

QMEA ANNUAL REPORT | 2017



Queensland
MINERALS & ENERGY
ACADEMY

QMEA ANNUAL REPORT 2017

TALENT PIPELINE INTO THE RESOURCES SECTOR

The Queensland Minerals and Energy Academy (QMEA) is Australia's largest and most successful industry/education schools partnership. The academy is a partnership between the resources sector, represented by Queensland Resources Council (QRC) and the Queensland Government through the Gateway to Industry Schools Program.

The QMEA has delivered hundreds of programs and experiences to:

- increase and broaden students' and teachers' knowledge and understanding of the sector and attract more students into science technology engineering and mathematics (STEM) subjects
- provide pathways for young people in years seven to 12 into the resources sector and other STEM-related careers.





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2017 HIGHLIGHTS

- The QMEA is now a **million-dollar industry-led** educational initiative.
- It has experienced significant **industry sponsorship growth of 122 percent**, from nine sponsors at the end of 2016 to 20 sponsors to date.
- **10 new schools** have joined the QMEA network on the back of this sponsorship.
- QMEA has broken new ground by incorporating **primary students** into its program starting from year five, successfully piloted in Gladstone.
- The **applicant pool for the QMEA ambassadors was a record 42**, with 20 successful candidates.
- At least a third of students who attended trade camps have been **offered positions in industry as apprentices**.
- **New experiences** such as Beakers Bots and Build, Pit to Port, Sky High Thinkers, STEM Stepping and My Digital World have been successfully integrated into the program to attract younger secondary students into STEM subjects and careers.
- The QMEA/Alexandra Hills SHS Centre of Excellence in Automation and Robotics has continued to progress with **new industry partners, projects under way with industry and a STEM competition** to attract primary students.
- STEMPunks and Red Dirt Drones as **new third-party providers** added their specialised expertise to Domobotics to deliver more than 30 student and teacher digital technologies workshops.
- Qualitative data demonstrates a high rate of students (84 percent) indicating the QMEA experience **influenced their selection** of science, technology, engineering, maths (**STEM**) subjects in the senior years.
- **QMEA students almost doubled their fundraising efforts in 2017** for the Leukaemia Foundation's Shave for A Cure event raising \$13,000, a 190 percent increase. Alexandra Hills State High School raised the highest amount while the highest fundraising school per student was Moura SHS.



100 EVENTS



3265 STUDENTS



810 TEACHERS



219 INDUSTRY EMPLOYEES





IN 2017:

OF STUDENTS ENTERING ALL FIELDS OF STUDY OR EMPLOYMENT:

17%

OF QMEA STUDENTS ENTERED ENGINEERING OR RELATED FIELD OF STUDY

COMPARED TO

11%

OF STUDENTS FROM NON-QMEA SCHOOLS

OF FEMALE STUDENTS ENTERING AN APPRENTICESHIP OR TRAINEESHIP:

9%

OF FEMALE QMEA STUDENTS ENTERED A MINING RELATED APPRENTICESHIP OR TRAINEESHIP

COMPARED TO

0.6%

OF STUDENTS FROM NON-QMEA SCHOOLS

OF ALL STUDENTS EMPLOYED AS APPRENTICES OR TRAINEES:

9%

OF QMEA STUDENTS WERE EMPLOYED IN MINING SECTOR

COMPARED TO

2%

OF STUDENTS FROM NON-QMEA SCHOOLS

OF INDIGENOUS STUDENTS EMPLOYED IN THE RESOURCES SECTOR:

6.2%

OF QMEA INDIGENOUS STUDENTS WERE EMPLOYED IN MINING SECTOR

COMPARED TO

1.7%

OF STUDENTS FROM NON-QMEA SCHOOLS

^SOURCES: QUEENSLAND DEPARTMENT OF EDUCATION AND TRAINING, NEXT STEP DESTINATION DATA 2016

'I really enjoyed the introduction from QMEA to different career options in mining.'

Dysart SHS student





ABOUT US

45
SCHOOLS

Alexandra Hills State High School
Anglican Church Grammar School
Biloela State High School
Blackwater State High School
Bowen State High School
Bundamba State Secondary College
Capella State High School
Chanel College
Chinchilla State High School
Clermont State High School
Cloncurry State School
Dalby SHS
Dowlands College Toowoomba
Dysart State High School
Emerald State High School
Gladstone State High School
Good Shepherd Catholic School
Kingston State College
Kirwan State High School
Middlemount Community School
Miles State High School
Millmerran State P-10 School
Moranbah State High School

Moura State High School
Nanango State High School
North Rockhampton State High School
Oakey State High School
Pimlico State High School
Pioneer State High School
Pittsworth State High School
Rockhampton Girls Grammar School
Rockhampton State High School
Roma State College
Spinifex State College
St John's School Roma
Tannum Sands State High School
Tara Shire State College
Taroom State School
The Cathedral College
Thuringowa State High School
Toolooa State High School
Toowoomba SHS
Wadja Wadja High School
Wandoan State School
Wavell State High School

