STEM North Online Conference 2025

30 October 2025

Overview

The STEM North Conference was held online at the end of October 2025. This comprehensive event was hosted by the University of the Highlands & Islands (UHI) and the Highlands and Islands STEM Partnership (HISP) and brought together over fifty stakeholders from education, government, industry, and youth organisations.

Presentations from thirteen different speakers considered the regional challenges and opportunities across the north of Scotland and highlighted the work of their respective organisations in addressing both through STEM education, skills development, economic planning, strategies for sustainable growth, workforce development, and community engagement.

This summary paper presents the key themes, discussions, and insights from the event.

Welcome: Key Themes & Strategic Context

Presented by **Dr Su Bryan**, HISP Chair and Dean of the Faculty of Science, Health & the Environment, UHI

- Persistent Inequalities in STEM
  - Gender and other inequalities persist in STEM fields.
  - Early intervention and inspiration from early years through education are essential.
  - Emphasis on building confidence and diverse pathways into STEM careers.
- Scottish Government's STEM Strategy (2017)
  - Called for the creation of STEM hubs across Scotland to foster collaboration and avoid duplication.
  - Thirteen regional hubs were established, including one for the UHI region.
- UHI STEM Partnership Structure
  - A two-layered model.
  - Strategic Group (HISP): Covers the entire UHI region.
  - Local STEM Networks: Based on academic partners, tailored to local contexts.
  - Aims to balance regional coherence with local relevance.

Regional Economic Opportunities & Challenges

Presented by **Martin Johnston**, Director of Strategy and Regional Economy, Highlands & Islands Enterprise (HIE)

- Over £100 billion in private sector capital investment projected over 15 years.
- 114,000 job years during construction
- 18,000 FTE jobs in operations by 2040.
- Predominantly driven by green energy, especially offshore wind.
- £77 billion added to Scotland's economy if all projects proceed.
- Major infrastructure upgrades (e.g., £50 billion in grid investment).
- Challenges:
  - Grid access and electricity pricing.
  - Housing & transport
  - Workforce availability.

The Power of STEM Education and Skills Development in regional economic growth and innovation

Presented by **Stephen Sheridan**, Director Economic Development & Advancement, UHI, and **Claire Sim**, Regional Skills Planning Lead with Skills Development Scotland (SDS)

- STEM is critical for:
  - Early exposure to career possibilities.
  - Gender balance and inclusion.
  - Informed career decisions.
- Career theory supports early engagement (pre-14) to shape aspirations.
- Post-14: Reinforcement through relevant training and pathways.
- Workforce North Initiative
  - System-wide approach to address workforce gaps.
  - Five key themes: awareness, experiential learning, apprenticeships, upskilling, talent attraction.

Why STEM Education and skills development are key for industry growth regionally now and in the future.

Presented by **Mike Hay**, Director of Strategy, West of Orkney Windfarm

- An industry perspective from the West of Orkney Windfarm, a £5.5 to £6 billion offshore wind project and part of the ScotWind leasing round.
- Part of a consortium of three major, international companies: Corio Generation (Australia); TotalEnergies (France); Renewable Infrastructure Development Group (Scotland).
- When built, the 2,000 megawatts project will produce for around about two million homes.
- The project will support around 4,000 UK jobs during construction with an estimated 120–140 long-term jobs in Caithness.
- Emphasised that, to ensure a workforce with all the necessary skills would be available at the various stages of the project, there was a need for long-term investment in STEM education, especially at early years and primary levels.
- Currently part of a group of industry sponsors supporting the UHI's STEM Outreach Programme:
  - Fourteen STEM outreach coordinators.
  - Focus on early years and primary education.
  - Teacher confidence-building and resource provision (e.g., Discovery Kits and community engagement).

Listening to the Future: What young people think about their community, green energy, and their future

Presented by **Clair Wallace**, Chief Officer, Youth Highland

- An opportunity to listen to the 'Youth Voice' with insights presented by Youth Highland following its survey of around five hundred young people in the Cromarty Firth area.
- Key findings:
  - Love for the Highlands, but uncertainty about staying.
  - Lack of jobs, housing, transport.
  - Poor access to apprenticeships.
- Concern about debt and cost of education.

