

Higher Education in the COVID-19 Era: Challenges and Opportunities of Using of Distance Education

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Abstract—The coronavirus (COVID-19) pandemic has caused a major health crisis and quarantined half of the planetary population, and as a result, it has caused a momentary rupture or even, in the invisibility of the magnitude of this virus total suspension of higher education. It is in this perspective that the treatment of a subject related to this Pandemic is, for us, very important, and especially to study its impact on higher education. Moreover, especially that there is little or no research that has addressed this issue in the case of Tunisia. The objective of this contribution is to report on research that we conducted at the Higher Institute of Technology Studies of Kairouan in Tunisia (HITS of Kairouan), with the aim of studying the experience feedback from the practice of Distance Education, through the Virtual University of Tunis (UVT) platform, in the COVID-19 confinement period (for the years 2020 and 2021). In this context, we will divide our research into three parts. The first will be reserved for the presentation of the general and current context of the COVID-19 phenomenon. Next, we will explain the extent and impact of this virus on higher education around the world. Finally, a third empirical part will be devoted to the presentation of our research, while demonstrating the impact of COVID-19 on teaching within the HITS of Kairouan, and also the opportunities and constraints of the use of distance education.

Index Terms—COVID-19, higher education, distance education, UVT-platform

I. INTRODUCTION

The world is currently experiencing an infectious disease pandemic called COVID-19, caused by a new virus that is part of the coronavirus family: SARS-CoV. This virus is spiraling like a forest fire and has caused global chaos. Many lives have already been lost, and the global economy is at stake. In the absence of a vaccine, for the majority of the people, and especially in developing and poor countries, such as our country, Tunisia (In the period of our research work), social distancing and total containment are the main current efforts to mitigate and flatten the epidemic curves. Several countries around the world are currently implementing social distancing and total blocking measures [1].

These measures are not without consequences for higher education, where they have posed enormous problems in ensuring studies under normal conditions. In fact, and following the confinement, which has, been generalized in the majority of countries, as a means to thwart and fight against this virus, millions of students have found themselves, for several months and even at this moment in the incapacity to attend their classes (a number that is increasing every day).

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As a result, teaching has been suspended in the majority of universities, to avoid the great risk of contamination, and has consequently left hundreds of millions of students in educational unemployment in their homes, without however to have an idea of their destiny, whether it been on the deadlines for the resumption of courses and their diplomas.

It is from this perspective that most countries and most universities have decided to use distance education as a unique and protective alternative to continue studies with ICTs and platforms, dedicated, such as UVT (Virtual University of Tunisia) in Tunisia.

Indeed, the issue of distance education is not something new in everyday realities. On the other hand, the importance and the characterization of the e-learning in the time of COVID-19, as an object of research in social sciences, is a topical theme, and particularly in the fields of education and training.

Distance education, which is a teaching medium, commonly discussed around its importance of its effectiveness in improving flexibility, learning and sharing information and knowledge, has constituted in this period of confinement, the one and only source of distance education and communication. In fact, several questions were asked about the opportunity that offered COVID-19 for the relaunch and reevaluation of the distance education ? But also on the constraints encountered

Really, do our universities have the means and the logistics to seize this opportunity, are our teachers and students well prepared for this experience and do they have the necessary training and knowledge in the field of ICT and digital? For this reason, there are several authors who have considered the mastery of these digital skills to be decisive factors in the success of any training, teaching or distance work programme (for example, [2–4]).

These are the questions addressed by this study, which describes, in detail, from a questionnaire, distributed to students, and concerning the study of distance education in the era of COVID-19, as they experienced it during periods of confinement.

II. THEORETICAL FRAMEWORK

A. COVID and Higher Education

In order to understand better the disruption caused by COVID-19 in higher education and to study the first steps taken by higher education institutions around the world to respond to the crisis, the results of surveys carried out by several organizations were used. For example the Institute of Education (IIE) in the United States or the European Association for International Education (EAIE) and Erasmus

Student Network (ESN) in Europe.

Throughout this paragraph, we will support our theoretical research on the International Association of Universities (IAU) Global Survey [5] on the impact of COVID-19 on higher education worldwide.

1) *Impact of COVID-19 on the course of classes*

The COVID-19 pandemic, which in just a few months led to the unprecedented health and socioeconomic crisis in which we live and which will mark our time for a long time, has had serious repercussions on the entire higher education sector in the world.

Within months, as the virus spread across the world, China succeeded in drastic removal and containment measures to reduce cases to zero. The success of the social distancing and confinement measures adopted by China and strongly recommended by the WHO has encouraged many other countries to take the same measure.

