

## **AHEP 4 Workshop: 12 July 2021**

### **Workshop report**

#### **Background**

This report details feedback from workshop discussions as well as associated zoom chat.

The objective of the virtual workshop was to support and encourage consistency in degree accreditation activities, as AHEP 4 is implemented.

Accreditations and PEI staff were given an opportunity to hear from and ask questions of:

- Sean Wellington, the Chair of the AHEP Working Group
- Speakers with expertise on topics that have an enhanced focus in AHEP 4

The workshop was proposed by members of EAB to allow representatives of multiple professional engineering institutions (PEIs) to hear Sean Wellington providing a briefing on AHEP 4 in a single event.

Members of the Engineering Accreditation Board, representatives of PEI committees that look after academic accreditation PEI staff working around accreditation, and Registration Standards Committee were invited to attend. Around 80 people participated, representing the following PEIs: IAgRE, BCS, CIBSE, CIHIT, EI, ICE, IChemE, IET, IMarEST, IMechE, IPeM, InstMC, IStructE, RAeS, The Welding Institute.

*Note the order of presentations was revised from that on the agenda to enable technical issues to be resolved.*

#### **Welcome – Alistair Greig (EAB Chair)**

The Chair welcomed everyone to the event, thanked The Engineering Council for organising the event and introduced the first speaker.

#### **AHEP 4 presentation – Sean Wellington (AHEP 4 Working Group Chair)**

Sean thanked the group for inviting him to the event and introduced himself. He thanked everyone who had contributed towards development of the standard, including working group members, everyone who provided feedback and Engineering Council staff.

Sean explained the background to changes AHEP 4 and the Working Group's hopes for how the standard would be used.

Sean's presentation covered: context and drivers for change, a response to changes on the AHEP standard, and some personal reflections including his hope for enthusiastic adoption of the standard to bring it to life. Sean outlined how the group hoped that the standard would provide a good reference point for academics to utilise in designing innovative new programmes. He confirmed the aim for the revised standard to address things that were important to the engineering profession and wider society such as environmental sustainability, innovation, ethical practice, diversity and inclusion, and security.

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He emphasised that AHEP 4 is not intended to limit innovation in teaching and assessment and that he hopes PEIs will resist the temptation to additional requirements or layers of complexity.

He made reference a paper by his IET colleague Dik Morling who wrote a paper summarising changes to the standard and thanked him for this work.

Sean explained that from the outset the working group were keen to:

- Produce a document that could be used as a reference point for academics when designing programmes and to prepare to accreditation visits. Therefore AHEP 4 includes information on topics such as distance learning, degree apprenticeships and compensation and condonement, that was previously in separate guidance.
- Maintain alignment with UK-SPEC, which specifies the competence required for registration whilst AHEP specifies the underpinning knowledge and understanding.
- Have demonstrable equivalence between routes to registration, so that the for example to BEng (Hons) + MSc CEng learning outcomes are equivalent to the MEng CEng learning outcomes, and learning outcomes are introduced for Foundation degree (or equivalent) and top-up degrees.
- Present a single and progressive and reduced set of learning outcomes in a tabular format. This has resulted in a maximum of 18 learning outcomes being specified for any accredited programme.
- Include learning outcomes for equality, diversity and inclusion (EDI) and for security. The EDI learning outcomes reflect introduction of the topic within UK-SPEC and inclusion of security was at the request of the Engineering Council's Registration Standards Committee.
- Respond to the paradigm shift where engineering graduates are required to respond to problems in any application domain rather than specifically engineering problems, with the standard using definitions of broadly defined and complex problems that relate to the expectations for IEng and CEng registration respectively.
- Qualifications that can be accredited have been pegged to International Standard Classification of Education (ISCED) levels.
- Include more information about accreditation process and evidence base.
- Make explicit that the Engineering Council is agnostic on teaching and assessment methods so long as degrees address the required learning outcomes.
- Increase alignment with international accords, including to ensure that partial CEng bachelors better align with the Washington Accord graduate attributes.
- Introduce or strengthen coverage of design and innovation, sustainability, ethical practice, EDI and security
- Formalise expectations for industry engagement with curriculum design and delivery, student engagement with professional practice, and for EDI.

