As Females Outperform Male Students
The world faces an unprecedented challenge in the current century. We need to redesign and rethink much of our way of life to make it sustainable given the planet’s limited and fragile resources. Rigorous science has explained that current consumption trends threaten the planet with extraordinary climate change, which threatens extreme social dislocation by placing hardships on vulnerable peoples. Modern systems ranging from transportation networks to community building to food production will need to be significantly changed and adapted to this new reality. University students have a key role to play in ensuring sustainable development in the country in all fronts. They have their own part in raising public policy concerns surrounding consumption, energy usage, and viable economic growth.

At the same time, universities have the responsibility to foster students’ environmental literacy using rigorous, scholarly-based research in the natural sciences, social sciences, and humanities disciplines. The second conference of the College of Arts & Social Sciences which concluded at SQU recently underscored the importance of Social Sciences in incorporating sustainability in science and development.

Sustainability encompasses a wide range of topics and explores social justice issues on a range of fronts, including environmental justice, resource allocation, urban development, and social equity. A student or researcher who approaches the field of sustainability and sustainability studies should possess interdisciplinary understanding of the varied dimensions of sustainability, both from a local and global perspective; be fluent in articulating how sustainability issues relate to matters of the environment, the economy, and social equity; and demonstrate proficiency in critical thinking, reading, writing, and research skills.

They should have the ability to identify and explain the central sustainability problems in multiple arenas, including energy, transportation, food production, waste management, water availability, and general consumption. Their role is to draw on a foundation of scientific, environmental, and quantitative literacy in order to understand and assess the science behind major sustainability problems, such as climate change, loss of biodiversity, and the threats to natural resources. Last but not the least, it should be understood that leadership is central to social change and technical innovation with respect to creating more sustainable communities and applying knowledge about sustainability to one’s areas of personal interest and profession.
SQU Council Mulls Evening Program in Law

The 2nd meeting of the Sultan Qaboos University Council was held recently under the chair of HE Dr. Rawiyah bint Saud Al Busaidiyah, Minister of Higher Education and Chairperson of the Council. The agenda included a number of topics pertaining to academic, administrative and medical aspects in particular, in addition to approving minutes of the previous meeting for the academic year (2012 - 2013). The meeting also viewed the follow up report that included following up implementation of decisions taken at the previous meeting, as well as previous meetings, which were under implementation.

The SQU Council also approved the changes in the name of the External Council and the introduction of bachelor program (evening) in Law at the Law College targeting those working at the state’s institutions. The programme comes within the framework of SQU keenness to serve the community through introducing such programmes due to wish of a number of institutions to rehabilitate their employees particularly those working at the legal field, in addition to the employees’ desire for rehabilitation to obtain a higher degree in the law discipline. The Council tasked the SQU Administration to take appropriate steps to prepare final proposal for the programme to be submitted for the Council to take the appropriate decision after presenting it at the SQU specialized councils.

The SQU Council also approved change in the name of the External Cooperation Office to the International Cooperation Office. It also approved the proposal of amending the article No. 12 of the tuition fee bylaw for postgraduate studies at SQU.

Dutch Delegation Visits SQU Research Centre

A group of Dutch scientists, representing Wageningen University and the Ekoﬁsh Group from the Netherlands, visited the Centre of Excellence in Marine Biotechnology recently. Common research interests in the area of biotechnology were discussed and follow-up activities identiﬁed. Wageningen is a leading international centre for sustainable aquaculture research and development, with focus on nutrition and genetics. They also have extensive facilities and expertise in micro-algae production and biofuel development.

Following the meeting it was agreed to exchange details of current research programmes and publications in aquaculture. It was also planned, in collaboration with the Ministry of Agriculture and Fisheries Wealth, who were hosting the group, to organize a video conference for exchange of information on staff interests and research facilities. This may lay the groundwork for future collaborative research and graduate training opportunities.

