Science Education- The case of Tunisia.

General informations

Tunisia is a young state with an age old civilisation.
Founded over a thousand years before the christian area , by Elissa a women coming from Tyr, Carthage once shone over the entire mediterranean basin.

By its geographical situation, Tunisia passed through countless foreign conquests (Phoenicians, romans, berberes, arabs, spaniards, turks, and French protectorate from 1881-1956).

Tunisia is a pure mediterranean country with a plural of civilisations.

Tunisia gets its independance from French protectorate on March 20, 1956

Once independence acquired, Tunisia's social policy was aimed at modifying the country's overall social structure, reforming Agriculture, Health , Housing, Education, …**with one historical first measurement : family statute**

family status law grants the women her rightful place , civil rights – **women and men are equal Citizens.**
Education was the first objective

Some general data:

Tunisian population (Millions):	in 1956 : 3, 5	in 2001: 9, 7
Rate of population increase :	in 1966 : 3,01	in 2001: 1,03
The income per head	in 1966 : 200DT	in 2001: 3000DT

(1DT=0,74 Euros)

the population increase: **x 2,8**

Evolution of people at school :

	Primary school		**Secondary school**		**University**	
Year	1955	1999	1955	1999	1966	2001
Total	226.736	1.433.000	17500	833.000	6000	207.388
Boys	177.736	754.000	16.000	416.500		99.715
Girls	49. 000	679.000	1.500	416.500		107.673
Rate (% girls)	**22**	**47**	**8 ,5**	**50**		**51,9**
the student population increase	**x 6,3**		**x 50**			**x 35**

Distribution of Students in Sciences (2000-2001)

Fundamental Sciences	Medical Sciences	Technical Sciences	Agriculture Sciences
28514	12551	27910	4031
13,7%	**6%**	**13,4%**	**1,3%**

References:
Tunisia works- Secretariat d'Etat à l'Iformation- -Gouvernement Tunisien 1960
Jeune Afrique- n°1837, 20-26 Mars 1996
Légende de Carthage- Ezzeddine Bach Chaouch- ; Découvertes-Gallimard
Le choix de l'avenir- Ministère des télécommunications Octobre 1999.
L'Enseignement et la formation supérieurs en chiffres 2000-01 Bureau des études de la planification et de la programmation.
Intelligent,20- 25 Aout 2002

Students and Physics Sciences:

Note : In Tunisia, University is open for each one who succeed at the last

exams- baccalauriat- at secondary school and is free.

Because of the limited place number in institutions, the choice of studies at the

different Institutes at the university : engineer, medicine, fundamental science,

human science… is not free. It depends of the results obtained at baccalauriat.

First choice is for medicine, then engineer, chemist's (pharmacie) or IHEC (

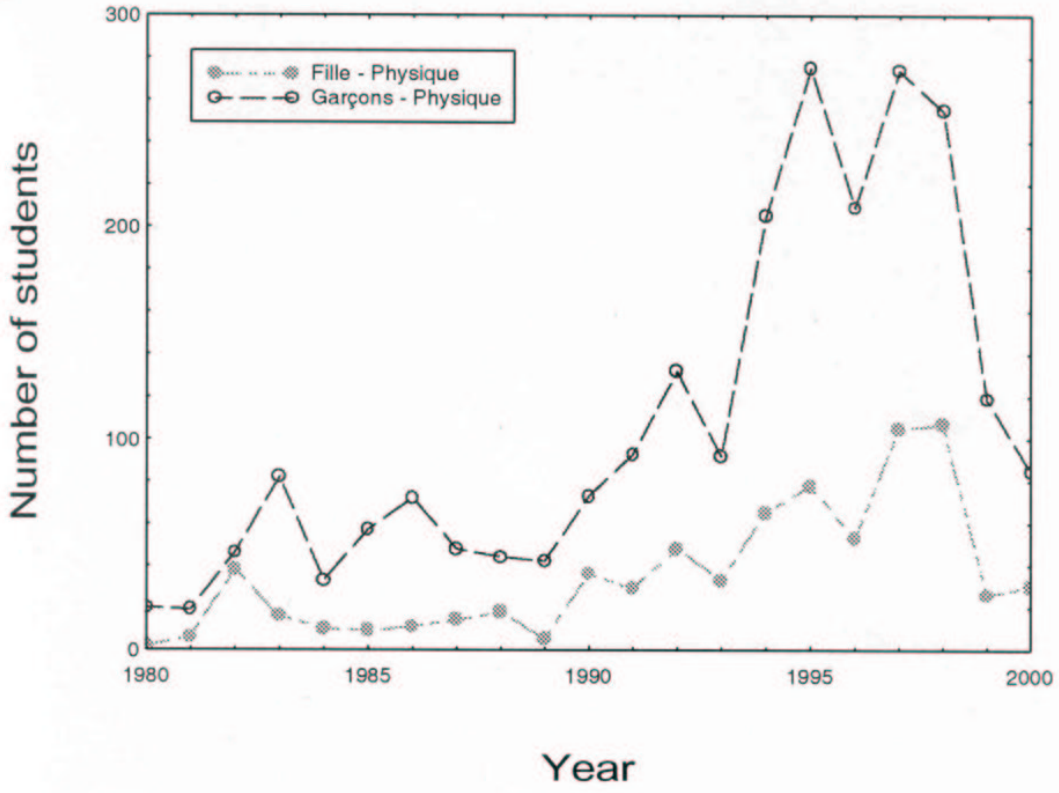
Institut des hautes études commerciales), …. ,

