AWASUL
تواصل علمي
دائرة النشر العلمي والتواصل بعمادة البحث العلمي
12

Neglected Studies on the Shelves

Academics Identify the Reasons and Suggest Solutions

Seasonal Edition Issued by oman Observer And SQU

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Children's Overconfidence

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A Research Device < A Nanocluster System >

A study assesses the economic feasibility of treated wastewater

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Research Themes: Key to the development of the country

Research is a beacon to reach out to those communities which harness it. Through conducting research studies that benefit society, researchers can contribute to progress and prosperity and find solutions to existing challenges.

Such collaboration between research agencies and society can only pay off if various research themes are geared to serving urgent societal issues, contributing, in a direct and concrete way, to delivering typically practical solutions, rather than indulging in mere theorizing.

Recognizing the paramount importance of research in serving society, Sultan Qaboos University has considered the need for its researchers and academics to focus on those research themes that seek to ensure scientific and intellectual progress and the development of Omani society. This has been translated into nine research themes, including environmental and biological research, energy and non-renewable resources research, life and health sciences research, humanities research, information and communication systems, materials and fundamental research, and industry-related research. These themes were addressed by SQU researchers and academics in more than 900 research studies conducted in the period 2009- 2015.

Marking the 16th anniversary of H.M.'s visit, which gave a robust impetus to scientific research, the University understands that the enhancement of scientific efforts in various areas is only possible through the support of society – in addition to the important support of the government. It is also necessary to see the private sector involved in this venture, and establish serious partnerships that can direct scientific research towards enhancing the national economy and, thus, contribute to the progress and development of society.

Editor

SQU Fair 2015

SQU Celebrates 16TH Anniversary of H.M.'S Visit

Dr. Talal Al-Wahaibi: "This occasion is a source of pride"

Sultan Qaboos University (SQU) is celebrating today the 16th anniversary of the Royal visit of His Majesty Sultan Qaboos Bin Said under the auspices of H.E. Dr. Ali bin Masoud Al-Sunaidi, Minister of Commerce and Industry. The opening ceremony will be held at the Grand Hall of SQU Cultural Center, with a speech given by Dr. Ali bin Saud Al-Bimani, SQU Vice-Chancellor, and another by Dr. Rahma Al-Mahrouqi, SQU Deputy Vice-Chancellor for Postgraduate Studies and Research. There will be a film featuring research at SQU produced by the Department of Academic Publication and Outreach. A number of distinguished researchers, academics, employees and students at SQU will be awarded for their achievements.

An exhibition for research and scientific activities of all colleges and research centers will be inaugurated with a display of 3D technology. It will show prototypes of scientific projects carried out by the colleges and research centers, along with students' innovations with intellectual property rights. New books published by the Academic Publication Board will be launched.

Meanwhile, all colleges will mark this occasion by organizing exhibitions and seminars covering their diverse academic achievements.

On this occasion, Dr. Talal Al-Wahaibi, Assistant Dean of Research, said: "The University is keen to celebrate the anniversary day as it is a source of pride for all employees. Considerable impetus has been given to research at the University with H.M.'s grant, allocated to funding strategic research projects, which are of paramount importance for the Sultanate. Such funding has encouraged academics to undertake diverse research projects that are of immediate relevance to society." He added that the University is marking this annual event with a variety of new programs and activities, including a 3-day scientific fair, to be opened this year for the public to have a closer look at the output of the University.

University Day 2015 – Guest of Honour at the Fair

Innovative style designed by InnoTech

The University Day Fair

A research fair will be opened today at the exhibition hall, SQU, as part of ongoing events marking the University Day. The function will feature 21 research projects carried out by SQU in seven scientific areas. Omani innovators will also show a selection of inventions and research works. There are also stalls for scientific books, audiovisual shows, and children's entertainment. Run by InnoTech, a company specialized in delivering high-tech services, interactive technologies will be in place to present a variety of shows on the research projects, educational games and other scientific features in an innovative and exciting way. Such technologies include virtual reality, augmented reality and hologram screens.

3D design – University Day 2016

Enabling Women and Engaging Them in Development Plans

A study fathoms Omani society's attitudes towards desirable occupations for women

Dr. Munir Kardasheh - Humanities Research Center

Contemporary societies are characterized by high-level dynamism as well as rapid changes of economic, social and cultural components. This calls for the need to monitor changes in the stereotypical thinking of society about the occupations desirable for women. This may be because the social norms, traditions and values prevailing in society play a key role in shaping the orientation of its members as to what professions are suitable for women. In this regard, Dr. Munir Kardasheh, from the Humanities Research Center, is undertaking an empirical study on Omani society's attitudes towards some desirable occupations for women. The study aims to uncover the most favorable and unfavorable professions for Omani women, as viewed from the perspective of the community, and to identify and explain the most important social, economic and cultural rationale behind these preferences. The study is very significant as it tries to uncover the general attitudes towards favorable occupations for women, as seen by that society. It also tries to probe the underlying principles that govern such preferences for specific jobs, and provide knowledge about such social phenomena. The research work is mainly based on a social sample survey methodology and stratified sampling. The samples will be representative of Omani society in three regions: Al-Dakhiliyyah, Al-Sharqiyyah, and Dhofar. This approach is appropriate for monitoring the phenomenon, analyzing its structure and underlying processes and understanding the overlapping relations at great depth and detail. A qualitative approach will also be applied through in-depth interviews with some community members in order to understand the implications of this phenomenon. The study seeks to provide a set of recommendations in order to empower women and integrate them into the development plans, and to raise awareness in the society of the importance of women›s work and its impact on women themselves, their families and on society as a whole. The research also seeks to increase awareness of the significance of women›s involvement in many modern professions needed by the community. This could be done through the media to change the attitudes of society towards those professions which are believed to be male-dominated in the first place. The study also seeks to provide solutions that would enable women to assume some leading and decision-making positions, including on executive boards. The study will use a set of statistical models to examine the data, uncover the details and analyze the merits. They are based on the analysis of variance (ANOVA), which is a collection of statistical models used to analyze the differences among group means and their associated procedures. The Statistical Package for Social Sciences (SPSS) will also be consulted.

H.E. the Vice-Chancellor to Tawasul:

H.M.'s visit constitutes a turning point for research

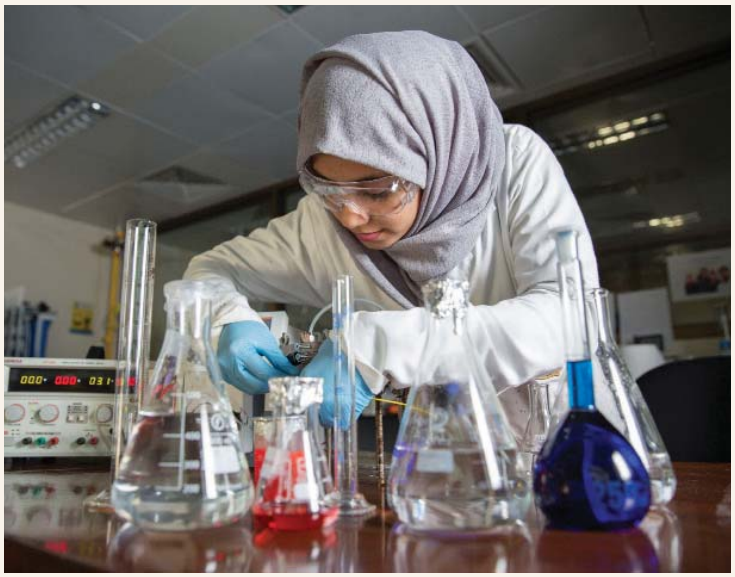
Sultan Qaboos University (SQU) is a leading landmark in scientific research in the Sultanate, an area which has seen remarkable developments in recent years, with growing numbers of researchers and research studies, academic publications, and innovations.

Today, the University is celebrating the sixteenth anniversary of the visit of His Majesty Sultan Qaboos bin Said, amid a host of accomplishments in various fields.

In the following interview with Tawasul, H.E. Dr. Ali bin Saud Al-Bimani, SQU Vice-Chancellor, has reflected on a number of aspects of research at the University.

How would you characterize research at SQU on this occasion,?

We consider research as the main pillar and backbone of university education, in addition to teaching and community service. Hence, the government has been keen on strengthening the role of scientific research. SQU is at the forefront of institutions addressing this vital aspect, being the premier academic institution in the Sultanate. As always, it has put in place all resources in supporting this vital domain, providing research facilities and laboratories and reaching out to local, regional and global academic centers of research excellence. The historic visit of His Majesty Sultan Qaboos bin Said to the University in 2000 was a turning point for scientific research, which has received all support, both moral and financial, from His Majesty. Because the progress of nations and institutions of higher education can only be measured by the quality of their research studies, the University has sought to enhance this through opening research programs and postgraduate studies. Now, after more than twenty years since the launch of research activities at the University, we consider research of paramount importance, both in kind and degree, despite the ongoing challenges. The University has sought over the years to establish a solid research foundation in order to achieve its ambitions, building laboratories and research centers equipped with the latest technology and attracting qualified professionals. The University is at the forefront of regional public universities in terms of the volume of scientific papers published in refereed journals, which has improved the University's international ranking.



Many successes have been achieved, and more are yet to come

How can research contribute to finding solutions to the current economic problems?

The University has recently carried out a number of studies aimed at contributing to the ongoing efforts to diversify the sources of income in the Sultanate. SQU researchers and academics are working hard, taking advantage of all opportunities to achieve economic benefits in such sectorsas tourism, agriculture, fisheries, mining, industry, oil and gas and renewable energy. I can say that several successes have been made, and we are in direct contact with those sectors to work together on studies that will contribute directly or indirectly to the promotion and development of the Omani economy, and to reduce dependence on oil as a source of income. We hope to see scientific research at the University factoring in Omani economic development. This can only happen by strengthening research capacity and rethinking related policies.

We are collaborating with other agencies of different sectors

•What can the Deanship of Postgraduate Studies offer?

The University has paid much attention to promoting postgraduate programs, both in quality and quantity, to cope with the rapid developments in various fields, and the need for qualified human resources in the Sultanate. Currently, the University offers postgraduate programs (PhD and MSc) in various colleges and disciplines, with students coming from various walks of life, in order to develop human resources to contribute to the overall development plans in the Sultanate. The Deanship of Postgraduate Studies is responsible for all matters relating to postgraduate programs and regulations, and the door is open for Omanis and non-Omanis to apply for such programs.

H.M. wants the University to be a distinguished institution

In addition to these two Deanships, we have research centers. How do you evaluate their efforts?

No one can disagree on the important role of research centers in supporting the development plans and projects. That is why the university has created ten research centers and three research chairs in collaboration with various agencies. The Centers now serve as a link between researchers, inside and outside the University, in the Sultanate or in other countries, who have an interest in doing research in the Sultanate. New research centers will always be an option when needed, and the University always ensures that these Centers have the latest equipment and technologies in their fields of specialization, as well as the best researchers.

Research efforts need marketing. How do you see academic publishing at SQU?

