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LNBIP 485

# Digital Economy

**Emerging Technologies and  
Business Innovation**

**8th International Conference, ICDEc 2023  
Braga, Portugal, May 2–4, 2023  
Proceedings**

 Springer



# Societal Complexity Problem of E Learning Adoption in a Post Covid Context: A Tunisian University Case

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**Abstract.** The COVID-19 crisis has raised significant concerns for the entire education community: policymakers, educators, and learners. School and university closures around the world have disrupted the learning and lives of a generation of students. Despite efforts to maintain educational provision through distance and online learning, unprecedented ‘institutional’ de-schooling has partly taken place, with an impact on learning. How to prevent this risk and mitigate its impact on learning inequalities and lifelong learning trajectories has become a major policy issue. This research aims to provide a conceptual framework for e-learning by adopting a complex societal approach that illustrates the profound changes brought about by the adoption of this education mode in society. From a theoretical foundation and based on our empirical explorations on one of the University of Manouba (UMA) institutions that chose to pursue this E-learning approach, this research identified the economic and social factors of E-learning analyzed through the complex societal approach developed by DeTombe (2008) in order to propose a redefinition of this mode of education. We show in this research how the different learning acquired as a result of the COVID-19 crisis constitutes a real societal issue and leads not only to a transformation of learning techniques but also to profound societal mutations in the different groups affected by this change process.

**Keywords:** Societal complexity approach · Impact · Crisis · Transformation · Developing Countries · Post COVID

## 1 Introduction

The E-learning experience following the COVID-19 crisis in Tunisia has started with an official ministerial initiative to implement a hybrid mode of teaching via learning platforms. The efforts of the State were directed towards supporting the technological infrastructure of universities and providing free connection to the moodle platform for students. Thus, the crisis has allowed the different actors of higher education (teachers, ministry, universities, students, and unions) to become aware of the relevance of E-learning as a complementary learning mode.

Most university institutions are trying to develop relevant mechanisms in order to deliver knowledge in an equitable manner and eliminate the geographical, linguistic and social barriers.

It is worth to be reminded that Tunisia has been committed to E-learning since 2002 with the launch of the Tunisian Virtual University (UVT). This commitment has been realized by the decision to increase the distance courses to 20% of the volume of the classroom program in universities in 2011. The field has been prepared by training students in the use of Information and Communication Technologies (ICTs). Tunisia ranks 5<sup>th</sup> among the African countries in the use of ICTs according to the NRI (Network Readiness Index) of the World Economic Forum, and it benefits from a fairly developed infrastructure. The digital sector in Tunisia contributes to 4.3% of the Tunisian GDP (INS, 2021). Moreover, 17.2% of students in Tunisia are enrolled in ICT courses. The Internet access rate is estimated at 64% in 2020 for a number of subscribers amounting to 7.55 million.

For all these reasons, several Tunisian institutions have opted for the perpetuation of E-learning in view of its advantages, thus taking advantage of the State support in the framework of its digitalization strategy (e-government project).

However, the sudden shift to e-learning induced by the Covid-19 crisis has disrupted the educational system in the Tunisian universities and prompted a reconsideration of the active teaching pedagogy, the technological and administrative infrastructure, and the valorization of the active learner's role in the learning process.

Based on an exploratory study analyzed through the complex societal approach developed by DeTombe (2008), we will show how the various learning approaches acquired as a result of the covid 19 crisis constitute a real challenge for society and lead not only to a transformation of learning techniques but also to profound societal mutations in the different groups affected by this change.

For the rest of the study, we proceed as follows. Part 2 is a review of the factors contributing to the effectiveness of E-learning and it emphasizes the complex societal aspect of this learning. Part 3 describes the methodology adopted in the study, while the results and interpretation of the complex societal process related to the adoption of E-learning are detailed in Part 4. Finally, we conclude in the fifth and last part.

## **2 Factors of E-learning Efficiency: Towards a Complex Societal Approach**

The e-learning is considered as a privileged learning mode drawing on technological innovations covering all learning formulas, assisted by computer, designed to be used on internet, intranet or extranet (Sousa and Rocha, 2019; Al-Fraihat et al., 2020, Dick et al., 2020, Wijekumar, 2021).

The choice of using this learning mode at the level of the Tunisian universities is explained by the acquired advantages in terms of saving time and effort. It is assimilated to a particular teaching mode based on the availability of students of teaching content via an electronic medium. Therefore, it allows a permanent learning, customized to the student's needs, independent of spatial and temporal constraints (Sousa and Rocha, 2019).