last choice in sciences is for physics at Faculty of sciences.

The number of students in Physics, girls and boys is decreasing . The number of

students is reduced by 50% from 1997 to 2001 .

Students goes to computer sciences and biology.


Fille - Physique
Garçons - Physique
Number of students
300
200
100
0
1980
1985
1990
1995
2000
Year

Development of research

DGRST (Direction Générale pour la recherche Scientifique et Technique) has been created in 1993.

Ministry of research in 1994

Structure of laboratory : in 1999

Budget for research will be 1% in 2004

UNIVERSITY of TUNIS-EL MANAR FACULTY of SCIENCES

LABORATORY

of

Spectroscopy of Atoms- Molecules and Applications

Laboratoire de recherche LAB-MA-04-Code 186 -

Research Field: Atoms-Molecules , laser spectroscopy, plasma.

Subjects and teams: 3 teams of research , Theoretical and experimental research

E1/ Theoretical studies - calculs ab initio and et semi empirical calculations – of molecular structures :
équilibrium geometry, electronic potential surface , spectroscopic parameters, collision cross, ro-vibronic movements and molecular dynamic.
Systems Studied or in studying : X-Y (X= C,S,O,N ; Y= H, He, Ne,Ar,Kr,Xe), HNO+, HSO+, HCO+, HCO_2^+ CH_4-OH, C_2H_4-OH, H_2O_2-OH, Na Ar_n, anhydrides cis-tétrahydrophtaliques, $Pb^{2+}(H2O)_n$
Applications : contribution to the identification of molecular species observed in the interstellar medium (HNO+/HON+, CH- He, ..).

E2/ Expérimental study of Plasma (moyennement denses): diagnostic of arc plasma and plasma induced by laser by spectral line shape analysis.
Applications :
Detection of pollutants (Na+, Ca+, Mg+) in water by LIPS technique (laser Induced Plasma Spectroscopy)

E3/ Expérimental study of excited molecules by Laser:

Absorption spectral line shapes of pollutant molecules (CH4, NO,..) isolated or in interaction with other atoms or molecules
Applications :
-measurement of CH4 concentration in the ambiant air by TDLAS technique(Tunable Diode Laser Absorption Spectroscopy)
- Study of the stress of plants by analysis of the evolution of the spectral line shape of fluorescence

Visitors: (2001-2002)

-Owonoo Owono Luc Calvin – Université Douala, **Cameroun - stage d'un an**(initiation aux calculs ab initio)

-Pr. Nikola KONJEVIC- laboratoire de Physique des plasmas-Institut de Physique, belgrade-**Yougoslavie : 15 jours** , mise au point sur la recherche expérimentale portant sur le plasma d'arc.

