Creation of a Mobile Science and Engineering Road Show for Texas A&M University at Qatar: Multicultural STEM Education and Entertainment (Resource Exchange)

Mr. G. Benjamin Cieslinski, Texas A&M University at Qatar

A resourceful science professional with expertise in STEM fields, science communication, laboratory safety, program management, and chemistry, Benjamin Cieslinski manages the science, technology, engineering, and mathematics (STEM) laboratories for Texas A&M University at Qatar's Office of Advancement. He designs and performs demonstrations of science and engineering to local schools via the Science and Engineering Road Show mobile lab and creates programs for local youth to educate and entertain with hands-on projects to challenge students' engineering and science skills.

Tala Katbeh, Texas A&M University at Qatar

Tala Katbeh is a STEM Instructor and Program Coordinator at Texas A&M University at Qatar (TAMUQ) where she applies her enthusiasm for engineering to create curricula and engineering courses for school students. Katbeh is currently also pursuing her PhD at Texas A&M University, having graduated from TAMUQ with a BSc and MSc both in chemical engineering.

Hassan Said Bazzi, Texas A&M University at Qatar

Dr. Hassan S. Bazzi is the senior associate dean for research and advancement and professor of chemistry at Texas A&M University at Qatar, a branch campus of Texas A&M University. Dr. Bazzi is also professor of materials science & engineering at Texas A&M University. Dr. Bazzi received his bachelor's and master's degrees in chemistry and organic chemistry, respectively, from the American University of Beirut (1996 and 1998), and his Ph.D. in polymer chemistry with Dean's Honor List from McGill University (2003). He worked briefly with the United Nations as a chemical weapons inspector in Iraq before doing a postdoctoral research fellowship at Université de Montréal. He joined Texas A&M at Qatar as assistant professor in 2004, was promoted to associate professor (2009), and then to full professor (2014). Dr. Bazzi completed the Management Development Program (June 2014) and the Institute for Management and Leadership in Education (June 2018) at Harvard University Graduate School of Education.

CREATION OF A MOBILE SCIENCE & ENGINEERING ROAD SHOW for TEXAS A&M UNIVERSITY AT QATAR:

Multicultural STEM Education & Entertainment

The spectacle of a well-presented science & engineering demo is a catalyst that creates initial interest in chemistry, physics, and engineering to young students, and acts to reinforce active learning environments.

150 Road Shows
to over
25,000 students
in over
90 schools

OBJECTIVES AND INSIGHTS

STEM OUTREACH

Communities and educators can utilize our materials and experience to create their own STEM outreach programs

PREPARATION

Safety of the students and schools are the highest priority, with rigorous risk assessments for all demos, mandatory site visits, and school checklists

CURRICULUM & STAKEHOLDERS

Demo topics need to be relevant to both students and stakeholders; focusing on how science principles are utilized in engineering and everyday problem solving

PROBLEMS

Schools separated by gender, language, and financial barriers were solved via discussions with education ministries, presentation style, and sponsorship

Scan to download risk assessments, checklists, and organizational information

https://stem.qa/

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TEXAS A&M UNIVERSITY at QATAR

SAFETY GUIDELINES, CHECKLISTS, & SITE VISITS

- All demos have risk assessments that include chemical and physical hazards, and approved by multiple EH&S stakeholders; copies of which are carried at all times in a dedicated safety case.
- Schools are required to download a safety checklist that outlines the safety requirements of the show; including egress, emergency procedures, and media waivers if required.
- The Road Show follows the American Chemical Society's 16-point check-list for safe school demonstrations.
- All locations have a pre-show site visit to ensure safe operations, timings, seating, egress, parking, and loading procedures. Alternative sites are discussed if sites do not meet operational standards.

LOGISTICS

- Schools register for the Road Show online; completing a survey of student body information, site safety, and language proficiency.
- The Road Show materials are designed to fit into six rolling cases that can be easily transported with two staff.
- Water, tables, and a small PA system are carried in case location warrants.

GRADE LEVELS

- **Grades K-2: "Fun Show!"** - 30 minutes highlighting the hands-on experience of science & engineering.
- **Grades 3-5: "STEM not Magic"** - 45 minutes of demos with explanations of everyday science and engineering.
- **Grades 6-12: "STEM Road Show"** - 60 minutes of demos with full technical lessons and interactive challenges.

LANGUAGE

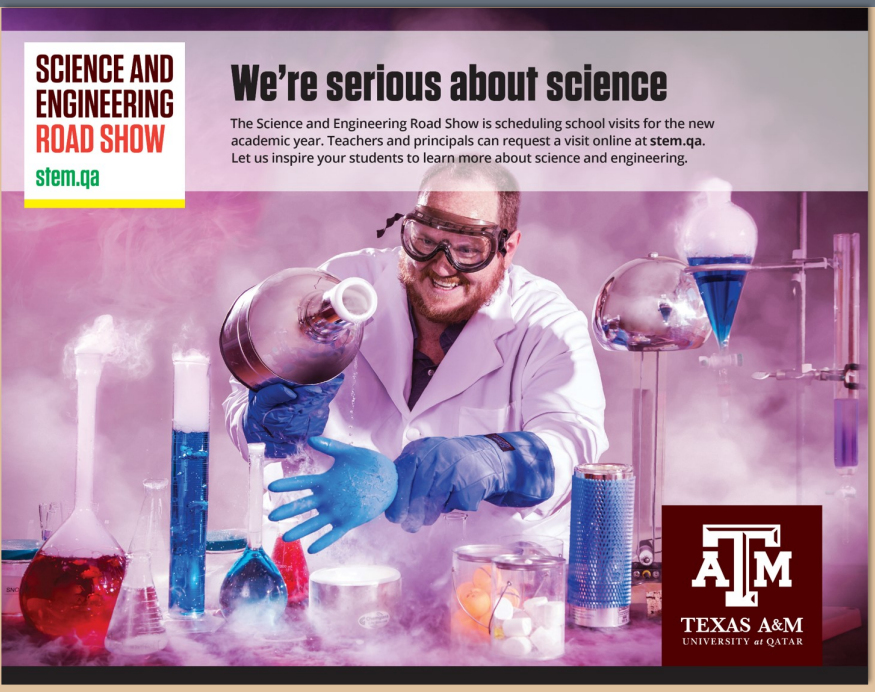
The Road Show is performed in English, with supplemental Arabic and exaggerated miming during shows for surveyed students with minimal English proficiency.

GENDER

Some schools are separated by gender, and require presenters of different sexes. Performing at these schools must be formally requested and approved, taking pictures is not allowed, special rules are followed as per social customs, and female staffers must be available.

FINANCIALS

Minimizing chemical usage and consumables keeps costs low (~$100/show). Funding was achieved by searching for corporate sponsors looking for community engagement.



TOPICS COVERED

Chemical Reactions
Bernoulli Effect
Coandă Effect
Pressure
Polymers
Sublimation
Condensation
Heat Transfer
Liquid Nitrogen
Kinetic Energy
States of Matter