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Diversity and Inclusion

NFEC Annual 2019 Conference

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Diversity and inclusion

What are they?

Video link
https://www.youtube.com/watch?time_continue=3&v=C1vskzOpR9s&feature=emb_logo

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'**Diversity** considers similarities and differences in terms of age, ethnicity, disability, gender and religion; and less visible differences such as sexual orientation, disability [also], religion, educational background, personality type, nationality etc.'

'**Inclusion** is extent to which individuals feel valued for who they are (e.g. personal and professional background, experience and skills) and the extent to which individual feel they belong/'fit' in the engineering profession and in their organisation.'

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Creating cultures where all engineers thrive

Key findings: culture themes and inclusion indicators

Engineers from diverse backgrounds took part in a survey to assess culture and inclusion in engineering

9 themes describe the culture across engineering employment

Problem-solving	Safety-conscious	Proud
Loyal	Team-oriented	Flexible in places
Friendly but not personal	A strong attachment to tradition	Job vs career

7 indicators engineers look for to assess the extent of inclusion

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Creating cultures where all engineers thrive key findings: benefits of inclusion

Inclusion benefits the performance of **individual engineers**:

- 80% increased motivation
- 68% increased performance
- 52% increased commitment to their organisation.

Inclusion benefits **organisational performance**:

- understand business priorities
- be confident about speaking up on improvements, mistakes or safety concerns
- see a future for themselves in engineering.

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Drivers for D&I in Engineering

Women and Minorities in Leadership Roles

The UK BAME community =14% population. What percentage of CEOs in FTSE 100 companies are not white in 2017?

How many female bosses were in the FTSE 100 in 2017?

When did a Fortune 500 company had its first openly gay CEO?

As of August 2018, how many women CEOs in the Fortune 500 index were there?

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Drivers for D&I in Engineering

Women and Minorities in Leadership Roles

- How many female bosses were in the FTSE 100 in 2017? - **Seven**
- The UK BAME community =14% population. What percentage of CEOs in FTSE 100 companies are not white in 2017? - **4%**
- When did a Fortune 500 company had its first openly gay CEO? **In 2014, Tim Cook became the first openly gay CEO of a Fortune 500 company**
- As of August 2018, how many women CEOs in the Fortune 500 index were there? - **Only 22 women CEOs in the Fortune 500 index.**

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Drivers for D&I in Engineering

Report "**Creating Cultures Where All Engineers Thrive**"

71% of disabled engineers described themselves as feeling very/quite included vs 83% of non-disabled respondents.

BAME (85%) engineers were more likely than their white (58%) colleagues to report that assumptions are made about them based on their ethnicity or nationality.

Six months after graduation, 14% of black engineering graduates were unemployed, compared with only 7% of white engineering graduates

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Drivers for D&I in Engineering

Automatic bathroom soap dispenser –white hands only

Google's speech-recognition software - 70% more likely to recognise male speech.

Voice (e.g. Alexa) Is the Next Big Platform, Unless You Have an Accent

Seatbelts do not work well for pregnant women

Body armour-not fit for women's bodies

Longer commuting time for people with disabilities

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Masculine, Feminine or Neutral?

- Active
- Ambitious
- Analytical
- Brave
- Challenge
- Committed
- Competitive
- Confident
- Connected
- Cooperative
- Decisive
- Dependable
- Determined
- Empathetic
- Honest
- Independent
- Interpersonal
- Leader
- Loyal
- Nurture
- Objective
- Outspoken
- Responsible
- Sensitive
- Supportive
- Trust
- Understanding

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Types of bias

- Confirmation / anchoring bias
- Expectation bias
- Halo and horns effect
- Mirror image bias / affinity bias
- Best of bad bias
- Contrast effect
- Primacy and recency effect
- Central tendency

