Imagineering's own mission to inspire tomorrow’s engineers through positive experiences of engineering and technology has been reinforced following a recent report by EngineeringUK.

‘Engineering UK Report 2016-The State of Engineering’ an all-encompassing report presents a comprehensive portrait of UK engineering and manufacturing and the links with education. However a disturbing picture is also emerging of poor quality of teachers, a shortage of specialist teachers and a distinct lack of their knowledge of routes to engineering careers.

The Report states: ‘The education of the future workforce needs to be underpinned by a highly valued and highly skilled teaching profession. The current reality, however, does not reflect this need. There are also too few teachers with specialist subject knowledge at all stages of education.’

‘The UK at all levels of education does not have the current capacity or the required rate of growth needed to meet the forecast demand for skilled engineers and technicians by 2022.

‘The Report does however point to an increase in positive perceptions of engineering amongst 11-16 year olds, attributed in part to major expansion in school engagement activities among the STEM community. Research has also shown that enjoyment in STEM subjects is significant in a pupil’s likelihood to pursue that subject further.

While this report provides calls to action with aspirations to meet – it unfortunately does not describe the ‘how’. However Imagineering is doing its part in providing connections between education and employers through STEM delivery and collaboration. It provides fun activities and role models, facilitates companies going into schools, highlights links to the Curriculum and real life applications – but it can only go so far. Somewhere along the line someone needs to address the issue further back down the line – the provision of more training and support for the teachers, to help them also to deliver tomorrow’s engineers – and that is going to take time.


INTERESTING FACTS:
* Engineering generated £455.6 billion GDP for the UK in 2014.
* It employed 5,529,000 people (two thirds of whom are practising engineers and technicians)
* Supported 14.5 million jobs in the UK
* It is 68% more productive than the retail and wholesale sector.
* Every time a new job is created in engineering, two more jobs are created elsewhere in the UK.
The High Sheriff of Warwickshire, Mrs Janet Bell Smith, paid a special visit recently to St Nicholas C of E Primary School in Kenilworth to learn more about the school’s two Imagineering Clubs, run weekly for Year 6 pupils.

The delighted children happily talked to Mrs Bell Smith about the working models they were making. Mrs Bell Smith commented: “I was very impressed both by the enthusiasm of the young people taking part in an after school activity which gives them such a positive first experience of engineering and also the dedication of the volunteers who support this initiative. How lucky we are to be able to offer such opportunities for pupils today.”

Each Club is run by volunteer engineers – Imagineering Chairman Bob Shanks runs one with assistance from retired engineers John Shiell and Bill Bailes. The other Club is headed by Richard Earp, a senior engineer at National Grid, assisted by Mark Perry and Adam Newington.

Bob Shanks said: “We are setting up the children with skills for the future, and hopefully sow a seed or two to lead them to becoming the much-needed engineers of the future.” He added: “The first Club, set up over ten years ago, proved so popular that a couple of years ago we had to open up the second one!”

And what do the teachers say? “Imagineering is very well established in our school and is very popular. We always have a waiting list of children wanting to take part. It is particularly beneficial for reinforcing the importance of reading instructions carefully and encouraging them to raise questions.”

Isabelle G, a former Inter-engineering Club member at Harris CofE Academy in Rugby (see page 4), now in Year 10, said: “Imagineering really sparked my interest in engineering”. She has since taken up the opportunity of attending a special course in automotive engineering at Coventry University (sponsored by Smallpeice) and a National Grid sponsored course in power generation.

She added: “Imagineering makes learning fun, because you are learning through doing practical things. Being a member of the Club gave me opportunities to experience the things you can do in engineering, and it helped me to realise what a wide and interesting subject it is.” Isabelle hopes to take A-levels in maths and science subjects before entering an engineering apprenticeship.
Imagineering Foundation is constantly reviewing its STEM projects for delivery in schools and Clubs, matching to subjects on the National Curriculum.

It has recently introduced a special individual three-kit Electromagnetism package—incorporating three of the main projects from the Imagineering Clubs suite of projects—Magnetic Compass, Steady Hand Game and Morse Key & Buzzer.

