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THE HISTORY OF ASTRONOMY IN MUSLIM CIVILISATION, FOR EDUCATING MOROCCAN FUTUR SCIENCE TEACHERS TO SCIENTIFIC THINKING IN HARMONY WITH THEIR CULTURAL IDENTITY

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ABSTRACT: Our aim in this paper is to show how we are acting with our students for developing their scientific thinking while trying to avoid that the fascination for science their mind a feeling of strangeness and alienation, showing that it remains an universal production which has a history and which scalable, showing them that the science it is a type of thought distinct of the religious one, and using their introduction in the history of astronomy in muslim civilisation as a springboard for initiating them to astronomy. In this paper we describe those goals and the content we teach to achieve them. In the training entity here described We try to show how it is possible to support the appeal that religion has on young people nowadays in our country to root them in scientific thought, and also to highlight the way in which it has been possible for Muslims to live their faith and in the same time to appropriate and develop scientific heritage of previous civilizations.

Key words: History of astronomy, civilisation, scientific thinking, cultural identity.

INTRODUCTION

Developing scientific literacy of students, reconciling them with their cultural identity through the discovery of the technical and theoretical scientific achievements of Muslim civilization and of the manner that the rationality has been developed inside the cult science are all reasons that support the need for the introduction of the history of astronomy in the Arab-Muslim civilization in science training programs at University in Morocco. They are the goals of a training entity that we have developed for the benefit of students of a master of philosophy and a master specialized in the teaching of science at the Cadi Ayyad University, Marrakech, Morocco.

In this paper we describe those goals and the content we teach to achieve them. In the training entity here described We try to show how it is possible to support the appeal that religion has on young people nowadays in our country to root them in scientific thought, and also to highlight the way in which it has been possible for Muslims to live their faith and in the same time to appropriate and develop scientific heritage of previous civilizations.

1. Moroccan and science: needs, fascination and alienation

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Morocco is a developing country that is working hard on many fronts to emerge on the world level. First in politics by adopting a bold new constitution in 2011 and engaging in a process of democratization considered enough positive within the country and abroad. In Economy by engaging in large projects such as the Green Morocco for the development of agriculture, Halieutis Morocco to value fishery resources, Azur 2020 program for the promotion of tourism and the Central Solar Noor, one the largest factories in the world of power generation from solar energy. He also conducted a social policy to improve life in precarious rural areas and urban poor districts through the National Initiative for Human Development. The country relies heavily on its education system to train human resources capable of carrying out its emergence objectives on the international economic scene. Unfortunately this system is not satisfactory enough.

Indeed the country has a big need of doctors, engineers and skilled technicians. He is also engaged to have an honorable production in scientific research as stipulate one of the levers of the Strategic Vision of the Reform of the Education System. Morocco has made training in science and technology the way to respond to those needs. Quantitatively we are very close to achieve the target rate of 66% of high school students in scientific and technical fields. These sectors have a good audience among young people, probably because they are deemed opening on best professional prospects. The best students look to join the great schools of engineering or medicine. On an other hand Researchers in Morocco in universities and research centers produce and communicate and publish books and articles in scientific journals. The average Moroccan uses many new technologies. So the number of mobile subscribers exceeds half the number of the country's population and Internet penetration rate reached 41% in 2015. There's respect and fascination towards science and technology products.

However Moroccan people have a sort of alienation towards science and technology. Maybe because of the fact that for Moroccan scientific researchers the issues of their work are domiciled in Western labs and for the average Moroccans technology products are made elsewhere away from home.

On the other hand when we analyze Moroccan sciences programs in the university we note that the contents are sufficiently rigorous and similar to those taught worldwide. Only the subjects taught are decontextualized and isolated from any historical or epistemological lighting. That could maintain or create in students minds a sense of alienation with respect to scientific thought.

During our experience of teacher and actor in an amateur asotronomy association, We have found that young Moroccans even those who have advanced degrees in science blame an indisputable lack of knowledge of astronomy. However the Moroccan sky is relatively less affected by stray light and is suitable for reading sky and doing astronomical observation. The problem may be in the low presence of astronomy in primary and secondary school programs or in the belief that to make it is necessary to have means equipment, telescopes and telescopes that one can't easily offer.

On the other hand, it there is an obvious return to religion in Moroccan society that is manifest in politics and in everyday and intellectual life. The political forces that rely on Islamic ideological repository are so active and popular that its a party of this obedience which leads the current government. The return to religion is also evident in the intense attendance to muskets and the way that many of both men and women are dressed (beards for men and scarves for women). The reference to religion is also present in the discourse of people and discussions shared by even the most highly trained in science among them. There is a tradition considered scientific by its supporters called "scientific miracles of the Quran" which try to find the origins of the latest scientific discoveries in verses of the Koran. It is popular among youngs and adults, even and specially those who graduates in science.

In our opinion, this "pseudo-science" shows a dogmatism and a withdrawal and pernicious intellectual laziness that is contrary to the requirement of effort and creativity that goes with scientific thought which is a kind of thinking which takes into account contemporary theoretical productions and the action on the reality for producing the knowledge and not the opposite.