SQU to Hold Symposium on Biotechnology

The Department of Biology of the College of Science at Sultan Qaboos University will host an international symposium on “Biotechnology & Conservation of Species from Arid Regions” from 10 to 13 of February 2013. The symposium sessions will explore aspects related to the diversity, conservation and biotechnology of bacterial, plant and animal species from arid regions. Having to tolerate extreme environmental conditions, these species have developed unique adaptation strategies that can be utilized for biotechnology and their conservation poses a serious challenge.

According to the organisers of this event, research on plant and animal species from arid environments have received scant attention in most major biotechnology meetings. So the symposium will review current progress and explore potential biotech applications. It will be divided into three main tracks; each including topics related to bacteria, animals and plants, respectively. The bacterial track will focus on the diversity and adaptation strategies of microbial species under halophilic, thermophilic and desiccation conditions and their wide applications in biotechnology including biomediation, biofuel production, oil recovery and production of different biomolecules. The animal track will present current attempts to conserve endangered species, stem cell generation, differentiation and cryobanking.

Moreover, the symposia will discuss advancements in human assisted reproductive technologies. Emphasize will be made on latest research on animals from arid regions such as camels that include reproduction, semen characterization, freezing, IVF and ET. The ethics of using stem cells, tissues and embryos in different religions will be discussed as well. The plant track will include topics such as micropropagation and plant tissue culture, genetic transformation for salinity and stress tolerance as well as the discovery of drugs and secondary metabolites from plants.

The symposium is designed to bring together biotechnology scientists from universities, government research institutes and private sector laboratories as well as ethicists, policy makers and industry leaders who are interested in exploring biotechnological application of species from arid regions. It is anticipated that attendees will represent various developed countries with advanced research programs and developing countries in South and Southeast Asia, Africa and the Mediterranean region.
As Females Outperform Male Students

According to researchers at the College of Education at SQU, over the years, female students have outperformed their male counterparts across all colleges and disciplines at the university. The average GPA for females is 2.92 and 2.63 for males. On the Deans’ honors lists across the colleges, the top students are almost consistently females. For example, 92% of the College of Education Dean’s honors list are female students. Over 78% of SQU’s honor lists have continuously consisted of female students has made it extremely difficult for the university to recruit qualified male demonstrators and assistant lecturers.

Dr. Mohamed El Tahir Osman, Assistant Dean for Postgraduate Studies and Research at the College of Education who is conducting a study along with Dr. Thuwayba Al Barwani, Dean of the College of Education, Dr. Abdo Al Mikhlafi and Dr. Mustafa Babikir Abu Sheiba, said that it is a worldwide phenomena that young males lag behind their female counterparts in schools and universities. “There is currently a reasonable concern in many educational systems that boys are not succeeding in school as much as they should. It is anticipated that this phenomenon will have serious implications on the structure of the labor market, as well as on the family structures and relationships. Globally, boys are more likely to ‘drop out’ of schooling prematurely, and this in turn, results in the type of employment opportunities and general quality of opportunities in life. This disparity in academic performance between female and male students can also be clearly observed at the higher education level in Oman” said Dr. Osman.

According to the researchers, the trend found at SQU may also apply to many other public and private higher education institutions. The fear is that in future, higher education institutions may have to recruit less qualified male academic staff for the sake of striking a balance between males and females at the expense of quality. Research shows that specific jobs related to business, information technology, and other computer-based emerging technologies are becoming more dominated by female graduates.

Dr. Osman said that it is important to understand not only the nature of the actual performance differences, but also which differences matter and why. The College of Education is proceeding with a research to analyze this phenomenon and to determine its causes in Oman by examining evidence from different age groups. The project seeks to systematically examine why young males in Oman do not seem to be performing academically well as their female counterparts; and to identify and examine the factors that influence boys’ school performance which may impact their future careers and the social balance of the Omani society. The researchers are of the opinion that such factors, if not intercepted, may have serious implications on the Omani labor market and hence impact the social balance within the Omani society.