QMEA
BOARD
MEMBERS

Ian Macfarlane (Chair)

Chief Executive,
Queensland Resources Council

Martin Breen

General Manager Government and
External Affairs ConocoPhillips

Bevan Brennan

Assistant Director General State
Schools Performance Department
Education and Training

Vincent Cosgrove

General Manager People and External
Affairs, Hastings Deering

Peter Dowling

Specialist Community Coal Corporate
Affairs BHP Billiton

Helen Huntly

Provost Tertiary Division Central
Queensland University

Matt O'Neill

Chief Operating Officer Copper Assets
North Queensland Glencore Mount Isa
Mines

Deryn Vahl Meyer

Assistant Dean International and
Engagement Science and Engineering
Faculty Queensland University of
Technology

FROM THE QMEA BOARD CHAIR



Growth, expansion and innovation are the words that best describe 2017 for QMEA. From small beginnings, QMEA has expanded to a million-dollar schools initiative.

I congratulate the Queensland Government on its support through the Gateway to Industry Schools Program and particularly acknowledge our Queensland Resources Council member companies for their continued and expanded support for this valuable program.

Without their support, it would not have been possible to expand our reach from 35 to 45 schools over the past 12 months. This expansion demonstrates that our small hard-working QMEA team continues to provide a fresh dynamic program that clearly adds value to educational communities, and the resources sector, by shoring up the talent pipeline into our industry.

In times where there are declining numbers of students taking up STEM subjects and careers, the QMEA remains an effective and powerful tool by providing students and teachers with a diverse program of experiences to increase their knowledge of the resources sector and pathways into STEM employment.

And here's the hard evidence. According to statistics provided by the Queensland Government, 17 percent of QMEA students who graduated in 2016 entered post-school study or employment in the field of engineering and related technologies in 2017, compared with 11.8 percent of students from non-QMEA schools.

A standout for me is that nearly nine percent of QMEA students ended up in an apprenticeship or traineeship compared to just two per cent in the non-QMEA school population.

It's very pleasing to see that QMEA is also helping our companies reach their gender diversity targets with 9.6 percent of female QMEA students entering a mining-related apprenticeship or traineeship in 2017, compared with just 0.6 percent of girls from non-QMEA schools. And speaking of diversity, more than six percent of QMEA's indigenous school leavers were employed in the mining industry in 2017, compared with just 1.7 percent from non-QMEA schools.

All up, the QMEA team hosted an impressive 100 events in 2017, delivered to more than 3,000 students, and included an enhanced focus on digital technologies made possible through third-party providers Domobotics and STEM Punks.

In the new year, QMEA will bring on an additional staff member to further boost this area.

I would like to extend my thanks and appreciation to the QMEA Board, our industry sponsors, the Queensland Government and the QMEA team for a successful year and look forward to an exciting 2018.

Ian Macfarlane,
Chief Executive, Queensland Resources Council



'CQU is indeed proud of our membership of and collaboration with QMEA where we are able to work together to achieve common goals inclusive of, but not limited to, the strengthening of STEM learning and teaching at all educational levels from schools to university.'

Helen Huntly Provost, Tertiary Division CQU

FROM THE SKILLS, EDUCATION & DIVERSITY DIRECTOR



It is definitely safe to declare 2017 as the best year ever for QMEA and we look forward to 2018 with excitement for an even bigger year to come.

Great years don't happen by accident and it is a credit to my team, Kym Frost, Tammy Grady, Caroline Morrissey and Dan Rea. We now have 10 additional schools, a bevy of new programs and events, and record numbers of students and teachers taking part in our activities. None of this would have been possible without support from the Queensland Government and our industry sponsors; another area of significant growth, with a 122

percent increase in number, from nine to 20. And, discussions are ongoing with additional prospective industry partners.

Becoming a QMEA ambassador is highly sought after by our student population and this year a record number applied, with our Ambassador Camp again a highlight of our program.

We have had great support from industry for our signature camp events and I'm delighted to advise that BHP Billiton, Glencore MIM and Hastings Deering have offered positions to a high number of students who participated in these experiences, which now form a crucial part of industry's recruitment process.

The feedback from our new events Beakers Bots and Build, Pit to Port, Sky High Thinkers, STEM Stepping and My Digital World has been most positive with primary students from as young as 10 now a part of our schools and industry engagement.

The QMEA/Alexandra Hills SHS Centre of Excellence in Automation and Robotics continued to progress, attracting interest from all corners of the state and sharing its knowledge with multiple schools. The inaugural Innovate STEM competition run by the school was a great success and well supported by our industry partners.

As part of the centre's outreach program, QMEA delivered a record 23 digital technologies teacher professional development sessions state wide, made possible through the hard work of the QMEA team and third-party provider Domobotics. I'm also very pleased to welcome a new third-party provider, STEM Punks which provides an additional level of specialised expertise to boost our engagement with a stronger focus on innovation, creativity and entrepreneurship in a digital world. Our Drones, Data and 3D workshops provided just a taste of this new and exciting capability.