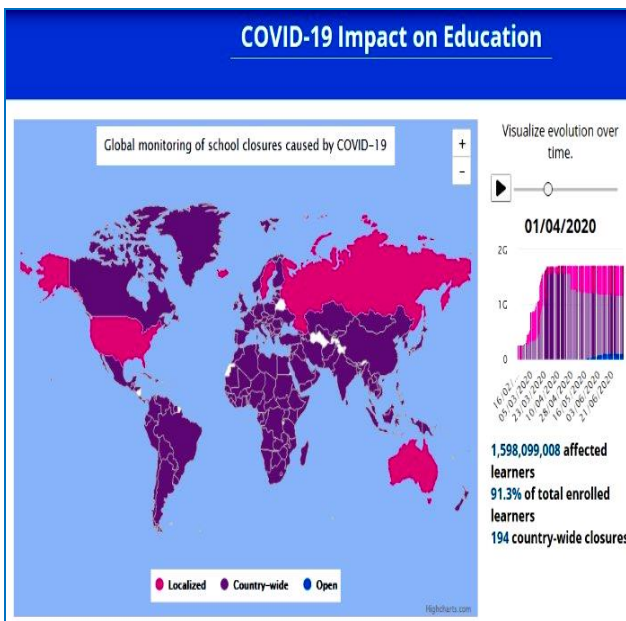


Fig. 1. COVID-19 impact on education ([6], 2020).

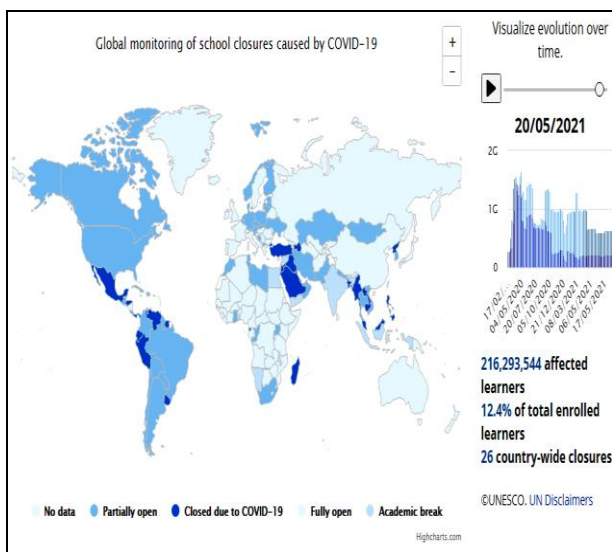


Fig. 2. COVID-19 impact on education ([6], 2021).

As of 1 April 2020, already more than 3.4 billion people, representing 43% of the world population, were in lockdown in more than 80 countries and territories around the world.

The lockdown and social distancing measures immediately had an enormous impact on higher education [5].

According to UNESCO [6], on April 1, 2020, higher education institutions (HEIs) were closed in 194 countries, affecting 1,598,099,008 learners, representing 91.4% of total enrolled students (Fig. 1). Even after a year 2021, the same statistics persist, the situation is still dangerous, some countries are in a situation of re-containment, and studies are suspended (Fig. 2).

2) *Impact of COVID-19 on teaching and learning*

At almost all higher education institutions, COVID-19 has affected teaching and learning, only 2% of higher education institutions (seven higher education institutions) reported that teaching and learning is not affected. It is important to mention that four of the seven higher education institutions that have no effect on teaching and learning are virtual universities and one responded that the campus is open as usual; while the other two are traditional universities responded that their campuses were closed. Two-thirds said classroom teaching has been replaced by distance teaching and learning, and one-quarter said most activities are currently on hold, but the institution is working to develop solutions to continue the teaching and learning, by digital means or self-study. Only 7% said education had been canceled [5].

These different results, we allow to note that two thirds of higher education institutions were able to practice online education, while one third were not. However, the majority of these institutions have been looking for ways to continue teaching online. Of course, and given the risks of choosing the sample of survey respondents, this result is difficult to generalize for all higher education institutions worldwide, but it is satisfying to see that these institutions have been prepared for this type of crisis or have reacted quickly enough to allow continuity of teaching and learning.

3) *Impact of COVID-19 on the conduct of exams*

Just over half of higher education institutions plan to take the semester exams as scheduled, although the majority are using new measures and only 6% as usual. That said, 14% plan to complete only part of the scheduled reviews, while others will be postponed. At about a quarter of higher education institutions, exams will be postponed or are on hold for now [5].