-Pr. Guy Taieb –Laboratoire de Photophysique Moléculaire-Université Paris Sud- **LPPM-France :**
2 x 3jours, mise au point et discussion de l'état d'avancement des résultats expérimentaux et interprétations effectuées sur l'étude de la pollution de l'eau par la technique LIBS .

-Pr.G.Chambaud – Laboratoire de chimie quantique-**Université Marne La Vallée-France : 3 jours,** participation à un jury de thèse et discussion de travaux de recherche avec calculs ab initio.

-Pr. Hubertus von Bergmann – Stellenbosch- National Laser Centre - **Afrique du Sud : 3 jours** discuter la mise en place d'une coopération dans le cadre d' un futur centre de technologie laser en Afrique.

Composition and organisation of the laboratory(2002)

The laboratory has (in 2002) 34 researchers with 6 from chemistry :

- 7 researchers (habilités à diriger la recherche dont 2 chimistes)
- 8 researchers (confirmés) – with Doctorate
- 15 preparing Doctorate
- 4 DEA
- 1 technician

All researchers are teachers. Among those who prepare doctorate 2 have fellowship from government, 2 are teachers at Secondary shool and 3 "contractuels".

Visitors : before 2001, 2 or 3 each year for a short period (3 -7 days)

International Coopération

1/North-South Cooperation

a/ Cooperation with French Laboratories: Many Projects one or 2 projects each 2 years since 1981 with French laboratories established in the frame of cooperation between :

- **CNRS - FST**
- **CNRS - DGRST since 1993. with one PICS in 96**
- **Or through program of CMCU since 1988**

French laboratories : LPPM-Université Paris Sud ; Laboratoire de physique des lasers .Atomes et Molécules .Université de Lille ; Laboratoire de chimie quantique Marne la Vallée, Centre de physique des Plasmas et Applications - CPAT- Université Paul Sabatier Toulouse ; Laboratoire Aimé Cotton -Université Paris Sud). This coopération began in 80-81 before the official structures.

We try to improve this coopération and to lead it at **a partenariat level** and to develop **other cooperations**

b/Cooperation with Italy and Yougoslavia Laboratories since 2001

-**Italy** : Laboratory of plasma physics, Pr Capitelli, University of Bari ; Laboratoire de biophysique, Pr Cannistraro, Universite de Tuscio)

-**Yougoslavia** : Laboratory of plasma physics, Pr Konjevic, Institute of Physics, Belgrade.

Experience of European collaborative research Projects

-Project E.U-AVICENNES Contrat AVI*92 C11
Teledetection par laser(LIDAR)des gaz hydrocarbures dans les pays méditérranéens
Project between : France, Spain, Algeria and Tunisia.

2/ South-South Cooperation

Through African collaborative research Projects (with support of ICTP-Trieste -Italy)- Coordinator : Tunisian partner

a/- Algeria (CDTA), Egypt (NILES), Tunisia (LSAMA)

Title of the Project "Laser induced breakdown spectroscopy-Application to the diagnostic of polluted water"

b/- Cameroun (CEMAPOQ-Yaoundé) – Cote d'Ivoire (INP-Yamoussoukro) - Tunisia (LSAMA-Tunis)-

Training in ab initio calculation-
Development of an African "network researchers"

As a first step and as most African Universities have
-no equipment for experimental research (our situation at the begining) and
-no technician environment

we help to give repeat our experience by a training in ab initio calculations for which we need **only a computer** and for which researchers, through **internet** are **less "isolated"** , can continue to collaborate and to **go on** with research.

In our laboratory 2 researchers come for training :
-from University of Cote d'Ivoire for 3 months
-from Cameroun (CEMAPOQ), for one year (2001-2002)

Scientific Manifestations

-International colloquium: Anthena 92 - Title :Transfert of knowledge in Science and Techniques.Tunis September 1992

- Workshop en physique atomique et moléculaire , Tunis Beit El Hikma 19-20 Décembre 1996 (ci joint une copie). Participants : North African researchers and French on project cooperation.

-Training school on « lasers and applications in Medecine, industry and Environment». Tunis 10-22 Novembre 1997.
With support of ICS Centre (International centre for Science) de Trieste – Italie. Participants : from Africa , Middle east and Europe

- Optique - Laser, Jeunes sciences , Tunis Mai 1997

- « First workshop on Plasma Physics , LIBS and Applications » Hotel Karim 11-13 Janv 2002, supposed to be regular each 2 years.