He emphasised that:

- AHEP standards are threshold standards so providers can exceed them if they wish.
- Revisions were informed by significant consultation and feedback which was contradictory.
- AHEP 4 is designed to align with external reference points.
- Language in AHEP learning outcomes reflects language of UK qualifications frameworks with active and demonstrable learning outcomes.
- Feedback has been received about PEIs being inconsistent in accreditation practice and that it is desirable for PEIS to be more consistent and only have differences in accreditation processes where necessary for disciplinary reasons.

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He talked through how some of the AHEP 3 learning outcomes had been replaced by AHEP 4 learning outcomes including through pulling out application which requires knowledge and understanding. He confirmed agreement with Dik that in some places learning outcomes are at a higher level this was intentional including to align with external reference points and respond to with required compromise to inconsistent consultation feedback.

Sean highlighted that the AHEP learning outcomes have been incorporated into the new Engineering Council standard Approval and Accreditation of Qualifications and Apprenticeships (AAQA). AAQA also specifies learning outcomes for qualifications at lower levels so we now have a set of learning outcomes to support all provision of interest to the engineering profession.

Sean commented on the new [Engineering Council Strategy](#) and that whilst published more recently than AHEP 4, he noted that both documents emphasise:

- diversity and inclusion
- international recognition
- sustainability
- ethical principles.

The Strategy also makes reference to a more digitality inclusive profession which was considered during AHEP 4 consultation but omitted as some PEIs did not support AHEP addressing this. He suggested that the next edition of AHEP should emphasise digital innovation.

### AHEP 4 Q&A

Question (posed by an IMechE accreditor and academic): Some of the LOs are the same for L6 and 7, so potential for students to do the same LO in one year and then repeat it in the next year at a different implied level. Do we need to assess these learning outcomes twice?

Sean: *The expectation of the working group was that a learning outcome will be demonstrated with a more sophisticated knowledge base even where at masters level even where the wording is similar or the same at other levels. Sean spoke about the security learning outcome as an example, he suggested that on an integrated masters students would look at more challenging and open ended problems than students on a bachelors programme, but acknowledged that the learning outcome was not repeated for MSc.*

Question (posed by a BCS accreditor and academic):: Emphasised that he thought AHEP 4 was a huge improvement in every respect. The differences in how the PEIs measure the learning outcomes will become clearer as the learning outcomes are now more concise, is there any advice as to how to go about harmonising the approaches of the PEIs?

Sean Wellington: *One of the suggestions he made was that they ran a conference but this AHEP event fulfils that aim to support open discussions and coordination across the PEIs. If the working group had more time they would have liked to produce guidance, but he also recognises as a white male he might not be the right person to draft guidance on EDI. He also emphasised the role of EAB in coordinating PEIs. He hopes the reduced LOs will help accreditors and HEIs to focus, as well as enabling HEIs to have the scope to introduce contextualised learning.*

Andy Downton (IET/EAB Deputy Chair): *The experience has been that the previous quantity of learning outcomes has proven to be a problem for most departments. He also spoke about the Engineering Council review of accreditation and his supplementary desk review of PEI documents and his expectations that implementation of recognition would help to address inconsistencies.*

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*Dik Morling (IET accreditor, author of report Sean mentioned): Praised AHEP 4 compared to AHEP 3 and praised Sean's work. AHEP 3 had some very useful learning outcomes but some were buried due to the number. The purpose of his paper was to emphasise that people were ignoring some learning outcomes in AHEP 3 and they were easier to see in AHEP 4, and that the reduced number of learning outcomes did not make the standard easier.*

Question (posed by an IChemE accreditor): Asked whether equality and diversity and sustainability need to go beyond learning outcomes to support behavioural changes within the wider engineering profession.

*Sean Wellington: AHEP 4 was developed with a lot of negotiation and he feels it is a step in the right direction, but he hopes that these areas are developed more in future and that people in leadership roles can champion change including by supporting diverse colleagues, looking closely at curriculum and attainment caps etc. He would have liked to have further but a compromise had to be reached and it is important to take people with us on journey to change. He emphasised the importance to diverse teams to work on design of products that meet the needs of diverse markets.*

*Dik Morling emphasised that this is content within AHEP 4 that goes beyond the learning outcomes.*

Sean mentioned that he had written a paper providing a personal commentary on AHEP 4.

