

## PEDAGOGICAL PRACTICES AND ACADEMIC ACHIEVEMENT IN THE ERA OF GLOBAL PANDEMICS

**O. Dardary<sup>1,2,3</sup> M. Tridane<sup>3,4</sup> S. Belaouad<sup>3</sup>**

1. *Laboratory of Educational Sciences, Philosophy and Humanities, ENS Meknes, Moulay Ismail University, Meknes, Morocco*
2. *Department of Sciences, ENS Meknes, Moulay Ismail University, Morocco, dardaryossama@gmail.com*
3. *Laboratory of Physical Chemistry of Materials LPCM, Ben M'Sick Faculty of Sciences, Hassan II University, Casablanca, Morocco, sbelaouad@yahoo.fr*
4. *Regional Center for Education and Training Casablanca Anfa, Casablanca, Morocco, tridan.malika@gmail.com*

**Abstract-** Morocco's recourse to "distance education" as an educational choice, instead of the usual face-to-face education in light of the spread of the global pandemic "COVID-19", highlighted problems and difficulties that the education system has never experienced before, such as the reduction in the volume of school hours, and the emergence of numerical differences between students as well as teachers, which has forced the adoption of certain pedagogical practices such as "flipped classes" and the introduction of some modifications to the examination standards in order to end the school year in good conditions. In light of the dynamism of the education reform and the ministry's 2015/2030 strategy, which aimed to improve training and educational practices and the need to integrate information and communication technologies, several questions had to be asked: What is the impact of this situation on teaching practices and on students' academic success? Are current teaching practices adapted to current technological development? What pedagogical approaches seem to be effective in such circumstances? This prompted us to seek solutions through an investigation. Research has shown difficulties for students, as well as teachers, to adapt with the new teaching-learning style, to manage the reduced volume of hours and to complete the program.

**Keywords:** ICT, E-Learning, Distance Learning, Covid-19, Achievement.

### 1. INTRODUCTION

The concept of education has been redesigned by UNESCO through the EFA global movement (Education for All), aiming to upgrade the learning of all children from all areas, and also to contribute to the global pursuit of the 8th (MDGs) "the 2nd on universal primary education and the 3rd on gender equality in education". To generalize quality in education for those who live in disadvantaged places far from big cities [1].

To achieve that, education can be based on information and communication technologies (ICTs) facilitate the task, save in terms of time, energy and for

other reasons. Distance learning or E-learning has many benefits, especially since the appearance of COVID-19, state of emergency and the confinement; because it can support wide scale teaching-learning, through all format of courses COOCs, MOOCs and SPOCs, facing the rapid diversification of online training tools, to choose the best suited to their needs.

There are various studies and research related to E-learning showed that there are still difficulties that hinder this type of education: such as low technical skill, distribution and access to equipment of the facilities. Moroccan national team occupied the 2nd rank in the second round of the Olympiad in Mathematics AOM 2020 that was organized remotely, under the supervision of the Organization for Education, Culture and Science and the Local Organizing Committee in Cairo, Egypt, during the period between 25 and 26 December 2020, after winning a gold and two silver medals and one bronze (Table 1) [2].

It should be noted that the Olympic coaching program extends over three academic seasons and is monitored by a group of distinguished inspectors and professors in mathematics, in addition to a group of Moroccan students, who have previously benefited from the National Olympiad track who are members of the Association of Mathematics of Morocco as the partnership in the national education sector [2].

Table 1. Results of the 2nd session of Olympiad in Mathematics, 2020 [2]

Country	Gold medal	Silver medal	Bronze medal
Morocco	1	2	1

The Ministry of National Education - announced on December 8th, 2020, the results of the international comparative study of Trends in Mathematics and Science Study TIMSS2019, which are supervised by IAEEA. This study is concerned with monitoring the performance of the educational system on the international level in the fields of mathematics and science, at two levels: fourth primary and second intermediate, with an explanation of the performance of the participating countries [3].

At present, the condition of Moroccan's education relatively favorable through the expansion access to schools, by the two available ways, face-to-face or remotely, especially after the minister of education emphasized the need to work to provide a connection to the Internet for all educational institutions. The school's national team won the 2021 African Mathematics Olympiad, where the national team achieved impressive results in the 28th session of the "remote" African Mathematics Olympiad, which was hosted by the Tunisia, May 23 and 24, 2021. The Moroccan national team won the gold medal, after winning first place (178 points) in the ranking of participating countries. Eleven countries participated in this scientific event with 60 participants, including our country with a team of six students (3 girls and 3 men) [8].

