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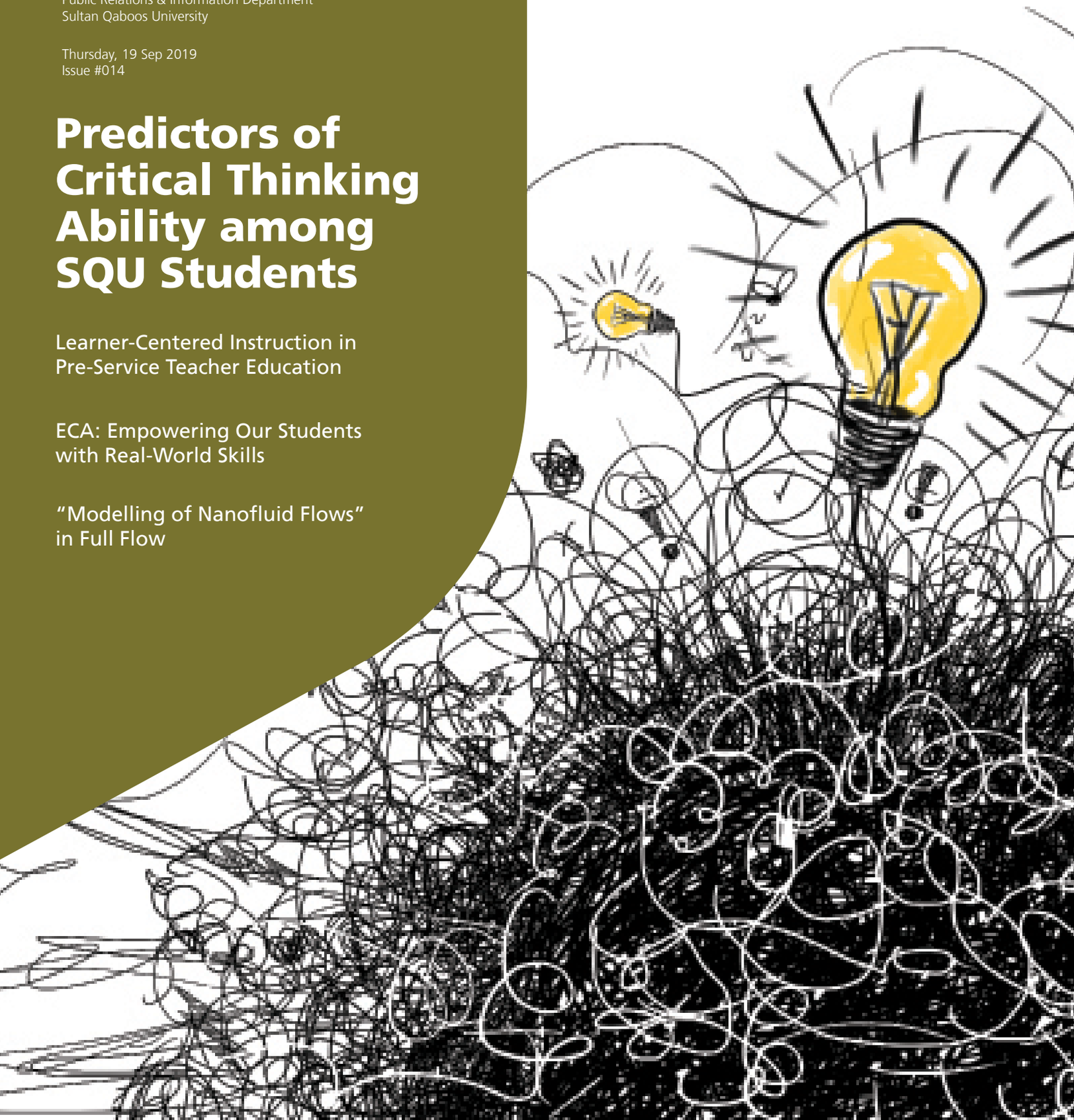
Predictors of Critical Thinking Ability among SQU Students

Learner-Centered Instruction in Pre-Service Teacher Education

ECA: Empowering Our Students with Real-World Skills

"Modelling of Nanofluid Flows" in Full Flow



جامعة السلطان قابوس
Sultan Qaboos University

دائرة العلاقات العامة والإعلام
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Flying High

While flying on Oman Air airplanes, many of you have noticed the standby footage in its in-flight entertainment system which is about the tourist attractions of the Sultanate. When the in-flight entertainment screen is on, and if you have not selected your favourite show, the screen, by default, would direct you to a slide show of major tourist attractions in the country. The Omani government, led by the wise leadership of His Majesty, has always focused on the tourism industry, given the unique tourism facilities that the Sultanate is blessed with, such as its geological diversity, high mountains, vast deserts, beautiful beaches, wadis as well as rich cultural heritage and glorious history.

