid and productive [21].
- (iii) The reluctance noted among some professors will dissipate or even disappear.
- (iv) The IT tool has made its definitive entry into schools and universities, and new governance through permanent coordination, in the form of remote

meetings and teleworking, has been tested and will be more widely implemented at all levels.

Based on the results of the analyses of our survey, we recommend the following at two levels.

3.1. Technical Level. Most professors have not received training on the use of tools applied in distance education. Thus, there is a need for technical support and training in the

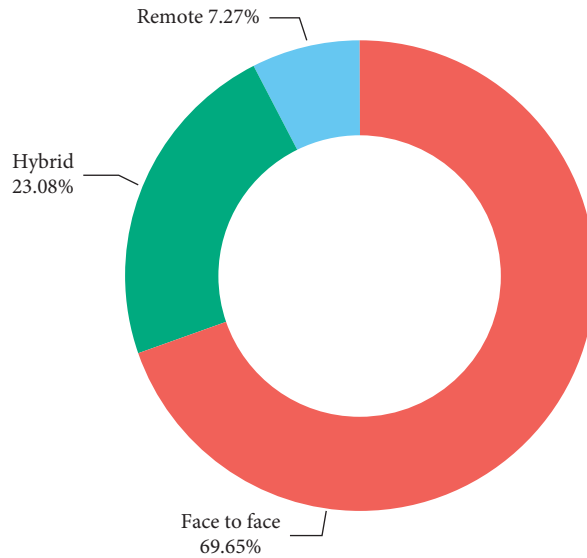


FIGURE 12: Preferred type of education.

TABLE 10: The resulting classification for professors and students.

Themes		Professors	Students
Previous experience with distance education	Yes	27.00%	34.60%
Distance learning platforms used during confinement	Yes	92.08%	91.17%
Use of platforms	Moodle	54.70%	—
Devices used	PC	78.71%	66.80%
Platforms assessment	—	85.00%	40.00%
Evaluation during the confinement period	Not possible	64.40%	81.45%
Distance learning in the future	Can ensure	60.00%	7.27%
Workload during confinement period	Surcharge	50.00%	—
Involvement of stakeholders	—	—	70.00%
Use of materials produced by professors	Sometimes	—	36.14%
Teaching methods preferred by students	Video recording	—	55.95%

use of these means. Consequently, establishments must ensure the following:

- (1) Setting up the necessary infrastructure to enable all students to access resources and activities via the e-learning platforms [19].
- (2) Setting up a technical assistance team to support professors in the task of putting content online.
- (3) Reliable technical equipment and Internet access, especially in suburban areas with poor Internet coverage as recently mentioned by Bozkurt et al. [22].
- (4) Effective access to programs.
- (5) Access to technical help and digital resources.
- (6) Access to in-service training that helps professors acquire skills to communicate remotely.
- (7) Communicating clearly on the nature of the resources and how to access them.
- (8) As time has been indicated as a factor playing an important role in preparing and guaranteeing the

quality of distance education, it is recommended that professors have enough time to prepare for good digital learning, which may involve the following:

- (i) Decreasing pressure on other fronts.
- (ii) Providing financial support through educational assistants and overtime during the start-up phase.
- (iii) Ensuring better access to educational resources.

3.2. *Teaching Level.* Higher education institutions must ensure that professors are well equipped to provide digital distance learning adequately through the following:

- (1) Organizing training for professors in the use of platforms and course scripting.
- (2) Motivating professors to use blended learning in all modules and disciplines.
- (3) Defining and assessing the workload generated by distance learning.

- (4) Improving follow-up and interaction between professors and students.
- (5) Evaluating the nature of the educational expertise for digital distance learning and teaching available in the establishment.
- (6) Creating sustainable structures to make educational expertise available and visible.
- (7) Communicating and promoting internal educational resources.
- (8) Offering the monitoring of good/best practices at the national and international levels.
- (9) Providing spaces for higher education institutions to meet/see their ideas, experiences, and challenges.
- (10) Having an explicit strategy to provide tailor-made educational expertise regarding distance education.

4. Conclusions

Online learning means education that uses Internet technology [3]. It has changed the concept of traditional education within the last few years, by creating education flexibility without being limited by distance, space, and time. In online learning, the latest technology needs to be used to enhance the learning process and interactions between professors, students, and technicians. It may be identified as a significant factor that can either encourage or hinder student and professor usage of e-learning. Online learning also reduces cost without reducing the quality of learning. For these reasons, professors are expected to be more facilitators, collaborators, mentors, trainers, directors, and study partners and provide choices and greater accountability for students to learn. To convey their learning to students, they must be able to innovate in their pedagogical approaches and in their teaching materials [29]. Disruption and innovation are key to helping students embrace e-learning [20]. Implementing online learning requires technology such as computer devices, applications, and the Internet, as well as appropriate steps toward carrying out online learning. It can also use flexible technology such as smartphones.

This method of online learning might be the best choice for every student of our university programs, in forced situations. This type of teaching has more advantages than disadvantages; it especially allows us to study anywhere and anytime. In Morocco, where many students come from suburban areas or other cities to study in big universities and schools, e-learning is the solution. In fact, students can connect to online lectures, following their schedules and learning at their own pace.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

All authors contributed equally to this work.

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