However, even though the Ministry of National Education has decided to use hybrid mode education (face to face and self-learning), the need of ICTs' use is still a necessity. Since the pupils still need guidance and help from their teachers to get or seek information, because it is the first time for them to self-learn. This mode of education perhaps created a time gap for the pupils, since the school time has been cut in half. The majority of teachers attest that the students have become lazy because they have never had so much free time.

The need to have a digital tool (smart phone, tablet or computer) allowed the full-time exploitation of the internet and the expansion of chat between students in groups, especially during confinement, when they were stuck at home. A report from the CSM (Common Sense Media) organization specializing in the study of family and children's media and technologies mentioned that kids watch online videos for a long time, and the content seen on screen lacks educational value. [4] This use can sometimes extend to bed; the American Academy of Pediatrics (AAP) recommends that children should not be sleeping with their devices in their beds [5-7].

Nevertheless, the good news is this mode has contributed to a reduction in the number of students per class, by dividing each class by two groups, which finally solved the problem of congestion in the classes, and allowed the teacher to do activities in small groups.

## **2. PROBLEM**

The recourse to "Distance Education" and "alternated teaching" as an educational choice, instead of the usual face-to-face education in light of the spread of the global pandemic "COVID-19", highlighted problems and difficulties that the education system has never experienced before, such as the reduction in the volume of school hours, and the emergence of numerical differences between students as well as teachers, which has forced the adoption of certain pedagogical practices such as "flipped classes" and the introduction of some modifications to the examination standards in order to end the school year in good conditions. Considering the dynamism of the education reform and the ministry's 2015/2030 strategy, which aimed to improve training and educational practices and the need to integrate

information and communication technologies, several questions had to be asked: What is the impact of this situation on teaching practices and on students' academic success? Are current teaching practices adapted to current technological development? What pedagogical approaches seem to be effective in such circumstances? This prompted to seek solutions through an investigation.

## **3. THEORETICAL FRAMEWORK**

Earlier researches mentioned that distance learning can replace traditional training in the event of global pandemics [9-14], such as Corona Virus COVID-19, that spread all over the world, and prevented all students from attending their classes. This research deals with many dimensions at the same time, we conducted that mixed training (distance training and traditional training) can be easily adapted to the situation which can be changed any time soon, without forgetting the avoidance of obstacles.

## **4. METHODOLOGY**

To carry out this research, a survey was distributed to teachers and learners, following the health protocol rules "Social distancing, mask wearing and disinfection". The population targeted by our research is selected from qualifying secondary level (high school) and made up of 198 teachers and 311 high school students, from various high schools of multiples provincial directorates in the region of Casablanca, Settat, Morocco.

We used an exploratory, analytical and descriptive method, to inquire about the use of NICT, "E-teaching" and "alternate educational mode", with: trainers and students, to determine the efficiency of this teaching – learning mode in education.

The study seeks for explanations through three fundamental axes:

- Program termination
- Constraints related to the "E-learning" and "alternate educational" modes.
- Continuity of teaching

## **5. RESULTS AND DISCUSSION**

The data collection process was carried out under sanitary conditions appropriate to the standards of the sanitary protocol in force at the national and international level; we used EXCEL and SPSS for the data processing. According to statistics ( $P < 0.05$ ), we can say that the results are very significant.

### **5.1. School Program Advancement / Completion Rate**

Considering the dynamism of the education reform and the ministry's 2015/2030 strategy, which aimed to improve training and educational practices and the need to integrate information and communication technologies.

Research has shown difficulties in adapting students (78%) as well as teachers (57%) with the new teaching-learning style "alternately" (Figures 1 and 2), (due to lack of time, skills or resources), to manage the reduced hourly volume (74%) and to complete the program (100%), it took more remedial sessions to get there, because the course is often accelerated or summarized, and there is a lack of activities (what the teacher is

supposed to do in two hours of class for example, now he had to do it in one), the survey was not carried out at the end of the school year, we avoided the last days of the season to target the maximum number of learners present.