In line with this vision, the Ministry of Tourism's marketing strategy aims to promote Oman internationally as a quality destination for responsible tourists and, in doing so, to spread of tourism benefits across the Sultanate of Oman. The Ministry's marketing focus is to position Oman as a quality destination for an authentic Arabian visitor experience. Culture, heritage, nature and adventure feature in its promotions, with its call to action being "Beauty has an address: Oman".

As a result of globalization, advances in technology and evolving consumer expectations, the tourism industry has become more complex and dynamic than ever before. The increasing recognition of the economic importance of tourism requires further prominence to the necessity for an expansion of tourism education. Availability of skilled labour is vital for the growth of tourism-related industries.

Research highlights the commitment of educators to develop sound, academically rigorous, innovative and perhaps even entertaining classroom experiences and study plans in tourism and hospitality management. Patterns of consumption, technology and supply innovation in tourism are in a constant state of change, which means tourism education must evolve with industry changes by incorporating a life-long learning approach to tourism education.

The Tourism Department at SQU has realised that one of the most distinctive features of tourism is its extensive relationships with other areas, where tourism rooted interactions with economic, cultural, social, environmental, political, and religious aspects are all well documented. Such nested relationships have a reflection on tourism education. The academic plan of the Tourism Department recognizes the interaction between tourism and other educational disciplines. As an accredited programme, practices of the Tourism Department at SQU could be seen as a good model for other departments in the region, which aim to ensure adopting an interdisciplinary approach in tourism education.

Smart Campus through IoT Integration

Dr. Mohamed Sarrab

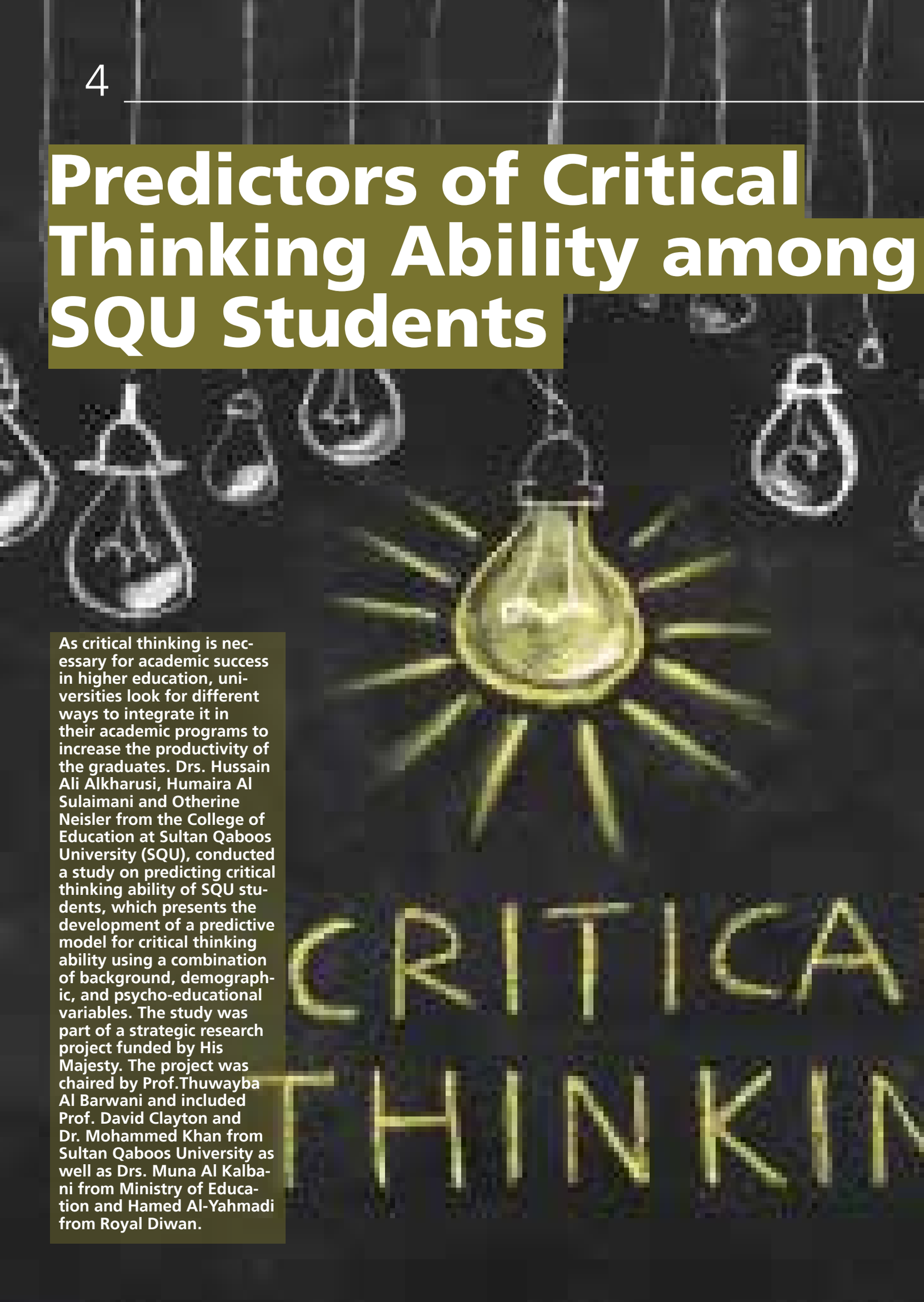
Information and Communication Technology has brought tremendous changes to our lifestyles and living environments that are evident in daily life, and specifically, in areas such as communication, public security, energy, and water resources, etc. Equipped with emerging technologies such as pervasive networks, advanced electronics, and various kinds of sensors, Internet of Things (IoT), Big Data, etc. urban spaces are evolving to be more smart and intelligent, and good example of this is "smart cities".