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Types of Bias - definitions

1. **Confirmation/anchoring bias** – looking to confirm your initial impression
2. **Expectation bias** – based on hearsay, something you've heard about the candidate prior to meeting them
3. **Halo and horns effect** – tendency to allow one's judgement to be influenced by whether your like (halo) or dislike (horns) someone based on your instincts or small cues
4. **Mirror image/affinity bias** – leads us to favour and select people who are like us
5. **Best of bad bias** – nobody reaches the benchmark set but you pick the best of the unsuitable candidates
6. **Contrast effect** – you compare candidates with each other, not against the assessment criteria
7. **Primacy and recency effect** – you remember the first and last person you review/interview, those in between are forgotten
8. **Central tendency** – Going for the 'easy option' by only using ratings in the middle of a scale and not scores at the extreme ends of the scale (eg 1/5) and requires more justification

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Free engineering contextualised resources for level 3

- A series of engineering resources with interactive elements that cover engineering
- Electrical & electronics principles and mechanical principles
- Developed in response to requests from college lecturers
- They start off with a real-life problem to solve
- They develop the engineering science and relevant mathematics to solve the problem

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Resources continued

What are the Benefits?

- Contextualised problem statement
- Background theory
- Interactive elements to test theory
- Free to use
- Free up teaching time
- Stretch and challenge activities
- Model answers

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Current Resources

Electrical/electronic

- AC phasors & fault detection
- AC power & power factor
- Filtering AC signals
- Kirchhoff's laws
- AC characteristics and AC waveform addition
- Solenoid valve – Magnetism

Mechanical

- Centre of gravity of composite bodies
- Forces, centre of gravity, reactions & stability
- Friction & sliding
- Force on a dam
- Co-planar forces on a crane
- Motion of a tube train – SUVAT
- Fireboat projectiles –SUVAT equations in two dimensions

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http://stemresources.raeng.org.uk/resources/post-16/

ACTIVITY

RESOURCES

AC phasors and fault detection

Electrical & Electronic: AC theory | Resistance, reactance and impedance

Mathematics: Phasors | Vector addition | Pythagoras' theorem | Trigonometry

Prerequisites: None

ACTIVITY

RESOURCES

Forces, centre of gravity, reactions and stability

Mechanical: Centre of gravity | Forces | Moments | Reactions | Resolving forces on an inclined plane

Mathematics: Angles | Trigonometric identities

Prerequisites: Centre of gravity of composite bodies

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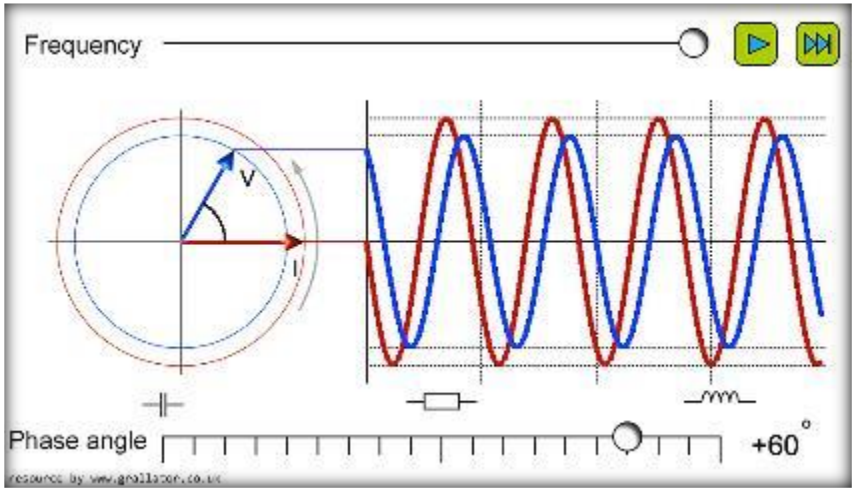