There is therefore a high level of uncertainty in planning for the next semester—when and whether regular face-to-face teaching can be resumed or whether distance education will be continued. For this, some universities have tried to find solutions to deal with this exceptional situation.

4) *Impact of COVID-19 on research*

Almost 80% of higher education institutions responded to the survey and said the COVID-19 pandemic has affected research at their institutions.

The situation is almost the same in all regions, with Africa having a slightly higher percentage of higher education institutions affected than all other regions (85% vs. 79%).

The most common impact of COVID-19 on research has been the cancelling of international travel (83% of higher education institutions) and the cancellation or postponement

of scientific conferences (81% of higher education institutions).

Science projects are at risk of not being completed in just over half of higher education institutions (52%), while at 21% of higher education institutions scientific research has ceased altogether. The same trend is visible for scientific conferences, which were canceled for 88% of European higher education institutions, 81% in Asia-Pacific, 78% of American and 68% of African higher education [5].

B. Emergency of Distance Learning in COVID-19

In this part, we will explain the usefulness of distance education as the only way to continue the studies in the period of total confinement.

1) Definition of distance education

Distance education is an educational practice favoring a learning process that brings knowledge closer to the learner. In a distance course, we thus seek to reduce the spatial and / or temporal distance separating the two, but according to these authors, this distance can also be of a technological, psychosocial and socio-economic nature [7].

In its opinion on distance education in Quebec universities, the Higher Education Council proposes a definition inspired by that of the OECD, which makes it possible to include its various modalities: "distance education is an activity which involves, to a certain degree, a dissociation of learning in space or time. This includes training delivered through technology, with the understanding that the latter can also be used in face-to-face training [8]."

According to the Université Laval [9]: "A training system that allows a student to learn alone or in a collaborative situation, using appropriate teaching materials, through various means of communication, and with the remote support of the teacher and resource persons. This training offers flexibility of schedule within the academic calendar and does not require any travel, with the exception of those required for summative evaluations of learning."

2) Typologies of distance education

Given that the origins distance education go back over 150 years (correspondence courses, televised courses; see the Issue sheet of this dossier), it is possible to consider the current period of time as being a moment when the distance education and line is booming and where we are witnessing a proliferation of forms and methods of training.

- Asynchronous mode: The courses offered remotely in asynchronous mode allow students to carry out the learning processes at the times that suit them, whether it is to consult the learning resources made available to them or to interact with the teacher or other students [10].
- Synchronous mode: Courses offered remotely in synchronous mode refer to courses or training, offered at specific times. These courses use synchronous communication tools such as video conferencing, video conferencing, and audio conferencing.
- Hybrid mode: For some courses and training, the two modalities (asynchronous and synchronous) can be combined. We will then speak of hybrid [11].

III. PRACTICAL FRAMEWORK OF STUDY

In this section, we will examine the extent of the spread of COVID-19 and its impact on higher education in Tunisia, particularly in the case of the Kairouan Institute of Technology Studies HITS Kairouan), and also explain the analysis of the results of the application of distance education in the total confinement period.

A. Research Methodology

1) Research objectives

- Measure the impact of COVID-19 on teaching and learning;
- Present the opportunities and challenges for the establishment of an effective distance education system;
- Measure the degree of satisfaction with distance education via the UVT platform.

2) Research hypotheses

- H1: COVID-19 has repercussions negative for the normal course of classroom teaching and learning.
- H2: COVID-19 is an opportunity for the establishment of an effective distance education system.
- H3: The adaptability of distance education depends on the type of module and the subject taught.
- H4: the degree of student satisfaction depends on the extent of the constraints encountered and the efficiency of the distance education system via the UVT platform.
- H5: Students are reluctant to take distance education and generally prefer face-to-face teaching.

3) Sampling method

The research hypotheses were verified longitudinally with a group of 120 students from the Higher Institute of Technological Studies in Kairouan. To collect the data, a questionnaire was distributed to students in class, and subsequently analyzed from SPSS version 22 software. The sampling method used is probabilistic (simple random sampling). It is the reference model and the easiest to use: all individuals have the same probability of belonging to the sample. This is the case of our research, which proves very difficult to study the perception of the whole population, namely, all the students of HITS of Kairouan.

B. COVID-19: Current State in Tunisia in Period of Research

In Tunisia, the first case of a person carrying COVID-19, was recorded on 2 March 2020 (a case imported from Italy, identified as part of the monitoring of travelers from risk areas), and the first case of deaths were recorded on March 26 and thereafter there is an increase with a low rate of cases recorded every day.