It was also pleasing to see 13 of our schools participate in the Leukaemia Foundation's Shave for a Cure, raising an impressive \$13,000. A great effort from all participants and sure to be a boost for the foundation.

I thank the QMEA Board for its valuable guidance throughout the year, my team, our sponsors and the ongoing support of the Queensland Government. A particular thanks to our chair Ian Macfarlane whose enthusiasm for QMEA and STEM in schools has injected a new energy and confidence in our work. We look forward to 2018 with increased industry/schools engagement encompassing a return of our favourite experiences, a new partnership with QUT to assist in the delivery of the Indigenous 'SID' Camp, a new Digital Technologies Camp to be hosted at University of Queensland and an enhanced focus on skills needed in a digital economy. Another busy year ahead!

A handwritten signature in black ink that reads "Katrina-Lee Jones". The signature is written in a cursive, flowing style.

Katrina-Lee Jones
Director Skills, Education and Diversity



WHAT WE DID IN 2017

QMEA hosts a range of professional and trade pathway and industry-focussed experiences for students and teachers based on STEM. Such hands-on learning increases awareness of the sector and provides pointers to career pathways into the resources sector and other STEM related careers.

The QMEA has delivered a program of 100 activities in 2017 based on stimulating student interest, making connections, informing decisions, influencing pathways and challenging and preparing the future workforce.

STIMULATING INTEREST AND MAKING CONNECTIONS

Students in year levels five to eight engage in activities to increase their awareness of the resources sector and the range of careers that exist in the sector.



Dalby students at My Digital World



Mick Law, Dept State Development & Natural Resources and Mines with My Digital World winners from Dalby SHS

SKY HIGH THINKERS

Creative thinking is the key to innovation and Sky High Thinkers brings technology, design and problem solving together so that students can work freely in this area.

Using the latest in drone technology, students build and design drones for particular purposes and learn the operation of their machine to effectively carry out their designated task.

Students are challenged to identify well-head points across a large area while also photographing and mapping difficult terrain.

Various year levels have taken on Sky High Thinkers, which is a brand-new event on the QMEA program.

In another first for the QMEA, year sixes transitioning into high school have undertaken this program as an introduction to the QMEA program. APLNG sponsored the program, which ran at Toolooa State High School involving more than 250 primary students from throughout the Gladstone region.

WATER 4 ALL

Water 4 All is an exciting new workshop with accompanying resources, which examines how water is tested, managed and treated on a mine site. It contains a series of fact sheets, activities and practical problems that teachers can use with their year-seven science classes. The main practical activity features a visit to the school by an industry expert who adds vital real-world knowledge and application to the activities and concepts the students have been studying. It was delivered in three schools in 2017 and will be offered more widely in 2018.

'Fabulous experience that enabled students to engage in real-world issues with mentoring from industry professionals - great day!'

Amanda Patzwald, Science Teacher, Toolooa SHS

MY DIGITAL WORLD

Students from Dalby and Chinchilla immersed themselves in a world of digital technology when they attended the first My Digital World event at the Dalby Bunya campus.

About 100 year-eight students worked in groups to undertake three separate challenges, ranging from spatial technologies, drone advancements and robotics.

Thanks to Arrow Energy's support, the students were able to get hands on with various technologies and test their skills in this fast-moving area.

Students showed off their talents in a challenge led by the Department of Natural Resources and Mines, which looked at spatial mapping and super data while STEM Punks set the young minds a search and rescue mission where students programmed and piloted a drone. The LEGO EV3s robotics challenge excited students as they programmed their kits to navigate and precisely identify LNG collection points within a harbour.

The inclusion of My Digital World in the Dalby and Chinchilla school calendars has created a solid skills pathway in the world of technology and innovation across years eight to 10.

QMEA looks forward to building on this pathway for the benefit of the Dalby and Chinchilla community.



Michael of STEM Punks with students and teachers from Miles SHS

ENERGY FOR A FUTURE EARTH

Global energy needs, forecasted population, and average sunlight hours were just a few of the topics discussed with more than 200 year-eight students when they attended Energy for A Future Earth at Blackwater, Brisbane and Gladstone.

Supported closely by industry representatives working in the resources sector, students determine the energy production sources for their particular country both now and the future.

Students were surprised by the many factors that enhance or restrict particular energy types within various countries, however their presentations proved that decisions around global energy needs are in good hands with these talented young minds.

Energy for Future Earth relies on strong industry support and thanks go to APLNG, Hastings Deering, Curragh Wesfarmers, Jellinbah Resources, BHP, Geological Survey of Queensland, CSIRO, Gladstone Ports Corporation, NRG, Boyne Smelter Limited, CQU, QUT, Queensland Energy Resources and Glencore Technology.

PIT TO PORT

Students from the Gladstone region were put to the test with booking excavators, managing stock piles, monitoring conveyor-belts and ordering tug boats in one of QMEA's brand-new day-long program, Pit to Port.