- Scepticism about energy careers:
  - Oil & gas are seen as unstable.
  - Green energy is unfamiliar and unclear.
- Strong concern for the planet but feel powerless.
- Desire for involvement in decision-making and community leadership.
- Recommendations:
  - Improve communication and access to opportunities.
  - Broaden pathways and inclusivity.
  - Involve youth in planning and shaping their futures.

Understanding research on inequities in STEM participation: insights from ASPIRES and Making Spaces research

Presented by **Dr. Meghna Nag Chowdhuri**, Senior Research Fellow, University College London

- Patterns of Inequality in STEM Participation:
  - Participation declines as students progress through educational and professional stages.
  - Strong participation in primary education declines sharply by secondary school and remains low in higher education.
  - Marginalised students' higher dropout rates lead to underrepresentation in science careers.
  - Despite investment and initiatives, overall inequity persists with STEM fields largely populated by white, middle-class, able-bodied males.
  - Surveys show high understanding of the importance and value of science but low aspiration for science careers.
- Shifting Research Focus
  - ASPIRE is a longitudinal study of students aged 10 to 23 exploring STEM aspirations.
  - Earlier work focused on non-participation arising from lack of interest or motivation. Newer studies recognise systemic issues within the education system.
  - Need to recognise and value science that is considered 'low status' as well as 'high status'.
- Science Capital
  - Science Capital = knowledge, attitudes, experiences, social connections related to science.
  - Students with valued science capital are more likely to pursue a STEM career.
  - Move towards emphasising equity and social justice, recognising that different students need different resources.
  - Identifying and nurturing diverse forms of science capital among learners connects STEM more meaningfully for young people and communities.
- Intervention programs targeting underrepresented groups to boost science aspirations.
  - Primary Science Capital project: a teaching approach model involving a reflective framework to embed equity within teaching practice.
  - YesGen project: reflective practice used by policy makers and educators in STEM learning settings or any other space.
  - Making Spaces project: a holistic approach that focuses on changing practice to create environments that welcome diverse learners to engage with science.

The R&I Framework: Growing Research and Innovation in Schools

Presented by **Georgie Lott**, Head of Education Innovation, Institute for Research in Schools (IRIS)

- The R&I Framework was designed to deliver STEM education through research and innovation, giving students real-world experiences and applications of STEM.

- Rolled out in nine secondary schools across the UK, including some in highly deprived areas, with an R&I Lead identified in each school.
- Year 9 students (equivalent to S2) completed questionnaires on Science Capital, STEM attitudes, career awareness, and post-sixteen pathways.
- Data analysed by sex and pupil premium to identify unique challenges.
- Schools received customised plans with two or three key actions based on student feedback.
- Ongoing support for schools includes mentoring for R&I Leads, resource development, problem-solving, and partnerships with national STEM organisations.
- The Year 9 baseline data was compared with Year 10 follow-up using anonymous identifiers, and analysis also included a control group of ten matched schools for comparison.
- Key Findings:
  - Prevented the usual decline in science capital over time.
  - Improved confidence and inclusion, especially for girls and disadvantaged students.
  - Students gained realistic, positive views of STEM careers, reducing misconceptions.
  - Demonstrated transformative effect on perceptions and aspirations within one year.
- Aim now is to expand the framework nationwide, secure funding, and embed research experiences into curricula.

Empowering Young People Through Research: The Work of the Institute for Research in Schools (IRIS)

Presented by **Anne O'Leary**, Regional School Engagement Lead, Institute for Research in Schools

- IRIS works with universities and industry partners to create research projects for school students.
- The projects are free to schools and IRIS supports teachers and students to help them carry out the projects.
- In 2024, 1,809 students from 93 UK state-funded schools participated in IRIS projects.
- Schools often run multiple projects over time, indicating deeper involvement and teacher engagement.
- IRIS evaluates projects to improve and evidence their value, and recent feedback shows that 99% of participating teachers would recommend IRIS.
- Project Timeline:
  - Phase 1: Teachers start projects around November.
  - Phase 2: Students do background reading and upskill on software.
  - Phase 3: Students conduct their own research.
  - Phase 4: Students write academic posters, which IRIS prints and provides feedback on.
- Currently ten active projects - some age-specific - across disciplines like computer science, ecology, geography, and particle physics.
- There is an annual conference where students present research, interact with peers, industry partners, and hear from diverse STEM professionals. The conferences receive strong feedback for inspiring students and highlighting STEM careers as accessible and diverse.