An increasing number of researchers and practitioners are working to develop smart cities across the globe. Considerable attention has been paid to the campus as it is an important component of smart cities. Since Sultan Qaboos University is a city itself, thus, the objective is to facilitate the development of SQU as a smart and sustainable campus. The main objective of the Smart SQU, primarily focuses on two aspects of smart campus including development of a novel ubiquitous learning model within a pervasive smart campus environment, and development of a secondary trading platform aimed at optimizing the allocation of the campus resources. Based on these objectives, the Communication and Information Research Center (CIRC) has established the Internet of Things laboratory funded by Omantel and Momkin to enhance IoT usage in Oman and the region by conducting training and research and enhance teaching and learning.

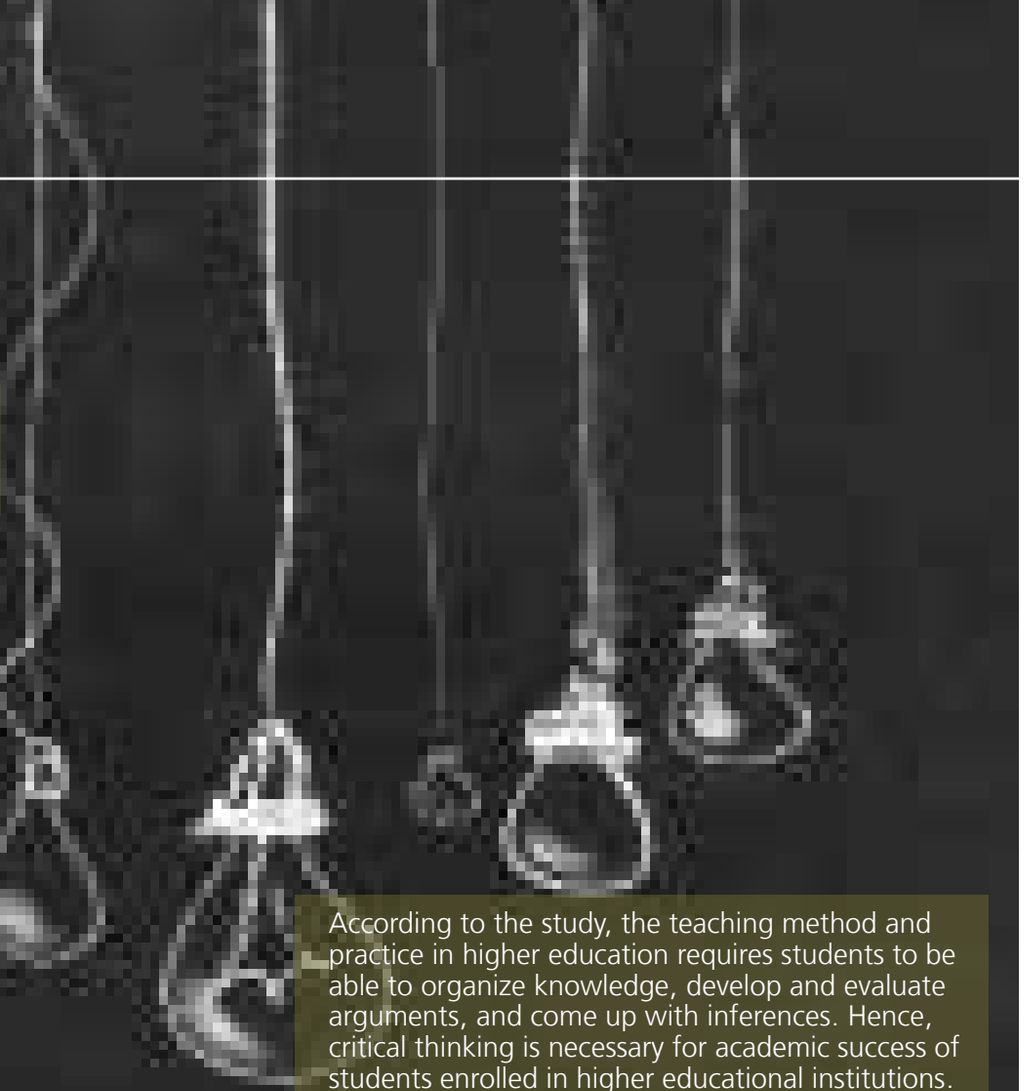
The IoT laboratory vision by the year 2022 is to make SQU Campus regionally known as the leading developer and exporter of smart campus solutions that are based on ICT and other technologies. The laboratory mission is to use, develop, test, study and conduct research about IoT and to support the development of Smart City solutions in order to improve the life quality in the Omani cities. The Lab aims to act as open platform for the development of different vertical applications that are also dedicated to other research areas of the university. The IoT laboratory promotes awareness on the use and development of smart city solutions and create suitable environment for research and networking between IoT and smart city users and experts. The lab seeks to share mutual experiences and discuss prospective implementations of Smart Cities and enable students and staff to use the full range of IoT technologies.