This package, aimed at Key Stage 2/3, comes complete with Instructions, Tutor/Teacher Notes, Worksheets, Curriculum Links, Lesson Plans, Pupil Project Record Sheets, Tool Spec and H & S guidelines.

Ideal for delivery over 1 term by all teachers and STEM deliverers.

**UPDATED AND UPGRADED— FOR INTER-ENGINEERING CLUBS**

The Electric Car (above left) and the new robotic vehicle, the ‘Imagibot’ (above right) are exciting new versions of some favourites in the Inter-engineering Clubs. The Imagibot uses ‘Crumble’ programme coding and picks up on gears, wheels and circuits in the National Curriculum. The Electric Car has been upgraded, refined and improved and covers motor, gears, circuits and linkages.

NEW HALF-DAY IMAGINEERING CHALLENGE

There is also a new half-day Technology/ICT activity aimed at KS2 Years 5/6.

The 'Imagibot', one of the key projects in the Inter-engineering Clubs schedule, is also available as a half-day Challenge for a class of up to 30 children, working in teams of three.

Pupils can design the graphics for the chassis, construct and program their own Imagibot using 'Crumble' Scratch-based software and then take part in the Skittle Run.

The session also includes a presentation on Robotic Systems.

For more information contact Peter Lock on: peterl@Imagineering Foundation.onmicrosoft.com

Order from:
HME Technology Ltd,
Saxon Park, Stoke Prior,
Bromsgrove B60 4AD
Tel: 01527 839000
In the Spotlight
In the spotlight this issue is the Harris C of E Academy in Rugby and its InterEngineering Club

The Inter-Engineering Club at the Harris Church of England Academy in Rugby has been running weekly in Year 7 for four years. Different children enjoy the experience each year working on the more advanced kits including the Hydraulic Arm and Wind Turbine.

The tutors are volunteers—Richard Ierna, a Power Systems Engineer at National Grid (and a former pupil) and Tony Conway, a retired mechanical engineer who has worked in the motor, heavy electrical and aluminium industries.

Tony Conway is very experienced and has been running the Club at Harris Academy from the start. He said: “In the Club they pick up how useful engineering is in society at large and they link the science they learn to what is needed in real life. They are also learning skills that will be generally useful in their lives.”

He continued: “It is very rewarding tutoring in the Club when you see the self-confidence building especially in those who are not too academic. The Club can help the children to discover skills they didn’t know that they had and then build on those.”

Richard Ierna has been an Imagineering Club tutor for at least ten years, with the support and encouragement of his employer, National Grid. He said: “The children get a lot out of it and they enjoy the experience. It is putting them in contact with working engineers and they learn what we do.”

“Engineering and science can be a mystery to them at this stage but we are breaking through the myth and putting different perspectives on it all.”

Maths teacher Gurj Dhilllon oversees the Club and said: “There is a lot of value in the Inter-Engineering Club. The pupils learn about engineering; they become more confident; they co-operate with each other. Some Year 10 pupils here are former Club members and have recognised that, when they are starting to study some of the maths and science they first came across it in the Clubs. It gave them a look ahead, something of a preparation, and they became familiar with terms and language.”

And a word from Club members.

Max T: “It’s really creative and I like making things – I like working with tools.”

Leon: “It’s good fun and I enjoy making things and we take them home.”

Abbie: “I like making stuff and the wind turbine is fun. I do mixed science at home and I have some fun kits.”

Aiyana: “My Dad makes things and I help him make them work and I help with telecommunication circuits. I like using tools and I get to learn what they are and what they are for.”

Jareth: “It’s good to learn different skills. I have learnt how to wire, about motors and how LEDs and a PCB work and how to solder. I have an electric set at home and do mechanical LEGO. I think might become an engineer.”

Jacob: “I wasn’t expecting to be able to join the Club as so many wanted to do it! I’d like to be an engineer or mechanic when I am older. I like learning how to use tools. I can create electric circuits now – clever.”

Max E: “I enjoy putting things together and making them work, playing with the when I have finished. Did Moisture Sensor and Fuse Tester first but they are all good. I am learning a lot.”

