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## CHAPTER XIV

### Resilience of higher education institutions. Feedback from ESI Algiers case during COVID-19

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#### 1. INTRODUCTION

Any unexpected event, undesirable change or situation can bring about both threats and opportunities for individuals, groups, teams, organisations and states.

Times of crisis subject an organisation, whatever its form (company, administration, association, etc.), to a new situation, leading to an organisational vacuum in which organisational routines are destabilised, and the usual tools are unsuited to the new context. Organisational resilience is the ability of all internal actors to interact with their environment in such a way as to project themselves into the future despite the destabilising, lasting nature of the crisis [Parsons, 2010][Trousselle, 2014].

The COVID-19 pandemic, which has lasted for more than 18 months, has created an unprecedented situation marred by uncertainties and doubts, particularly impacting training and research institutions in the exercise of their numerous and complex missions. The level of resilience of the existing parties (Teachers, teams, departments, Managers, etc.) has certainly been put to the test. The use of digital intermediation has resulted in restructuring of routines, reconsideration of educational content, investment in support software tools and strengthening of training on these tools. The challenge is to carry out the missions of initial training and continuing development, scientific research and relationships with the socio-economic world in optimal conditions.

This article has a two aims:

— First, to share the feedback from the case of an engineering school in Algiers, the ESI (National School of Computer Science), over a year of crisis and the role of digital intermediation practices that were applied to boost organisational resilience;

— Next, to capitalise on the knowledge and expertise resulting from this human experience, in the form of good practices for colleges and other higher education institutions.

This article is organised as follows: First, we will provide an overview of the main concepts used when addressing resilience in higher education institutions (section 2), followed by an outline of the higher education sector, particularly higher education institutions, which is the framework for the analysis (section 3). We will then report the main results from the feedback of one year of ESI Algiers (section 4), and conclude with recommendations for higher education institutions to enhance their organisational resilience (section 5).

## 2. BASIC CONCEPTS

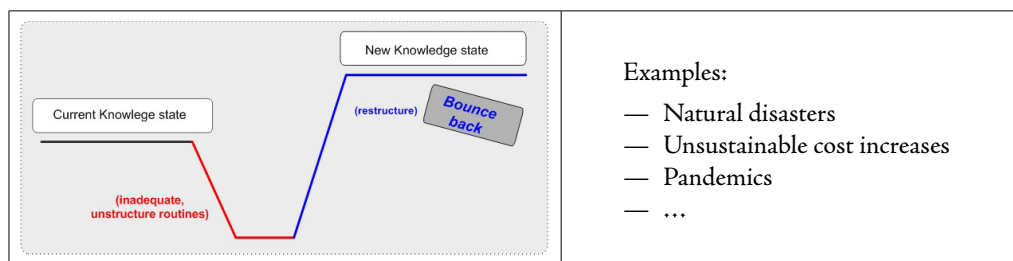
According to Boris Cyrulnik, Neuropsychiatrist, “resilience is the ability of an individual to resume new development after agony/chaos”.

For a company and/or administration, *organisational resilience* is the ability of the existing parties to interact with their environment in such a way as to project themselves into the future despite the destabilising, lasting nature of the crisis [Parsons, 2010] [Trousselle, 2014]. Resilience skills include: emotional regulation, overcoming challenges, empathy, building healthy relationships and constructive conflict management [Durlak *et al.*, 2011][Wear & Nind, 2011].

According to the literature review carried out by [Riz-Martins *et al.*, 2018], a set of factors contribute to strengthening this organisational resilience: building situational awareness, managing organisational vulnerabilities, having resources, ability to improvise, ability to anticipate events, agility, ability to learn, collaboration, and individual resilience.

We focus on the interactions of the learning process, which is how human beings acquire, in a fortuitous or deliberate way, new knowledge, new capacities, and new attitudes, thus creating changes in them that lead to new behaviours. Learning manifests itself in many ways: Practice of a technique, observation, reflection on experiences, reading and meditation, trial and error, conditioning, imitation, real or graphic simulation, feedback, etc.

Crises and their destabilising character subject organisation(s) to a new situation each time, resulting in an organisational vacuum (stagnation of its state of knowledge). This void is revealed by the partial or total inability to implement organisational routines (inadequate, unstructured) (Figure 1).



**Figure 1.** Disruptive Learning (adapted from [Argyris, 1997])

How long this situation lasts will depend on the organisations' ability to bounce back (restructure), which will increase the organisation's knowledge capital and consequently transform the organisation, which will become more mature.

### 3. HIGHER EDUCATION INSTITUTIONS IN THE CONTEXT OF THE COVID-19 CRISIS

The basic mission of higher education institutions is threefold: First of all, *Teaching (initial training and continuing development)*: educating, motivating, assessing learning, etc. Then, *Scientific research and technology transfer*: Contributing to research and scientific production. Finally, *Innovation, entrepreneurship and social commitment*: Stimulating the spirit of innovation and entrepreneurship, developing with the ecosystem (companies/administrations, universities, laboratories).