IoT laboratory has sufficient advanced resources e.g. computers, switches, access points, smart board, and others to do research and run most of the software scenarios, software development and testing. The IoT lab has different IoT tools including Arduino kit, Raspberry-Pi 3 kit, IoTify simulator, Open Rex and more. In the current Internet of Things lab setting, each student has an access to a workstation, and the instructor can provide instruction to many students at once. In addition, graduate students can use the lab for self-directed research projects.

Predictors of Critical Thinking Ability among SQU Students



As critical thinking is necessary for academic success in higher education, universities look for different ways to integrate it in their academic programs to increase the productivity of the graduates. Drs. Hussain Ali Alkharusi, Humaira Al Sulaimani and Otherine Neisler from the College of Education at Sultan Qaboos University (SQU), conducted a study on predicting critical thinking ability of SQU students, which presents the development of a predictive model for critical thinking ability using a combination of background, demographic, and psycho-educational variables. The study was part of a strategic research project funded by His Majesty. The project was chaired by Prof.Thuwayba Al Barwani and included Prof. David Clayton and Dr. Mohammed Khan from Sultan Qaboos University as well as Drs. Muna Al Kalbani from Ministry of Education and Hamed Al-Yahmadi from Royal Diwan.



According to the study, the teaching method and practice in higher education requires students to be able to organize knowledge, develop and evaluate arguments, and come up with inferences. Hence, critical thinking is necessary for academic success of students enrolled in higher educational institutions. However, students pass out from secondary schools with skills below the expected levels seek entrance into higher educational institutions. There has been a concern about the adequacy of preparation of secondary school graduates in skills related to mathematics, reading comprehension, and writing.

