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Review of 'Towards a framework for inclusive STEM Education' Workshop

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REVIEW
The Open University's Centre for STEM Pedagogy (eSTEeM) held a specialist workshop "Towards a framework for inclusive STEM education" as part of their two day Annual Conference. The objective was to create a vision of inclusive STEM education. The workshop aimed to generate tangible outcomes and recommendations that could be implemented within institutions, including at the Open University. With this in mind, the workshop brought together diversity experts and STEM educators for an interactive discussion of the key issues and constraints, opportunities and challenges in achieving inclusive STEM education.

The workshop began with a series of speakers bringing insights from the UK and across the world. First, Ann Holmes, Principal Consultant at Ann Holmes & Associates gave a digest of the situation in Canada, focusing on two initiatives: The Canadian Centre for Women in Science, Engineering, Trades and Technology (WinSETT Centre) is an action-oriented, non-profit organization that aspires to recruit, retain and advance women in science, engineering, trades and technology (SETT). Ann described the WinSETT Centre's leadership program for early to mid-career female STEM practitioners. She then talked about an analytical tool called Gender-based Analysis+ developed by the Canadian government that assesses the potential impacts of government policies on diverse groups of women and men.

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The Open University

Next to speak was Jan Peters, lead consultant at Katalytik and recently awarded an MBE for services to women in engineering and science. In an engaging address focusing on inclusive engineering, Jan discussed outputs of the "Set to Lead", aproject based at University College London (UCL) Engineering Department, describing how a strengths based approach, using Gallup's StrengthsFinder gives students working in teams a vocabulary to grow self-awareness and to value and appreciate one another.

Drawing on her experience of developing gender inclusive engineering at the University of South Australia, Mary Ayre, co-author of Gender Inclusive Engineering Education, proposed several questions that might be explored in constructing a framework for inclusive STEM education.

Mustafa Ali Lecturer in School of Computing and Communications at the Open University gave a stimulating talk about Decolonsing Computing, proposing that the very definition of computing was and is being framed by those in dominance, and that their values, identity and position in the world was akin to colonialism. Mustafa reviewed several key papers in the discussion, including Sandvig, Hamilton, Karahalios & Langbort (2016), Dourish & Mainwaring (2012) and Andrejevic (2014). His contention is that, as with historical colonialism, the diverse voices of those in computing are in danger of being subjugated by more influential interests.

In a powerful talk, Anita Shervington, Director of Community Perspectives CIC and Founder of Black STEAM, drew on her own life story to illustrate how a combination of cultural factors can cause STEM to seem remote for some groups in society, leading to their near-absence from STEM careers. She reflected on her role in a number of community initiatives during her journey, and her growing interest in engaging the community in STEM by means of culturally-specific events, arguing for their formal recognition and funding.

There followed a valuable discussion of attainment gaps between socio-economic groups, students with disabilities and BME students, focusing on their differential outcomes. There is a gap – small and more pronounced at the upper end of starting qualifications – in students with and without stated disabilities achieving a "good" degree. The prevailing argument is that this gap narrows when means are put in place to promote equitable outcomes and narrow that gap.

Claudia Morrell, consultant for the U.S. Department of Education and the Pennsylvania Department of Education, made her contribution to the workshop from the US via Skype. She began with the need for empathy in education and brought up the equality vs equity debate, which contrasts treating everyone the same with bringing minority groups up so they have the same experience. Claudia argued that for empathy to flourish, it requires equity, which itself originates from three major components. These are 1) Inclusion, whereby educators and policy makers are aware of, and respond to the ways in which diverse students may be marginalised by our current education system, e.g., women in male-dominated systems; 2) Normalisation, whereby educators take seriously the multiple perspectives, values, experiences and beliefs of their students and their families and create daily opportunities for community contributions and collaboration; and finally 3) Empowerment, in the students-centred classroom, where students have responsibility for their own learning and self-assessment (and are provided with opportunities for free enquiry).

The last of the talks was from Jiten Patel, Head of Equality and Diversity at the Open University UK. He, too, argued that the key was not equality, but about being equitable. In a thought-provoking series of examples and definitions under the broad topic of inclusion, Jiten suggested first that we, in our comfort zone, should make others comfortable in our comfort zone. He contrasted inequality: unconscious bias, discrimination, the historical perspective, with equality: deconstructing stereotypes, taking positive action, and having due regard for difference. He reminded us of Gordon Allport's hierarchy of the "Nature of Prejudice", in terms of escalation of levels of action based on prejudice; this begins with anti-locution followed by avoidance, discrimination, physical attack, and at its extreme, ends with extermination. Jiten also argued for the relevance, in this debate, of Kahneman's "System One and System Two" thinking which can help illustrate and explain how unconscious bias can come about.

The morning's talks gave food for thought for the afternoon's workshop activity, which took place after a convivial lunch with plenty of networking possibilities and a chance to look at the excellent conference posters.

After lunch, delegates divided into three groups to explore the following questions: Can we imagine what inclusion will look and feel like? Can we anticipate the sort of new processes and priorities that need to be in place? What can we commit to doing to achieve this? The groups used a Rich Pictures methodology to portray the complex factors, relationships, stakeholders, conflicts and processes in the inclusion problem situation.

Taken as a whole, the workshop was a rewarding day in which to participate, offering a fruitful exchange of ideas between colleagues from different organisations and geographical locations. It was not so large as to be anonymous, and delegates did not feel inhibited from participating or having their contribution heard. Representation from the range of areas that have a stake in greater inclusion in STEM: commercial and community organisations, consultancies and academia, was a particular strength, and created the synergy that will have to be generated, if we are to reach our goal of inclusivity in STEM education.

REFERENCES

Andrejevic, M. (2014). Big Data, Big Questions| The Big Data Divide. *International Journal Of Communication, 8*, 17. Retrieved from http://ijoc.org/index.php/ijoc/article/view/2161

Dourish, P. and Mainwaring, S. (2012) Ubicomp's Colonial Impulse. Proc. ACM Conf. Ubiquitous Computing Ubicomp 2012 (Pittsburgh, PA).

Sandvig, C., Hamilton, K., Karahalios, K., & Langbort, C. (2016). When the Algorithm Itself is a Racist: Diagnosing Ethical Harm in the Basic Components of Software. *International Journal of Communication 10*: 4972-4990.