-International workshop on « Laser Physics and Applications » Cité des Sciences 11-17 Dec 2002.
Africain network LAM(Laser-Atomes-Molecules) activities suppoted by ICTP-Trieste-Italie. 30-40 African participants. Lecturers : (D.D.Bhawalkar, P.Chavel, W.Demtroeder, A.Friberg , G.Gerber, M.Mansuripur, J.Weiner, L.Woeste ..)

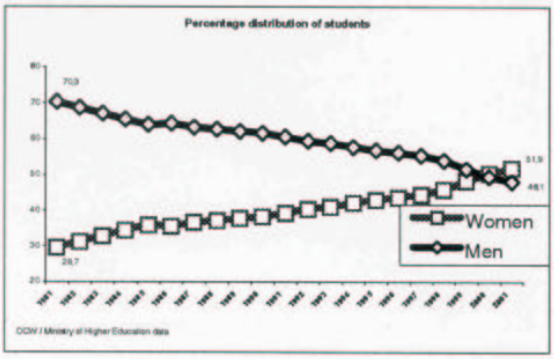
Participation to Workshops, Seminars :

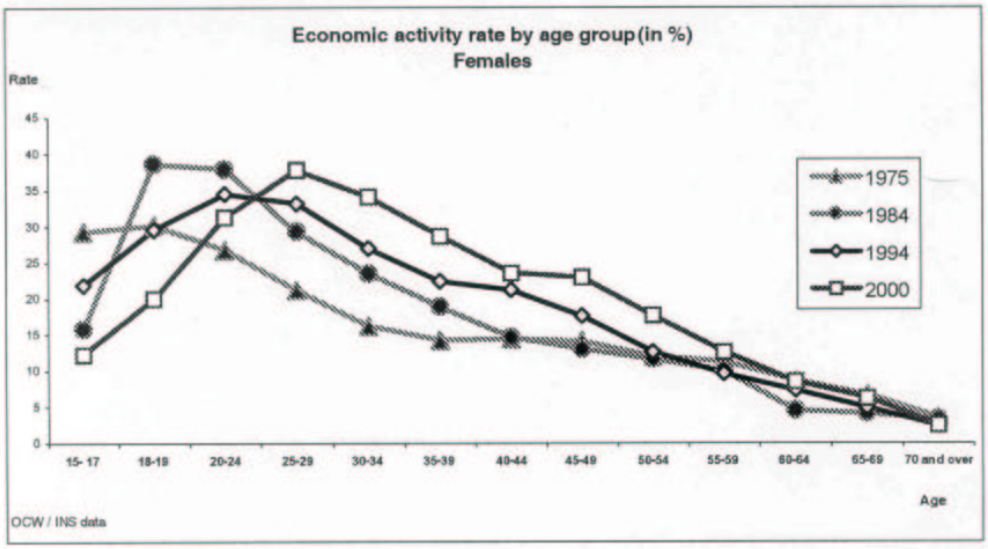
-Seminaire « New tools for Sustainable Development- The Trieste Science and Technological pole ». 31 Oct 2002-
Northern African Network on Spectroscopy (NANS), Z. Ben Lakhdar