Using high-level maths and strong communication skills, students worked on various job orders, which each formed a link in the chain from product extraction to export.

For the first program of its kind, students adapted to the challenges well. With the majority of Australian products being exported from the Gladstone Harbour, students had a good grasp on the concept of pit to port.

The day was supported by local industry and sponsors as well as university students from CQU.

CLASSROOM TO CAREERS

A big thank you to Hastings Deering, BHP, Millmerran Power Station and McCosker Contracting for their wonderful support of the Classroom to Career (C2C) program over the year. Students from years seven to 12 were fortunate to hear from people working in the industry about how their jobs link to classroom studies of that day.

Hastings Deering covered a lot of ground with C2Cs run in Brisbane, Rockhampton and Mount Isa, while McCosker Contracting met with more than 150 year 10s in Gladstone.

Senior students at Emerald learnt more about BHP's Gap Year program, which is a new and exciting initiative for the company and local community, while Millmerran Power Station worked with a mix of year levels during the Pittsworth annual careers day.

By bringing examples of careers into the classroom, we enable students to clearly see how their day-to-day studies are applied in the workplace. This is an effective way of informing students exactly what is involved in a particular job and enabling them to assess if this applies to their interests or skills. Industry representatives generously give their time each year to this program and experience has shown us that one conversation can lead a student to their chosen career pathway.

'It's great to see so many motivated and inspired young minds. Our sector is one that is technologically advanced and we need people with high levels of skills in these areas, now and into the future.'

Matt O'Neill, Chief Operating Officer, Glencore MIM



Ellen of Boyne Smelter Limited with Chanel College students at Energy for future Earth at CQU



Malcolm from Lienster Consulting works with Gladstone SHS students at Energy for Future Earth at CQU



Brian from Gladstone Ports Corp working with students from Tannum Sands SHS and Toolooa SHS at Pit to Port



Owen Berry of Hastings Deering speaks with students from Spinifex College about career options after school



Darren of McCosker Contracting with students from Toolooa SHS at a Classroom to Career

INFORMING DECISIONS, INFLUENCING PATHWAYS

Extended periods of engagement within this phase of learning leads to greater depth of understanding of the resources sector for students in years nine and 10.

BEAKERS, BOTS & BUILD

About 200 year-nine students from 11 schools worked with a dozen industry representatives in challenges across engineering and design, robotics and programming as well as chemical processing.

Students worked in teams with visiting students to achieve the best results in the three STEM-related project challenges.

Each challenge represents a step in the mining process so critical thinking, communication, design and test all play a big role in the day.

Overall winners are chosen on each challenge, however special consideration is given to those student groups who have collaborated well, as these skills are vital for career or study post high school.

‘The day was a real challenge for some of our students however after working with the industry reps they picked up the process. This is a good day for students to mix with other schools as well as present in front of an audience.’

Teacher at Middlemount SHS

STEM 4 SCHOOL KIDS

The science, technology, engineering and mathematics (STEM) 4 Schoolkids event aims to engage Year-10 students interested in pursuing an academic pathway in years 11 and 12. The program teams industry mentors with students in a number of hands-on, problem-based challenges.

During the 15 STEM 4 School Kids events held across Queensland in 2017, industry professionals told more than 200 students about their pathways from high school to their current career. The students worked on activities that followed the mining process from exploration and extraction through to processing and rehabilitation.

Students from a range of schools participated in events in Brisbane, Rockhampton, Moranbah, Emerald, Wandoan, Mackay, Oakey, Millmerran, Biloela, Capella, Middlemount, Townsville and Mount Isa. Participants had the opportunity to hear from a variety of resources sector professionals including geologists, mining engineers, geotechnical engineers, metallurgists, process engineers, environmental scientists, human resources and many more.

‘This partnership with QMEA encourages students to take up a role in engineering-based fields. Young minds really take to robotics and programming and it will be these skills that are needed for future jobs, especially in engineering.’

Peter Scott, Principal Good Shepherd Catholic College Mount Isa



Students test their coin launchers at Beakers.Bots.Build in Pittsworth



Ruby Stovin-Bradford from BHP assists students at the Dysart STEM 4 Schoolkids



QMEA's Dan Rea with Wavell SHS STEM 4 Schoolkids participants



Paul Radulovic from Glencore Tech with students at a Brisbane STEM 4 Schoolkids workshop

TOOLKIT FOR SCHOOL KIDS

Toolkit for Schoolkids targets students who wish to pursue VET careers. These events help to make the students aware of different trade and operator pathways available in the resources sector and enables them to talk to sector representatives who share information on their career journey.

QMEA's VET-specific events begin in year 10 with Toolkit days, which provide opportunities for students to gain an understanding of the types of roles available in the resources sector and help them choose the appropriate subjects in senior school. Toolkit days also have a practical component where the students try for themselves some trade-like tasks.

As students begin to consider life after school and pursuing roles as apprentices or trainees, it is a perfect opportunity for them to hear about local industry opportunities and develop networks with local industry representatives.