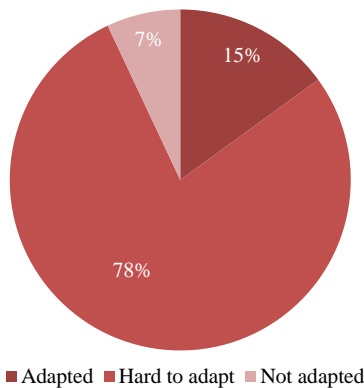


Figure 1. Adaptation to the alternated - teaching mode for learners

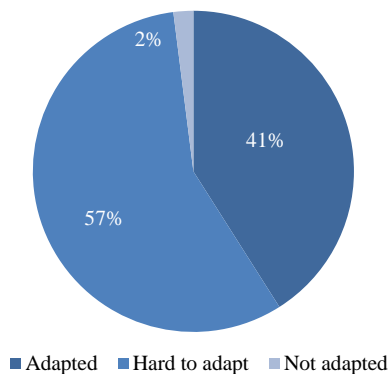


Figure 2. Adaptation to the alternated - teaching mode for teachers

### 5.2. Comparison of Success Rates for the 2018-2021 Baccalaureate

According to data provided by the Ministry of National Education (2018-2021), the pass rate for the baccalaureate is 81.83% (2021) with an increase of 2.21% compared to (2020) and with an increase of 3.87% compared to 2019 and 9% compared to 2018 (in the same cycle) of learners enrolled. The ministry said in a statement that the percentage of girls was 55.75% (54.30% in 2019) (Figure 2 and Table 2).

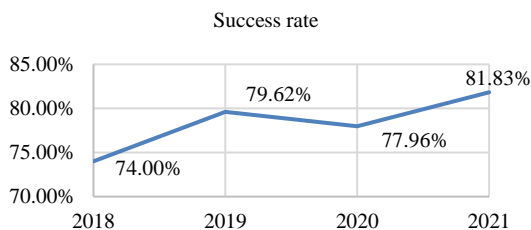


Figure 3. Success rate 2019-2021

According to Figure 3, the success rate decreased in 2020, in the first year after the appearance of the Covid-19 virus, and this is due to the end of face-to-face classes, and the adaptation for the first time of distance teaching /

learning mode. This is normal and inevitable, since several research [9], [10], as well as global organizations [15-18] (WHO, UNESCO, UN, UNICEF, IFRC) have shown it:

The WHO and UNESCO, the United Nations body responsible for education, say the link between education and well-being has never been so clear. The closure of many schools around the world during the Covid-19 pandemic has caused increased stress, anxiety and other mental health issues.

This difference is perhaps due to the fact that, "maybe" the learners have developed a new way of learning adapted to the new situation (alternating), or maybe they have had recourse to private lessons or evening classes, this is often the case (for baccalaureate students), this hypothesis is highly probable, but which remains to be verified. Or perhaps the method of assessment and writing of national and regional exams has been changed, or even adapted to the situation, since the volume of hours has changed, as has the rate of completion of the program.

Table 2. Baccalaureate success rate 2019-2021 [8]

	2019	2020	2021
Baccalaureate success rate	79.6%	↓ 77.96%	↓ 81.83%
Success rate of learners at the scientific and technical pole	NA	78.23%	↓ 79.45%
Success rate of learners at the literary and authentic pole	NA	83.22 %	↓ 87.81%
Success rate of learners in the Moroccan international baccalaureate	97.5%	↓ 93.20%	↓ 89.52%
Success rate of learners in the professional baccalaureate	59.5%	↓ 73.19%	↓ 74.97%
Success rate of learners with disabilities who have benefited from the adaptation of standardized national exams and the conditions for passing and correcting them	90.2%	↓ 83.41%	↓ 81.49%
free baccalaureate	41.1%	↓ 55.24%	↓ 56.1%

As shown in Figures 4 and 5, and despite the harmful impact of the pandemic on the teaching - learning process, this has not prevented good results from being obtained, precisely in professional poles and at learners with disabilities and the free baccalaureate.