Josh: “It is amazing! I like it cos you get to take them home and learn something every time. I have learnt about resistors and got to know about electrical circuits. We are doing the wind turbine now and it is fun.”
MORE UK COMPANIES SUPPORT IMAGINEERING CLUBS

One major issue continuing to face manufacturing industries is the need to engage more with schools. Two quite different organisations have stepped up and are successfully taking Imagineering activities into local schools.

Bulk materials handling manufacturer Guttridge plc in Spalding, Lincolnshire has been running an Imagineering Club in the local Monkshouse Primary School this last year.

Guttridge

Guttridge HR advisor Bobbie-May Schlechter said: “We are very keen to encourage children to become involved with Guttridge and engineering in general with the eventual goal of finding enthusiastic and high calibre employees of the future. The children have loved every minute of it and the school has been delighted that we approached them to be a part of the project.” She continued: “However, for me, the most surprising and valuable aspect of the initiative has been the enthusiasm of our eight members of staff who volunteered to take part. The process has

A helping hand from a Guttridge tutor involved working together and planning as well as the taking part and has served as a fantastic team-building exercise.”

“This will benefit us in the short term as well as fulfilling our longer term objectives of engaging with the local community and teaching young people more about the exciting challenges of engineering.”

“Our involvement in the Imagineering project is our way of investing in the UK’s future workforce. It has been extremely rewarding to see the children actively engaged in measuring, making and understanding the projects and how the principles they demonstrate are applicable to real life situations.”

Elsewhere in the country, Stuart Gilbert, Production Engineer at Tewkesbury company MecWash, manufacturers of wash systems for engineering businesses, ran an after-school Imagineering Club at Bengeworth CE Academy in Evesham which was a resounding success.

Managing Director John Pattison said: “MecWash recognises the importance of ensuring that the next generation understands the vast array of exciting careers to be found in engineering and manufacturing.

More happy ‘imagineers’! This time at Bengeworth CE Academy

These are just two companies that are looking ahead and have experienced some of the benefits of engaging with the next generation of engineers using Imagineering projects - developing engineers of the future; boosting recruitment; developing personal, professional and leadership of staff, team building, as well as fulfilling CSR and community programmes.

Imagineering continues to establish close links between education and manufacturing across the UK and is providing the tools to do the job. Hopefully more companies will recognise the need for direct contact with schools for that essential early start on a career path to engineering.
Philip Purkis has been running a successful Imagineering Club at Scotton Lingerfield Primary School in Knaresborough, Yorkshire for some years. Philip explains how he became interested in STEM subjects and how he brings his experiences to inspire and interest the pupils in his Club.

As a boy I was switched on to STEM by enthusiastic teachers, particularly my chemistry teacher Mr Bates. I formulated unstable and pungent substances in my attic playroom, made smoke bombs and other fireworks.

Another boyhood pleasure was pottering around electronics shops in Tottenham Court Road and nearby in what is now London's China town. I'd rummage in the bins for aircraft instruments, telephone generators, neon lamps, relays, instrument panels, gauges, motors and mysterious geared things. It was fascinating to take things to pieces and see how they worked.

Model engineering became an interest and I started building steam engines, acquiring a lathe and other metal machining tools.

How does this help my role as a STEM ambassador and Imagineering tutor? Quite a lot actually. It might supplement learning points from an Imagineering kit or just be a demo to attract the children's attention, a gyroscope, Victorian bell or Jacob's Ladder circuit that makes a blue crackling spark rising up the tall electrodes.

Or a USB microscope to examine a mechanical watch, insect specimen or decapitated integrated circuit.

You don't have to be an engineer to become an Imagineering tutor like Philip. You too could bring your own everyday life experiences to an Imagineering Club and demonstrate how engineering is such an intrinsic and essential part of our every day life. If you have some practical skills and can spare an hour a week, you can find out more about becoming an Imagineering Club Tutor or helping out at a Club by going to: www.imagineering.org.uk/clubs. There is plenty of information and background information on each project.

EXCITING NEW PROJECT AT MYTON SCHOOL

Each year the graduates of the previous year's Inter-engineering Club at Myton School in Warwick take on a special STEM project, using skills they learned in the Club, under the guidance of David Bray, their Imagineering tutor who has been supporting the Club for years.