The Equity, essentially opportunity equity, is one of the major concerns of the political authorities. It is an integral part of the notion of quality in higher education. In this paper, we identify three key factors in the implementation and sustainability of e- learning:

## **2.1 Frustration Related to the Structural Transformation of the Teaching Method**

E-learning is one of the new emerging technologies replacing or complementing the traditional pedagogical approaches. This practice is distinguished by certain particularities insofar as it implements new pedagogical approaches (Ben Zammel et al., 2016; Dick et al., 2020).

Subjected to technological and social pressures, following the COVID crisis, public universities have not ceased to be adaptive in order to respond to the request of the Ministry of University Education to ensure pedagogical continuity. They have embarked on E-learning project crisis concretized by the evolution of platforms, technological tools of teaching modes and students belonging to Z generation.

However, the implementation of e-learning project crisis has led to a profound change in learning methods, generating resistance on the part of the involved actors (Dick et al., 2020). Indeed, the requirement to go beyond the universities and its actors in the covid context has resulted in a change in learning pedagogies and provoked a change management approach.

The learning process is seen as a collaborative relationship that supports knowledge construction, rather than as a simple process of transmitting knowledge. Knowledge is a collaborative construction: the learner must be placed in a context that allows him or her to construct knowledge, and the teacher must change roles and help students to acquire knowledge (Dick et al., 2020). The adoption of such approach to learning is legitimized by the idea that knowledge can only be obtained if the learner takes an active part in the learning process (Ben Zammel and Najar, 2021).

## **2.2 The Technological Infrastructure**

Unlike traditional teaching, e-learning efficiency is mainly determined by the technological aspect (Sousa and Rocha, 2019, Ben Zammel et al., 2018). Indeed, many studies have shown that technology in different forms has positive effects on learning (Parasuraman et al., 2005; Al-Fraihat et al., 2020).

Lack of funds is one of the main obstacles to the development of distance education in public universities. This new education method is hindered by the lack of resources, accessibility of technological infrastructure and the importance of social factors mainly in the developing countries (Al-Fraihat et al., 2020).

Experience shows that the technological challenges can cause frustration and dropout (Parasuraman et al., 2005; Al-Fraihat et al., 2020, Malik et Al-Toubi, 2018). Hence, characterized by the physical separation of the teacher and the student during the teachings, e-learning can be considered as a source of de-motivation.

### 2.3 Change Management for a Sustainable E- Learning Experience

The efficiency of e-learning depends on the change management of the adopted pedagogical approach, but also remains among the involved actors.

University teachers are particularly at the center of this change. This transformation goes from the simple introduction of some tools (platform, EAD, meetings, trainings, etc.) to the redesign of the whole teaching process.

Similarly, the student is invited to actively participate in the learning process. In this way, the motivation to learn or teach emerges as an essential condition for learning. Effectively managing this change depends on several elements such as:

The first factor is Individual efficiency, it is reflected in the beliefs and convictions of people in their abilities to achieve behaviours through the use of technologies (Artino, 2007, Wijekumar, 2021). It means an individual's belief in his or her ability to successfully perform a given task which plays an important role in motivation to learn. Training is essential to support these changes by developing new skills needed to perform their jobs.

Also, the beliefs of the individual in relation to the achievement of a behaviour are strongly influenced by the opinion of people or reference groups (Wijekumar, 2021), Hislop, 2013). This means that when teachers encourage the use of e-learning, students will therefore perceive its usefulness.

On the other hand, learning alone at a distance can lead to student demotivation. For this reason, it is recommended to encourage social interaction through knowledge sharing. Thus, the integration of e-learning as a teaching mode based on technologies evokes a socialization process revealing the interaction between technology and its users. Indeed, e-learning technologies promote resources sharing in the form of texts, images, videos allowing an interactive communication through different tools such as wikis, forums, chat and peer-to-peer activities (Sousa and Rocha, 2019, Wijekumar, 2021).

## 3 Methodology

Realizing that there was no specific analysis that directly addresses complex societal problems related to E-learning adoption, we have first used the methodological approach of storytelling which for us constituted an empirical asset, then we defined the thematic content analysis based on a post-covid context on which storytelling has been conducted, and finally we assessed the economic and social factors of E-learning and explained how its adoption constitutes a real complex societal problem.