As documented in the study, in the Sultanate of Oman, each year around 50,000 students pass out from the secondary schools with only half of them being accepted into higher education institutions. Of those, approximately 3,000 students are accepted at Sultan Qaboos University. The situation is that over half of the newly admitted students at SQU fails either the math or the technology placement examinations and fewer than 10% qualify the placement test for university readiness in English.

Literature says that students with better critical thinking skills are likely to have higher levels of academic achievement. Hence, it is crucial to identify factors that can facilitate the development of critical thinking skills for university students. The study at SQU on predicting critical thinking ability of its students was guided by the following research question: Which combination of background, demographic, and psycho-educational variables contribute most to the variance explained in the critical thinking ability of SQU students? For this research, data were collected for 9809 Omani students selected from the population of students entering SQU between the years 2010 and 2013. There were 4700 (47.9%) males and 5109 (52.1%) females. About 45.7% (4483 students) were graduates of the basic education schools and 54.3% (5326) were graduates of the non-basic education schools.

About two-third of the students (6256) were admitted in the science colleges and 3553 students were admitted in the humanities colleges at SQU. The majority of the students (72.2%) studied pure mathematics in the general education diploma whereas (27.8%) studied applied mathematics. With respect to the number of science subjects taken in the general education diploma, 13.6% (1330) did not take any science subject, 1.4% (138) took one science subject, 5% (487) took two science subjects, and 80.1% (7854) took three science subjects.

The study used instruments including Demographic Questionnaire, the Motivated Strategies for Learning Questionnaire, the College Readiness Survey Questionnaire, and the California Critical Thinking Skills Test to investigate the predictors of critical thinking ability among the SQU students. For this, the team developed a predictive model using demographic, background, and psycho-educational variables. The results of this study reveals that the final full model included gender, type of general diploma education, type of general diploma math subject, number of general diploma science subjects taken, overall general diploma GPA, general diploma math subject score, general diploma English language subject score, college readiness, self-efficacy for learning and performance, peer learning, rehearsal, and metacognitive self-regulation as collectively statistically significant predictors of the critical thinking ability. It accounted for 8.7% of the variance in the critical thinking ability. The English language subject score obtained by the student in the general education diploma was the most robust predictor of the critical thinking ability.

The results of the study demonstrates the need for additional scientific investigation about predictors of critical thinking. The results highlight the need for educators at the secondary schools to fostering on what might facilitate the development of the critical thinking ability of the students. The findings of the study provide the basis for designing support programs to help students develop their critical thinking ability.

The findings of this research were published in the *International Journal of Instruction* in its April 2019 issue (Vol.12) under the title "Predicting Critical Thinking Ability of Sultan Qaboos University Students".

Learner-Centered Instruction in Pre-Service Teacher Education

A strand emerged in the seventies with a focus on the learner under the rubric of individualized instruction and more generally, individualization. This includes self-access learning, self-directed learning, and the movement towards learner autonomy, all of which focus on the learner as an individual and seeks to encourage learner initiative and to respect learner differences. Individualization was replaced in the 1980s by the term learner-centeredness, which refers to the belief that attention to the nature of learners should be central to all aspects of language teaching, including planning teaching and evaluation.

Dr. Salma Al-Humaidi

College of Education, SQU

Student-centred learning appears to relate primarily to the constructivist view and the importance it places on activity, discovery and independent learning. While the cognitive theory emphasizes activity in the learner's head (or the mind), the constructivist view emphasizes activities, such as projects and practicums, in which students are required to engage themselves in some form of physical activity. The social-constructivist view of learning also emphasizes activity and the importance of communities of practice in the learning process. This paper sheds light on Sultan Qaboos University (SQU) experience in implementing learner-centered Instruction project in Pre-Service Teacher Education. The terms student-centered learning, learner-centered instruction, learner-centered approach, and learner-centered methodology will be used interchangeably. In 2008, SQU teacher education program wanted to ensure that its graduates possessed the necessary learner-centered pedagogical skills to enable them to teach in learner-centered environments. The university implemented a project for adopting the learner-centered approach in the preparation program of the English teacher trainees in the College of Education. Methods courses that used traditional approaches were converted into learner-centered courses and student teachers were invited to participate in sections where students were exposed to learner-centered classroom practices. The learning materials package used in the project was developed as a result of the collaboration of two parties: SQU and the American Partnership Initiative represented by Seward Incorporated.