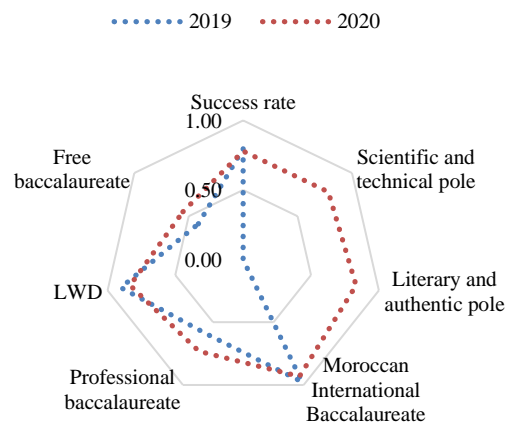


Figure 4. Comparison of success rates for 2019-2020 baccalaureate [8]

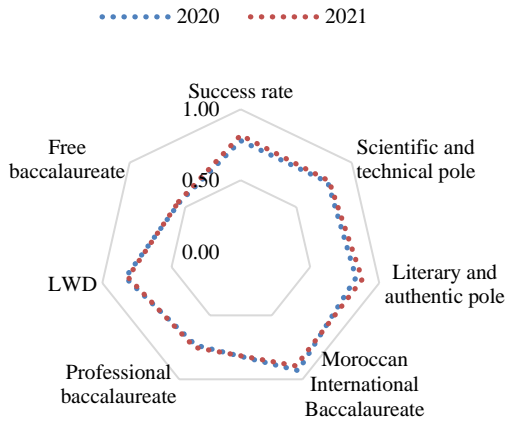


Figure 5. Comparison of success rates for 2020-2021 baccalaureate

### 5.3. Effectiveness Indicators for School Sector Performance

According to the annual report of the Ministry of National Education (2019-2020), regarding the efficiency indicators of the performance of the education system, it should be noted that the sector was able to reach significant percentages in terms of enrollment rate. Regarding the completion rates of studies, for preparatory secondary education, an increase of 5.8 percentage points was achieved, since this indicator rose from 55.6% for the 2018-2019 school season to 61.4% recorded in 2019-2020. In qualifying secondary education, the studies completion rate index increased from 31.3% for the 2018-2019 school season, to 39%, recorded in 2019-2020, with an increase of 7.7 points of percentage [8].

ICTs have advantages [21], [24], and disadvantages, all that remains is to exploit their power through the diversification of training methods "flipped classrooms [22-23], alternated-teaching, distance teaching [25-28], or hybrid, etc.", in all pedagogies, even in pedagogy of primary school [29] or higher education evaluation [30].

### 6. CONCLUSION

Our research has shown that there are still concerns among teachers and also among learners about the new mode of teaching - learning, but the statistics have clearly shown that the situation is still under control, and even better than before, since the programs, the number of hours and the number of learners per class have been adapted to the situation. We appreciate the plans of the Ministry of National Education, facing the inevitable situation (COVID-19), to save the school year, to ensure the continuity of classes and above all to avoid a blank year. The numbers have clearly spoken, despite the changing, alarming health status and the potential for new mutations of the virus to spread; we are perhaps heading toward a new chapter of "distance education".

The study is limited to a sample of limited size belonging to a single type of high schools in Morocco. Indeed, we neglect the rural areas. Because we had complications, such as: time, resources, participants, size of the region, etc. That is why we had to work only in the region of Casablanca-Settat, Morocco. Another limitation is that we based only on qualifying secondary level (high school), rather than primary education and higher education, which could be integrated in this research.

### NOMENCLATURES

#### 1. Acronyms

IAEEA	International Association for the Evaluation of Educational Achievement
IFRC	The International Federation of Red Cross and Red Crescent Societies
LWD	Learners with disabilities who have benefited from the adaptation of exams
MDGs	Millennium Development Goals
OMS	Organization Mondiale de la sante
ONU	The United Nations Organization
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations International Children's Emergency Fund
WHO	World Health Organization

#### ACKNOWLEDGEMENTS

Thanks to all the trainers and all the staff of the Chemistry Laboratory affiliated with the Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco and trainers at the regional center for education and training professions for their aid in completing out this study.