### 3.1 Storytelling as an Empirical Research Methodology

In this research, we have mobilized the methodological approach of storytelling, which is a method used to investigate the organizational practices and discourses. This method has become increasingly popular with the rise of new technologies, digital storytelling and new management practices, leading us to storytelling management. The diversity of the actors and objects involved in our study and the nature of the available data, have led us to adopt this methodology for data qualitative analysis. The storytelling analysis

method best fits our research since it constitutes a way of accessing deep realities by exploring the “conveyed symbolism” (Chautard and Collin-Lachaud, 2019, P.33). This methodological approach aims at exploring the experiences and reality, which presents itself to us as an empirical asset, in order to organize and transmit the experiences of e-learning in knowledge perspective to others. Indeed, our research aims to explore how the university institutions have evolved by introducing e-learning in periods of crisis and pushes us to question the collective and organizational dynamics that have influenced individuals and markets by putting their transformations into stories.

### **3.2 The Study Context**

Our analysis based on storytelling has been conducted over the selected qualitative materials in the context of a case study (Yin, 2003, Chautard and Collin-Lachaud, 2019) in this particular case of the Higher Institute of Accounting and Business Administration (ISCAE), University of Manouba (UMA) and has proceeded to a triangulation of data collection tools (Yin, 2003). It should be highlighted that two phases of data collection have been conducted: A first phase taking place during the adoption E-learning during the covid-19 crisis and a second phase of collection conducted during the implementation of hybrid E-learning in the same institution. For this purpose, we have resorted to documents shared by the institution (emails, reports, minutes, etc.). Furthermore, our status as intervening researcher has allowed us to participate in the different meetings organized with the different project actors. In this same way, we have followed and have witnessed the E-learning experience in this institution as a participant (crisis E-learning) and coordinator (hybrid E-learning). Finally, twelve semi-structured interviews have been conducted with the teachers who participated in crisis E-learning and a focus group has been conducted with the teachers who have adopted the hybrid mode as their preferred teaching mode post-covid.

## **4 Results and Discussion: Towards a Societal Transformation in Adopting E-Learning Approach**

The results of a thematic content analysis based on a post-covid allow us to assess the economic and social factors of E-learning and to show that its adoption constitutes a real complex societal problem (DeTombe, 2008), and leads us to a renewal of the definition of E-learning that includes the complex societal aspect.

### **4.1 The E-learning Approach: A Process of Societal Transformation**

We have mobilized DeTombe’s approach (2008, 2013, 2015) to prove the existence of a complex societal problem related to the institutionalization of E-learning as a teaching mode in the Tunisian university after the Covid period.

According to DeTombe (2015); “When a person or group of people becomes aware of a complex social problem they can address the problem in more detail through reading, discussion, and observation. This process transforms the vague concept of awareness. The problem into a clearer problem .The problem can be a challenge or a threat, a

challenge in terms of obtaining new and interesting opportunities; a threat because it causes or will harm a certain group of people. By thinking about the problem, they can decide whether the problem should be dealt with politically or non-politically.”

A more precise definition of a complex social problem is given by DeTombes (2013): “A complex social problem is a real problem that has a large and often different impact on different social groups. The problem often affects all levels of society, micro, meso and macro. Often the problem seems to “go away”. The problem is dynamic; it changes during its development. The future development of the problem is uncertain. Awareness of the problem and putting it on the political agenda is often difficult. It is difficult to understand and deal with the problem. Only changes are possible, not “solutions”. The problem contains information, power and emotional components. The problem consists of many phenomena that are intricately intertwined. Information is often missing; the information is incomplete, uncertain or contradictory. The problem is multidisciplinary and requires theories from different fields to explain what is happening. There are many parties. Each party has a different vision, a different definition, and different goals and desires. Often the parties have different “solutions” to the problem. Different parties have different influence on the problem. A problem often creates a lot of emotion in society.”

In short, social complexity theory focuses on the entire spectrum of the problem-handling process, from problem awareness (step 1) to assessing the dynamics of the problem (step 2), focusing on the problem; how difficult it is (step 3), identifying different and interrelated interventions (step 4), assessing the interdisciplinary nature of the problem (step 5), identifying many parties (step 6), and concluding that the problem often generates many emotions in society (step 7), (see Fig. 1).