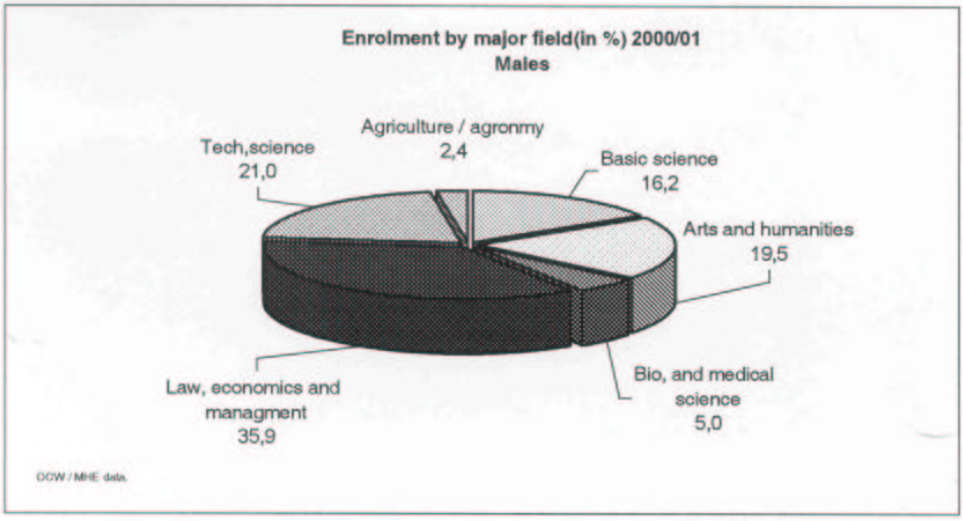
-International Conférence on « women in physics » - 7-9 Mars 2002
'Women in Physics- the case of Tunisia' , Z.Ben Lakhdar

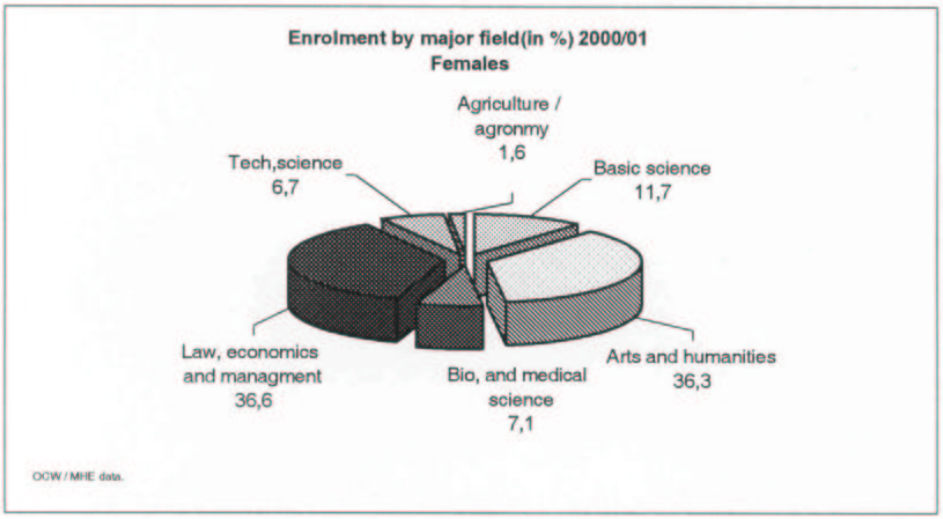
-Workshop : "World-Med"2002-Marseille- France, 18-20 Avril 2002
Developpement de la recherche et coopération Nord-Sud de la Méditerranée- Z.Ben Lakhdar

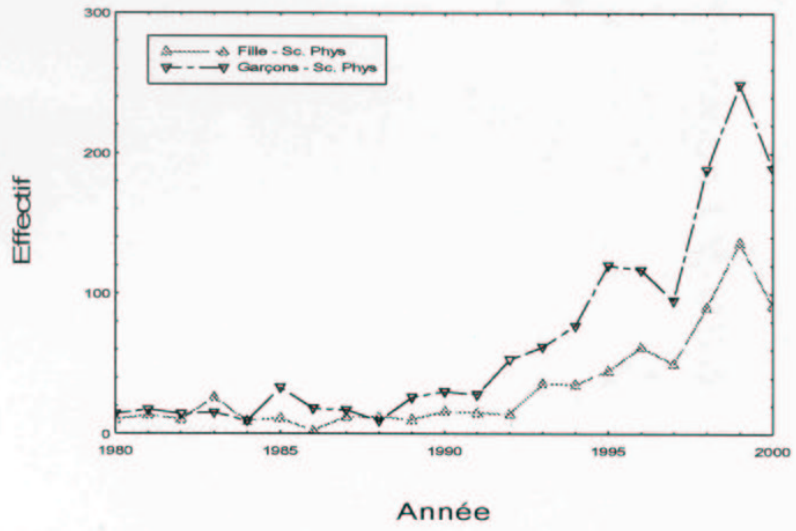
- EPS 12 General Meeting- « trends in Physics » - Budapest , Hongrie, 26 –30 Aout 2002
« Research Development » Z.Ben Lakhdar