#### REFERENCES

- [1] The EFA movement, "United Nations Educational, Scientific and Cultural Organization", 2000-2015.
- [2] Results of the Second Session of the Olympiad in Mathematics 2020, [www.men.gov.ma](http://www.men.gov.ma).
- [3] General Results of Moroccan Students in the International Mathematics and Science Study (TIMSS) 2019.
- [4] The Common-Sense Census, "Media Use by Kids Age Zero to Eight", 2020, p. 5, [www.commonssensemedia.org/sites/default/files/uploads/research/2020\\_ht\\_zero\\_to\\_eight\\_census\\_final\\_web.pdf](http://www.commonssensemedia.org/sites/default/files/uploads/research/2020_ht_zero_to_eight_census_final_web.pdf).
- [5] AAP Council on Communications and Media, "Media Use in School-Aged Children and Adolescents", THE American Academy of Pediatrics, Vol. 138, No. 5, November 2016.
- [6] AAP Council on Communications and Media, "Media and Young Minds", American Academy of Pediatrics, Vol. 138, No. 5, November 2016.
- [7] The Common-Sense Census, "Media Use by Kids Age Zero to Eight", p. 4, 2017, [www.commonssensemedia.org/sites/default/files/uploads/research/csm\\_zerotoeight\\_fullreport\\_release\\_2.pdf](http://www.commonssensemedia.org/sites/default/files/uploads/research/csm_zerotoeight_fullreport_release_2.pdf).
- [8] The Ministry of National Education, 2018-2021, [www.men.gov.ma](http://www.men.gov.ma).
- [9] O. Dardary, J. Daaif, M. Tridane, S. Belaaouad, "Distance Learning in the Age of COVID-19: Between Perspective and Reality", International Journal of Engineering Applied Sciences and Technology, Vol. 5, No. 5, pp. 46-52, 2020.
- [10] S. Ouahabi, K. El Guemmat, M. Azouazi, S. El Filali, "A Survey of Distance Learning in Morocco During COVID-19", Indonesian Journal of Electrical Engineering and Computer Science, 2021.



- [11] H. Bachiri, R. Sahli, "The Need of Distance Learning in the Wake of COVID-19 in Morocco: Teachers' Attitudes and Challenges in the English Foreign Language Instruction", *International Journal of Language and Literary Studies*, Vol. 2, No. 3, pp. 240-256, 2020.
- [12] S.S. Jaggars, "Choosing Between Online and Face-to-Face Courses: Community College Student Voices", *American Journal of Distance Education*, Vol. 28, No. 1, pp. 27-38, 2014.
- [13] H. Karal, A. Cebi, M. Peksen, "Student Opinions About the Period of Measurement and Evaluation in Distance Education: The Difficulties", *Procedia-Social and Behavioral Sciences*, Vol. 9, pp. 1597-1601, 2010.
- [14] P. Magalhaes, D. Ferreira, J. Cunha, P. Rosario, "Online vs Traditional Homework: A Systematic Review on the Benefits to Students' Performance", *Computers and Education*, Vol. 152, 2020.
- [15] ONU, "Health and Education: The UN Call for all Schools to be Places of Well-Being", 2021, <https://news.un.org/fr/story/2021/06/1098782>.
- [16] UNESCO, Education: from the Closure of Schools to the Resumption, 2021, <https://fr.unesco.org/covid19/educationresponse>.
- [17] OMS, "COVID-19: IFRC, UNICEF and WHO Release Guidance to Protect Children and Enable Safe Operation of Schools", 2020, [www.who.int/fr/news/item/10-03-2020-covid-19-ifrc-unicef-and-who-issue-guidance-to-protect-children-and-support-safe-school-operations](http://www.who.int/fr/news/item/10-03-2020-covid-19-ifrc-unicef-and-who-issue-guidance-to-protect-children-and-support-safe-school-operations).
- [18] IFRC, "Back in School During COVID-19", 2020, [https://pscentre.org/wp-content/uploads/2020/06/back-in-school\\_ver\\_4.pdf](https://pscentre.org/wp-content/uploads/2020/06/back-in-school_ver_4.pdf).
- [19] UNICEF, "COVID-19 Education: Framework for Contingency Planning, Risk Reduction, Preparedness and Response", 2020, [www.unicef.org/lac/media/12351/file](http://www.unicef.org/lac/media/12351/file).
- [20] UNICEF, 2020. Education and COVID-19", <https://data.unicef.org/topic/education/covid-19/>.
- [21] A.M. Nuur Wachid, S. Fuada, "E-Learning for Society: A Great Potential to Implement Education for All (EFA) Movement in Indonesia", *iJIM*, Vol. 14, No. 2, 2020.
- [22] L. Chien Hung, J. Bin Shyan, H. Yen The, "Use of a Mobile Anonymous Question-Raising System to Assist Flipped-Classroom Learning", *iJIM*, Vol. 14, No. 3, 2020.
- [23] C. Kustandi, H. Wargahadibrata, "Flipped Classroom for Improving Self-Regulated Learning of Pre-Service Teachers", *iJIM*, Vol. 14, No. 9, 2020.
- [24] M. Chergui, "Towards a New Educational Engineering Model for Moroccan University Based on ICT", *iJEP*, Vol. 10, No. 3, 2020.
- [25] S.R. Sobral, "Mobile Learning in Higher Education: A Bibliometric Review", *iJIM*, Vol. 14, No. 11, 2020.
- [26] I. Fitri Rahmadi, "WhatsApp Group for Teaching and Learning in Indonesian Higher Education What's Up?", *iJIM*, Vol. 14, No. 13, 2020.
- [27] E. Budiman, "Mobile Data Usage on Online Learning During Covid-19 Pandemic in Higher Education", *iJIM*, Vol. 14, No. 19, 2020.