We can summarize the different phases of the spread of the virus and the measures taken as follows:

- On March 12, 2020, Tunisia proceeded with the gradual closure of borders with countries at high risk of transmission of SARS-COVID.
- On March 14, 2020, Tunisia closed all schools and universities and banned all gatherings.
- On March 22, 2020, Tunisia launched general containment, border closures and quarantine in dedicated places for all returnees. This confinement was, each time,

renewed, and it was extended until May 28.

- On May 04, 2020, Tunisia began the first phase of targeted containment.
- On May 28, 2020, Tunisia applied partial deconfinement.
- Between 31 October and 15 November 2020, studies were suspended in schools, universities, and migration to distance education with the application of curfew in the evening.
- Between 1 and 15 February 2021, studies were suspended in schools and universities and migration to distance education with the application of curfew in the evening.
- Between April 19 and May 16, 2021, studies were suspended in schools, universities, and migration to distance education with application of curfew in the evening.
- Between 8 and 16 May, 2021, reconfinement totally.
- According to the latest statistics (in the research period) from the Tunisian ONMNE., as of June 30, 2021, the cumulative number of confirmed cases of COVID-19 is 426,879 cases (out of a sample of 1,737,467 people tested) of which 15,065 died [12].

C. Impact COVID-19 on Tunisia Education in Period of Research

We note, and according Fig. 3, that education in Tunisia, and at its various levels, was negatively influenced by the COVID wave, and thus caused the total suspension of studies.

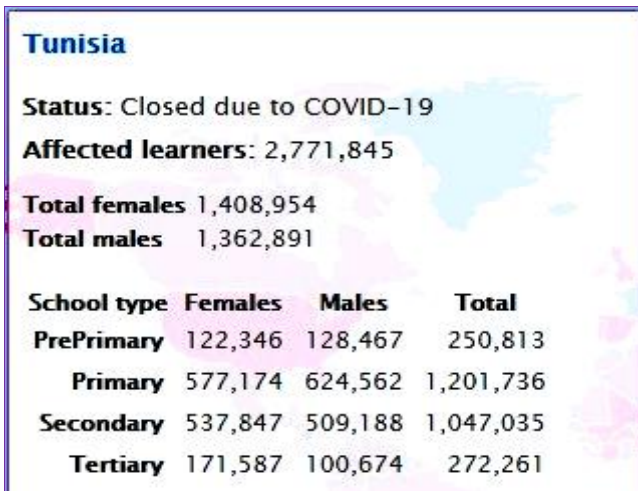


Fig. 3. COVID impact on education ([6], 2021).

IV. RESULTS AND DISCUSSIONS

Following the closure of higher education institutions as of April 19, 2021, the question that worried all teachers, students and their families is: what are the consequences of COVID and confinement on studies, exams and research? This is the very objective of our research.

In fact, the project in which the empirical framework of our research is articulated is the study of the impact of COVID-19 on the teaching and the practice of distance education within the HITS of Kairouan.

A. Respondents Profiles

The following Table I present the profile of the 120 students who answered the questionnaire.

TABLE I: PROFILE OF RESPONDENTS

Channels	Student profile	Frequencies
Sex	Female	70.8%
	Male	29.2%
Level of studies	1st year	41%
	2nd year	35%
	Master	24%
Department	Economic Science and Business Administration	41%
	Computer technology	30%
	Electrical engineering	29%

Through our survey, and with a view to diversifying our study and reaching different categories and profiles of students, we interviewed an amalgam of girls and boys, of different levels of study and department, to see their perceptions of the impact of COVID-19 on their education and the application of distance education

B. Impact of COVID-19 on education at HITS of Kairouan

From this Table II, we notice that the majority of students (i.e., 79.2%) confirmed that total confinement has a negative impact and caused the total cessation of their studies and their end-of-studies projects. Indeed, like all establishments, in Tunisia, and from April 19, and even before the start date of total containment (May 8, 2021), the studies were 100% suspended within the HITS of Kairouan, and this for an unknown date, at the beginning, because of the invisibility of the situation, in front of a virus which causes day after day several damages.

TABLE II: DO YOU THINK THAT TOTAL CONFINEMENT DUE TO THE COVID-19 VIRUS HAS A NEGATIVE IMPACT ON YOUR STUDIES AND LEARNING?

	Frequency	Percentage	Cumulative percentage
Disagree	11	9.2	9.2
Moderately agree	14	11.6	20.8
Agree	95	79.2	100.0
Total	120	100.0	

In addition, the internships (license and master), were stopped, following the closure of the majority of companies, and most of the students were not able to complete the empirical part of their final project (for example: collection of the data necessary for the implementation of production optimization projects, improvement of the quality of financial analysis, strategic and commercial analysis, etc.).