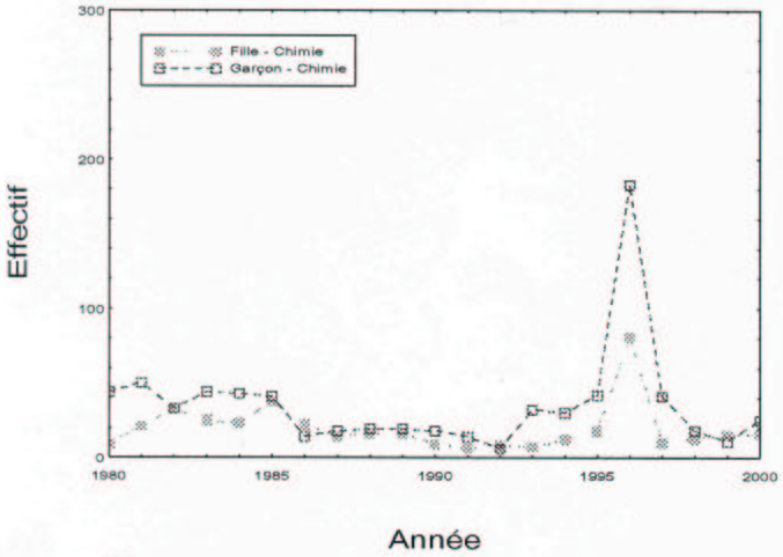

Percentage distribution of students
80
70
60
50
40
30
20
70,9
28,7
51,9
48,1
Women
Men
DOW / Ministry of Higher Education data

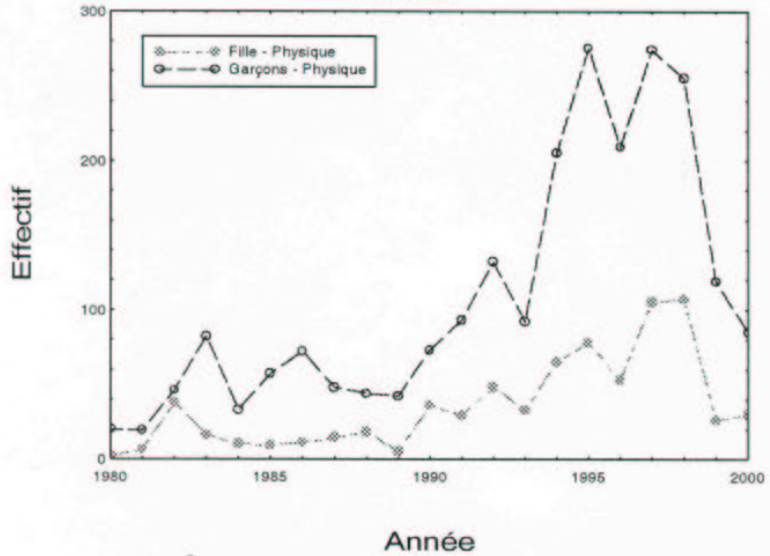

Economic activity rate by age group (in %)
Females
Rate
45
40
35
30
25
20
15
10
5
0
15- 17
18-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 and over
Age
1975
1984
1994
2000
OCW / INS data


Enrolment by major field(in %) 2000/01
Males
Agriculture / agronmy
2,4
Tech,science
21,0
Basic science
16,2
Arts and humanities
19,5
Bio, and medical
science
5,0
Law, economics and
managment
35,9
OCW / MHE data.


Enrolment by major field(in %) 2000/01
Females
Agriculture /
agronmy
1,6
Tech,science
6,7
Basic science
11,7
Law, economics
and managment
36,6
Bio, and medical
science
7,1
Arts and humanities
36,3
OCW / MHE data.


Fille - Sc. Phys
Garçons - Sc. Phys
Effectif
Année


Fille - Chimie
Garçon - Chimie
Effectif
Année


Fille - Physique
Garçons - Physique
Effectif
Année