The sample of the study consists of 12,500 male and female students from all regions of the Sultanate in five different age groups: Grades 1 – 3, 5, 10, 12, and years 1 – 3 of university. In addition, another sample of 1000 will be selected for structured interviews. This sample will include a proportional number of parents, teachers, schools’ administrators, supervisors, guidance counselors, and social workers selected from the same schools and communities. This research project is based on a mixed methodological approach which draws upon quantitative and qualitative data that integrate school-based, psychological, social, and cultural factors. Implications of academic disparity on the labor market and societal balance will be highlighted. It is expected that this project will provide valuable data that can be used to help in planning relevant pedagogical, psychological, and sociological interventions as well as in developing a practical gender equity strategy.

The project is divided into three phases: The first phase will determine the level of academic disparity in different subject areas and at different age groups. Data collected from 8000 students from grades 5, 10 and 12 revealed that girls outperformed boys with an average of 10% in science, math, IT, English and Arabic languages.

During the second and third phases, the research team will identify the factors (e.g. pedagogical, psychological, and sociological factors) that may explain this gender gap, and the level of impact of each of these factors on the disparity in academic performance between boys and girls. Accordingly, the research team will highlight possible “Factor Treatment Interactions” (FTI) that suggested to bridge the gender gap in academic performance. This research project is fully funded by the Research Council (TRC) as part of its efforts to solving societal problems of strategic importance.
Financial Modelling and Prediction: An Overview

Financial modelling and prediction is formidable and ever challenging and has been an area of immense interest and assumes great importance in stock market, bankruptcy, financial distress of companies etc. Accuracy and reliability of prediction solely depends on many factors including the quality of data base, tools and techniques and most importantly the sampling of data. Many aspects of financial time series, model, algorithms are elucidated herein for a comprehensive understanding of this vital area of business and finance.

A basic concept in econometrics and mathematical finance is time series (TS) which is a sequence of data points, measured typically at successive time instants spaced at uniform time intervals (Daily closing price of oil). TS analysis is used to extract meaningful information of the data. A TS forecasting is the use of a model to predict future values based on previously observed values. Further, TS can be classified as stationary and non-stationary in which a stationary TS is one whose statistical properties like mean, variance etc remain constant all through unlike a non-stationary one. The prices fluctuate up and down widely which prompts to assume that financial TS follow a pattern of nonlinearity. Also, a TS can also be deciphered as either random or chaotic. A random series is one that never recurs in space or time whereas a chaotic series is one which is beyond the perception of known physical/mathematical laws.

A financial model (FM) is a representation of an entity’s financial statements and accounts that can be modified to gain useful insights typically, will focus on future results. Financial modelling is the task of building an abstract representation of a Financial Decision Making situation. In general, modelling is either linear or nonlinear, however, it is more appropriate to model them as nonlinear. Also, FMs can be classified as deterministic and stochastic wherein a deterministic model (some times known as quantitative model) is based on mathematical calculations and considered to be highly reliable. A quantitative model is designed to produce accurate predictions. Whereas, a stochastic model is based on statistical estimates and the outcome unlikely reliable 100%. A qualitative models yield only approximate outcome based on experience or intuition of a model builder. It may be true that, a stochastic model substitutes a “tamed” version of uncertainty for the “wild” uncertainty of the real world. FMs are used to predict financial performance and therefore, they are closer to necromancy than accounting. Generally, models consists of weekly model not more than a year and a monthly model not more than three years etc. Among all these models, the time interval at which the input data whether it is hourly, daily etc has great significance both in modelling and prediction.

It is only since 1920s, predictions are known in which, the basic approach is to assume that the price of an equity is based on a random walk (random steps). The magnitude of the randomness is called the volatility. Often the tools and techniques in forecasting of future entirely depends on the past data. Further, prediction ensures highly accurate and reliable results when longer the past and shorter the future of prediction. The prediction may span to short term, intermediate and long term predictions. There are numerous elegant and sophisticated algorithms are in vogue in stock market prediction. Some of the well known algorithms that are being used in finance are Bayesian probability method, regression analysis, genetic algorithms (GA), nearest neighbour (NN), artificial neural network (ANN) etc. ANNs are being used in a variety of financial tasks such as credit authorization screening, mortgage, risk assessment, financial and economic forecasting, risk rating of investments, detection of regularities in security price movements etc. Often many interrelated variables, such as closing price, highs, lows, and volume influence stock prices. Neural networks are good at pattern recognition, generalization, and predicting trends besides they are immune to imperfect data, and do not require formulas or rules.