Likewise, and because of the prolongation of confinement after the holidays, the students could not take the control homework, which was initially scheduled at the beginning of April.

Based on these findings, we can thus validate Hypothesis 1: for which the total confinement, due to the COVID-19 virus, had a negative influence on the normal course of teaching and face-to-face learning within the HITS of Kairouan.

C. Analysis of the Implementation of Distance Education via the UVT-HITS Kairouan Platform [13]

- Presentation: The Virtual University of Tunis (UVT), a

public scientific and technological establishment, created in January 2002, has the main mission of developing online university courses and programs for Tunisian universities.

- Role of the UVT platform in the total containment period: Faced the practice of total confinement in Tunisia, during various periods in the 2020 and 2021 academics years, the Ministry of Higher Education has decided to continue studies, online and through the UVT platform (you find in Fig. 4, an extract from my personal account of the UVT, containing some examples of courses and by which I ensured the distance teaching, in asynchronous mode).
- Personal experience: As a teacher within the Kairouan HITS, I provided 14 courses throughout the confinement period (Cost analysis, financial accounting, budget management, production management...), to the different levels. Moreover, this through the asynchronous method (via digital tutorials and tutorials, video sequences from YouTube) and through the Synchronous method by the tools of JITSI, Microsoft Teams, Zoom and BigBlueButton (for example, Fig. 5).

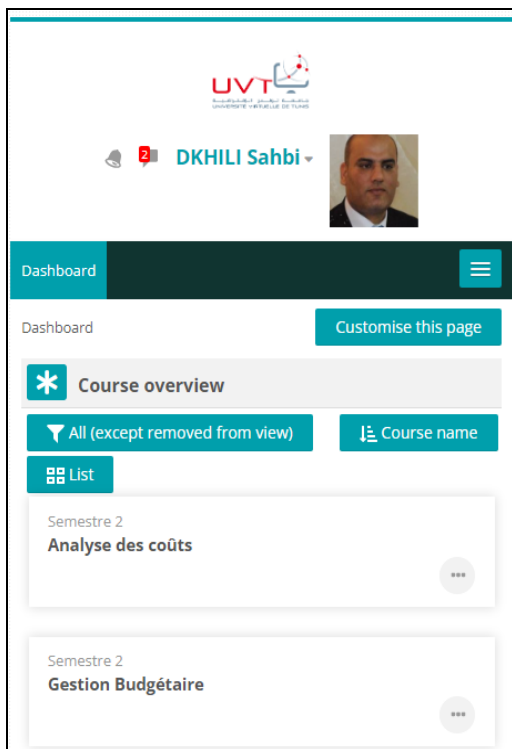


Fig. 4. Personal account in the UVT-HITS Kairouan platform.

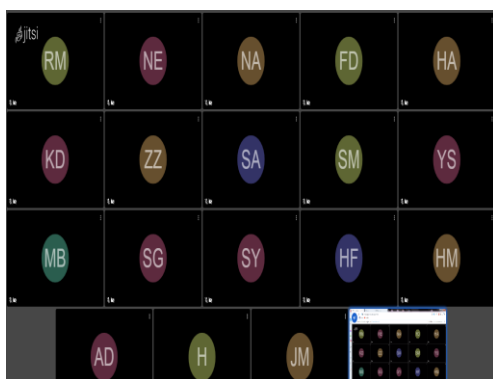


Fig. 5. Example of synchronous session via JITSI.

D. Analysis of the Perceptions of Distance Education Students via the UVT-HITS Kairouan Platform

- Perception of distance education students before the launch of the distance education program:

From the Table III, we can confirm that the students have the necessary skills and prerequisites in the field of ICT (Internet, social networks and smartphone almost have the same rate of use) so that they can familiarize themselves, properly and easily, with the tools and basics of distance education. In addition, and although the rate of use of the distance education—UVT platform is moderately low 12.5%, but note that all 1st year students (in all departments) already use the UVT platform in the course of 2CN’s subjects.

TABLE III: WHAT TYPE OF TECHNOLOGY DO YOU USUALLY USE?

	Frequency	Percentage	Cumulative percentage
Internet	30	25.0	25.0
Social networks	35	29.2	54.2
Distance education platform	15	12.5	66.7
Tablet	7	5.8	72.5
Smart phone	33	27.5	100.0
Total	120	100.0	

According to Table IV, we can see the importance given to distance education by students, with a high participation rate (68.3%), but the rates of those who did not participate and who did not. could not complete the entire program remotely, 38.3% are worrying. We will come back to the causes of this result in later analyzes.