This year, QMEA facilitated one Toolkit for Girls event in Moranbah, which enabled some of the Central Queensland female year-10 students to try trade tasks and talk to female apprentices from the resources sector about their roles.

In 2017, 206 students and 25 teachers along with 39 industry representatives attended Toolkit events in Moranbah, Emerald, Mount Isa, Townsville, Rockhampton, Gladstone, Middlesbrough, Biloela, Mackay and Brisbane.

In addition to these events, QMEA ran combined STEM and Toolkit days at Wandoan, Millmerran and Oakey State Schools and partnered with Wesfarmers Curragh mine to continue the partnership with Wadja Wadja Community School.

These events would not be possible without the ongoing support of our industry partners, and our local schools, and their combined vision to ensure school leavers have an understanding of opportunities in the resources sector.



QMEA's Kym Frost assists a student at the Oakey Toolkit 4 Schoolkids



Students undertake an activity at the STEM 4 School Kids event in Townsville

'The QMEA is a great initiative that Middlesbrough South supports fully. It has been very worthwhile assisting the QMEA with helping Middlesbrough students to get a good idea on the resources sector and the opportunities that exist for a rewarding career.'

Scott Graham, Chief Operating Officer, Middlesbrough South Mine



Students at the Middlesbrough South Toolkit 4 Schoolkids day

CHALLENGING AND PREPARING

The challenging and preparing phase targets years 11 and 12 students who have demonstrated a genuine interest in a resources sector career. Students participating in this phase have generally completed earlier activities in QMEA.



Glencore Mount Isa MINE Challenge students go underground



Students at the Glencore Mount Isa MINE Challenge

PROFESSIONAL PATHWAY

QMEA professional pathway students are completing an academic program of work across years 11 and 12 with the aim of receiving an Overall Position (OP) to gain entry into tertiary education. These students are considering a range of careers in areas such as engineering, geology and environmental science.

These students are invited to take part in STEM-related opportunities including taking part in one of the QMEA 'Make It Now in Engineering' (MINE) Challenges through the support of BHP Billiton and Glencore Mount Isa Mines.

MINE Challenges provide an amazing opportunity for high-achieving senior students to work alongside industry professionals to solve genuine problems while experiencing the life of a resources sector worker. In 2017, 30 students and four teachers from QMEA schools attended a MINE Challenge.

During the June school holidays, 15 students participated in the Glencore Mount Isa MINE Challenge, which was an amazing and career-shaping experience for all. The students were split into four teams and assigned to solve real-life problems on the mine site. In two of these challenges, the groups travelled more than a kilometre underground to carry out their project.

'This is a wonderful opportunity for students and supervising staff to engage in 'real' work scenarios to explore how current school learnings are applied in the workplace. The camp also provides an opportunity to explore potential fields of study at university.'

Teacher at Mount Isa MINE challenge



The Goonyella Riverside Mine team at the BMA MINE Challenge



Students complete a challenge at the BMA MINE Challenge

The September BMA MINE Challenge involved 15 students who travelled to Moranbah for a week to experience the life of an industry professional at a coal mine. They stayed at Civeo's MAC village accommodation. One of the students commented how they really enjoyed "going out on site and learning from professionals in the industry."

Split into two teams, one based at BMA's Peak Downs and the other at Goonyella Riverside mines, the teams met with key staff, toured facilities and undertook a challenge to design, cost and propose a new box-cut coal mine.

The week concluded with the teams presenting their cases to a panel of BMA's mine planners and site managers who agreed everyone had done a brilliant job before awarding the 2017 BMA Mine Challenge Trophy to the Goonyella team.

VET PATHWAY

Camp

Signature events for year-12 students are QMEA's trade camps, which are week-long events that have the students working in a simulated work environment to solve a trade-based problem.

These camps are run in trade training centres in Central Queensland, Moura and Mount Isa, where the students work in teams to solve the problem while demonstrating an industry level of safety, teamwork, problem solving and trade skills.

The trade challenges for 2017 were the BMA challenge held at the Dysart State High School, the Anglo American challenge held at the Moura State High School and the Glencore Mount Isa mine challenge held at Spinifex College Mount Isa.

All camps were wonderfully supported by a mix of apprentices and tradespeople from the local mines and culminated with judging by industry representatives of the best completed project.

Comments from students indicate their enthusiasm for this event and quite a few of the apprentices who helped during the camp had participated as students in the past.

Industry has advised that due to the quality of students participating in these camps they are now using them as a significant part of their recruitment process.

QSMART

QSMART maths is a trade-based maths course designed with the help of industry to assist students wishing to pursue a trade pathway, particularly an electrical trade. It is available to years 11 and 12 students. During 2017, more than 200 students completed this QMEA-designed course.

Cert II RIWP

Certificate II in Resources Infrastructure Workplace Preparation (RIWP) focuses on safety, environment, maintenance, communication and organisational skills. During 2017, 29 students worked towards completing the course.