Academic publishing is an important factor that enhances and markets research activities, and the University plays a significant role in this area. Given the current, rapid developments worldwide, the University is working to take advantage of all new advances, and utilizing new technologies in order to disseminate scientific research findings to the community and institutions. Observers will find the University highly visible in the press, social media, book fairs and refereed journals.

Could you elaborate on the University's links with other research-related agencies in Oman?

The University has become a significant academic and research environment, given its cumulative experience and continuous development since its inception. That is why various institutions, both public and private, are interested in collaborating with it. As far as research is concerned, the University is keen to reach out to the relevant authorities to invest in existing resources in order to upgrade scientific projects, inside and outside the Sultanate, and in order to overcome the challenges facing the research sector. The University collaborates with other parties to establish a solid research base in the Sultanate; it has also created a partnership with such parties on the basis

of common goals, to develop this vital area. There are SQU research teams working on research projects funded by some authorities, such as The Research Council (TRC); there are joint committees between the University and some government and private institutions in the industrial and production areas, which have been established to promote cooperation and the application of research results. In the next stage, we will be doubling efforts to promote scientific investment to serve the goals set by the country's leader H.M. Sultan Qaboos bin Said, for the advancement of scientific research, and the development of methods and tools in line with national needs and global changes.

Having distinguished researchers is one factor of consolidating universities in the world. To what extent has the University managed to attract such academics?

The University has always sought to recruit high-caliber researchers. Annually, we have visiting researchers in various applied or social sciences, which we consider an important factor in enhancing the educational process in general, and research, in particular. There have been many accomplished research projects in the Humanities about the Sultanate, such as studies on local dialects of Himyarite and Kumzari, and the social and demographic development of the Sultanate in the light of significant global changes. We also have leading researchers in the Earth Sciences, with students coming from GCC universities to study the geological formations in Oman. The University has also collaborated with many universities on joint scientific research in engineering, medicine, agriculture and other areas. We have worked with a Dutch medical center on hypertension research and with other institutions on diabetes, blood diseases and cancer.

Innovation is key to future success. How do you see the successes of our students at regional and international levels?

We are satisfied with such achievements, being a source of pride for all of us at the University. It is testimony to the fact that we are moving in the right direction, and that the educational process has achieved its objectives, mainly to prepare a generation of students able to take advantage of their creative potentials and convert them into innovations that benefit the community and serve humanity. Hence, we have the creation of a department for innovation and entrepreneurship, and a group of innovation and entrepreneurship, to help university students implement their ideas and turn them into projects, as well as protecting intellectual property rights by seeking patents with the agencies concerned, inside and outside the Sultanate.

Innovations are testament to our sound approach

Finally, what are your research expectations?

I sincerely hope that the University's research efforts will come up with concrete results that benefit the society and its institutions, with solutions that address current problems. It is also hoped that the University will assume a position among the best research institutions in the world. To reiterate what H.M. said, "We want this University to be distinguished".

Sultan Qaboos University Major Research Themes

Sultan Qaboos University (SQU) has paid considerable attention to research in different areas, as a result of its conviction of the important role research plays in delivering solutions to challenges facing society. Research at SQU can broadly be grouped under nine themes, which cut across disciplines, colleges and research centers. Such themes were covered in 902 research projects and studies produced at SQU during the period 2009-2015. The University has developed its tools in order to enhance such research themes and come up with practical findings that could be used to overcome diverse problems in the country. Such results may be seen in the oil industry sector, for example, whereby researchers have developed various techniques to solve different problems, apart from significant studies in other fields.

Environmental and biological research

The studies include the fields of agriculture, fisheries, water and biodiversity. Important sub-themes are optimizing the productivity of agriculture and fisheries, conservation of biological resources and fresh water, and environmental management, with emphasis on sustainable development. Climate change, desertification, disposal of oil-production water, production of brine from desalination industries, pollution, earthquake monitoring, water resource management, protection of endangered species and environmental restoration are also key issues.

This theme requires cross-disciplinary approaches to environmental problem solving, and involves scientists from agricultural and fisheries, biologists, climatologists, hydrologists, ecologists, environmental engineers and economists, physical geographers, system analysts and remote sensing and GIS specialists. There were 160 studies in this field produced by SQU researchers during the period 2009-2015. One research project was about Jabal Akhdar rose water production which was aimed at improving rose water processing. Farmers were supplied with paper filters and funnels based on a technology that was simple and easy for them to adopt. Tests showed that the filters removed more than 96 percent of the impurities, significantly improving the quality of the rose water. Farmers were also advised to use gas instead of firewood in the processing of rose petals into rose water—this is because gas processing is more efficient, economical and eco-friendly than firewood processing. Another project was to do with "Mango Wilt Disease in Oman: Resistance Mechanisms and Environmental Interactions", which sought to combine direct technology transfer to the farming community and scientific research to backstop a reinvigorated production sector.

Energy and non-renewable resources research

This theme focuses on the oil and gas industry in Oman. The emphasis is on improving our understanding of the location and nature of reserves, enhanced oil recovery and the development of alternate energy sources, including solar and other renewable energy forms. Geosciences and mineral resources are also an important area of study. There were 56 studies produced at SQU during the period 2009-2015. One important research paper dealt with the "In-situ analytic upgrading of Omani heavy crude oil during steam injection", and was aimed at investigating the feasibility of in-situ upgrading of Omani heavy oil by the use of orgametallic catalysts. Another study concerned solar power generation and solar cooling cogeneration. An organic rankine cycle was built and integrated with a cooling system. The heat discharged from the cycle's condenser was fed into an absorption cycle, while most of the generated electricity (8 kW) could be provided to a mechanical vapor-compression chiller.

Life and health sciences research

This includes physiology, biotechnology, human nutrition and dietetics, medicine and nursing. Human health is a major sub-theme and there is great emphasis on clinical research. Sub-themes include genetics, clinical research and patient centres, healthy environment and society, health informatics and epidemiology, psychology, genomics and drug discovery, occupational health, sanitation, immunity and infection, oncology, metabolic disorders and other clinical areas. There were 175 studies produced at SQU in this field during the period 2009-

2015.

One study, "Breast Cancer Awareness among Omani Women", sought to obtain baseline information on the current status of breast cancer awareness among women in Oman, with the ultimate goal of defining strategies that can be implemented to increase this, in order to facilitate early detection. More importantly, ensuring that the correct information reaches the society may help eradicate some of the common myths about breast cancer, and facilitate treatment of patients diagnosed with it. The study was built on the experience of a multidisciplinary team in the area of breast cancer research. It led to a larger scale randomized control trial that was disseminated, with the support of the Omani National Cancer Association, to a diverse population of women in Oman.

Another study, "Evaluation of Risk Factors for Strokes in the Omani Community," was aimed at identifying and quantifying the degree and extent of the association between various risk factors and their interaction in the development of strokes in terms of risk ratios. It resulted in the establishment of a biochemical profile and lifestyle characteristics baseline data for early diagnosis and screening of high-risk individuals, using a risk scoring system for prediction of strokes among the Omani population.

Over 900 research projects in 5 years

Humanities research

Humanities, social sciences and education research covers culture, economy, business and management models, society, geography and law, as well as history, archaeology, language and literature. It is concerned with educational psychology, early childhood education, language planning and policies, language acquisition, testing, accreditation and quality assurance, assessment and evaluation, educational technology, vocational guidance and counseling, special needs, human resources development and leadership. Research in these areas is critical to an understanding of the economic, political, historical, educational, legal, social and global context within which Omani society operates.

There were 143 studies in these fields produced at SQU during the period 2009-2015. "Social participation of Omani women" was one important study which examined the reality of social participation of Omani women at various developmental, cultural, and political levels, the challenges faced, and the prospects for increasing this participation. Another study, "The impact of New Media on Socialization", sought to identify patterns of use of the new means of communication among Omani families, explored the cultural impact of the new media on the younger generation, and examined the influence of such demographic variables as family size and level of education on the socialization process. An attempt was made to set criteria that can direct the new media to play a more positive

role in the socialization process.

Information and communication systems research

This includes telecommunications, digital technology, computer science, e-commerce, electrical and computer engineering, physics, informatics and mathematics. Major sub-themes include computer engineering, computer science, information technology, management information systems, software engineering, communication and networking technology, embedded systems, electronics, instrumentation and control. There were 65 studies produced at SQU during the period 2009-2015.

"Website structural properties" is an important research project that embodied scientific, practical, and experimental merits. It proposed an original modification to improve the engineering of a well-known, accepted and tested procedure to discover popular spots in a website. More specifically, it attempted to identify hot spots, such as candidate pages, within the context of the overall site, determine popular site components which should be restructured, and predict future user interests. Another paper developed a theoretical framework to evaluate e-learning acceptance in higher education institutions in Oman.

Nine themes cutting across colleges and research centers

Materials and Fundamental research

This area includes studies on the development, characteristics, structure and properties (physical and chemical) of natural and synthetic materials. It is concerned with the advancement of knowledge in fundamental areas of science and humanities, including philosophy, linguistics, mathematics, statistics, econometrics, theoretical physics and geophysics, physical chemistry and mathematical biology/ecology. There were 194 studies produced at SQU during the period 2009-2015.

One study, "Characterization of Omani Meteorites", classified over 200 Omani meteorites through a detailed geochemical, mineralogical and petrological analysis. Another study, "Preparation and Characterization of Gas Separation and Purification Membranes", investigated suitable preparation methods of thermal and chemically stable membranes using different inorganic materials, as well as the preparation of adequate low cost supports that can provide high performance in gas separation processes under elevated pressure and temperature conditions.

Industry-related research

This area includes studies in industrial and engineering technology, food safety, security and processing and commercial aspects. Major sub-themes include soft aspects such as governance, financial markets, human resource management and e-commerce; and hard aspects such as construction, biotechnology and manufacturing. There were 109 studies produced at SQU during the period 2009-2015.

One research project is "Secondary Chromite Deposits in Oman: Source Areas, Exploration Targets, and Cr Pollution of Fresh Water". It sought to identify primary chromite-rich zones within the ophiolite sequence of Oman that act as source areas for potential secondary placer deposits in adjacent wadis, locate and examine such placer deposits, identify local processes (often microbial) leading to chromium pollution of drinking waters, and develop concepts to remediate polluted waters. Another study, "CO2-Oil Minimum Miscibility Pressure Estimation for Omani Oils", adopted a methodology based on two parts: an experimental study based on slim-tube, rising bubble and vanishing interfacial tension experiments to measure CO2-oil MMP for selected Omani oils from different reservoirs in Oman, and the mathematical calculation of the pressure of CO2-oil MMP.

Efficient water use in agriculture

Dr. Baby Shaharoona - Agricultural and Marine Sciences College

Fresh water scarcity is a global issue, which is exacerbating the situation in arid regions in many countries, including the Sultanate. It is therefore of paramount importance that the small amounts of water available for agriculture should be used wisely to get maximum benefits. In this regard, Dr. Baby Shaharoona, from the College of Agricultural and Marine Sciences, has carried out a project aimed at improving water use efficiency in the agricultural sector and developing new methods to increase crop yield, water use efficiency and enrichment of compost.