- [28] K. Zhampeissova, "Collaborative Mobile Learning with Smartphones in Higher Education", *iJIM*, Vol. 14, No. 21, 2020.
- [29] N. Jad, K. Raouf, K. Elkababi, M. Radid, "Teaching Practices of Scientific Awakening Related to Management of Representations of Primary School Learners: Inspectors' Viewpoints", *International Journal on Technical and Physical Problems of Engineering (IJTPE)*, Issue 50, Vol. 14, No. 1, pp. 50-56, March 2022.
- [30] I. Echchafi, Y. Bachra, A. Benabid, M. Berrada, M. Talbi, "Evaluation of Higher Education Pedagogy for Continuous Improvement: A Case Study", *International Journal on Technical and Physical Problems of Engineering (IJTPE)*, Issue 49, Vol. 13, No. 4, pp. 179-185, December 2021.

## BIOGRAPHIES



**First Name:** Oussama

**Surname:** Dardary

**Birthdate:** 03.07.1991

**Birth Place:** Khouribga, Morocco

**Bachelor:** Computer/Electronics, Faculty of Sciences and Technology, University of Hassan II, Mohammedia, Morocco,

2013

**Master:** Teaching and Training of Physics and Chemical Sciences, ENS of Casablanca, University of Hassan II, Casablanca, Morocco, 2016

**Doctorate:** Didactics of Physics Sciences, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 2020

**The Last Scientific Position:** Assist. Prof., Higher Education of Sciences' Didactic, Department of Sciences, ENS Meknes, Morocco, Since 2021

**Research Interests:** Physics, ICT, Didactics

**Scientific Publications:** 12 Papers, 1 Thesis

**Scientific Membership:** Laboratory of Physical Chemistry of Materials LPCM, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco - Department of Sciences, ENS Meknes, Moulay Ismail University, Morocco



**First Name:** Malika

**Surname:** Tridane

**Birthdate:** 03.01.1967

**Birth Place:** Casablanca, Morocco

**Bachelor:** Physical Chemistry, chemistry department, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 1990

**Master:** Physical Chemistry, Faculty of Sciences, University of Mohammed V, Rabat, Morocco, 1992

**Doctorate:** Physical Chemistry of the 3rd Cycle, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 1999 - National Doctorate in Physical Chemistry, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 2006 - University Accreditation in Physical Chemistry and didactics, Ben M'Sick Faculty of Sciences, University of

Hassan II, Casablanca, Morocco, 2016

The Last Scientific Position: Prof., Higher Education, CRMEF Casablanca, Settat, Casablanca, Morocco, Since 2022

Research Interests: Physical Chemistry, Education Sciences

Scientific Publications: 80 Papers, 4 Projects, 1 Thesis

Scientific Membership: Regional Center for Education and Training Casablanca Anfa, Casablanca, Morocco - Laboratory of Physical Chemistry of Materials LPCM, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco



First Name: **Said**

Surname: **Belaouad**

Birthday: 05.05.1964

Birth Place: Casablanca, Morocco

Bachelor: Physical Chemistry, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 1988

Master: Physical Chemistry, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 1990

Doctorate: Physical Chemistry, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, 2002

The Last Scientific Position: Prof., Higher Education, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco, Since 2002

Research Interests: Physico-Chemical Properties, Crystal Structures and Valorizations of New Phosphates Condensed, Engineering of Training and Didactics of Sciences and Techniques

Scientific Publications: 179 Papers, 8 Projects, 1 Thesis

Scientific Membership: Laboratory of Physical Chemistry of Materials LPCM, Ben M'Sick Faculty of Sciences, University of Hassan II, Casablanca, Morocco