BUT THERE'S MORE

Chanel College pupil is QMEA female student of the year

Year-12 Chanel College student Abi Meehan's talent for driving race cars, and stripping down their engines won her the chequered flag in the prestigious Exceptional Female Student category of the Queensland Resources Council's 2017 Resources Awards for Women.

The award is open to female students in QMEA schools and aims to encourage girls to consider and champion careers in the resources sector.

Abi was presented the award in Brisbane before a state-wide audience of almost 900 people at the annual QRC/WIMARQ International Women's Day Breakfast and Resources Awards for Women presentation, hosted by BHP Billiton.

'My passion for motorsport has been the driving force behind my career aspirations, I have never been a person that could just stand back and let others prepare or fix my race car. I needed and wanted to know how to do it myself.'

Abi Meehan, 2017 Exceptional Female Student

This experience has also led to Abi's interest in mechatronic engineering to improve robotics in the resources sector and increase the safety of workers by taking people out of high-risk environments.

Abi has a slew of other achievements, including being a QMEA Ambassador, a National Youth Science Forum Ambassador and University of Queensland Science Ambassador. And, she also finds time for charity work including Gladstone soup kitchen, the Red Shield Appeal, Rotary, and the Leukaemia Foundation.

And what does she do to relax? On her school holidays Abi has completed work experience at a high-performance engine builder and at Harley Davidson motorcycles.



Participant in the trade camp in Dysart



Students at the Anglo American Moura trade camp



Testing time for two students at the Mount Isa trade camp



Abi Meehan and her parents at the 2017 QRC/WIMARQ International Women's Day Breakfast and Resources Awards for Women



Wonie Yusia and Kaitlyn Tobane with their awards for Exceptional Indigenous QMEA student

QMEA students tie for prestigious award

Two QMEA students were equal winners in the prestigious Queensland Resources Council Exceptional Indigenous QMEA student award.

Wonie Yusia of Wavell State High School and Kaitlyn Tobane of Blackwater State High shared the honour, which was presented during National Reconciliation Week.

The awards provide the opportunity to showcase exceptional indigenous people and businesses, and the and non-indigenous individuals and businesses who support them.

‘These two bright young minds have excelled academically, in attendance and in sharing their knowledge to other students in the classroom.’

Ian Macfarlane, QRC Chief Executive



2018 QMEA Ambassadors with STEM Punks

Ambassador program

The QMEA Ambassador Program attracts Queensland’s most talented students who are considering professional or VET pathways into the resources sector.

The students participate in a number of activities across a 12-month period that increase their understanding of the resources sector, provide unparalleled opportunities for networking with other students and industry representatives and develop leadership skills.

The students participated in a three-day camp, which exposed them to cutting-edge mining and resources innovation through their tour of BHP’s Integrated Remote Operations Centre, the CSIRO’s Queensland Centre for Advanced Technology (QCAT), the Hastings Deering Institute of Technology and the Queensland Governments safety in mining research station (SIMTARS), as well as experiencing a taste of life at the University of Queensland.

The camp provided a perfect opportunity for the students to increase their knowledge of the sector to inform their own pathways and to encourage other students to consider resources sector subjects and careers.

The students were presented with their certificates by representatives from industry, government and academia at a gala breakfast event attended by a wide range of education and industry supporters.



2018 QMEA Ambassadors tour labs in the Engineering faculty at UQ

Congratulations to our 2018 QMEA Student Ambassadors:

- Caitlyn Barnes, Moranbah SHS
- Ruan Bekker, Clermont SHS
- Zoe Boothby, Biloela SHS
- Itaal Brooymans, Nanango SHS
- Ainsley Childs, Chanel College
- James Fairbairn, Moranbah SHS
- Rosella Goh, Gladstone SHS
- Renae Keech, Tannum Sands SHS
- Andrew Knight, Spinifex SC
- Jake Knot, Pioneer SHS
- Cody Krafft, Biloela SHS
- Joshua Morley, Gladstone SHS
- Rylee Muller, Moura SHS
- Shye-Leigh Rankine, Cloncurry SHS
- Travis Richmond, Chanel College
- Conrad Spann, Chinchilla SHS
- Teliah Thyssen, Moura SHS
- Erasme Tumukunde, Bundamba SSC
- Rebecca Wheeler, Blackwater SHS
- Toby Winters, Wavell SHS



A 2018 QMEA Ambassador tries out augmented reality at CSIRO

POST-SCHOOL INITIATIVES

In this phase, drawing on QMEA expertise, apprentice readiness programs are delivered on behalf of companies to incoming apprentices.

APPRENTICE ONBOARDING PROGRAM

During 2017 QMEA helped facilitate two apprenticeship work readiness programs.

More than 30 new BHP apprentices and 12 MIGAS apprentices completed the separate programs before they commenced work on site. The program reinforces the companies' cultural expectations and focuses on safety and developing hand skills, enabling the apprentices transitioning seamlessly into their site roles.



A student tries his hand at welding during the BMA apprentice program

TEACHER PROFESSIONAL DEVELOPMENT

QMEA's annual teacher professional development (TPD) program includes a range of activities to support teachers in QMEA schools.