The courses were based on main principles that reflect the learner-centered approach. These are: fostering independent thinking (e.g., accepting innovative and creative answers, asking higher order questions instead of recall ones), encouraging students to share ideas and opinions through asking open questions, creating a stimulating classroom environment, teaching according to students' abilities, teaching according to students' learning styles (i.e. the way students learn), using a variety of teaching techniques, engaging students in active learning (e.g., task-based; problem-based activities, group work), developing and conducting higher order thinking skills (e.g., application, analysis, synthesis, and evaluation), and providing opportunities for reflection among students (e.g. what is the new thing you learned today? what is the hardest part/point in the lesson?).

Three main published studies were conducted to investigate the effectiveness of implementing Learner-centered methodology in the teacher education program. These are:

1.Al-Humaidi, S. (2015). Adopting a Learner-centered Methodology at Sultan Qaboos University. *Studies in English language Teaching* (*SELT*). 3 (2), 172-186

This study investigated the effectiveness of this project on students' achievement and quality of learning. Findings showed that the project is effective and

successful in different ways: involving students in active learning processes and tasks, minimizing the use of lectures as the principle mode of instruction, giving students increased ownership of their learning, fostering team work and cooperative learning, and manipulating technology and e-learning efficiently. In general, this study revealed positive effects of learner-centered approaches on students' achievement and quality of learning.

2.Al-Humaidi, S., Al-Barwani, T., and Al-Mekhlafi, A. (2014). Learaner-Centered Instruction in Pre-Service Teacher Education. Does it make a real difference in learners' language performance? *International Journal of Education* (*IJE*). 6 (4), 93-106

This study looked at the impact of exposing prospective teachers to learner centered methodologies through an EFL methods course. In turn, the effect of this approach on their school students' performance in English language skills (reading, writing, and speaking) was examined. Moreover, the study looked into students' attitudes towards language in a learner-centered environment. Major findings of this study revealed: significant differences between the performance of students in learner-centered schools compared to those in schools using non learner-centered approach, in favor of the learner-centered schools, significant differences within the learner-centered schools which can be attributed to the school environment and the attitude questionnaire administered to learner-centered students indicated they had positive attitude towards learning English.

3.Al-Humaidi, S. (2014). Learner-Centered Methodology and Teacher Performance. *International Journal of English: Literature, Langauge and Skills.* (*IJELLS*). 3(3), 197-206

The purpose of this study was to find out the extent to which the student teachers of English are manipulating the principles of the learner-centred approach in the teaching practice classrooms. Findings showed that most of the learner-centered principles are applicable in the Omani context.

The learner-centered instruction project was effective and successful as the above studies show. The faculty participants garnered a great deal of experience with this project. However, they also concede the fact that there is still much to learn about this approach. Currently, they are practicing more of what they have been preaching in this learner-centered approach, and they have extended their experience to other courses in the teacher education program, e.g. Methods 1, Educational Curriculum, Teaching Practice, and a number of other masters-level courses. In order to empower both teaching and learning, they further recognize that all stakeholders must take practical action in the following: 1) further cultivating this methodology in the pre-service and in-service teacher education program, 2) convincing SQU faculty and Ministry of Education teachers of the importance of this approach, and 3) developing supplementary tasks and activities for actual use in classrooms.

ECA: Empowering Our Students with Real-World Skills

Fayaz Ahmed

Centre for Preparatory Studies, SQU

ECA is one of the key student support services offered by the Centre for Preparatory Studies that seeks to extend language learning beyond the four walls of the classroom with a wide array of fun and engaging activities. It is an informal and welcoming space that provides our students ample opportunities to develop their language, social and leadership skills. The primary objective of ECA is to bridge the gap between classroom learning and real-world needs by transforming skill-building into a stimulating and pleasurable experience.

Highlights of the Year 2018-19

ECA scripted a remarkable success story during the last academic year that witnessed a slew of brand-new initiatives and a burst of infectious creative energy. It offered fifteen clubs over two semesters in addition to a variety of special events, presentations and workshops which, though mostly targeted at the Foundation Year students, attracted a record number of enthusiastic participants from other SQU colleges.