TABLE IV: DURING THE COVID-19 CONFINEMENT PERIOD, DID YOU FOLLOW DISTANCE EDUCATION THROUGH THE UVT-HITS KAIROUAN PLATFORM?

	Frequency	Percentage	Cumulative percentage
Yes, Totally	36	30.0	30.0
Yes, partially	45	38.3	68.3
No	38	31.7	100.0
Total	120	100.0	

Referring to Table V, we find that the majority of students at the Kairouan HITS (63.3%) are very aware of the usefulness of distance education practice during the total lockdown period, which was caused by the spread of COVID-19.

TABLE V: BECAUSE OF THE COVID-19 PANDEMIC, WHAT DO YOU THINK OF THE USEFULNESS OF DISTANCE EDUCATION IN YOUR STUDIES?

	Frequency	Percentage	Cumulative percentage
Not useful	19	15.8	15.8
Moderately useful	25	20.9	36.7
Useful	76	63.3	100.0
Total	120	100.0	

In addition, and in Table VI, and through the 2-factor ANOVA method, we notice that there is a significant relationship (the P-values are equal, respectively, to 0.031 and 0.012, are below the threshold of meaning of 0.05) between the dependent variable and the independent variables. While the interaction between these last variables (indicated by the symbol * in the table) is not significant (0.755 is greater than 0.05). Therefore, we retain the alternative hypothesis that explains the dependency

relationship between the high rate of student participation in distance education, which is due to the negative impact of COVID, felt, on their studies and learning on the one hand, and the usefulness of distance education as the only way to continue their studies and maintain permanent contact with their teachers, on the other hand. Whereas, the interaction between these variables was found to be non-significant.

TABLE VI: TWO-WAY ANOVA: TESTS OF INTERSUBJECT EFFECTS
Dependent variable: In the COVID-19 lockdown period, did you take distance education

Source	Sum of squares type III	dof	Medium square	F	Significance value
Corrected model	13.204 a	8	1,651	3.015	0.004
Usefulness of distance education in containment	3.910	2	1,955	3.572	0.031
Impact of COVID-19 Usefulness of distance education *	4.999	2	2,499	4.566	0.012
COVID impact	1.037	4	0.259	0.473	0.755
Mistake	60,762	111	0.547		
Total	562,000	120			
Total corrected	73.967	119			

a. R-two = 0.179 (Adjusted R-two = 0.119): size of model effect

- Students' perception of distance education during and at the end of the distance education program:

According to Table VII, we can see that the majority of students are dissatisfied (61.7%) with distance education via the UVT-HITS Kairouan platform. In the following analyzes, we will seek the root causes of this discontent.

TABLE VII: HOW SATISFIED ARE YOU WITH DISTANCE EDUCATION VIA THE UVT PLATFORM?

	Frequency	Percentage	Cumulative percentage
Not at all satisfied	47	39.2	39.2
Unsatisfied	27	22.5	61.7
Moderately Satisfied	31	25.8	87.5
Satisfied	9	7.5	95.0
Very satisfied	6	5.0	100.0
Total	120	100.0	

Table VIII shows us that students perceive that distance education is not practical for study and learning (63, 3%). In the following tables, we will examine the causes of this perception.

TABLE VIII: DO YOU FIND DISTANCE EDUCATION PRACTICAL FOR STUDY AND LEARNING?

	Frequency	Percentage	Cumulative percentage
Not agree at all	58	48.3	48.3
Disagree	18	15.0	63.3
Moderately agree	17	14.2	77.5
Agree	19	15.8	93.3
Totally agree	8	6.7	100.0
Total	120	100.0	

According to Tables IX and X and the students' replies, we can conclude that distance education is rather practical in the case of course modules rather than in tutorial or practical work modules. This is in fact because the latter require in certain matters software or even machines to be used, and

which is not the case remotely. Moreover, the distance education is also practical, according to them, only for the subjects with theoretical or transversal vocation rather than those with scientific vocation, calculations, which require more explanation, sometimes are not easy, and practical in the distance education (this confirms, thus, in our research hypothesis H 5).

TABLE IX: IN YOUR OPINION, WHICH TYPE OF MODULE IS BEST SUITED FOR DISTANCE EDUCATION?

	Frequency	Percentage	Cumulative percentage
Scientific and technological subject	8	6.7	6.7
Theoretical subject	51	42.5	49.2
Transverse material	12	10.0	59.2
None	49	40.8	100.0
Total	120	100.0	

TABLE X: IN YOUR OPINION, WHICH TYPE OF SUBJECT DO YOU FIND MOST SUITABLE FOR TO DISTANCE EDUCATION?