The COVID-19 pandemic, which has lasted more than 18 months, has generated an unprecedented situation for education and research establishments (Table 1). The level of resilience of the existing parties (teachers and educational teams, support units, managers, partners, etc.) has certainly been put to the test.

Events that occurred	Impact (vacuum generated)	Challenges to overcome
Decision to close universities	<ul style="list-style-type: none"> <li>— No more face-to-face lessons/tutorials/workshops</li> <li>— No more intern supervision and follow-up sessions</li> <li>— Research projects frozen or slowed down</li> <li>— Local life stopped (no scientific, cultural, sporting events, closed innovation spaces, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>— Quick and sustainable adaptation of educational resources for remote sharing</li> <li>— Checking and tracking absenteeism rates</li> <li>— Online education platforms to be used</li> <li>— Webinars</li> </ul>
Company activity stopped and/or reduced	<ul style="list-style-type: none"> <li>— No movement of intern students on site</li> <li>— Short-term internships difficult to complete</li> </ul>	<ul style="list-style-type: none"> <li>— Preserving the quality of end-of-cycle internships</li> </ul>
Digital divide	<ul style="list-style-type: none"> <li>— Inequality of access to the Internet for students throughout the nation</li> </ul>	<ul style="list-style-type: none"> <li>— Video recording of course/tutorial sessions</li> </ul>
	<ul style="list-style-type: none"> <li>— Gaps in use of technology (technophobia by some teachers, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>— Education/Support</li> </ul>

**Table 1.** COVID-19 and the organisational vacuum it has created

## 4. FEEDBACK FROM THE CASE: ESI ALGIERS

### 4.1. Overview of the School in figures

The ESI (Higher School for Computer Science), located in Algiers, is a major engineering school<sup>1</sup> created in 1969. It has trained more than 6,000 graduates, including 75% of state engineers. It has 1,100 students graduating in 4 specialities (SIQ, SIT, SIL, and SID) and 200 PhD students supervised by 121 permanent teachers. It produces an average of 160 to 180 graduates each year. It has two active research laboratories (LMCS and LCSII), 11 student clubs & associations, around forty academic and professional partners and an active network of Alumni (former students).

The internal culture of the School can be summarised as follows:

- A predominantly tech-savvy population (intensive use of digital tools),
- A technology monitor, an education laboratory (we test a lot),
- A free space for entrepreneurship where initiatives are encouraged, even welcomed
- Finally, it is an eco-citizen school.

### 4.2. Situational governance

From the start of the COVID-19 crisis in March 2020, the authorities<sup>2</sup> asked all establishments to set up a COVID crisis unit consisting of the School Director, the Director of Pedagogy, Heads of the Scientific and Educational Boards, Web and Network Managers, ICT for Education unit, Teacher representatives and Student club representatives.

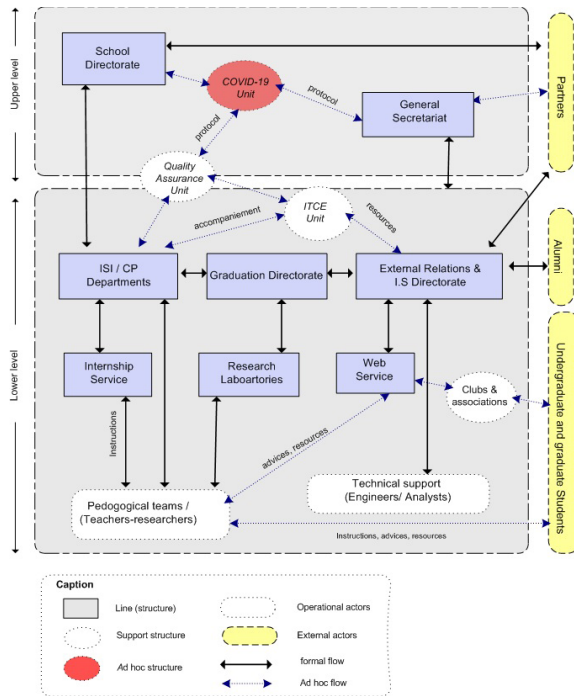
The latter had to work in close collaboration with management staff and existing units, including the Quality Assurance Unit and the ICT in Education unit.

Figure 2 summarises the interactions between the upper level (School Management and General Secretariat) and the lower level (Pedagogical structures and support units) in order to successfully serve students, doctoral students, Alumni (former students) and other partner organisations.