### **Equality and diversity presentation – Joanna Horton (IMechE)**

Joanna introduced her presentation emphasising the equality is not the same between equity. Equality means each group is given the same resources whilst equity recognises need to treat people differently depending on need.

Joanna quoted relevant sections of AHEP and emphasised the group 11 learning outcomes.

She used an iceberg image to highlight that EDI covers a great more things than we see and isn't just about protected characteristics (such as race, regional and sexual orientations) with much hidden that needs to be addressed through trusted conversations.

Joanna shared some statistics about the UK workforce (including 16% of working age adults are disabled, 14% of the population are from ethnic minority backgrounds, 6% of the population are lesbian, gay or bisexual) and the UK engineering workforce (8% of professional engineers are female, 6% are BME, yet 14% of those who achieve first degrees in engineering are female and 26% of engineering students have a BME background).

Joanna emphasised the impact of inclusion in supporting business development and business outputs when there is a culture of belonging and inclusion, with organisations that develop and nurture teams with D&I learning and inclusive practices benefiting from:

- Improved global reputation
- Increased creativity and innovation
- Improved problem solving
- Greater productivity and efficiency
- Increased market share
- A culture of common goals and mitigated bias
- Recognition as an “employer of choice”, enabling access to a wider pool of talent
- Increased employee engagement and retention

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- Lower levels of absenteeism

She emphasised that we will soon have five generations working together, and 67% of job seekers say workplace diversity is important when considering employment opportunities.

Joanne spoke about inclusive engineering, which requires engaging people with different perspectives to come up with solutions that meet needs of a diverse population. She highlighted that currently the engineering workforce is not representative of society and therefore risks coming up with solutions that do not meet the needs of some sectors in society including women and people with disabilities. She suggested that the accreditation process should look to encourage inclusive engineering solutions.

Joanne emphasised the importance of having conversations, raising awareness and educating people on the EDI topic and embracing differences. She emphasised that it is important for leaders to support change but also for individuals to look at their own behaviours and thinking, including when recruiting staff and students, and to empower people and ensure they have a voice.

Joanna signposted some information sources:

- Royal Academy toolkits: [increasing-diversity-and-inclusion-in-engineering \(raeng.org.uk\)](https://www.raeng.org.uk/increasing-diversity-and-inclusion-in-engineering)
- University EDI UK Case studies: [universitiesuk.ac.uk](https://www.universitiesuk.ac.uk)
- Employers Network for Equality & Inclusion – inclusive communications guide: [enei - the Employers Network for Equality & Inclusion](https://www.enei.org.uk/the-employers-network-for-equality-and-inclusion)
- Inclusive Engineering: [www.inceng.org](https://www.inceng.org)
- IMechE D&I strategy: <https://www.imeche.org/about-us/governance/council/committees-and-boards/diversity-and-inclusion-committee>

## Equality and diversity Q&A

Question (posted by an IAgRE volunteer): PEIs are by their nature elitist and discriminatory, how can PEIs have an affect on the general community, beyond producing non-discriminatory leaflets when the issue seems and relate to recruitment. He also questioned why we are not talking about EngTech.

*Joanna Horton: Key isn't to work in silos and work collectively across the PEIs, trying to support a wider group of volunteers who can also go into schools and speak about their experience and encourage a wider group to go into engineering. IMechE are trying to recruit a more diverse range of engineers to go into schools to promote engineering and tell their real life stories.*

*Alistair Greig noted that Catherine Elliott (Engineering Council Education and Skills Manager) had indicated in zoom chat that this event was about AHEP and therefore EngTech was not within the remit of the event.*

Question (posed by Dik Morling): How do IMechE assess EDI?

*Joanna Horton: Conversations are happening to support IMechE strategy and create guidance. An IMechE committee Chair confirmed that this is an area where PEIs need to work together and it is useful if they can collectively signpost guidance such as that from RAEng.*

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Comment (posed by an IET accreditor): felt that conversation about women in engineering won't be resolved until engineering is a protected profession in the UK, and suggested that PEIs lobby government on this.

### **Sustainability presentation one – Luke Smith (Engineers Without Borders)**

Luke spoke about how engineering curriculum needs to meet the needs of people for today and tomorrow and global responsibility needs to be at the heart of this. He said we urgently need to balance the needs of people with the needs of our planet, and that globally responsible engineering needs to be responsible, purposeful, inclusive, regenerative and align well with AHEP 4. He spoke about people not having basic human rights met such as access to clean water and electricity. Luke spoke about the holistic approach needed for engineering above just technical solutions and skills, how many companies feel they do not have the skills to fulfil sustainability goals, and that interdisciplinary learning is important to encompass sustainability.