	Frequency	Percentage	Cumulative percentage
Courses	53	44.2	44.2
Directed Work	14	11.7	55.8
Practical Work	5	4.2	60.0
None	48	40.0	100.0
Total	120	100.0	

This finding was approved by the 2-factor ANOVA method (Table XI) which confirms the relationship between the non-practice of distance education and the field of study (the types of module and subject taught), as well as the interaction between these two variables with a P-Value which is always below the 0.05 threshold (i.e., 0.018, 0.000 and 0.021).

TABLE XI: TWO-WAY ANOVA: TESTS OF INTERSUBJECT EFFECTS

Dependent variable: Do you find distance education practical for teaching and learning?

Source	Sum of squares type III	dof	Medium square	F	Significance value
Corrected model	111.346a	15	7.423	7.150	0.000
Module adaptation to distance education	10.932	3	3,644	3,510	0.018
Subject adaptation to distance education	21,687	3	7.229	6.963	0.000
Module adaptation to distance education * Subject adaptation to distance education	21.612	9	2.401	2.313	0.021
Mistake	107.979	104	1.038		
Total	787,000	120			
Total corrected	219,325	119			

a. R-two = 0.508 (Adjusted R-two = 0.437): size of model effect

According to Table XII, we note that the constraints that prevented students from taking or continuing distance education, during the COVID-19 containment period, are multiple. The most important are manifested in problems of means for students (41.7%: Non-availability of internet network and lack of material means), the second constraint relating to the difficulty of assimilation through distance education, i.e. 33.3%, this explains the non-practice of the

distance education explained previously. There are psychological issues that play, too, as a factor that is able to prevent students from engaging in distance education sight, the state of fear and panic throughout the population in this phase of containment.

TABLE XII: IS THE MAIN CONSTRAINT THAT PREVENTED YOU FROM (TO) FOLLOW DISTANCE TRAINING?

	Frequency	Percent age	Cumulative percentage
Internet network unavailability	29	24.2	24.2
Lack of material resources (laptop, smartphone, tablet)	21	17.5	41.7
Difficulty of assimilation at a distance	40	33.3	75.0
Poor psychological state of the learner	18	15.0	90.0
None	12	10.0	100.0
Total	120	100.0	

Table XIII shows that students have found many problems related to distance learning via the UVT-HITS Kairouan platform. For example, the problem of the synchronous model, which pays off (26.7%), the problem of teaching aids (24.2%), which are, for some of them, ineffective, and other students suggest that there are also technical problems (10%).

TABLE XIII: WHAT IS THE MAJOR PROBLEM OF THE DISTANCE EDUCATION IN THE COVID-19 CONTAINMENT PERIOD?

	Frequency	Percent age	Cumulative percentage
Paid synchronous model	32	26.7	26.7
Technical problem of the UVT platform (access, configuration, registration, ...)	12	10.0	36.7
Ineffective method and teaching aids	29	24.2	60.8
None	22	18.3	79.2
I do not know	25	20.8	100.0
Total	120	100.0	

It can be seen from Table XIV that students are still dissatisfied during 2021 (35%), because they have not found any significant improvement, 2020 to 2021 in the UVT platform and distance education methods practiced by teachers. For the percentage of 49.1% is the response of new 1st year students who did not take distance learning courses during the year 2020.

TABLE XIV: IS THERE AN IMPROVEMENT IN THE UVT PLATFORM AND DISTANCE EDUCATION METHODS BETWEEN THE YEAR 2020 AND 2021

	Frequency	Percentage	Cumulative percentage
Yes, certainly	5	4.2	4.2
Yes, partially	14	11.7	15.9
No, never	42	35.0	50.9
I do not know	59	49.1	41.0
Total	120	100.0	

Table XV allows us to conclude that the majority of students prefer face-to-face teaching, i.e., 64.2% and secondly the synchronous model (with 22.5%) for distance education. As for the asynchronous model is totally rejected by them (i.e., 2.5%).

TABLE XV: WHAT TYPE OF TRAINING DO YOU PREFER?

	Frequency	Percent age	Cumulative percentage
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Asynchronous Via the UVT-HITS Kairouan platform	3	2.5	2.5
Synchronous via Google Meet, JITSI and Zoom tools	27	22.5	25.0
Mixed (Asynchronous and Synchronous)	12	10.0	35.0
Face-to-face	78	65.0	100.0
Total	120	100.0	

We notice, and from Table XVI, that most of the students (67.5%) confirm that distance education distance education in the era of COVID-19 has been an opportunity for them. To the extent that they have lived a new adventure in the digital world and they learned a lot of methods and tools in ICT (this confirms, thus, in our research hypothesis H2).