According to the academic, there are different strategies to overcome the reduction of plant growth due to lack of water and dry soil. They include promoting root growth to better absorb water through the plant hormone ethylene, which contributes to the inhibition of root growth significantly. The production of ethylene, under water stress conditions, can help eliminate, to some extent, the effects of water stress on plan growth.

He added that organic compost is one of the tools that could be used to improve water use efficiency by enabling the soil to retain water, which can be useful for the physical and biological properties of the soil.

The project will hopefully come up with some important findings to develop organic fertilizers to increase crop production and the use of water on a sustainable basis under water stress conditions in the Sultanate of Oman.

Effects of Prolactin on Liver Tissue

Dr. Fahad Al Zadjali - College of Medicine and Health Sciences

Prolactin is a protein hormone secreted mainly from the anterior pituitary gland which plays an important role in the processes of growth and the composition of breast milk during pregnancy and after birth. The hormone controls a variety of behaviors and also balances metabolism; therefore, a blood test for the hormone is done clinically to exclude cases of breast milk supply.

In some cases, dopamine is examined to overcome the problem of dynamic changes in prolactin in the blood, possibly due to inaccurate diagnosis. It is difficult to determine the hormone levels in vitro because of the dynamic vital differences in its levels in the blood. Such changes occur in normal individuals due to factors related to the differences between night and day, eating, and after sexual intercourse.

In this regard, Dr. Fahad Al Zadjali, from the College of Medicine and Health Sciences, has conducted a study on the effects of prolactin on liver tissue. The research seeks to develop new biological tests to determine the functions of prolactin in the human body, as there should be no dynamic differences that hinder the diagnosis of diseases which are connected to the hormone.

The project is expected to come up with preliminary results about the impact of prolactin on the liver. The liver tissue will be stimulated with prolactin, and its secretions will be isolated from the liver and then purified. The proteins will also be identified with the available technology in the University. Hopefully, the study will suggest useful methods in the diagnosis of diseases.

A PhD Student Probes Groundwater and Aflaj Water in Northern Oman

Researchers from the Water Research Center and College of Agricultural and Marine Sciences at SQU, are undertaking a project aimed at developing technology to probe groundwater by radar in Oman. The U.S.-funded venture is in collaboration with the California Institute of Technology (Caltech) and the Jet Propulsion Laboratory (JPL) in Pasadena.

In his remarks to Tawasul, Dr. Essam Heggy, a NASA scientist, said the idea of the project had started at a conference held in the U.S. and attended by delegates from some Arab countries which have the potential to detect groundwater, such as Oman. The participants agreed to explore radar capability for this purpose, he added. Muscat, Rabat and L.A. were chosen as the sites of the project, whereby a 24-hour mission was initiated in L.A., then pursued in Muscat and finally in Rabat.

He carried on: "This is a very important project. We are able to map with our technology the ground deformation associated with the water table at depth variations ranging between 20-60m."

He added that the team had chosen the Sharqia Sands, being an ideal region for the project, as it is characterized with a hyper-arid environment and minimal rainfall rates. This makes the area easy for radar mapping and subsequent detection of aquifers and their reservoirs.

The scientist pointed out that the project was launched two years ago. The team has already done the ground mapping, but is yet to do the aerial imaging, after coordinating with the competent authorities in the Sultanate, he stated.

Essam Heggy: Oman has geological formations similar to those on Mars

Researchers conduct an experiment in the Sharqiya Sands

Essam Heggy conducting an experiment

As for the major findings, he said the team managed to map the aquifer in the Sharqia Sands at 40-50m deep. This was verified in the field, as well.

According to Dr. Heggy, the radar mapping of a small area in the Sharqia Sands has shown that the segment has the same features as those of a site on Mars that NASA had already investigated. Oman's desert is rich in geological formations which are similar to those on Mars, he remarked. Such results will help the team in developing technical standards, such as frequencies and radiation forces, for designing the technology required for mapping and detecting water on Mars by satellite imaging, he said. "What we are doing in Oman is a simulation of satellite mapping of the Earth and Mars."

He underlined the significance of such a project for the people in the region, since the current equipment of water mapping is not efficient. Hence, the team is working to improve water mapping by using better and more recent technology.

Heggy concluded his statement by praising SQU collaboration: "SQU, Dr. Ali Al-Maktoumi, the team head, and the Ministry of Regional Municipalities and Water Resources have made important scientific contributions, specifically in data analysis and water mapping. I would like to express my utmost gratitude to the University and the Ministry for their huge support for the project, and for the scientific and practical efforts they have made during all the stages of the project. I should say here that SQU and other relevant agencies in Oman are really passionate about scientific research."

Research is a Profitable Investment

Dr. Rahma Al-Mahrouqi - Deputy Vice-Chancellor for Postgraduate Studies & Research

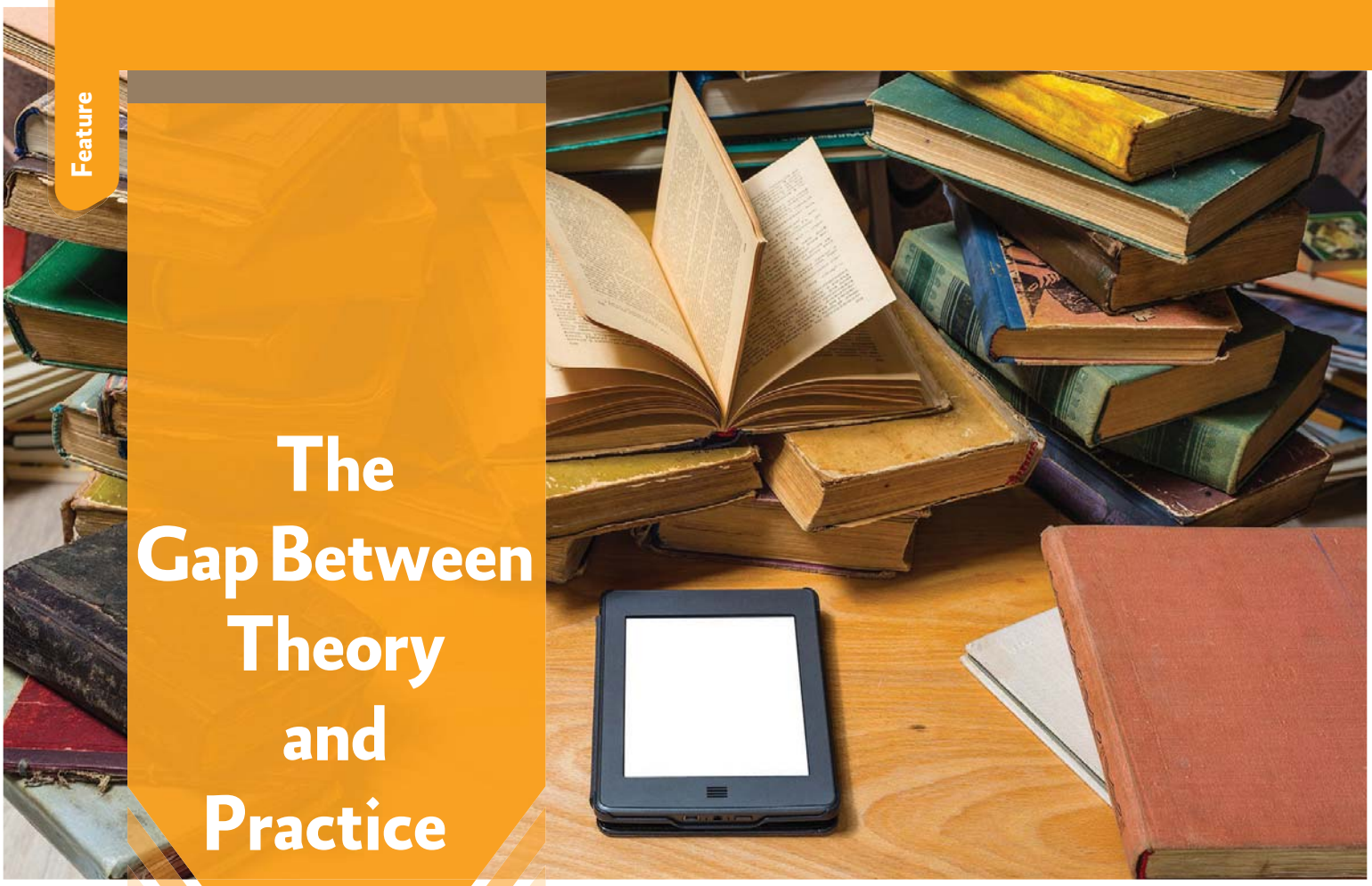
Humanity has had a long and eventful history. When we look closely at the literature across the centuries, we realize that people would have had no chance for survival had they not utilized what God had endowed them with. They were given sensory, mental, intellectual and cognitive abilities to perceive the universe and interpret its diverse, natural and disparate phenomena in an informed, conscious and meticulous way. They have managed to understand and deduce patterns of events governed by laws which were used to develop principles enabling them to foresee the future. Accordingly, they were able to survive and their communities flourished. Those qualities of observation, induction and deduction are the foundations of scientific thinking in its most fundamental sense. Scientific thinking began to take shape and follow a systematic approach with the development of social and philosophical thought, when Plato, Socrates, and Aristotle laid the foundations of western philosophy and science, with schools of thought that encouraged ideal, pragmatic and realistic ways of thinking.

Then came the Muslim scholars, who built on the knowledge produced by the Greeks, Romans and Persians. It was during the Islamic era that science-based logical thinking and methodology started to take an unprecedented form. That era witnessed the great development of empirical and scientific approaches which became prominent in those scholars' experiments, manuscripts, schools and mosques that were a beacon of knowledge for the whole world. Thus, it was knowledge based on scientific methodology that made Islamic civilization the predecessor of later developments; it was Muslim knowledge and scientific discoveries that helped build Europe's civilization during the Renaissance and, later, the Industrial Revolution, thereby allowing Europeans to leave behind the ignorance and poverty of the past..

As the Europeans realized the importance of scientific methodology in the study of phenomena and the economic, social, and industrial challenges facing their societies, they focused on scientific research by establishing research laboratories, facilities, centers and universities. Now, because of the findings and applications of such research, they made tremendous advances across various industries which enabled them to develop into advanced, industrial societies, thus becoming the world's richest countries. Later, the United States went on to become a technological and industrial superpower, with considerable impact on the course of events in the world.

Capitalizing on research is always profitable. If research was merely some kind of luxury, the advanced nations would not continue to spend fortunes on science. Take, for example, countries like Malaysia, South Korea, China and Singapore, which have spent billions of dollars on research and are subsequently no longer considered part of the Developing World. They have now gained global recognition in industrial and technological fields and enjoy their share of the wealth of nations.

Research remains a profitable investment, even in times of economic crises; indeed, research is even more important during these times because it offers a way out of those crises. Accordingly, research efforts should be intensified to identify investment opportunities, and a sustainable path for development that sets future plans built on solid foundations that incorporate previous knowledge and current observations in order to move forward. During economic crises, different community organizations in both the public and private sectors should join forces to support research in institutions of higher education, for the common interests of companies, the labor market, and other educational, civil and industrial sectors. Through this integration between sectors, it becomes possible to identify research priorities as defined by stakeholder needs. Such needs can then be addressed by systematic study and research, in order to achieve results that lead to effective solutions.



