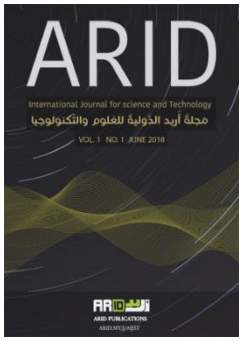
ARID Journals

ARID International Journal for Science and Technology (AIJST)
ISSN : 2662-009X

Journal home page: http://arid.my/j/aijst



Letter by the Editor

Arab Muslim scientists, with their scientific capabilities, potentials and multiple talents, are models of multidisciplinary science and scientists.

Hasan Ibn Al-Haytham for example (born in Basra in 965 and died in 1040) was an Arab Muslim Iraqi encyclopedic scientist. He has made significant contributions to mathematics, physical optics, physics, astronomy, engineering, ophthalmology, scientific philosophy, visual perception and science in general, with his science-based experiments.

He had many scientific literatures and findings which were authenticated by modern science.

Ibn Al-Haytham has also corrected some of the prevailing concepts at his time which were based on the theories of Aristotle, Ptolemy and Euclid.

Google Doodle celebrated this unrivalled scientist, and his image was featured on the currencies of some Arab countries to commemorate this great scientist.

The Muslim physician Abu Bakr al-Razi, who was a philosopher, chemist, brilliant Physician, and inventor, is yet another example of encyclopedic and multidisciplinary scientist.

He wrote many books, including the 30-volume famous book of medicine tilted (Al-Hawi).

He set up a sophisticated laboratory in Baghdad and prepared more than 70 kinds of perfumes using the distillation method.

His portrait as a Muslim scientist was painted on a window glass in a church at Princeton University. In the portrait, he is shown holding a writing feather in his right hand while holding his Al-Hawi book in the left, beginning his writing with the commonly used opening phrase “In the name of Allah the Merciful”. Moreover, his statue was placed in front of the United Nations Office in Vienna.

Scientific research collaboration in modern times is an important and indispensable pillar for the development of knowledge and progress of nations.

There are lots of examples on such scientific research collaboration, including but not limited to a joint study which was conducted to determine the future of hydrocarbon fuels (oil and gas) as a source of energy.

In 2016, the American Institute of Physics affiliated “Physics Today” journal has published a paper entitled "Physics, Hydrogenation, Fuel and the Future". The paper was co-authored by a group of multidisciplinary scientists, including an engineer, a geologist and a physicist.

The paper dealt with the sustainability of oil and natural gas today, and its prospects.

In the field of cooperation between theoretical and applied research, it is noted that the field of physics is well-rooted in many scientific disciplines.

Therefore, the cooperation between theoretical and applied research to secure energy supplies in the future should continue and be promoted. In addition, there is a need to activate the involvement of physicists' community in examining the impact of energy related issues, and solutions for these issues should be provided through the development of alternative energy resources, such as nuclear fusion reactors, solar cells and other energy resources.

Multidisciplinary education is another example which combines multidisciplinary researches of diverse experiences that consolidate to bring forth a promising research area or solve a multifaceted problem. Nanotechnology, as an example, requires knowledge of chemistry, biology, physics, materials science, engineering, etc...

The practical definition of interdisciplinary research is introduced in the National Academies Report as follows:

Interdisciplinary research (IDR) is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice.

The discipline of disease control, for instance, requires consolidated efforts by bimolecular scientists, biostatisticians, public health officials and sociologists.

Environmental sciences, which examine, inter alia, the interlinked ecosystems and their impact on policies, are essentially multidisciplinary disciplines.

Distinguished human potentials alone cannot ensure a valuable scientific return of researches unless augmented by financial support.

As funds for specialized multi-disciplinary research are notably stagnant, the multi-disciplinary research and education scholarship program for complex scientific issues such as climate and atmospheric monitoring and groundwater recovery, is an example that must be emulated.

Many of the world's universities are making structural changes to promote multidisciplinary research, including the establishment of multidisciplinary centers or institutes. Qatar University is an example of institutions that support inter-multidisciplinary research and research projects within Qatar Foundation.

Hamad Bin Khalifa University focuses on innovative multidisciplinary research, while Hamad Medical Corporation focuses in bringing into being a multidisciplinary team. A brain cancer case is an example that necessitates a multidisciplinary cooperation between a neurosurgeon, radiologist, oncologist, histologist, as well as a public relation specialist to conduct communications, arrange appointments and register the medical team's decision in the computer.

Thus, the case of the patient is viewed from different perspectives, and only one decision is taken by the committee with regard to the treatment plan.

Some unknown disciplines may not have access to other scientific communities at the time being due to hurdles that prevent its global dissemination, including the sole use of Arabic language in such disciplines, or the lack of international interests for such disciplines.