TABLE XVI: FINALLY, DO YOU THINK THAT THE DISTANCE EDUCATION IN THE ERA OF COVID-19 WAS AN OPPORTUNITY FOR YOUR TRAINING?

	Frequency	Percentage	Cumulative percentage
Yes, certainly	46	38.3	38.3
Yes, moderately	35	29.2	67.5
No never	39	32.5	100.0
Total	120	100.0	

Through Table XVII, and based on the 2-factor ANOVA method, we succeeded in validating the hypothesis of the existence of a significant relationship between the dependent variable and the independent variables (P-Value 0.008 and 0.000 are less than 0.05). The interaction between the independent variables (indicated by the symbol * in the table) is not significant (0.558 > to 0.05).

Thus, we can say the fact of measuring the timeliness of the practice of distance education in the period of total COVID-19 containment, is related to the participation rate and the degree of satisfaction. In fact, the students who were able to complete the entire program remotely and were satisfied with the content and tools used, responded "yes, definitely. On the other hand, the students who were not able to complete the entire program at a distance, and were moderately satisfied, answered "yes, moderately". In addition, the students who answered "No, never" are the students who were not able to follow the distance education and therefore are dissatisfied.

TABLE XVII: TWO-WAY ANOVA: TESTS OF INTERSUBJECT EFFECTS
Dependent variable: Finally, do you think that the distance education in the era of COVID-19, was an opportunity for your training

Source	Sum of squares type III	dof	F	Significance value
Corrected model	55.887a	10	21.221	0.000
Distance education monitoring by the UVT	2,650	2	5.031	0.008
Degree of satisfactfon	7.658	4	7.270	0.000
Distance education monitoring by the UVT *	0.794	4	0.754	0.558
Degree of satisfaction				
Mistake	28,705	109		
Total	537,000	120		
Total corrected	84,592	119		

a. R-tow = 0.661 (Adjusted R-two = 0.630): size of model effect

V. CONCLUSION

With billions of people isolated, the status of digital spaces is shifting from a convenience to a necessity, as they become

not only the main route of access to information and services, but also one of the only remaining vectors for economy, educational activities as well as social interactions.

As a result, due to COVID-19 and the application of total containment, as the only solution to decrease the scale of this new virus, studies, research and examinations, in higher education institutions, have been totally stopped for an unknown period, at the time of the increasing proliferation of the pandemic in the years of 2020 and 2021.

In view of this situation, the Ministry of Higher Education in Tunisia, and in order to resolve these problems, has encouraged the use of distance education, through the UVT platform, during lockdown periods; where thousands of students confined to their homes for nearly three months.

By betting everything on digital technology to implement the imperative of “pedagogical continuity”, the MES, and the HITS of Kairouan, seems to have forgotten a certain number of problems, which were going to arise in a large number of family configurations. In fact, not all students are equal in terms of access to networks or connected devices, or in terms of the skills required to optimally navigate computerized spaces. Digital inequalities already existed, between students and between regions, but the COVID-19 crisis is dramatically exacerbating them. This inequality was approved through the analysis of the interviewee of HITS students in Kairouan, Tunisia. In fact, a quarter of the students interviewed could not follow the distance education,

On the other hand, it turned out that the distance education application, and although internet access was free to the UVT-HITS Kairouan platform, was not well prepared by the Tunisian Ministry of Higher Education. In view of the major shortcomings and the technical and educational problems encountered by the students in accessing this platform easily, (problem of congestion and slowness of access, ineffective teaching aids, synchronous paid model).

For these and other reasons, it was found that the participation rate is average, and that the degree of student satisfaction with the application of the distance education, was low.

So, we can conclude that the fact of considering that distance education as an opportunity, in the period of confinement, both for universities, as well as for teachers and students, depends on the quality of distance education provided in response to the COVID-19 total containment emergency. In fact, this opportunity varies greatly, depending on the infrastructure in place, the abilities of students and teachers to adapt to distance education, and on the field of study, which according to the analysis of the distance education survey is practical only for transversal and theoretical subjects, and only for course modules and not for tutorials and practical work.

Thus, the existence of a technical infrastructure (availability of a fast and efficient internet network which

covers the entire Tunisian territory, the existence of platforms, well-structured and developed, and specific to each higher establishment), dedicated to the distance education, is a necessary prerequisite for ensuring adequate distance teaching and learning?

CONFLICT OF INTEREST

The author declares no conflict of interest.

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