The weekly ECA clubs remained the biggest draw among students offering them an impressive range of choices in terms of skills, hobbies and entertainment. The clubs that built a loyal following during the year were Apps Club, Art Club, Chess Club, Culture Club, Debate Club, Drama Club, Film Club, Spelling Club, Games Club, Manga Club, Reading Club, Speaking Club and Science News Club.

Culture Club

Culture Club emerged as the most popular ECA club with most sessions drawing a 160-200 students. Each Culture Club session focused on showcasing a specific culture and country in an engaging, interactive and lively format involving videos, games, quizzes, music and live demonstrations that our students found highly appealing. Most of the Culture Club presenters were CPS teachers who beautifully captured the multi-cultural ethos of SQU with sessions on countries as diverse as Belarus, Colombia, Iran, the United Kingdom, Romania and the Caribbean Islands.

Eminent Speakers and Guest Experts

A new initiative that proved to be a great success was inviting distinguished citizens and achievers as guest speakers to interact with our students. Students showed up in large numbers to attend these presentations and found them truly motivating.

Two eminent speakers invited for motivational talks last year were Nabil Busaidi, the leading Omani adventurer and the first Arab to walk to the magnetic North Pole and Saleh Jabri, the captain of the historic ship 'Jewel of Muscat'. The speakers shared memories of their personal struggles and triumphs with our students with the focus firmly on the role of mental strength and

endurance in overcoming seemingly impossible challenges. Another speaker invited by ECA was well-known author and educator Jane Jaffar who delivered a special talk on the benefits of extensive reading on the occasion of World Book Day.

ECA also reached out to a number of other guest speakers last year including two martial art experts, a leading comic scholar and illustrator, a member of Toastmasters International, an avid gamer and the founder of the Korean Culture Club in Oman.

Teacher-led Presentations & Workshops

A concerted effort was made last year to engage and recruit more teacher volunteers that resulted in a noticeable increase in the number CPS teachers who were actively involved in running and supporting various ECA initiatives. A number of exclusive presentations and workshops were delivered by teachers on a variety of themes ranging from recycled book art and effective presentation skills to cutting-edge digital technology and Soccer World Cup.

Language Workshops

ECA organized several language workshops focusing on foreign as well as local Omani languages including Korean, Turkish, Azerbaijani, Balochi and Jabbali. These popular workshops involved introducing the basics of the target language in an interactive format with plenty of vocabulary games, pronunciation drills and hands-on activities thrown in for good measure offering our students a rich and stimulating learning experience.

National Day Celebrations

The biggest ECA event of the year was held to celebrate 48th Omani National Day on 26th November, 2018. It was a fun-filled event attended by around 300 students and 20 teachers who were treated to a variety of student-led activities including musical performances, magic show, Omani team quiz, live art demonstration and traditional Omani games.

The most heartening aspect of this special event was the active role played by the ECA student assistants and volunteers. They demonstrated their excellent organizational and leadership skills with their valuable contributions ranging from decorating the venue and using innovative promotional strategies to anchoring different competitive events and managing overall logistics.

Music Mania

A bunch of talented musicians from the SQU Music Club treated our students to a gloriously entertaining evening of live English music on 4th March. The event, the first of its kind to be organized at CPS, turned out to be a massive success with around 200 students in attendance. It was absolutely heartening to watch the young musicians, most of whom had never performed in public before, showcasing their art with incredible energy, grace and confidence.

Word Quest 2019

For the first time, ECA successfully hosted a team vocabulary competition titled Word Quest 2019 in two phases. A preliminary written round was followed by a live oral round in front of an audience in which six qualifying teams competed for the top three positions. The final included six rounds of questions ranging from spelling and picture-based questions to fun challenges based on popular language games like Hot seat and Pictionary.

ECA is a unique platform offered by the Centre for Preparatory Studies that has served our Foundation Year students over the years as a hub of creativity, innovation and meaningful learning. It broke new ground in 2018-19 by engaging and empowering the wider SQU student community.