TEACHER PROFESSIONAL DEVELOPMENT

This year we continued to enhance the skills of our teachers in automation and robotics with application to the digital technology, maths and science curricula. In addition to Domobotics, we partnered with two new providers - STEM Punks and Red Dirt Drones.

INTRODUCTION TO ROBOTICS/ARDUINO

These introductory workshops were very successful in bringing new teachers into the digital technology world that QMEA has helped introduce at many schools. LEGO robotics (EV3) is a world-class platform for teaching design thinking and robotics and it enables to teachers to engage students in a variety of concepts. Arduino is an open-source electronics platform based on easy-to-use hardware and software, which helps teachers to make their classes more interactive.

BEYOND THE BASICS

Across term three 2017, QMEA facilitated Dr Damien Kee from Domobotics to run 12 full-day workshops across 11 locations. The content went beyond last year's introductory sessions to give more detail on how to implement Scratch, Arduino & LEGO EV3 robotics as well as some python programming. More than 80 teachers from more than 18 different schools attended a workshop.



Teachers across Gladstone took part in the two-day Mining Innovators Robotics TPD



Teachers enjoying the day at the Mining Innovators Robotics TPD

'I liked getting the time to get into higher level robotics and talk to Damien about how to guide students in learning the robotics program.'

Participant of a 'Beyond the Basics' workshop

STEM PUNKS

STEM Punks provides a series of exciting and innovative student workshops and teacher professional development sessions, which focus on creativity, innovation and entrepreneurship.

Sessions incorporate robotics, drones, 3D printing and advanced coding and have a resources/agricultural context. This demonstrates the use of these digital technologies in industry.

All sessions have included strong links to the digital technologies curriculum and general ICT capabilities with additional links to science and industrial design and technology curricula. The hands-on activities have been a most welcome part of these experiences.



STEM Punks

‘This was an excellent opportunity for staff and for students. Michael provided information in easily accessible formats and was able to offer something to everyone, from novice coder to those with some experience of more complicated coding platforms.’

Jenny Kent, Principal Millmerran P-10 State School

RED DIRT DRONES

Red Dirt Drones are experts in drone technology based in the Central Highlands region.

Phillip Richardson an operator with Glencore Coal, is CASA qualified and promotes the safe and responsible use of drones.

Phil has shared his time in Capella and Clermont working with students of all year levels teaching them aspects of drones and uses for them within different industries.

‘It was a fun lesson to learn about how flight works and drones are used. I liked how we got to touch the parts of the drone and discuss what they do to help the drone fly.’

Student at Clermont SHS



Students from Capella work with Glencore Coal and Red Dirt Drones on the Physics in Flight program

TONY YEIGH

From the success of 2016's visit to Gladstone, Santos GLNG once again put their support behind the engagement with Dr Tony Yeigh of Southern Cross University who visited the region to work with local teachers in two intensive professional development sessions.

More than 200 secondary school teachers attended the two 3-hour teacher PD sessions held during October pupil free day.

Dr Tony Yeigh is an expert in the teaching areas of educational psychology and classroom management. He has a keen interest in the area of working memory and classroom instructional design, while examining the relationship between cognitive load and cognitive inhibition.

Gladstone SHS teachers looked at strategies to reduce cognitive load and the stages of learning development while Toolooa SHS, examined ways to improve engagement with students at all levels with new and innovative teaching techniques.



A bird's eye view at Capella SHS, thanks to Red Dirt Drones

CENTRE OF EXCELLENCE

QMEA/ALEXANDRA HILLS CENTRE OF EXCELLENCE IN AUTOMATION & ROBOTICS

There has been consolidation and growth since last year's launch of the innovative QMEA/Alexandra Hills State High School Centre of Excellence in Automation and Robotics (COE).

The centre has both an in-school approach and broader outreach program to students and teachers across all QMEA schools.

'The COE offers a real-world industry/school/university partnership including automation as part of the every day curriculum. Working across multiple subjects and year levels it integrates industry practice and application and while familiarising students and teachers with leading technological research undertaken at universities.'

Gail Armstrong, Principal, Alexandra Hills SHS

HIGHLIGHTS:

- A 'special coding project' was brokered between QMEA sponsor Glencore MIM and Alexandra Hills State High School to solve a real-life issue using digital technologies.
- The inaugural INNOVATE – Redland City STEM Competition. Developed in partnership with Redland City Council, the competition aims to develop and encourage STEM-related skills of students in Years five to eight through science investigations, video game development projects and robotics challenges. 11 primary and secondary schools competed in 2017. INNOVATE was supported by QMEA industry partners including Hastings Deering Glencore Technologies, and tertiary institutions QUT and Griffith University. Plans are under way for an expanded competition in 2018.
- QMEA third-party providers Domabotics and Red Dirt Drones have provided guidance in the development of curriculum units in design and technology, digital technology and science so that students exposed to real-world applications of automation and developing industry desired skills.
- New school/industry partnerships have been established, including RAW-Robotics, Red Dirt Drones, Actemium, Glencore Technologies and Griffith University.
- The QMEA brokered industry site visit and guest presenter opportunities including CSIRO Queensland Centre of Advanced Technologies; Hastings Deering CAT (automation facilities); Australian Centre for Robotics Vision and QUT STEM ambassadors who delivered student workshops at school.
- QMEA ensured the sharing of digital technology knowledge with regional schools through teacher professional development workshops hosted at Alexandra Hills State High School.
- Schools piloted QMEA activities in automation and robotics (Beakers. Bots. Build) ahead of rollout to other QMEA schools.
- QMEA facilitated significant upskilling of staff at Alexandra Hills SHS through peer-delivered and externally sourced PD on the teaching of coding, robotics, drones and automated systems.