### **Step 1: The Problem Has Different Impacts on Different Groups of Society and is a Real Problem in Life**

The content analysis identified the impact and importance of adopting e-learning on the different involved actors. The results emphasize the consideration of this practice especially in times of covid 19 crisis at the time of the confinement “distance courses are the unique means to stay in touch with our students” (teacher 3, crisis e- learning), “it is essential to ensure a pedagogical continuity to succeed in the academic year” (teacher 1, crisis e-learning). Furthermore, during the post- covid period, this teaching mode has given students a certain flexibility to organize their time and allow them to continue their university studies regardless of social and geographical constraints: “e-learning allows students who are far from the institution or who work to access a master’s degree and to continue their studies without worrying about problems related to class attendance” (Head of the Virtual Department, hybrid e-learning). This not only saves time for the student, but also financial savings related to travel, accommodation, etc. This learning mode thus contributes to reducing social inequalities by allowing everyone access to quality education, as targeted in ODD 4<sup>1</sup>. From a structural point of view, it allows, among other things, to solve the problems related to the lack of classrooms “hybrid teaching has made it possible to overcome the problem of classrooms and to arrange a

<sup>1</sup> ODD 4: Quality education: Ensuring equitable access to quality education for all and promoting lifelong learning opportunities.

better schedule for students” (minutes of the scientific council) as well as that related to the costs of teaching which weigh heavily on the state budget. Therefore, focusing only on the education quality without considering the socio-economic elements can hinder its implementation and can generate various problems and conflicts.

### **Step 2: The Problem is Dynamic**

The unions reject the use of E-learning, explaining that it reduces the equality of opportunities for access to education because of the unequal allocation of financial and technological resources to students. *"To implement E learning, it is necessary to give the means to poor students to be able to adopt it and especially not to accuse them of being lazy wrongly, because they have no money to equip themselves"* (Teacher unionist, crisis e-learning). They specify that Tunisian universities suffer from a recurrent shortage of computer hardware and software which makes the adoption of this teaching mode precarious. Challenges of confidentiality, data security, Internet connection speed, virus attacks hinder any attempt of digitalization. We can see that generalizing E-Learning to at all education levels would be difficult, unless we take into account these dynamic constraints to succeed in driving change related to E-Learning adoption, operation and sustainability.

### **Step 3: It is Difficult to Handle the Problem**

E-learning is a solution, but because of its inadequate implementation, it can lead to societal problems. During the crisis education, the adopted approach was related to a desire for educational continuity that did not respect the proper method of E-learning. It is a sharing of unscripted course resources (pdf, video...) accompanied by online meetings. We have noted several criticisms in the teachers' observations about the ethics of its adoption *"It is a disappointment to see some colleagues who are happy to finish their course with a PDF file of which thousands are available on the internet and a chat of which hundreds of forums are accessible and people from all over the world can answer questions"* (Teacher 2, crisis E-learning).

Several actions have been recently implemented as a project of awareness, support and monitoring has been implemented for the benefit of teachers since April 2020, mandatory training and technical sessions, the use of a unique platform namely the platform designed by the virtual university of Tunis UVT in order to avoid all the loopholes related to data security, administrative control (compliance with the charter) and design a pilot project for master students to adopt the hybrid mode (small number of students and equipped with the necessary tools and resources).

### **Step 4: The Problem Consists of Many Interlinked Elements**

As we have indicated, the E-learning project involves several actors: the learner, the tutor, the administration, the university, the E-learning unit, and the union. The diversity of these actors does not make the problem of adopting and sustaining E-learning easy, since it involves several complicated and interrelated elements.

On the part of the E-learning unit, colleagues need to undergo training: *"colleagues need to launch the courses; however we can't start without training"* (obs 1 post covid). The administration plays a role in adjusting schedules and fixing the timetables established for this purpose in order to satisfy the teachers and the students.

*“there are teachers who have in the timetable in the same day both courses for the Masters’ Degree and courses for the Licenses Degree (which does not benefit from the hybrid mode) and therefore when they come to teach they will have off hours because at the time of the E learning course, they will not teach but they will have to wait for the face-to-face course for license students” (Teacher 7; hybrid E- learning).*

### **Step 5: The Problem is Interdisciplinary and Requires Background Theories from Many Fields to Understand What is Going on**

In order to properly initiate E-learning and move towards the digitalization of higher education in the country, all the participants must be committed to this revolutionary approach from the political, economic, social, technological and legal (PESTEL) perspective.

Several data that take into consideration the social aspect of E-learning are necessary to carry out the learning digitalization project which is among the priorities of the e-government project of Tunisia. This strategic orientation will enable us to meet the expectations of the new generation (generation Z) and to guarantee knowledge transfer (access to information) but above all the new approach to education (transparency, equity) by promoting digital inclusion and improving the individuals’ life quality (disabled people, economically disadvantaged people). In order to respond to the ecological issues, E-learning offers several advantages: zero waste, minimizing transport and therefore polluting emissions, reducing energy costs, etc.

It is the role of the university to establish a regulatory framework and an adequate technological infrastructure for E-learning planning. The university has also established an *EAD unit* that accompanies and coordinates the various activities related to this system.