Predictions fall into three broad categories that sometimes can overlap. They are fundamental analysis, technical analysis and technological methods. Fundamental analysts are concerned with the company that underlies the stock itself. They evaluate a company’s past performance as well as the credibility of its accounts. Many performance ratios are created that help the fundamental analyst with assessing the validity of a stock etc. Technical analysts are not concerned with any of the company’s fundamentals but determine the future price of a stock based solely on the past trends. With the availability of high performance computing (HPC) and elegant tools, stock market prediction has since moved into the technological realm.

It is well known that the stock market, viewed as a complex, open, and nonlinear dynamical system, is affected simultaneously by many factors including international environment, government policies, political and economic situation, the public psychology over some events and rumours etc which intrinsically influence each other and make the relationships cumbersome. But we have no way to exactly know which and how the states govern the evolution of the system.

Thus, the process of prediction in economics are either based on mathematics or statistics with powerful and elegant algorithms are far more reliable than any other form of prediction devices. The significance of such prediction algorithms are exemplified with the forecasting of crude oil price for various terms shown here is self illustrative.
Nursing Internship Abroad

By: Rhoda Muliira

The College of Nursing at Sultan Qaboos University, arranges for student nurses to undergo a prescribed period of internship after completing their Bachelor of Science Nursing degrees. This is a structured six-months experiential program designed to allow the intern nurses to rotate through several clinical areas to condense their clinical experiences. Two months out of the total six months are dedicated to training abroad. The internship abroad program aims to give students additional experience in critical areas like Intensive Care Unit, Cardiac Care Unit and Emergency Room. It also enables students to practice nursing in different countries like USA, Canada, UK and Jordan. This year, the 6th batch of interns had their internship abroad experience in USA, India and the UK.

During the internship abroad program students are expected to provide comprehensive nursing care to patients in the respective hospitals, demonstrate clinical competencies in advanced technology within their areas of practice and to understand the health care systems of the respective countries. The students are also expected to demonstrate high level interpersonal relations skills and strive towards further professional development.

After completing the internship program the students make an internship presentation where they share their experiences with representatives of sponsors, university officials, nursing faculty and other students. The sixth batch of nurse interns shared their experiences on 12 December 2012 at the College of Nursing. The Guest of Honour at this year’s internship presentation was Dr. Taher Bin Abdulrahman Ba-Omar, the Vice Chancellor’s Advisor for Academic Affairs.

In the internship presentation, the students highlighted that as a result of the latest internship abroad program they improved their knowledge, clinical skills as well as their speaking and communication skills. The students also reported they learnt how to care for with patients of different cultures, increased their self-esteem and confidence and acquired a higher level of independence in their clinical practice.

The students expressed appreciation to the management of SQU, SQUH, College of Nursing, California School for Health Sciences and Cardiff Hospital, Wales, UK. The students expressed special thanks to Dr. Raafat Qaaoush of the California School for Health Sciences, and Prof. Bazdawi Al-Riyami, Dean, College of Nursing, for their support and contribution to this program.

SQU Wins Octets Football Championship

Sultan Qaboos University won the final match of the first national level octets football championship for government and private institutions in the Sultanate. The final match between SQU and the Ministry of Sports Affairs, was held at SQU Sports Complex under the patronage of HE Dr. Ali bin Saud Al Bimani, the Vice Chancellor of SQU. It was through a penalty shootout that SQU team scored a 4-3 win over the Ministry of Sports Affairs team.

Mahmoud Al Aamiri of SQU has been chosen as the best goalkeeper in the tournament, and the best player is Said Al Ma’amari of the Diwan of Royal Court, Jaber Al Shabibi from the Ministry of Sports Affairs is the best goal scorer. A total of 16 teams participated in the tournament, which included 39 matches in which 39 goals were scored.