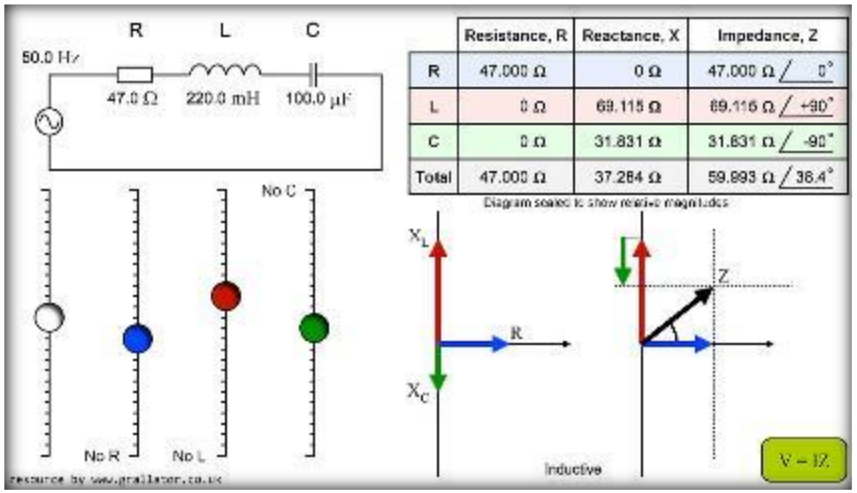

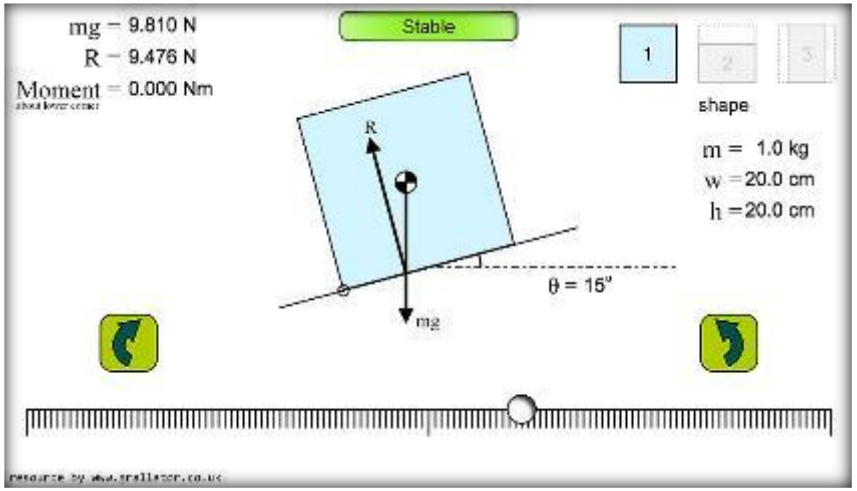

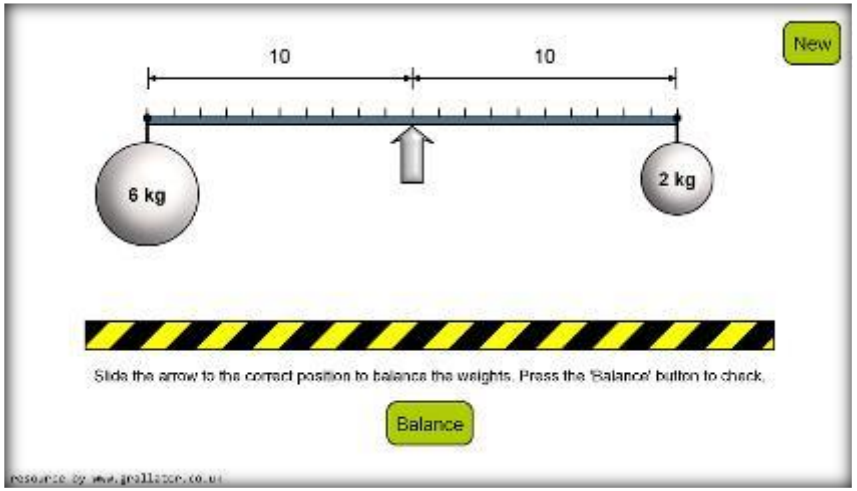

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Case Studies

Female technicians and engineers case studies that can be used by providers of further education to promote diversity and inclusion in engineering.

Benefits

- Promotes females into engineering
- Shows how they got to where they are
- Explains what they do day to day
- What challenges they have
- Advice for future technicians and engineers

https://www.raeng.org.uk/education/post-16-education/case-studies

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Thank you

Any Questions

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