The Gap Between Theory and Practice

Neglected Studies on the Shelves

Academics identify the reasons and suggest solutions

Research is one of the most important instruments of social and economic progress and the development of nations. Countries which are capable of translating research results into applications, will always take the lead in several areas. In the Arab world, however, research faces many barriers that prevent the society from benefiting from its findings and turning them into decisions and guidelines. No wonder, then, that many studies often end up being forgotten on the shelves of libraries or in archived storage drawers. The correlation between theory and practice raises a lot of questions and problems in different areas of knowledge, particularly in the most problematic field of the Educational Sciences. The findings of many research studies are not utilized in applications, and thus the efforts made in producing them sometimes go unnoticed. Why does this happen, and how should it be dealt with?

Tawasul has had this dialogue with a few academics from the College of Education to shed light on the challenges facing research in education in the Arab World, and on how to improve research policies and funding.

Lack of foundation

Dr. Oman Hamad, Assistant Dean for Postgraduate Studies and Research at the College of Education, reflected on the obstacles preventing the implementation of educational studies: "One of the major factors is the common belief of many people that research is a matter of 'luxury' which is not important for social development. Also, there is little collaboration or communication between academics and educators in the field. For example, it is rare to see ministries or companies providing funding to applied studies or taking advantage of research findings or recommendations. Another factor has to do with the reluctance among some academics to conduct joint research projects."

He went on to suggest: "A key solution is to consolidate links between academia, executive authorities and decision-makers by creating specialized centers for strategic research that interlink different agencies to address educational issues and submit relevant recommendations. This is the case in developed countries."

Dr. Al-Rab'ani:
Funding should be geared to research that offers innovative solutions

The researcher or concerned parties?

Dr. Ahmed Al-Rab'ani, Associate Professor in the Department of Curriculum and Instruction, had this to say: "There are several problems in the educational sector. There is little awareness among educators about research results, and a lack of cooperation between researchers and educational institutions, as well as the concerns of those in the education sector that the latter might become a field for experimentation, without the required number of workshops to explain how to make use of research findings."

Dr. Hamad:
Better collaboration should exist between academia, executive authorities and decision-makers

He further went on: "There are several reasons behind such problems. Some of them have to do with the differences of opinion between researchers and educators in the field on how to solve such problems, insufficient funding and the lack of a database to document education-focused studies."

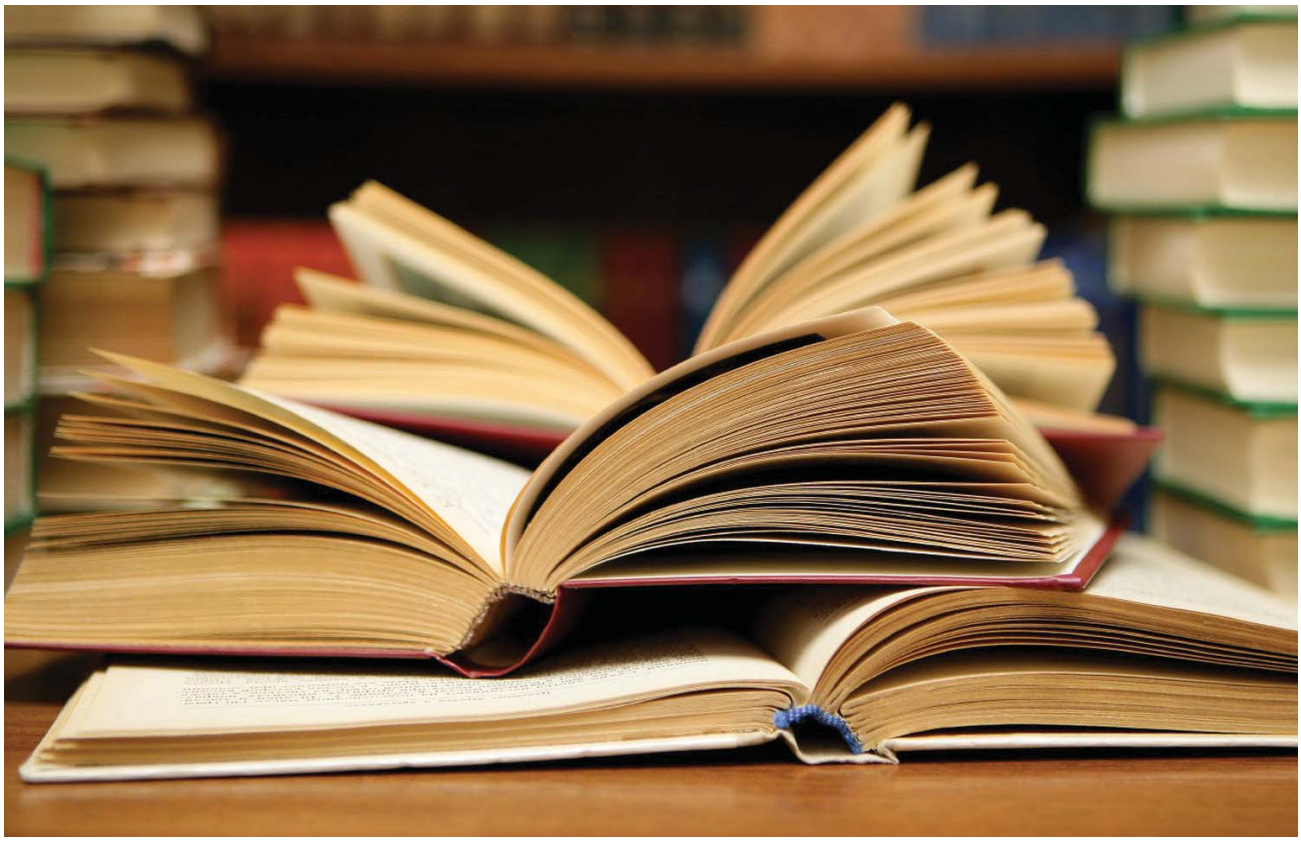
Al-Rab'ani clarified: "All parties are responsible for this situation, specifically those in charge of decision-making. The application of research results requires reaching out to researchers in order to benefit more from their work. It is not difficult to establish such links among different parties in the educational sector and academic institutions."

As for the solutions, he suggested: "Research projects on education, which are funded by SQU or The Research Council (TRC), should be oriented towards a specific goal, namely

to develop innovative and practical solutions. Unlike descriptive studies, which are more concerned with the theoretical aspects, innovative research is what is needed these days. Further, researchers need to know what kind of studies should be prioritized in the educational sector. Workshops and seminars should be held in coordination with researchers and educational organizations to expand the scope of the application of research findings."

Dr. Al-Dhafri: We need a national strategy for research

Dr. Said Al-Dhafri, Associate Professor in the Psychology Department, observed that: "The bulk of research studies are based on isolated, individual efforts rather than well informed strategies in this regard. It is very often, then, that the main purpose of such research is merely publication in a journal, rather than the application of its results for practical projects. I can also assume that research conducted by academic institutions does not meet the needs of the educational sector, simply because there is no coordination between the two sides; researchers may not be aware of such needs, and decision-makers may not trust the abilities of academics to address real issues."



Appreciating research

Dr. Al-Mousawi: Researchers should be conscious of implementing research findings in the educational field

In order to overcome this situation, he suggested that: "The solutions lie in developing a national strategy for research supervised by TRC, so that the studies will mainly address the needs of public institutions by suggesting solutions to overcome problems. We should also avoid replication of research, and bridge the gap between academics and educational organizations."

He carried on: "A possible way to take on such challenges is to raise awareness of the significance of research and its role in developing the country. Generally, there is little attention given to research in our society, at various levels and in different sectors, including among some top decision-makers who may not take into account the findings reached by different research studies. Therefore, it is of para-

mount importance to bring to focus the significance of research projects for the progress and development of the country."

Dr. Al-Dhafri pointed out that there was one strategic research project which was of national importance as it was designed to address a specific problem in coordination with a specific stakeholder. He also referred to the social observatory, adding that such projects are part of the strategic research programs run by a committee headed by H.E. Dr. Yahya Al-Ma'wali, Undersecretary of Social Development.

E-solutions

Dr. Ali Al-Mousawi, Associate Professor in the Department of Instructional and Learning Technologies (DILT), complained that the problem lies in the fact that some studies are either inaccessible for researchers, or their findings cannot be applied due to the lack of competence of some practitioners. He called on researchers to have a better understanding of the education context in which certain recommendations might be applied. He referred to a recent initiative taken at the College of Education, whereby the library uploads key sections of some studies online so that they are accessible to everyone.

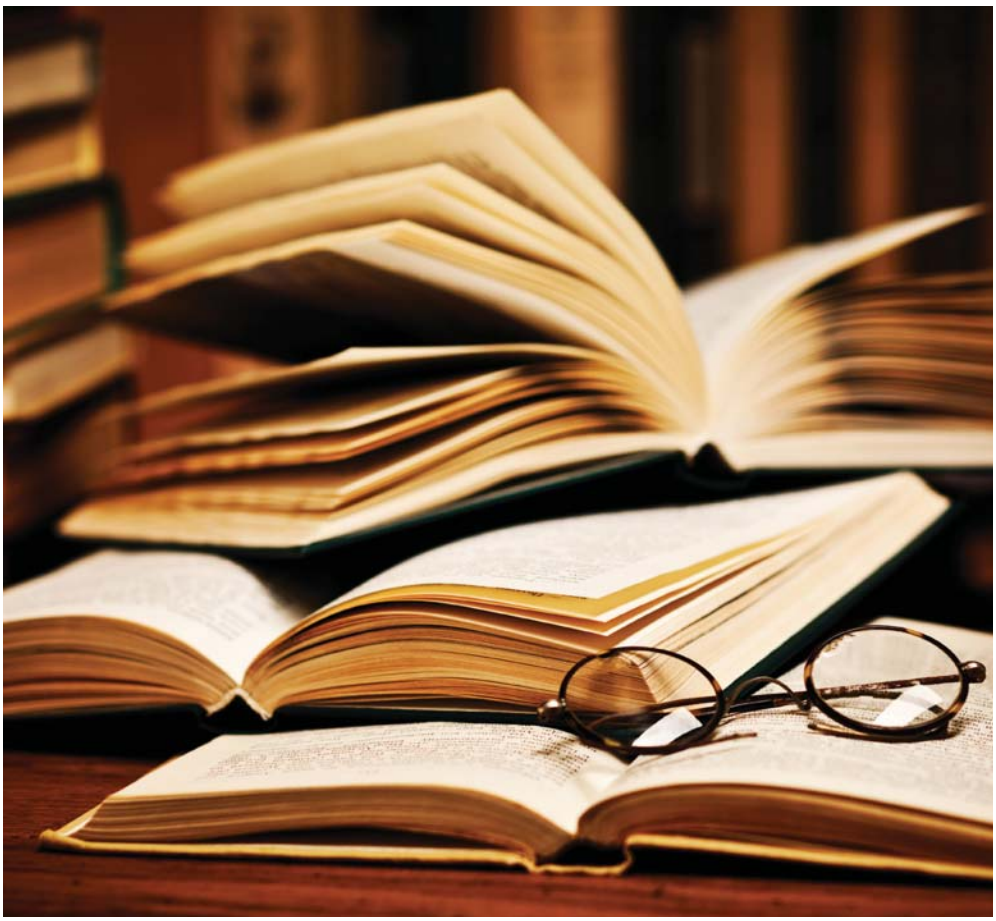
Insufficient funding

Dr. Talal Amer, Assistant Professor in the DILT, raised the issue of lack of resources allocated for research: "In Arab countries, researchers face a lot of challenges related to the lack of investment in research findings. For examples, some decision-makers, planners and other officials have no idea about such results, or maybe they don't evaluate them highly enough. Other reasons have to do with the rigid rules and regulations that block the translation of research results into concrete actions. One incident is worth mentioning here. In 1992, a number of scientific studies, including an M.Sc. thesis submitted at the College of Science at Al Azhar University, predicted an earthquake and identified its epicenter. However, the thesis, like other such manuscripts, was put on the shelves. On 12th October 1992, a disastrous quake struck, and the dissertation's recommendations made headlines in the press, which took to task those officials who had just ignored the whole thing. Unfortunately, it was a case of too little too late."