Richard Murray of Alexandra Hills SHS with student



Luke of Hastings Deering with students from Alexandra Hills and Wavell Heights at Beakers.Bots.Build

'The COE prepares students and their teachers for the future world of work and provides a potential pipeline of students into the resources, mining, equipment, technology and services (METS) and other technology savvy industries such as agriculture, medicine and aerospace.'

Katrina-Lee Jones, Director, Skills Education and Diversity

SHAVE FOR A CURE

QMEA students raise record amount for Leukaemia Foundation

QMEA students almost doubled their fundraising efforts in 2017 for the Leukaemia Foundation's Shave for a Cure event.

A total of 13 QMEA schools took part, compared with four in 2016, increasing their fund-raising from \$4500 to more than \$13,000, a 190 percent increase. Alexandra Hills State High School raised the largest amount and the highest fundraising school per student was Moura State High School. Both schools have been presented with trophies.

All 13 schools have signed on for next year.



OUR SPONSORS

QMEA looks forward to 2018 in building on its successes, achievements and outcomes for students, teachers and industry.



WHERE ARE THEY NOW?

RILEY STEWART

It's no wonder Biloela's Riley Stewart (pictured far right), 17, decided he wanted a trade for a career – he will be the fourth generation in his family to do so. In 2015 Riley joined 19 other students to get a real taste of what a career in the resources sector could hold. This year the former Biloela State High School student was one of 21 apprentices selected by mining support company Hastings Deering to train as a diesel fitter in the company's first round of apprenticeship intakes.

Based at Hastings Deering's Rockhampton branch, his first few months included basic training to familiarise himself with his new work environment. The real milestone moment was the day he started work on the big machines brought into the branch for maintenance and servicing.



ELAINE ELEVERA

Meet Elaine Elevera, a former Wavell State High Student and a 2014 QMEA Student Ambassador. Elaine began her affiliation with the QMEA in 2013 when she was selected for the QMEA's Make It Now Engineering Challenge. Alongside 21 other budding engineers and apprentices throughout Queensland, the challenge offered the opportunity for Elaine to immerse herself in the resources sector.

The highlight of this challenge was going into the underground copper mine, and it was there that Elaine gained a true appreciation of the magnitude of the operation. Now in her penultimate year of process engineering at QUT, Elaine has had vacation work with Peabody and will take on summer vacation work with Shell during the summer break ahead of an exchange program with University of Denmark.

'The magic moment for me was being chosen for an apprenticeship when so many others applied. To be chosen over thousands is really something. I honestly believe the opportunities I had as a QMEA ambassador really helped me achieve my goal and I am forever thankful for every opportunity that has come my way.'

Riley Stewart

SARAH COUGHLAN

Sarah Coughlan is a QMEA success story to come out of the regions. Graduated from Nanango State High School in 2011, Sarah now works for Anglo American as a graduate mining engineer.

So far Sarah has worked in technical services learning how to operate equipment and the processes for mining, helped in the office for the operations planning and planning for ventilation contractors underground. Sarah's future goals include joining the Operational Leaders Pathways Program. Sarah was a guest speaker at the QMEA end of year breakfast celebration in 2017.



MIGUEL PENGEL

Aeronautical engineering was all that was on Miguel Pengel's mind, at least until he came into contact with QMEA in his senior years of high school. It was at Toolooa State High School in Gladstone that he discovered a whole new world of engineering and decided to take on a mechanical engineering degree, as well as aeronautical. Miguel credits the QMEA for expanding his horizons.

Miguel has secured vacation work with Batchfire Resources and his next step is to secure a graduate placement in a resources sector company to set him firmly on his path.

WHAT'S NEW IN 2018?

On top of the many and varied workshops QMEA provides, 2018 will see the addition of even more new and exciting opportunities, including;

- **Augmented and virtual reality**, within the context of a new autonomous vehicle program
- Collaboration with other key stakeholders to bring QUT's **Indigenous 'SID' school camp** to life (a five-day camp giving Aboriginal and Torres Strait Islander students an opportunity to learn about university pathways and experience what it's like to go to university)
- A **Digital Disruption Camp** at the University of Queensland (UQ)



Virtual reality comes to life



Augmented reality a reality



Opportunities for indigenous students

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