SQU Receives Austrian Academician

HE Dr. Ali bin Saud Al-Bimani, SQU Vice Chancellor and HH Sayyidah Dr. Muna bint Fahd al-Said, Assistant Vice Chancellor for External Cooperation received Dr. Heinz Boyer, CEO of IMC University of Applied Sciences, Krems, Austria.

During the meeting, the two sides discussed topics pertaining to research and scientific cooperation, academic cooperation and students exchange between the two universities, in addition to discussing tourism discipline, the possibility of setting up Master programme in tourism, students exchange in hospitality and hotel management.

The meeting also discussed potential of research cooperation in biotechnology and taking part in joint research, besides attending international symposia and conferences held by the two sides and discussing music discipline in relation to music therapy.
During the fall semester, the Department of Earth Science at the College of Science, organized a number of seminars in which local and international guest speakers gave lectures on different topics. The lecturers were mainly from the oil industry to update the students on the state of the art technologies in this field and to prepare them for joining this industry by knowing the important techniques and problems under investigation. These seminars managed to attract about 50-90 students in each event, which reflected the enthusiasm of students to attend such activities.

**History of Depth and time seismic imaging**
Samuel Gray, from CGGVeritas, Canada gave a talk on the history of depth and time seismic imaging on 25 March 2012. The lecturer went through the history of seismic imaging and migration which helped the oil and gas industry in locating hydrocarbon traps inside the earth. Seismic imaging is based on the sound wave transmitted and bounced off reflectors to be sent through localized pockets of wiggle energy back toward recording devices where wave fields are processed and molded inside the computer by different wave equation techniques.

**4D Time-Lapse Seismic Reservoir Monitoring**
Rocco Detomo from Shell, USA gave a talk entitled “4D Time-Lapse Seismic Reservoir Monitoring of African Reservoirs” 25 November. Dr. Detomo presented a very interesting talk about the 4D time-lapse seismic monitoring which provides an effective method for delineating geo-mechanical and elastic properties of the earth especially related to fluids (oil and water) movement in reservoirs. The technical and visual demonstration of what is happening in a reservoir deep in the Earth, especially away from the immediate well bore, is of key importance for insuring that fluids are moving as we have modelled them, and that the integrity of the reservoir is being maintained.

**Energy Resources in the Middle East**
On 2 December, Bernard Fourcade from TOTAL Professeurs Associés, Paris, France, delivered a talk on “the energy resources in the Middle East; yesterday, today and tomorrow”. The talk covered a very interesting part in the field of energy resources. The speaker began the lecture by giving a historic background of different energy resources that are used worldwide and found in the Middle East. Dr. Fourcade introduced the origin and history of fossil energy, explained the development and growth of this form of energy in the Middle East, the origin and history of fossil energy, explained the development and growth of this form of energy in the Middle East, conventional and non-conventional energy resources such as gas and oil shale and concluded the talk by mentioning solutions for draining energy resources and alternatives and renewable energy resources for future such as nuclear, solar and wind energy.

The lecture was a very useful for both undergraduate as well as graduate students. An overview of the current situation in the energy industry was highlighted in course, enabling the students to understand the challenges of the future. The content of the lecture helped the students to come up with fresh ideas on what can be done in the development of renewable energy resources and effective methods in conservation of fossil fuel resources.

**Elements of Seismic Dispersion**
A one-day short course given by Christopher Liner from University of Houston, USA, on December 12, was titled “Elements of Seismic Dispersion”. The course was about the frequency-dependent seismic wave velocity (seismic dispersion). Dr. Liner broadened the concept of dispersion to more general definition that includes not just wave speed but also interference, attenuation, anisotropy, reflection characteristics, and other aspects of seismic waves that show frequency dependence. This course was a survey of selected frequency-dependent phenomena that routinely are encountered in reflection-seismic data.

Commenting on the usefulness of this short course on Samiya Al Abri, MSc student in the Department said: “I realized the importance of using right frequency when work with frequency dependent aspects. Also, I get more understanding of some basics e.g. Fourier Transform, harmonics and different types of anisotropy and attenuation. Moreover, this course opens my mind to some new studies and new references to read. This course also helps me to get exposed and interact with experts from outside my university”. Naeima Al Habsi, another student said that the course was excellent both in terms of the topic and the way in which it was delivered. “I had general understanding of some aspects e.g. Anisotropy, attenuation and harmonics and the lecture helped me to broaden my knowledge and add many new insights. At the same time, I had some difficulty in understanding some of mathematics and physics. However, the materials provided with the course will help me to read more about these topics in the future”, said Samiya Al Abri, another student.