Dr. Amer:
There should be agencies specialized in marketing research results

He attributed the reasons why some research findings are inapplicable to the nature of some studies in terms of themes, relevance, significance and applicability of their conclusions. Other factors may be related to the researcher's choice of topic and funding. Some researchers may not make the effort and seek sources of funding.

Dr. Amer concluded his remarks by putting forward some solutions: "I believe the allocated research budgets should be increased in order to ensure positive social and economic revenues, to compete with other regional and global institutions. Specialized agencies should be in place to market research findings, and awareness should be raised, in both public and private sectors, about the short- and long-term strategic significance of scientific applications for the progress and development of the Sultanate."



The Harat Project: Documentation of Omani Vernacular settlements

Dr. Naima Benkari - College of Engineering

Omani vernacular settlements, locally called *Harat* (sing. *Harah*) are the material witnesses of the social history of this country, and the savoir-faire of its people. These settlements are highly endangered due to their rapid desertion since the 1970›s. Recently the abandoned dwellings have been occupied by populations of Asian workers. This has dramatically accelerated the destruction and alteration of these settlements. In order to ensure the urgent documentation of these sites before they all vanish, the Ministry of Heritage and Culture (MHC) has initiated the operation of documenting the most important and threatened among these Harat.

This project was an opportunity for Sultan Qaboos University (SQU) to cooperate with the Ministry for the Preservation and Re-use of the Omani Vernacular Heritage. A team from the Department of Civil and Architectural Engineering (DCAE), College of Engineering, headed by Dr. Naima Benkari, has documented four settlements: Harat Al-Khabt and its fort (Wilayat Al-Khaboora), Harat Qasra (Wilayah of Rustaq), Hujrat Musalmat (Wadi Al-Ma›awil) and Harat Saija (Wilayah of Sama'il).

The team, which also included DCAE students, has concentrated primarily on identifying the main structures of interest, establishing a documentation convention in accordance with national and international guidelines and procedures. The following key documentation approaches were adopted during the fieldwork:

a) Geo-location of the settlement's components and completion of its detailed layout and levels using theodolites and total stations.

b) Architectural surveys through measured sketches of orthographic projections (plans and sections) using measuring tape and laser meters.

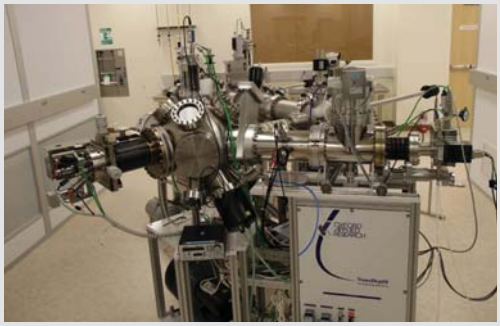
c) Semi-structured interviews with owners, residents and other stakeholders in the settlements which were recorded using audio and video recorders.

d) An extensive photographic documentation of each dwelling, included its general views, as well as the significant details and objects it contains.

The results of this detailed investigation were presented in a report dedicated to each settlement. Besides the detailed documentation of the settlements and their buildings and other components, the report included a proposal for an adequate safeguard and management plan for the *Harat*. These efforts were designed in accordance with local regulations (Heritage Law) and the international legislation managing the protection of, and intervention in, the built heritage, through the UNESCO and the International Council on Monuments and Sites (ICOMOS). In 2015, the Harat documentation project won the Prince Sultan Bin Salman Award for research on the built heritage. It was also featured in a poster during the ICOMOS General Assembly and 50th anniversary celebrations in Fukuoka, Japan. Three students among the team members were recruited by the MHC after their graduation.

A Research Device < A Nanocluster System >

Sultan Qaboos University has dedicated all resources to have research equipment in place, which contribute to the advancement of research and streamlining of scientific activities. One of the important devices is a nanocluster system, which has at least one dimension between 1 and 10 nanometers and a narrow size distribution. Nanometer-sized single crystals, or single-domain ultrafine particles, are often referred to as nanocrystals. Nanopowders are agglomerates of ultrafine particles, nanoparticles, or nanoclusters. There are many potential applications of this in the fields of bio-medicine, optics and electronics. The system can produce nanoclusters of various sizes, ranging from 10 atoms to 100,000 atoms of different materials.



Nanocluster system received from the Mantis Deposition Company

Water Research Center holds international conference

The Water Research Center at SQU recently organized an international conference on Water Resources in Arid areas: The Way Forward, under the auspices of H.E. Ahmed bin Abdullah Al-Shihhi, Minister of Regional Municipalities and Water Resources.

The conference discussed water resources in arid areas and their problems, ways to tackle water pollution, water governance, economic and social aspects of water, drought policies, innovation and technology to cope with water scarcity and drought, water resource management for the control of drought, integrated management of water resources in arid and semi-arid areas, and the conservation of water.

Some 320 abstracts and over 200 research papers were submitted at the conference. A scientific committee reviewed the papers and an editorial board considered some 30 papers for publication in refereed journals, another 40 to 60 to appear in a book, and 300 abstracts to be published by SQU in a book of abstracts.

The conference included nine scientific sessions, entitled Water Management and Hydrological Systems, Flash Flood and Erosion in high-risk Areas, Water Investment in Rural Areas, Irrigation Management, Technology and Cost, Rain Water Management, Irrigation Management, Climate and Hydrology, Water Quality and Agriculture and Water Conservation and Agriculture. In his opening speech, Dr. Osman Abdalla, Director of the Water Research Centre, said the rising demand for water associated with population growth, water intensive diets and rising living standards, are increasing the pressure on water resources.

"The situation is much worse in arid regions where natural resources are facing depletion, which is attributed to low precipitation and high evaporation rates. The water budget deficit in arid regions, the high cost of water supply, the essential need for food and associated energy values, among other challenges, all need to be scientifically addressed to find solutions to the world's current and future water problems," he said. Delivering his keynote address on "Water Challenges and Unintended Consequences of Development in Arid Regions," Dr. Kaveh Madani, Senior Lecturer in Environmental Management at the Imperial College, London, stressed the need for a holistic understanding of water resource systems as a vital prerequisite for strategic decision making in water management. He argued that promoting regional farming cooperatives and water management institutions and increasing water and energy prices, together with technological improvements to prevent socioeconomic pressure on rural and farmer communities, would help meet water challenges in the world.

WRC Director addresses the conference

Enhancing a poultry farm sewage station

The Al Safa poultry farm in Thumrait has recently witnessed expansion plans, which are likely to have a negative impact on the sewage station there, and, thus, requires urgent action to update its infrastructure. For this purpose, Dr. Mushtaq Ahmad, from the Environmental Studies and Research Center, is currently embarking on a project to develop the station. Specifically, he is seeking to recommend an economically feasible and appropriate system for treating wastewater which is generated on the farm, and reusing it in an environmentally friendly manner.

Unfortunately, the cost of having a wastewater treatment sludge stimulant plant, is relatively high, although an ideal solution otherwise. Therefore, the researcher is working on what he calls "an innovative and cheap solution" for the problem of drainage and gray water treatment on the farm. It is worth mentioning that Sultan Qaboos University has conducted several experiments using alternative systems of sewage and gray water treatment, including chemical, physical and biological ones, some of which can be applied, with a little adjustment, to solve this problem.

A study assesses the economic feasibility of treated wastewater

Dr. Ali Khamis Al-Maktoumi - College of Agricultural and Marine Sciences

Water scarcity is a big challenge for many countries that have low rainfall rates. The Sultanate, for example, has an estimated annual water deficit of 316 million cubic meters, which is expected to increase due to population growth, increased economic and agricultural activities and depletion of natural water resources, especially non-renewable ones.

In this regard, an SQU research team has conducted a new study on water treatment applications and management and risk assessment. The group was headed by Dr. Ali Khamis Al-Maktoumi, from the Soil, Water and Agricultural Engineering Department, CAMS. The study has been funded by the US government and is in partnership with the University of Jordan and the University of Nebraska.

Reflecting on his research, Dr. Al-Maktoumi said: "Many countries, such as Australia, the United States, Singapore, Jordan, have put in place appropriate legislations for classifying possible uses of treated water, which requires different levels of treatment processes. They have made potential risk assessments and established appropriate checks and regulations. In reviewing the experience of other countries, it was found that they have achieved great success in the reuse of treated wastewater, as bottled drinking water, as in Singapore, or being injected into underground reservoirs that are used for the drinking water supply and for agricultural production, as in Australia, or for use in manufacturing, as in Singapore, apart from the wide uses in agriculture in many other countries."

He added: 'The Sultanate has recently built the infrastructure of a drainage system through large investments, in order to provide water resources and preserve the environment. It is time to expand the use of treated water – especially since most of the treatment operations in Oman are three-phase processes – from only landscape irrigation and afforestation of cities, to other uses in agriculture, construction, saline groundwater reservoirs, civil defense and other areas.'

The researcher pointed out that the project, launched in 2014, lasted for 18 months, according to the agreement with the funding sources. The work concentrated on several issues, including analyses of groundwater dynamics of the injected treated water in different the groundwater systems, using both analytical and numerical modeling approaches, along with field measurements of both groundwater and surface water characteristics, critical for development of concepts, models, analyses of various management scenarios, and recommendations of the conjunctive use of water resources in arid catchments.

According to the action plan, three studies were carried out to investigate the quality of groundwater. The team has come up with important findings, said Dr. Al-Maktoumi. Modeling results of Al Ansab Wetland aquifers showed that managed aquifer recharge (MAR) using treated water could act as a hydraulic barrier against seawater intrusion in a developed coastal aquifer (Samail lower catchment, i.e. SLC), characterized by overpumping of fresh groundwater. MAR along the coastline of SLC helped to determine feasibility and increase the abstraction volume of pristine groundwater 3-fold, compared to the current abstraction.