2. Our problematic

Faced to those multiple challenges and those phenomena at least disturbing several questions arise related to training in science in our country:

- How to train in science and to avoid that the fascination that she could create in young Moroccan mind dose not turn into a feeling of strangeness and alienation?
- How to train in science while showing that it remains an universal production which has a history and which scalable?
- How to train in science and to show that it is a type of thought distinct of the religious one?

We believe that for our students the history of science, that of science in Muslim civilization in that case, presents relevant answers to those questions. This is at least what we stand for years and that we use in the training of future teachers of physics and future researchers in philosophy. We describe in this text the objectives of the training unit and the teaching content.

3. Arab-Muslim history astronomy training unit

a. Presentation of the unit

It is a course of six hours which is part of the course of physics Education for the Master of Teaching Physics and Chemistry. A course that analyzes:

- the learning difficulties,
- the learning acquisition process of these school subject,
- the operations undergone by the scientific knowledge to be transformed into taught knowledge
- and the teachings operations and actions.

For the masters of philosophy, this course is part of a unit called "History of Mathematics and Arabic sciences". It lasts the same time but is slightly simplified because those students do not have a great prerequisite in terms of scientific knowledge.

b. Targeted goals

The objectives of this training unit are manifold:

Epistemological objectives

- (1) Showing that science is a universal building
- (2) Showing that its truth is relative

Psychological goals

- (1) Fighting against the feeling of alienation toward science by highlighting the Arab-Muslim scientific heritage
- (2) Enjoying the attractiveness that the achievements of Muslim civilization has on young people of the countries of this civilization
- (3) Helping Moroccan young people to build confidence in the genius of the Arab and Muslim peoples and their ability to produce science
- (4) Reconciling young people with the history of their civilization and be aware that they don't stay its prisoners

Cultural goals

- (1) helping students to distinguish between scientific and religious thinking
- (2) showing how science had helped to solve problems and on the other hand that is not the sacred text that helps to solve scientific problems
- (3) showing how the scholars of Islamic civilization lived their faith regardless of their scientific production
- (4) showing how science was an intellectual production that served the practice of religion
- (5) introducing students to astronomy and make them love it
- (6) supporting the attractiveness of science
- (7) developing the spirit of intellectual openness

c. The content taught

1) The first theme is an introduction to traditional astronomy in the Arabian Peninsula before the advent of Islam. A first objective of this course is epistemological ; showing that even before emerging on the world scene, the Arab people had, as did those of other countries, a handy and practical astronomical scientific tradition. The second is psychological; is to show our students that there are fifteen centuries their ancestors had best knowledge that their in this science. What we hope here is that fact lead them to be interested in this science. Indeed before Islam, Arabs had built a traditional astronomical around observations of constellations, the movement and the phases of the moon to meet :

- Aesthetic and artistic motivations (to revel in the beauty of the moonlight in the clear desert nights)
- Guidance needs
- Weather needs to know (recognize) cyclic climate phenomena and the various agricultural seasons. Among others, to know when to plow, transhumance ..etc. They did not knew observing the sun movement like the Greeks or the Syriacs, but they managed to solve the many practical problems by combining the phase of the moon and its position in its twenty-eight stations in the sky.

This theme ends with the description of the period of translation in Bagdad at the 8th-9th century of the Greek heritage and the Syriac heritage and the Indian heritage in astronomy. We show also the process of the emergence of the astronomy in the muslim civilisation and its transformation into an universal corpus produced in arabic that supports theoretical scientific issues and the political and cultural and social issues that have accompanied this development.

2) The second theme begins with the discussion of religious issues that were among the major causes of the development of astronomy in the Arab-Muslim civilization, namely the designation of the direction of Mecca towards which Muslims pray and the determination of months beginnings, particularly the sacred months Ramadan and Chawal and Dou-Alhijja. These problems have been at the beginning resolved by lawyers who made the interpretation of the founding texts, the Koran and the hadith (sayings and decisions and actions of the Prophet and of his companions). But over time, with the expansion of the Muslim empire and the distance from the center and also with the complexity of political life in various corners of the empire, these solutions had become inadequate and the muslims were forced to use astronomical knowledge to develop a sacred geography. And thereafter to solve these problems mathematically by making use of spherical trigonometry. This need for an epistemological break against cultic thinking of the Muslims in the 10th century. In the term of the course we invite the students to an initiation in astronomy. Our argument is that they must know at least a little in comparison with the great culture that their ancestors had in this area.

CONCLUSION

Our aim in this paper is to show how we are acting with our students for :

- developing their scientific thinking while trying to avoid that the facination for science their mind a feeling of strangeness and alienation
- showing that it remains an universal production which has a history and which scalable
- showing them that the science it is a type of thought distinct of the religious one
- using their introduction in the history of astronomy in muslim civilisation as a springboard for initiating them to astronomy.

The training unit might seem consistent but the question that arises is that of its efficiency. Hence the need to carry out research to assess its impact.

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