He spoke about needing future engineers to be prepared to address global challenges, to be critical thinkers and to challenge the status-quo. He emphasised that accreditors and educators have an important role in influencing future engineers.

He emphasised that globally responsible engineering should:

- Be responsible
- Purposeful
- Inclusive
- Regenerative

He suggested that these priorities align with AHEP 4.

He spoke about problems being categorised as 'obvious', 'complicated', 'complex' or 'chaotic' He suggested sustainability sits in the complicated and complex domains, which requires student centred interdisciplinary learning which the Engineers Without Borders Engineering for People Design challenge supports.

The Design Challenge was shown through a video and comment from a number of academics shared.

### **Sustainability presentation two – Fiona Bradley (Royal Academy of Engineering Sustainability within HE Working Group)**

Fiona emphasised that sustainability and global responsibility must be integral to engineering. The working group was created to think about how innovation can be stretched and sustainability put into the centre of both higher education and business planning. She emphasised the importance of collaboration and that the working group want to work with PEIs to ensure sustainability is addressed within accredited degrees, and that AHEP LOs are appropriately contextualised.

She emphasised the importance of engineering degrees address societal needs and that this helps to attract female students. She that the working group want sustainability to be core within all engineering courses and whilst welcoming AHEP 4 feel it represents the absolute minimum coverage of sustainability

Fiona spoke about JBM as an exemplar for pushing sustainability within engineering degree accreditation.

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She then spoke about her experience in industry and higher education and some of the programmes she has come across that combine sustainability with engineering going through how sustainability has been integrated within a programme in many different ways.

She praised the Engineers Without Borders programme and a number of other collaborative project examples.

She invited HEIs to provide exemplars to the working group that could inform creation of toolkits to support people confront and address sustainability.

### **Sustainability Q&A**

Question (JBM committee member): Could the AHEP 4 go further with regards to sustainability?

*Luke Smith: It could always be further however there needs to be encouragement for institutions to adopt some form of sustainability engagement and hopes for the future there will be an increase in engineers engaged with sustainability. A key message is about urgency of the challenges, and anecdotally students feel it is not given enough focus.*

*Sean Wellington: Agreed it is a start and is encouraged by work that presentation spoke about and welcomes that AHEP 4 implementation will encourage further conversations like the ones this event is permitting.*

### **Security presentation – Hugh Boyes (IET/Bodvoc Ltd)**

Security is not just for government but infrastructure and other assets can also be attacked (including to disrupt lifestyle or ransomware demanding money). He emphasised the difference in controlling security from prior years using paper to current day online with large amounts of people having access to designs and plans which is much harder to protect, and gave an example of a construction project where people who were no longer employed could still access documents.

It was noted that industries may be increasingly interdependent but rain separately regulated.

Building Information Modelling is valuable but gives access to information that can enable major disruption if misused. Moving forward there is the concept of smart cities and digital twins and there are more problems such as managing security over lifecycles of assets and with more systems connected to the internet. He identified categories of people who may want to cause harm such as disgruntled people, hackers, activists and cyber criminals.

He gave an example of environmental protestors knowing when to arrive at a site because a tweet indicated when police would not be on site.

He shared that his work takes a holistic approach considering technical, people, process and physical aspects, and management of associated information. He suggested other things need consideration including safety, resilience, long-term utility of data etc. He recommended a risk based asset management approach.

He raised information management versus cyber security. For example benefits and risks of publishing information about our energy system which may be useful for maintenance but provide opportunities for malicious attack.

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He highlighted the Engineering Council [guidance on security](#) which sets out 6 key principles..

Hugh explained the current need to focus on appropriate access to data and the inclusion of security in the UK-SPEC to encourage engineers to think about security daily rather than expecting someone else to address this.

## **Security Q&A**

*No questions were posed or comments made.*

## **Final comments from AHEP Working Group Chair**

Sean Wellington spoke about the importance of multidisciplinary approaches and supporting one another through sharing of best practise.

## **Final comments from EAB Chair**

Alistair Greig thanked all the speakers for their time and for the group for taking part.