Researchers at the Zarqa river basin in Jordan

The analysis of the results has shown that the designed management of the aquifer would produce an annual net benefit ranging from RO 10-12 million, if 4000-5000 m3 of wastewater was injected on a daily basis, which is a very small amount of water. This analysis was based on hydrogeological modeling, and demonstrated that MAR using treated water is a feasible solution for the development of water resources in arid regions. It was found that MAR could significantly help in managing stressed aquifer systems in arid zones to maximize the benefit of

using water for domestic purposes, and minimize damage to the aquifer resources and water quality. Dr. Al-Maktoumi also talked about the part of research conducted in Jordan. He said that the groundwater flow model for the Zarqa River basin was developed and used to predict changes in aquifers and streams under a set of different scenarios of the conjunctive use of surface water and groundwater. These scenarios investigated progressive changes in treated water discharge rates. Such scenarios sought to understand the aquifer response to increased treated water discharge into the Zarqa River, increased groundwater extraction from irrigation wells and potential reduction of groundwater extraction in case of water quality deterioration. The work started in the Zarqa River valley. When 110 million m3 of treated water was discharged into the river, the aquifer water level recovered with about 29 m. This is an important achievement, which was welcomed by experts, and could be replicated in the Sultanate.

He added: "The simulated scenarios highlighted the significant role of releasing treated water in recharging the aquifer, maintaining flow in the stream, and increasing the availability of water in the Zarqa River valley that allows for the expansion of farming activities. Calculation of the optimal abstraction rates of water for irrigation that would induce minimum damage to the aquifer and the river in general is envisioned, but is not addressed in this work by specific modeling scenarios."

As for the recommendations, the researcher suggested that quantitative assessment of groundwater recharge under MAR conditions could provide key information for future water resources management plans by Omani institutions, such as the Ministry of Regional Municipalities and Water Resources, Ministry of Environment and Climate Affairs, Haya Water, and Salalah wastewater treatment company. National guidelines for using treated water in various fields such as agriculture, were also recommended, in the light of current operating standards. A tentative treated water project should be launched in farms in coordination with farmers so as to raise their awareness of this important application.

Magnesium: The Healing Treasure on the Omani Coastline

Dr. Jumana Saleh - Biochemistry Department

Throughout history, human beings have lived around oceans and rivers, where the soil is rich in magnesium. Sea water has three times more magnesium than calcium. In modern times, the magnesium content of plant and animal meat has become lower due to depleted soil conditions and water purification by chemicals (such as chlorine), that bind magnesium. Caffeine and sugar intake, and stress also deplete magnesium in the human body.

Magnesium deficiency has become a worldwide problem which is largely overlooked. More than 80% of human beings are magnesium deficient. Magnesium is an essential major mineral involved in more than 300 regulatory enzyme systems responsible for a wide array of biological functions that control muscles, nerves, genes and energy production. Calcium is also an essential mineral; however, calcium is excessively consumed through dairy products, processed foods and supplements. Scientists suggest that the calcium: magnesium consumption ratio should be kept at an ideal level of 1:1 (700 milligrams of each daily). Increased calcium levels compromise this balance causing the calcification of tissues, arteries and largely affecting neural function. Magnesium acts as a guard that controls calcium uptake and function. It stimulates hormones that draw calcium from muscles and soft tissues into the bones, lowering the risk of heart disease, osteoporosis, arthritis and kidney stones. Headaches, insomnia, anxiety, restlessness, panic attacks, numbness/tingling, heart palpitations/arrhythmias, high blood pressure and diabetes are also linked to magnesium deficiency. Major health studies found that magnesium intake correlated with a lower risk of coronary heart disease. A Harvard study of over 70,000 people found that people with the highest magnesium intake had the healthiest blood pressure values. Amazingly also, a meta-analysis of available studies showed a dose-dependent reduction of blood pressure with magnesium supplementation. Dr. Carolyn Dean, the author of the «Magnesium Miracle», highlighted that hormonal changes in women largely affect magnesium levels linked to leg cramps and muscular complaints. The link of magnesium deficiency to mental health is explained by the over-excitation of neurons by calcium and glutamate. Dr. Mark Hyman calls magnesium the ultimate relaxation mineral for body and mind, contributing to restful sleep. Dr. Norman Shealy, a neurosurgeon and a pioneer in pain medicine, described magnesium as the most critical mineral required for the electrical stability of cells, and goes further to say that magnesium deficiency may be a leading cause of diseases in modern times.

Fortunately, magnesium deficiency is easily resolved with magnesium supplementation. However, when taken orally, only 20-55% is absorbed, and can cause digestive disturbances or stress to the kidneys. Fortunately, topical magnesium is a great alternative. Magnesium sprayed on the skin is absorbed efficiently into the bloodstream, bypassing the kidneys. Transdermal, «across the skin" magnesium is highly absorbent compared to other major minerals, raising intracellular magnesium levels significantly. This method is comparable to soaking in an Epsom Salt bath. Luckily, Oman is blessed with a vast coastal stretch that keeps this good old friend within reach. By taking a plunge in the rich sea water, or simply soaking their feet in it, Omanis could reclaim the benefits of this mighty mineral.

The First Chairman of a Student Group for Innovation

He believed he could add something new to the world of innovation, working harder and harder throughout his career as a student, which culminated in chairing the first student group concerned with innovation at Sultan Qaboos University. Finally, he did it, reaping the fruits of his labour. He is Abdullah bin Nasser Al-Saidi, a graduate of electrical engineering, from the College of Engineering, and currently serving as CEO of Nafath for Renewable Energy. Interviewed by Tawasul, he made the following remarks on several themes.

The beginning

Al-Saidi talked about his debut in innovation: «Innovation is associated with my field of electrical engineering, and after studying electronics and software, I found myself passionate about innovation; so I continued my adventure, taking courses, participating in conferences and keeping abreast of advances in new technology."

As for his inventions, he said: «All the innovations were the outcome of team work, which included doing much research and development. They include a coffee robot, an electrical car and an automatic dust cleaning system for photovoltaic panels."

Student Group

Speaking about his experience as the head of the student group, he said: «I had heard that a student group for innovation was being planned, so I went straight to Sheikha Al-Akhzami, in charge of the Innovation and Entrepreneurship Department (IED), and asked her if I could be part of the first group team. She welcomed the idea, so we started to form the group and selected a chairperson. Being at the head of the team gave me a lot of experience, as it opened up for me new horizons in the world of innovation, intellectual property, entrepreneurship and learning how to translate ideas into projects.»

Challenges

On the difficulties he faced in his career and how he managed to overcome them, Al-Saidi stated: «The biggest challenges were how to keep the group on the right track of innovation and entrepreneurship and make it visible. Some had considered the group a magical solution or a funding source for innovators, but the members made real efforts to get the message across about their role. Now, we can say that our group has gained the position it deserves."

Roles

Commenting on the role of the University in general, and the IED in particular, in promoting innovation, he said: «I really see the Department as a beacon for students, guiding them to benefit from innovative discoveries. The University has taken bold steps on the road to innovation and entrepreneurship, but there is much yet to be done in the Sultanate and the region. We expect more innovative products in the local and global markets. Therefore, the University is expected to provide support for the IED, and thus enhance the abilities of the youth in developing human resources."

Abdullah Al-Saidi to Tawasul:
Converting innovations into products requires resources

Productivity

He reflected on the process of converting innovative ideas into products, saying: «I think that the concept of innovation has not been formulated properly yet in Omani society as there are a few gaps that need to be bridged. The conversion of innovations into products requires a lot of resources, which are not available in the Sultanate. It needs technical and financial support and incubators for researchers and developers to be able to develop an idea into a product and study its feasibility as a commercialized product. This includes new products, or a service for an earlier product which has been developed; after passing the economic feasibility of the product, there is the prototype manufacturing stage, and so far we don't have such manufacturing techniques in the Sultanate. Then, we would go on to have the experimental product in the market, and next, the final product would be launched. Every innovative product has a life cycle.»

Tips

Abdullah Al-Saidi concluded his remarks by calling on the Omani youth to delve into the world of innovation and discovery, taking risks, standing up to the challenges and generating new knowledge in order to serve society and contribute to the development plans in the Sultanate. "The world of innovation is full of risks, but also full of fun."

Under the slogan: digital creativity: Culture reimagined ...

The world marks WIP Day

Insufficient digital measures jeopardize the creativity industry

Sheikha Nasser Al Akhzami - Deputy Director, Innovation & Entrepreneurship Department

World Intellectual Property (WIP) Day is observed annually on 26 April. The event is an occasion to raise awareness of how patents, copyright, trademarks and designs impact daily life, and to celebrate creativity and the contribution made by creators and innovators to the development of societies across the globe. This year's theme, "Digital Creativity: Culture Reimagined", is intended to shed light on the concrete and aesthetic aspects of digital creativity, being no less important than other forms of the arts, such as sculpture, painting or photography. Indeed, it is sometimes considered as a subtype of such arts, e.g. digital painting, digital photography.

The various tools of digital technologies have crossed spatial boundaries and facilitated access to cultural expressions in a way that has contributed to cross-cultural interaction. They have stoked the creative fantasies of artists who have produced works of art rich in cultural diversity. This could be expressed through the plot of a story, the words of a song, or the dialogue in a play. In the midst of this digital revolution, creativity has travelled spatially to reach all parts of the world.

However, the growth of the digital economy has been matched by the risks of weak technological measures, as well as violations of the intellectual property (IP) rights of digital creators. Digital piracy is a threat to two important sectors: the creativity industry, or orange economy, of movies, music, publishing, the games industry, radio and television, architectural design, fashion, designing, advertising, etc., and the cultural industry of employing or mixing cultural expressions in the arts. In 2008, the rate of digital piracy of just music was 98%, through illegal downloading, and the highest percentage of unlicensed re-broadcast of programs was, unfortunately, recorded by the satellite channels in Arab and Asian countries. In contrast, the world of games and entertainment programs seems immune against hackers, due to the technical difficulties in the control panel, whereby the games industry has developed a model for a piracy-resistant business through monthly subscriptions, and the feature of value-added service for the customer.

Therefore, the IP system must ensure a balance between providing protection for stakeholders to encourage them towards creativity, and the availability of such creative works for a decent fee for the creators. This year the world is celebrating digital creators in recognition of their work. The IP system has to cope with the challenges of this new world of digital creativity.

Patent Search and Analysis Facilitation Cell

The Academic Innovation Assistance Program (AIAP) has introduced a series of training courses for members selected from different fields and colleges, to create a Patent Search and Analysis Facilitation Cell. The aim of this cell is to provide the SQU community value added patent search and analysis assistance in research, ideation, and proposal writing for fostering innovation and capacity building in the context of SQU and the Sultanate of Oman. The practical and pragmatic approach includes implementation of the patent search and analysis process by working on live cases, and simultaneously developing the capacity of the Patent Search and Analysis Cell.