“Modelling of Nanofluid Flows” in Full Flow

Dr. Mohammad Mansur Rahman, an associate professor in the Department of Mathematics in the College of Science at Sultan Qaboos University, has more than 20 years of teaching and research experience at three different universities: Sultan Qaboos University (Oman), University of Glasgow (UK), and University of Dhaka (Bangladesh). He acquired incredible knowledge in Mathematics and always had high passion for teaching, learning, and scholarship. Dr. Rahman has made some excellent contribution to the academic program at SQU through quality teaching in the Mathematics Department over the past 12 years. He has designed lecture demonstrations, models, and teaching aids for effective teaching of Fluid Dynamics and Viscous Incompressible Flows courses at the undergraduate and postgraduate levels. Dr. Rahman is playing a leading role in supervising BSc, MSc, PhD students and Postdoctoral scholars in Applied Mathematics at SQU. Dr. Rahman’s commitment to quality research, dedication, and substantial research outputs awarded him the Most Active Research Group Award for 2019 by SQU on the 19th University Day. Dr. Rahman has won Distinguished Researcher and Distinguished Academician awards that were presented to him during the University Day celebrations in 2016 and 2018 respectively. In this interview, Dr. Mohammad Mansur Rahman speaks about his background, his teaching, and research over the years.

Could you summarize your research interests?

My research interest is on applied mathematics especially in the field of Fluid dynamics (Nanofluidic phenomenon, Heat and Mass Transfer, MHD, Transport in Porous Media and Bio-fluid Flows). The multi-disciplinary research focuses on the modelling, simulation and characterization of nanofluids flow, heat and mass transfers in various media identifying their applications in physics, engineering, nanoscience and nanotechnology. Nanofluids have lots of potential real life applications in industrial cooling, solar cells, nuclear reactors, extraction of geothermal power, automotive engine coolant, cooling microchips, nanodrug delivery, nanocryosurgery, sensing and imaging, and cosmetics. My research is dedicated to promote world class nanofluids research at SQU and help to develop best "heat transfer fluid" to benefit the afore-said fields in Oman. My research has generated 105 publications in high impact international journals, 10 conference proceedings, 6 posters, and 33 presentations in major international conferences promoting SQU's standing in research internationally.

Your main research interest is the study of nanofluids. Could you summarize your work in this field over the last 5 years during which you received research grants from TRC and IG? How would you comment on the outcomes of your research on the development of nanofluids?

Nanofluid is a relatively new class of fluid born at the Argonne National Laboratory, USA. Choi (1995) engineered it by mixing nanometer sized particles with the base fluids. During last decade, it became a hot area of research due to its real life applications in various fields. At SQU, I initiated the nanofluid research in the department of mathematics. As the principal investigator, I secured several SQU internal grants (IG) and The Research Council (TRC) funded project "Nanofluid: Emerging Applications in Nanoscience and Nanotechnology" (ORG/SQU/CBS/14/007) valued RO 158,000 for nanofluid research. The TRC project was successfully completed in January 2018 with substantial research outputs: review and original journal papers published in international journals. The TRC and IG projects helped to build capacity in the department through awarding 2 PhD and 4 MSc degrees, training postdoctoral scholar and Omani research assistants on nanofluids. From these projects, I bought two high computing workstations and necessary software for numerical simulation. Young faculty members, PhD and MSc students are immensely benefitted from these departmental resources. In 2016, we developed and published a new mathematical model "nonhomogeneous dynamic model" along with a new theory for heat and mass transfer in nanofluids. Currently, a number of PhD and MSc students are working on nanofluids under my direct supervision. I am significantly contributing to nanofluid research, publishing high quality research papers, reviewing articles for international journals, evaluating PhD thesis and research projects globally.

Could you give an overview of the research activities of your established research group "Modelling of Nanofluid Flows" which was awarded the "Most Active Research Group Award 2019" by the SQU?

I strongly believe in collaborative research and right from the beginning of my career at SQU, I am collaborating with colleagues from the department and internationally. I established a research group in the department named Modelling of Nanofluid Flows (MONAF) (DR/RG/04). The group actively works on various problems on nanofluids, prepare and submit projects for internal and external funding, jointly supervise PhD and MSc students, establish institutional collaboration nationally and internationally etc. Over the years, the group produced substantial research outputs, secured SQU internal grants and TRC funding. Due to the excellent contributions of my research group in nanofluids, it was awarded the Most Active Research Group Award 2019 by the Deanship of Research, SQU. It is a great honor for me receiving this award on the 19th University Day of SQU. For the first time in history, receiving this award glorified the mathematics department as well as the College of Science.

I believe deep down in my heart that hard work never dies. I dream my hard work and passion coupled with active contributions from the MONAF group members will make it one of the leading research groups in nanofluid in the entire world.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