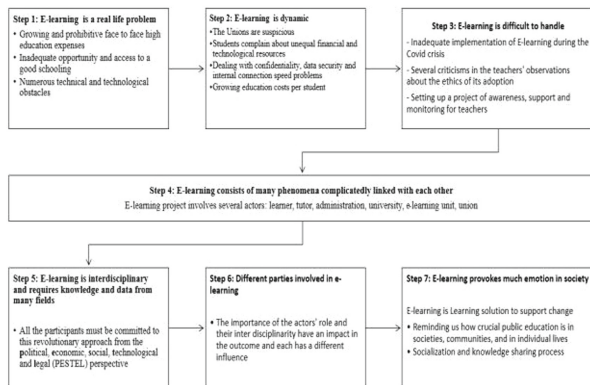
### **Step 6: Numerous Parties Are Implicated and Each Has a Different Influence on the Solution**

We can say that several parties are involved in E- learning and each one differently impacts its implementation and sustainability. The importance of the actors’ role and their interdisciplinarity (students, tutors, unions, and administration), have an impact in the outcome and each has a different influence. As we have highlighted, following the covid crisis, the University of Manouba (UMA) has decided to organize hybrid courses, alternating face- to-face and e-learning, which concerns only the master’s students, responding to the financial constraint and the availability of students’ equipment revealed in this research. This decision is supported by connectivity difficulties, computer equipment purchase, and timetables programming on the part of the administration, accentuated by the refusal of union representatives to accept this learning mode (the principle of equal opportunity). In addition, several teachers offered to provide distance learning courses. These teachers were optimistic about using this teaching method because it enables them to use different techniques of teaching tools offered by the platform improving the learning level *“having the possibility to put video capsules and that’s where it would be interesting. Especially for subjects like finance or math where*

*we record ourselves and make video sequences with slides and send them as a capsule to the students".*

### Step 7: The Problem Frequently Leads to Much Emotion in the Society

E-learning is an efficient solution to avoid infrastructure expenses for the State and a solution for students who cannot travel for different reasons (disability, high cost of studies, etc.) and makes possible equal opportunities between learners. This education mode can contribute to fight against school dropout and women marginalization, especially in rural areas. This paradigm change is certainly a source of deep emotion in society. The students were enthusiastic, motivated, involved, focused and attentive. They repeatedly intervened either to ask questions or to give illustrative examples. *"I truly believe that the basic ingredient for success in E-learning is empathy and caring on our part, and motivation and overcoming the fear of the unknown (E-learning) on the part of the students. This is certainly not to minimize the logistical problems and lack of resources among some of our students, but I can see that the university is doing what it has to do to help them."*



**Fig. 1.** Is e-learning approach a complex process of societal transformations?

## 5 Conclusion

E-learning has shown its importance especially during the COVID crisis as an unavoidable solution to any kind of crisis, not only health crisis.

Social science knowledge is an indispensable part of the global scientific, policy and social mobilization effort required. It can also perform the role of being a co-designer of relevant and effective solution strategies to succeed the generalization of e-learning, namely in the developing countries. Adopting some new educational policies for SDG4 that may lead to co-benefits between education quality and other sustainable development goals, have gained increasing attention in recent years. Initially, our analysis reveals a paradigm shift in society with respect to the adoption of e-learning.

Positive effects of technology on learning would be noticed (Sousa and Rocha, 2019). The effectiveness of teaching has become essentially technology- determined (Sousa and Rocha, 2019) and the availability of technological resources is a major condition for e-learning implementation. Thus, the availability of a technology platform is needed to use web-based technologies, the basis for e-learning. That's why giving learners a practice session on the computer in advance of the training would be helpful in improving attitudes, especially feelings of self- efficiency (Ho, 2009; Ho and Kuo, 2010; Ho et al., 2010).

E-learning creates new challenges for the global society. Adopting this new approach of learning is a complex process of societal transformations that should be studied as such. The contribution of the social sciences is crucial to the understanding of these change processes. The growing body of knowledge on E learning techniques, its determinants and consequences is not matched by an equivalent understanding of the societal changes it poses.

Despite the growing scientific evidence, the consequences of e-learning and its efficiency remain contested by different groups in society and are associated with different perceptions of uncertainty, risks and urgency.

Responses to pandemic crises challenges are not only a matter of infrastructural adjustments or technical innovations. They also include fundamental changes in our way of educating, individual effectiveness of using technology, group influence and social image, knowledge sharing and learner reflexivity.

As such, e-learning challenges are also societal changes. Thus, it is fair to say that effective response to pandemic or other crises perturbing classical approaches to education involve complex processes of societal transformations that should be studied.

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