The Cell members include representatives from different technological fields in biotechnology, mechanical engineering, process and petroleum engineering, nanotechnology, agricultural technology and medicine.

At a training course

Omani medical experts participate in an international event in Italy

A number of SQU Hospital physicians and College of Medicine and Health Sciences academics took part in the 4th International Conference on Prehypertension, Hypertension and Cardio Metabolic Syndrome, which took place in Venice, Italy, from 3-6 March, 2016.

The event was attended by a host of professionals and experts from the U.S., Canada, Europe, and the Middle East. The participation of the Omani team was supported by SQU and was the result of the efforts between the Omani Association for Fats and Arteriosclerosis and the Italy-based Europe-Middle East Institute for Science and Technology.

In his paper Dr. Khamis Mohammed Al-Hashmi talked about hypertension management in the cardio metabolic syndrome and its prevalence in the Sultanate, the Middle East and North Africa. He also touched on the latest developments in the treatment of high blood pressure in patients with metabolic syndrome and diabetes, and concluded his paper with appropriate recommendations based on the latest steering systems of international organizations in this field.

Dr. Mustafa Al-Hinai presented an update on obesity management and its spread in recent decades, which is a source of concern to the World Health Organization. Obesity is a potential risk in the development of high blood pressure, diabetes and diseases of cardiovascular agents. He reviewed many treatment options to control obesity, through nutrition, medication and surgical methods of physical behavior.

Dr. Khalid Al-Waili, in his paper, Overview of Dyslipidemia Management in Cardio Metabolic Syndrome, addressed the relationship of lipid disorders to heart disease and arteries, and touched on the types of fat disorders, especially in metabolism, and their causes. He also touched on the latest developments in the treatment of lipid disorders in the metabolic syndrome according to the latest international recommendations.

Further, Dr. Fahad Al- Zadjali presented a paper on the heritability of plasma triglycerides and the role of adiponutrin. He spoke about developments in genetics, high blood triglycerides and the mechanism of genetic inheritance calculation by using the typical change of fat in individuals per family. He said that the analyses of his results have shown that about 40% of the change in blood triglyceride levels are due to genetic factors. He also mentioned the role of some genetic factors in influencing triglyceride levels in males and females.

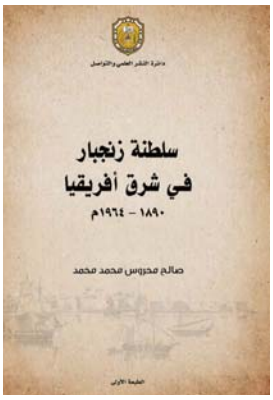
Dr. Khalid Al-Rasadi discussed in his paper, New Therapeutic Options to Treat Atherogenic Lipoproteins, the latest scientific findings in the treatment of cholesterol and other harmful low-density lipoproteins. He pointed to the relationship between these lipoproteins, harmful diseases and atherosclerosis, and their relation to the occurrence of strokes and heart attack. One of the latest group of drugs that have been addressed are PCSK9 inhibitors, which, in addition to Statin, can reduce cholesterol and harmful fatty proteins to levels of up to 70%.

The final paper, presented by Dr. Mohammed Al-Abri, dealt with the relationship between sleep disorders and cardiovascular diseases. He managed to show some links between sleep disorders, on the one hand, and the problems of obesity, diabetes and the metabolic syndrome. According to other studies, 25% of adults also suffer from the metabolic syndrome. He said there is a tendency among many people to change their rest and sleep patterns due to the increasing use of modern technology, especially the social media, which affects the human body's ability to digest and recycle nutrition elements. All of this causes metabolic diseases, he concluded.

Book at a Glance

(*Sultanate of Zanzibar in East Africa*)

Book sheds light on an important period in the history of this Arab Muslim Sultanate



The book, *Sultanate of Zanzibar in East Africa* 1890-1964, sheds light on an important period in the history of this Arab Muslim Sultanate, focusing on the political, economic, social, cultural and religious conditions of the Sultanate of Zanzibar under British protection. It illustrates the Arab role in the national movement, and the "black coup" of 12 January 1964, its causes and the details of the events, as well as the British, Israeli, American and Arab positions against this coup and its ramifications on East Africa in general , and on Zanzibar, in particular.

The manuscript is authored by Dr. Saleh Mahrous Mohammed and consists of an introduction, a preface, six chapters and a conclusion.

Preface

The preface introduces Zanzibar, its strategic position and its history before becoming a British protectorate. It provides a historical overview of the presence of Arabs in East Africa and their migrations to the region, as well as the spread of Islam there. It touches on the circumstances surrounding the arrival of the Al-Busaid family to Zanzibar and Oman and the Al-Busaid Sultans who had ruled Zanzibar and Oman before the Protection. It also refers to the European powers in East Africa in the second half of the nineteenth century, the French, Belgian, Italian and German ambitions in Zanzibar and how its lands were divided according to the 1886 agreement between Germany and Britain, finally coming under British protection.

Chapter One

This chapter provides an overview of the political and administrative situation in the Sultanate of Zanzibar under British occupation, and describes the system of British rule and the political developments that have occurred in Zanzibar since 1913. It also addresses the British policies, emergence of sectarianism, the judicial system under the protectorate, and the seven Sultans of Zanzibar and their positions on the British occupation.

Chapter Two

It deals with the economic conditions of Zanzibar under British occupation, shedding light on the British economic policies of controlling Zanzibar's trade, customs revenues, monetary policy and pegging the currency to the pound sterling. It also discusses aspects of agriculture and some crops such as cloves and coconuts, the ivory trade, customs revenues, industrial activities and some economic projects carried out by Britain in Zanzibar.

Chapter Three

It addresses the social conditions in Zanzibar under British protection, highlighting the British policy towards the people, the integration of different social groups in Zanzibar, the components of society in Zanzibar, such as the Arabs, Indians, Africans, Swahili and Shirazi people, and the English, as well as the traditions of Zanzibar.

Chapter Four

This chapter deals with the cultural, educational and religious life in the Muslim Sultanate under British occupation. It illustrates the objectives of the British educational and cultural policies, Islamic education and Arabic and Muslim culture. It deals with the British missionaries, public schools, languages, religions and creeds.

Chapter Five

Chapter V provides an overview of the national movement in the Sultanate of Zanzibar and the reasons behind the lack of national awareness, factors of national awakening, the role of the Arab national movement and the call of the Arab Union for unifying all segments of society. It also sheds light on the important roles of the Zanzibar National Party in the National Movement, Arab figures such as Ali Mohsen al-Barwani and Saif bin Hmoud and Ahmed Al-Lamki, and other parties such as the Umma Party, the Zanzibar People Party, Pemba and the Afro-Shirazi Party. The chapter addresses the racist legislations enacted by Britain, the elections, signs of discord, the end of Arab rule and, finally, the independence of Zanzibar on 10th December 1963.

Chapter Six

This is the most important chapter as it reviews the bloody coup which occurred on 12th January 1964, illustrating the course of events that surrounded it, its causes, Britain›s role, the Communist expansion, the role of Israel, Tanganyika and Nyerere. It also mentions the number of Arab victims, leaders of the coup, the role of the Afro-Shirazi Party's leader and how the Ugandan Okello planned for the coup. Other aspects have to do with the positions of the East African countries, the United States and Arab States, the implications of the coup, the political ramifications of British colonial rule, such as the three coup attempts in East Africa, the end of Al-Busaid rule in East Africa, and the annexation of Zanzibar by Tanganyika. The chapter refers to the economic impacts, such as the collapse of the Sultanate's economy, the former commercial role, the social effects, such as the deterioration of the situation of the Arabs and the rise of Africans, and the cultural effects, such as the demise of the Arabic language and the spread of Swahili in Latin script.

Conclusion

The book ends with a conclusion that sums up the findings of the study about the British presence in Zanzibar during the period 1890-1964.

It is worth mentioning that the manuscript is one of the recent publications of the Department of Academic Publication and Outreach at Sultan Qaboos University.

Postgraduate Studies: Oman's Window to the Future

Postgraduate studies are a central component of the higher education system. They are of paramount importance for universities in their pursuit of the goal of preparing highly qualified, efficient graduates and enhancing their innovative abilities. Further, students will acquire the skills needed in the market so as to contribute to the overall development plans of the nation. They will also get their professional and scientific expertise polished. The society will be able to develop its resources and, thus, become self-reliant. It is for these reasons that Sultan Qaboos University seeks to improve the scope of postgraduate studies by offering a variety of programs, and recruiting competent academics who will implement and develop them.


M.Sc. student graduation

92 programs and 700 scholarships have been offered to date

The Deanship of Postgraduate Studies is responsible for delivering on diverse issues, including the enhancement of postgraduate studies, marketing the annual master's and doctoral programs locally and internationally through advertisements, and aligning them with the requirements for admission, registration, and graduation of postgraduate students. It is also responsible for administering postgraduate tuition fees, grants, and regulations, as well as organizing training courses and workshops aimed at developing the research skills of postgraduate students and academics.

Masters programs

These programs started in 1992, just six years after the inception of SQU. At present, there are 60 programs offered in all colleges. Students are admitted to the master's programs under four options: thesis only, coursework and thesis, coursework only, or coursework and comprehensive examination.

Ph.D programs

Initiated in 2008, these programs are mainly based on research and some coursework, determined by the thesis committee. At the moment, there are 32 doctoral programs offered in the six Colleges of Agricultural and Marine Sciences, Engineering, Medicine and Health Sciences, Science, Arts and Social Sciences, and Education.

Admission criteria

Admission to the masters and doctoral programs is subject to a set of general criteria applicable to all colleges. To apply for a master's program, applicants should hold a BA degree, whereas admission to a Ph.D program requires a master's degree. Applicants for a master's degree should have a cumulative GPA of at least 2.75 on a 4-point scale, or equivalent grade. Those with a cumulative GPA between 2.50 and 2.74 on a 4-point scale or equivalent may be considered for conditional admission. Applicants for Ph.D programs should have a minimum cumulative GPA of 3.00 on a 4.00 point scale, or equivalent in the master's program in case the GPA is based on a different system. They should also fulfill the requirements of English language proficiency and other program-specific conditions. These criteria are applicable to both Omanis and non-Omanis, a policy pursued at SQU, and elsewhere, to offer postgraduate programs

Postgraduate students


Postgraduate Medical students

to everyone, regardless of their nationality, as long as they meet the conditions for admission.

Students

Since the launch of masters programs in 1992, the number of postgraduate students has rapidly increased. While there were only 34 students at the outset, the total number of students enrolled in different postgraduate programs up to the end of 2015 was 4875. This is a considerable development, given that the number of students enrolled only in 2015 totaled 473. This increase in the number of students accepted in the master's programs occurred in 1999, when the administrative structure of research was established. Since the inception of master's programs in 1992, some 2609 postgraduate students have graduated so far. In 2015, the university granted 298 master's degrees, compared with only 24 in 1995, which indicates the level of progress made by the university in the areas of enhancing postgraduate studies, opening new programs, and satisfying student needs.