<sup>1</sup> [www.esi.dz](http://www.esi.dz)

<sup>2</sup> [www.mesrs.dz](http://www.mesrs.dz)





**Figure 2.** Situational governance at ESI

The web service dependent on the External Relations & IS Department was to be a driving force in digital intermediation, in collaboration with the ICT in Education Unit, the teaching teams and the technical staff. Shared awareness is considered the key factor for the success of an organisational resilience process.

#### 4.3. Continuity of activities through enhanced digital intermediation

ESI Algiers launched a roadmap in April 2020, the main actions of which are:

- Evaluation of the digital preparation of teachers through a survey
- Student survey: These surveys showed:
  - ♦ About 75% have a basic 2 Mb ADSL connection.
  - ♦ Just over 50% say they have a dedicated work space at home.
  - ♦ About 66% say they find it difficult to follow classes in the presence of their relatives.
    - ♦ Almost half say they use a 3G or 4G connection.
    - ♦ Monthly payments for Internet access vary between DZD 1,500 and 2,100.
    - ♦ PCs are the main tool used to access recorded courses/tutorials.









School officials and the entire community signed up for this development project, based in part on enhanced intermediation and carried out according to good practices in change management (Table 2).


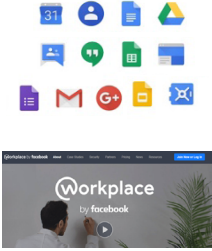
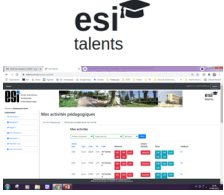
Finally, we can conclude that during this period (March 2020–June 2021) the School experienced the three drivers of improvement as defined by Jurgen Appelo [Apelo, 2011], namely: anticipation, adaptation, and exploration.

— With regard to anticipation, ESI’s internal community had opted for a paperless strategy well before the crisis (2016), thus increasing the digitisation of information and the use of information sharing tools. The web service also carried out permanent monitoring and encouraged experimentation with open source tools.

— Adaptation was shown by participants in their quick adoption of the new “Talents<sup>3</sup>” software; Validation of remote internship offers via “Talents.esi.dz”;

— New possibilities were explored through MOOCS and their integration into teaching practices (in particular the current experience with Coursera<sup>4</sup>), experimenting with Classroom, video production, participation in Webinars, etc.

Section	Before COVID-19	During COVID-19	Roadmap and Change Management
Content production	 	 	— Systematic recording of lectures/tutorial sessions and sharing them with reading permissions on the shared Drive;
Progress assessment	Face-to-face workshops and tutorials	 	— Project assessment via surveys — Remote assessment of doctoral students (PhDays 2020, etc.) — Postponement of final viva voces to September.
Educational Platforms		 	— Training/Support · The essential Google Classroom · Screen recording with audio

Section	Before COVID-19	During COVID-19	Roadmap and Change Management
Sharing and collaboration platforms			<ul style="list-style-type: none"> <li>— Standardisation of the use of sharing platforms: Google Meet instead of Zoom or any other synchronous course tool;</li> <li>— Training/Support <ul style="list-style-type: none"> <li>· Successful MEET Online Meetings</li> <li>· Student assessments</li> <li>· Assigning work to students</li> <li>· Using an online whiteboard</li> <li>· Programming workshops</li> <li>· Remote learning for mathematics</li> </ul> </li> <li>— Crisis communication: Use of Workplace to share experiences between teachers, enhance coordination within the pedagogical team, etc.</li> </ul>
Dedicated management tools			<ul style="list-style-type: none"> <li>— Reduction in the hourly volume of sessions (to a max of 45 mins)</li> <li>— Systematic use of the diary for any exchange: Timetables, assessments, monitoring, etc.</li> </ul>

**Table 2.** Digital intermediation for educational governance

## 5. RECOMMANDATIONS FOR RESILIENT HIGHER EDUCATION INSTITUTIONS

From this modest experience, we offer recommendations (far from comprehensive) for colleges and other educational institutions to become more resilient in the future. They are organised into four categories.

- Human aspects:
  - ♦ The human (“the expert”) is the agent of change;
  - ♦ Leadership in times of crisis drives all initiatives;
  - ♦ Shared awareness is a key success factor for organisational resilience (internal agents, facilitators, skill networks and ecosystem).
- No intelligence/performance without memory
  - ♦ A library of shared multimedia resources for the community (students, teachers, ecosystem);
  - ♦ Intelligent use of knowledge acquisition and learning devices (MOOCs, etc.).

- Reduce inequality/digital divide
  - Identify communication issues;
  - For more performance, pooling of material and financial resources, etc.
- Assessment/Benchmarking
  - Regularly assess the digital maturity of the institution and improve related processes;
  - A secure digital infrastructure is a condition for success;
  - Learn from regional and international initiatives. Digital products and services are the foundation of resilient organisations.

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