Nowadays, we must look seriously for effective ways to develop Arab scientific research. Therefore, I proposed the formation of research groups within the "ARID" platform that promote multidisciplinary research projects, identify the relevant scientific and humanitarian disciplines, recognize the obstacles that face researchers as they try to publish their findings and research, and develop a plan of action to overcome these obstacles, after securing the required support and funding for the implementation of their research.

Based on the above proposal, “ARID International Journal for Science and Technology (AIJST)”, “ARID International Journal for Educational and Social Sciences (AIJESS)” and “ARID International Journal for Health and Medical Sciences (AIJHMS)” has been established as a preliminary step to help disseminate new and original researches after being scientifically evaluated as per the common practice followed by international journals. Thus, these researches could be disseminated at the international level, and researches of Arabic speaking authors could be best introduced to the world of researchers, yielding projects that promote development plans in the countries of the developing world.

In the second part of the lecture some statistics will be presented which were collected from the international publication of researches on the types of solar panels that multiplied three times from 2009 to 2017, within Scopus data. These statistics are about the growth of the scientific publication on the famous crystalline silicon cells and next-generation organic solar panels, which are characterized as being light, mechanically flexible and cost-effective.

Moreover, these statistics show the increase in the publication of researches on nanotubes, light-sensitive dye cells manufactured since 1988, quantum dot cells, carbon-nanotube cells, and graphene cells.

In the third part of the lecture, the focus will be one of today's modern sciences; the Nanotechnology. NANO is a Greek word which means dwarf, and it equals a fraction of a billion, so one nanometer equals ten hydrogen atoms, paralleled longitudinally to each other.

Nanotechnology deals with objects with dimensions ranging from 1 to 100 nanometers. Water molecule is about 1 nanometer in diameter, while the diameter of one human red blood cell is about 7,000 nanometers, and the diameter of one human hair is about 10,000 nanometers.

Materials with such dimensions are very interesting because they show enhanced characteristics which are fully different or sophisticated when compared with materials with large dimensions and sizes.

This change occurs in the properties and behavior of nanomaterials due to the significant increase in surface area of the material relative to its size, as well as the prominence of the phenomena and effects of quantum mechanics in the place of the phenomena of Newton's traditional mechanics. An increase in the surface area of material relative to its size, boosts the chemical reactivity, making some nanomaterials very useful as catalyst agents in petroleum and petrochemical industries, or useful agents for improving the efficiency of fuel cells and batteries.

Therefore, Nanotechnology aims to utilize these effects which are associated with the Nano dimensions of material, to establish systems, devices and structures with useful new properties and functions depending on these new dimensions and sizes.

Nanoparticles have been used for thousands of years without being realized. For example, the Roman Cup of Lycurgus, (currently preserved in the British Museum) which dates to 4th century AD, contains gold and silver nanoparticles. The color of the Cup changes from green to dark red when exposed to light.

The Arabs used to make the famous robust Damascene swords. These swords were fitted with nanomaterials that give them mechanical robustness. Phoenician glass makers used gold and silver granules as well as colloidal nanoparticles for coloring. In the 18th and 19th centuries, photography technique was based on film or tape made of light-sensitive nanoparticles.

Nanomaterials today are being used in numerous applications, including medicine, agriculture, food preservation and many other industries.

The water desalination and filtration industry are one of the industrial sectors targeted, to a large extent, by recent developments in nanotechnology, to meet the challenges of global freshwater scarcity, and provide clean fresh water for human use. Nanotechnology is expected to play a very important role in water treatment and prevention of the spread of diseases caused by unsafe drinking water which contains small size of pathogenic germs. It is known today that 80% of the currently well-known diseases are transmitted through the water.

Some researchers have embarked on making the world's smallest brush, with bristles finer than the hair of a human's head a thousand times. The brush will be used for many applications, including water purification. These small bristles will help trap contaminants in the water, allowing only the passage of pure water molecules. Another technique for water treatment known as Life Straw, is fitted with nanocrystalline filter that helps purify water contaminated with mud, sediments and other particles. The device can absorb about 700 liters of purified water for personal use.

Nanotechnology is similar to any other technology, and it can be used for other purposes that are far from the main purposes for which it was manufactured. The risks associated with the use of nanotechnology in these areas can be summarized as follows:

- Industrial Hazards
- Environment-related Hazards
- Social Risks arising from the developments of nanotechnology, including the development of military applications utilizing this technology.
- Public safety associated with health risks that may result from neglecting certain negative nanoparticles

Absence of laws regulating the production of manufactured nanoparticles or goods and materials containing nanoparticles; or absence of laws regulating their circulation or classification