Next spring semester, the Earth Science department is planning to host more honorary and distinguished lecturers. Dr. Hesham El-Kaliouby, coordinator of these seminars and short courses at the Department of Earth Science said: “Gerard Schuster, a professor from King Abdullah University of Science and Technology, KAUST, Saudi Arabia will join us in the spring semester to give a talk about “Seismic interferometry and beyond: Harvesting signal from coherent noise”.

**Dr. Hesham El-Kaliouby**
Professor Theo Wubbels

Horizon: Could you explain briefly how the relationship between the teacher and his/her students affect achievements of students in science and technology?

Prof. Wubbels: Our research has shown, that student achievement is influenced by the relationship of teachers with their students. It seems that a good relationship is a prerequisite for other influences of the teacher on the students such as providing good explanations or giving appropriate experiments for students to carry out in physics lessons. Without a good relationship such pedagogical arrangements seem to count less than when teacher and student go along well. It appears that the teacher should be in control of the class to get high student achievement, especially at moment when there is central teaching activity in front of the classroom. When students work on their own or in groups teachers can loose the reins. A second important aspect of a good relationship is the amount of affiliation or emotional proximity of teachers towards the students. The more affiliated teachers are with their students, the better the relationship and the more students learn and are motivated for their studies.

Horizon: Do you think that a positive relationship between the student and the teacher is difficult to establish?

Prof. Wubbels: It appears that for beginning teachers it is not easy to establish a good relationship with their students, in particular on the aspect of teacher control. Some beginning teachers learn this quickly but for others it may take longer. On average teachers need three to five years before they have become fully experienced on this aspect of teacher professionalism. On the affiliation dimension this usually goes a bit quicker, but the downside here is that teacher with more than 20 years of experience often start to become a little bit less affiliated with their students and because of that their students’ motivation might dwindle. Teacher education can play an important role here by not only providing content knowledge and pedagogical (content) knowledge but also make student teachers experience what is necessary behavior to be in control in class, both verbally and non-verbally.

Horizon: What are the factors to be taken care of in order to create and sustain positive relations in classrooms?

Prof. Wubbels: This is of course the most difficult question and if there was an easy answer then I would be rich. Many teachers have problems in this field and would love to have easy answers and if these existed I would be happy to share these. What teachers can do to create and sustain positive relations depends not only on the skills and personal characteristics of teachers and the circumstances they have to teach in. A few general ideas however can be mentioned as in the last sentence of the previous answer. In addition it is important for teachers to realize that generally friendly behavior of he teacher evokes friendly behavior from the students. So in order to get a positive relationship teacher’s friendliness is an important factor. On the other hand every now and then every teacher will have to stop unwanted student behavior and this implies some unfriendliness. The risk of such behavior is that unfriendly or aggressive behavior of a teacher may evoke aggressiveness of the students thus introducing a spiral of negative interactions between teacher and students.

Theo Wubbels received his MSc in Physics in 1974 and his PhD in Education in 1984. He was a physics teacher, school principal, university lecturer before becoming a full professor of education in 1991. He fulfilled many administrative positions. At the moment he is Associate Dean for Academic affairs at the Faculty of Social and Behavioural Sciences and is Admissions Dean of Utrecht University. He is President of the Netherlands Educational Research Association and council member of the European and World Educational Research Associations. He is Fellow of the American Educational Research Association. His main research interests developed from the pedagogy of physics education, via problems and supervision of beginning teachers and teaching and learning in higher education to studies of learning environments and especially interpersonal relationships in education. Professor Wubbels gave the first keynote address on “Sustainable teacher-student relationships in science classrooms” at the 7th International Conference on Science, Mathematics and Technology Education hosted by SQU.