This year’s graduates are making a test rig (right) to investigate the effects of different coloured light on growing plants. The rig consists of six chambers made from 2-litre pop bottles, five of which are clad with aluminium foil. The bottles have Red or Yellow or Green or Blue LEDs, one with none and one blacked out.

The pupils have made the PCBs to mount the LEDs and are making the frame to hold them at a fixed distance above the seeds, which initially will be Cress as it grows quickly.

The next stage is to make the chamber to hold the bottles at the same temperature and humidity conditions. This project has been inspired by Warwick University research work.

Last year’s Inter-engineering 'graduates', above, designed and constructed a go-kart from recycled materials and powered by 2 battery-powered hand drills—very successfully!
Imagineering’s team of dedicated volunteers not only support a number of Imagineering Clubs but also have taken a lively presence at a number of public events around the country over the last year. Here are just a few snapshots from some of the shows.

IMAGINEERING FAIR, Royal Bath & West Show, Shepton Mallet (right & below)
This event saw record numbers through the doors over the four days.

LONDON MODEL ENGINEERING EXHIBITION, Alexandra Palace (below & right)
Attracted some happy ‘imagineers’ eager to have a go at anything!

IMAGINEERING FAIR, Ricoh Arena, Coventry
A wide range of companies and engineering organisations laid on scores of fun activities. (below)

CALLING ALL VOLUNTEERS!
Volunteer help is always needed at all Imagineering events—it is great fun and very rewarding. If you would like to know more email Joy Smith E: joy.jcm@btinternet.com

IN MEMORY
Imagineering received the sad news earlier this year of the passing of Michael Denny. Well-known in the Meccano modelling world, he was also a long-standing supporter of Imagineering and brought his marvellous Meccano models to many Imagineering events for over a decade.

A kind, generous man with a great sense of fun who believed children should experience things for themselves and all his models had bells to ring, buttons to push or handles to turn—he never minded if they broke them, he would just mend them again!

He will be sadly missed. RIP
WHO SAID BOSSES SHOULD NOT HAVE FUN TOO!

There were some hilarious fun and games— and evidence of some seriously competitive characters—when a number of directors and senior managers got into the spirit of a special event at the National Motorcycle Museum earlier this year.

The light-hearted event was laid on by the Advanced Propulsion Centre (based at Warwick University) on the first day of the ‘Future Powertrain Conference.

Imagineering volunteers supervised a special Imagineering Challenge. Working in teams, the delegates had to build to a specification, an electric vehicle, powered by battery, with an articulated trailer to carry a golf ball. This 'rig' was tested and evaluated including its performance crossing a bridge and the dramatically-named ‘Valley of Death’.

Everyone took the Challenge very seriously—especially when they were told that pupils in Years 9/10 soon sweep through it!

The event illustrated the kind of walk-in opportunities Imagineering can provide for companies working with schools.

DATES FOR THE DIARY

Imagineering has a busy year as usual with all kinds of events planned.

Some are for the public and the team will be welcoming families together in partnership with companies and engineering organisations. Others will see Imagineering introducing fun activities to children of all ages from schools and scouting groups. More information can be found on the website or social media – in the meantime here are some of the highlights to come.

1-4 June
IMAGINEERING FAIR
Royal Bath & West Show, Shepton Mallet, Somerset

13 June
RED ARROWS STEM EVENT
RAF Scampton, Lincoln

17-19 June
ROYAL THREE COUNTIES SHOW
Malvern Worcestershire

2 July
RNAS YEOVILTON INTERNATIONAL AIR DAY
Ilchester, Somerset

4 October
MALVERN FESTIVAL OF INNOVATION
Next Generations Day

11-13 October
SCARBOROUGH ENGINEERING WEEK
Yorkshire

November (date tbc)
IMAGINEERING FAIR,
Ricoh Arena, Coventry

Imagineering Foundation is an independent Charitable Incorporated Organisation number 1158003. It is dependent on grants and donations. To find out how you can support this charity and the young engineers of tomorrow, go to:

https://imagineering.org.uk/donate

Thank you

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