Workshops and seminars polish new students' skills

Scholarships

In 2007, the university started a scheme of scholarships for postgraduate students. During the period 2007-2015, some 608 master's students, in addition to 93 others offered to Ph.D students in the colleges, whereby students were nominated based on their test results and interviews, which are the basic conditions for admission. Scholarships for master's and Ph.D students fall into two types: "full grants" which include a tuition fee waiver, a stipend, and other benefits, in return for work at the university as teaching or research assistants; the second kind of scholarship is a tuition fee only waiver.


Conducting experiments

Skills Enhancement

In 2009, the Deanship of Postgraduate Studies conducted three workshops. In March 2010, the Skills Program was established in the Deanship with the aim of providing training and developing the skills needed by postgraduate students, researchers, and academics. Seminars and workshops have been organized to develop their skills in their specific disciplines. The Deanship offered 24 workshops in Arabic, another 30 in English, one training course in Arabic and two in English. These were designed to introduce participants to research methodology, selecting a research topic, writing skills, and documentation. The program has proved to be practical and popular amongst participants. In 2015, over 2520 postgraduate students and academics benefited from such workshops.

The programs meet social development needs

Expectations

SQU exerts continued efforts to develop the master's and Ph.D programs offered annually through the Deanship of Postgraduate Studies. New fields of study are upgraded in the light of social demands, ongoing scientific discoveries around the world, and the university's academic and logistical potentials. Efforts are currently in full swing to qualify staff and attract skilled academics so as to establish such programs according to a definite, detailed plan that would cater to the university's aspirations as well as the government's endeavors to attain its comprehensive developmental goals.

When do children develop metacognition ability? Children's Overconfidence

Dr. Ibrahim Al-Harthi - College of Education

A new study has been carried out at the College of Education to determine the age at which children begin to use metacognition. Calibration, the relationship between how confident one is in one's performance and actual performance, is captured in the research to assess children's ability to use metacognition. Reflecting on his work, Dr. Ibrahim Al-Harthi from the Department of Psychology, observed: "A 6-years-old child may, for example, say to his father 'I can recall all the directions to go home', but may in actuality fail to do so and get lost." Previous research demonstrated that young children have limitations in their metacognition. Such research findings were utilized by the researcher to investigate the development of meta-memory in children, and one research question was: When do children begin to make accurate predictions of performance on a simple memory task? Two experiments were conducted with 1st - 6th grade children.

Experiment One

According to Dr. Al-Harthi, "The experiment sample consisted of 239 1st - 4th grade students enrolled in a public school in Muscat. The subjects were randomly selected from different classrooms. They were individually tested and given clear instructions. The experiment was conducted in a quiet room. The task began with the experimenter placing 10 4 x 6-inch colored pictures of familiar objects on the board (the lists of pictures were always presented in order). After pilot testing, 10 pictures were chosen from the curriculum for each of the four grades. As each picture was placed on the board, the child was asked to name it. After all 10 pictures had been presented, the child was given 10 seconds to study the pictures. The child was then asked, "How many of these pictures do you think you are going to be able to remember once I cover them up?" After the child responded, the pictures were covered with a large piece of white paper, and he/she was asked to recall as many of the pictures as possible."

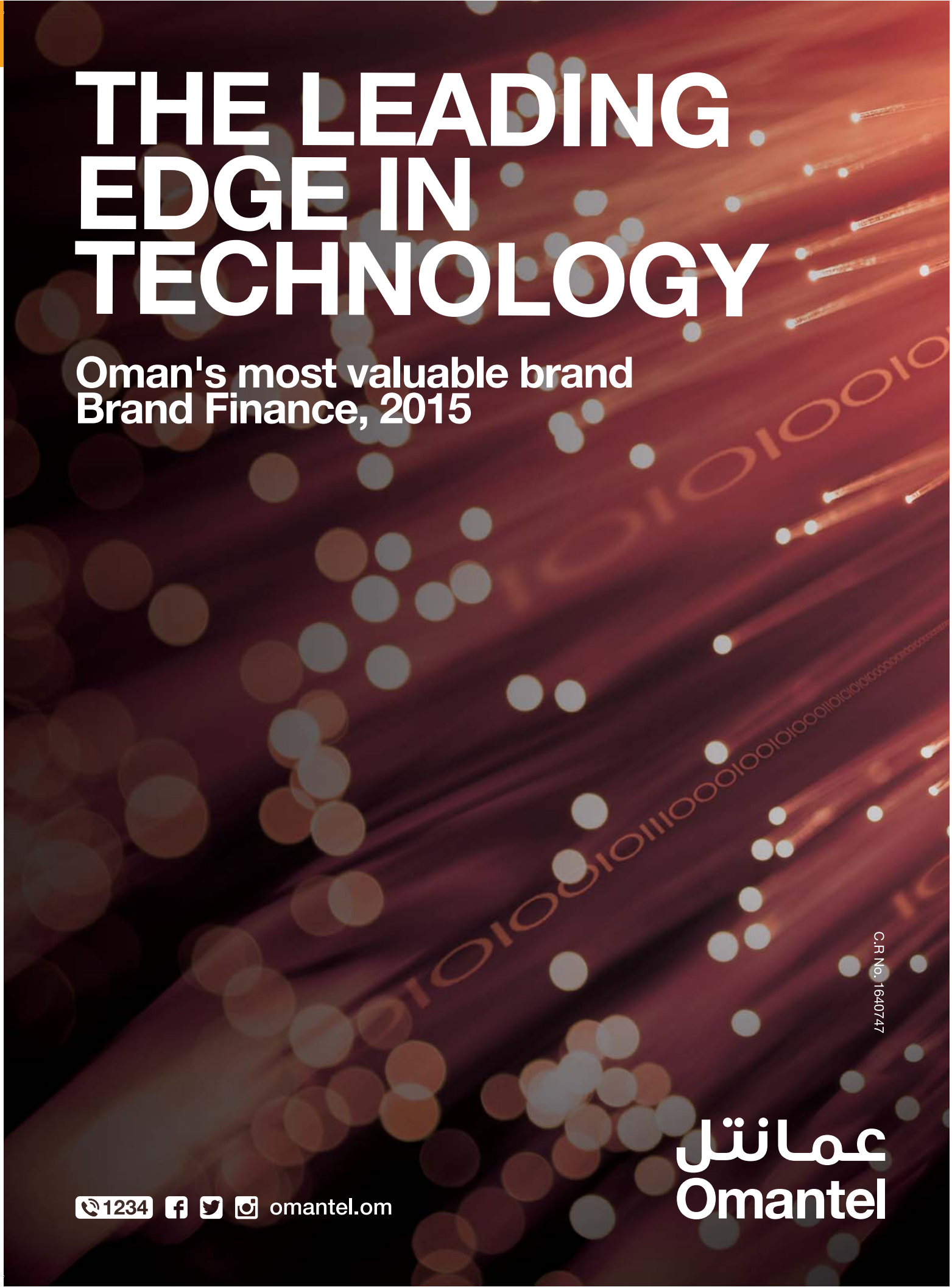
He went on to elaborate on the study results: "First, each successive grade was significantly better at the memory task (recall) than the preceding grade. Secondly, the ANOVA method indicated a significant effect of grade on judgment of learning (JOL). Post-hoc analysis indicated that the difference between 1st and 4th graders was the source of this effect, with 4th graders predicting a significantly lower performance than 1st graders. Lowering their prediction (JOL) is a sign of using metacognition. They knew that they could not remember all the pictures and did not depend on other cues to make prediction. The analysis indicated that 4th graders were more accurate in their predictions than all the other grades. Their predictions (number of photos they thought they could remember) were close to the actually recalled photos. Interestingly, students in grade 4 have begun to use metacognition."

Experiment Two

The researcher added: "In the second experiment, we selected 181 4th - 6th grade students from the same school. The procedures were the same as in experiment 1, with one exception. Each child completed two tasks: 1) Identifying pictures derived from the curriculum; 2) Recognizing photos of objects from other cultures that were unfamiliar to the children (e.g., a Christmas tree). The order of familiar vs. unfamiliar objects was counter-balanced across students." As to the findings, he pointed out that, "4th graders had higher JOL's than both 5th and 6th graders. The same analysis indicated that all students reported higher JOL's for familiar items than for unfamiliar items. ANOVA indicated a major effect of grade, but no effect for familiarity. The correlation between calibration and memory performance was r = -.58, indicating that better memory performance was related to lower calibration (or less overconfidence). The results of experiment 2 indicate that the improvement in children's prediction accuracy with age in experiment 1 is not simply an artifact of the data. Furthermore, children with better metacognition also performed better on the memory task. Children's calibration is better across the grades, which is explained by improvement in metacognition. The results of experiment 2 demonstrated that those children's judgment of learning (JOL) of familiar items is higher compared with their JOL of unfamiliar items. It is not surprising that children rated their learning of familiar objects higher compared to unfamiliar objects. However, no differences were found in calibration due to familiarity. They still predict more than they can actually remember."

New Perspectives

He concluded his remarks by stating that the study "offers a new look at the link between children's metacognitive abilities and developmental differences. Grade 4 was observed as a distinction point where children begin to develop metacognition. Children lower their prediction of unfamiliar photos compared to familiar photos, which demonstrated their use of previous learning experiences. Why do students significantly start to use metacognition at Grade 4? At this stage, children think operationally and logical reasoning replaces intuitive thought, but only in concrete situations; classification skills are preset. They become able to operationally realize that their prediction should be based on their knowledge of materials to be tested. It is also clear from the current study that reasoning in relation to younger children (grades 1-3) is very different. It is very difficult for children to understand that their initial predictions could be based on external cues, such as easy photos, to remember."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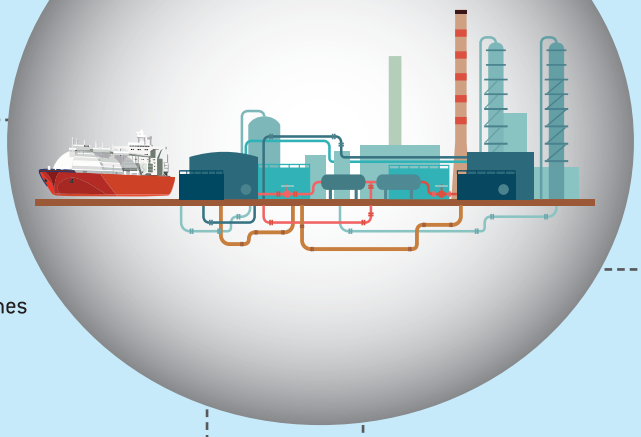
+300
Million US$ - amount invested in over 3,500 projects and initiatives across the country

16.4
Million Man Hours without Lost-Time Injury (LTI)

89%
Omanisation - Oman LNG has remained at the forefront of attracting and retaining the best talent

1.5%
Of Company's Net Income After Tax (NIAT) dedicated for Social Investment Programmes



56
Staff sponsored by the Company for higher education programmes

608
Number of Staff

99
Staff are undergoing professional qualification, sponsored by the Company

+97%
Pacesetting Reliability of Trains

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* Information provided as of December 2015.

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