Improving equity of access: Opportunities of AR/VR and simulation use in education

Presented by **Eliza Kostika**, Outreach & Training, RESILIENCE, Heriot-Watt University

- RESILIENCE is a government-funded initiative addressing skills shortages in life sciences and chemical sectors caused by rapid technological evolution with an aim to align workforce skills with industry needs and government priorities.

- Core Activities of RESILIENCE:
  - Outreach and career awareness for schools, colleges, and job centres
  - Early engagement with primary schools to inspire STEM interest.
  - Tailored training for industry, colleges, and universities
  - Promotion of digital literacy and confidence in using new technologies
- Resources, Tools, and VR training platforms:
  - Educational materials for educators and online resources and videos.
  - VR-based training using Meta Quest headsets for immersive learning experiences.
  - Eclipse Creator: Mixed reality lab simulations (e.g., pipetting, bioreactor assembly)
  - Accelerate: Clean room training for life sciences manufacturing
  - Body Swaps: Soft skills training with role-play and feedback
- Benefits of VR Integration:
  - Accessible, flexible, and cost-efficient training and consistent quality across locations.
  - Large-scale training and equitable access for underserved and remote populations.
  - VR helps to demystify STEM, making it feel accessible and achievable.
  - Supports both technical and soft skills development.
  - Empowers educators and learners, fostering equity and inclusion.

Improving equity of access: Opportunities of AR/VR and simulation use in education

Presented by **Greg Haylott**, Programme Manager, Energy Skills Partnership (ESP)

- Ocean Winds and Seabury collaborated to introduce augmented reality (AR) welding equipment for STEM education to engage students in technical vocations through innovative technology.
- Ocean Winds previously funded full-size industrial training equipment for colleges and expanded efforts to include STEM outreach and pre-apprenticeship programs.
- The AR STEM welding kits use QR codes to simulate realistic welding visuals. Safe, cost-effective, and accessible compared to traditional welding setups.
- Easy to use and intuitive for students, providing real-time feedback and scoring for weld accuracy, making learning competitive and fun.
- Encourages school-level interest in fabrication and welding careers with kits available for booking through ESP for STEM activities.

Data Mapping: the opportunity of coordination

Presented by **Dawne Bloodworth**, Head of STEM Development, UHI

- The STEM outreach programme has been running for a couple of years and is industry-funded.
- The program focuses on primary education and has evolved over time to cover a large geographic area that is about a third of Scotland and around the size of Belgium.
- Coordinating a consistent program across multiple primary schools has been challenging due to the vast geography and diverse needs.
- Data collection has been a priority, aiming to make it meaningful and relevant; qualitative feedback and numerical data have been gathered.
- Initial data mapping efforts involved simple pin maps, and the STEM team developed this into a geographical mapping system using Power BI to visualise the programme's impact for deeper insights.

- The tool layers data by school and local authority (eight in total) and tracks requests for the STEM Discovery Kits used in the outreach programme.
- A video demonstration of the mapping tool is available on the UHI STEM webpage, showing how data visualisation highlights program reach and impact.

Data Mapping: the opportunity of coordination

Presented by **Beth Brown**, Strategic Quality Improvement Manager, Highland Council Education

- Partnership between My Highland Future and Workforce North emphasises STEM as one of five key focus areas and aims to use data mapping to support STEM engagement initiatives.
- Employer Charter to support strong employer engagement beyond schools.
- Development of self-evaluation plans linked to curriculum rationale with schools collecting quantitative and qualitative data to track progress, including STEM-specific sections focusing on equalities, skills profiling, industry relevance.
- Focus on collating data and creating joint dashboards for planning and strategic discussions and to share best practice.
- The UHI STEM outreach data is seen as an inspiration and will help to analyse participation trends, identify gaps and strengths in teacher training and engagement.
- GDPR compliance will shape considerations for accessible and intuitive data visualisations.
- Expansion of work experience and career learning offerings to include more STEM employers.
- Collaboration with industry ensures activities are relevant and address equity gaps.
- Next Steps
  - System-wide approach engaging schools, employers, leadership teams, and researchers.
  - Regular meetings sustain momentum and ensure shared objectives remain central.
  - Emphasis on using evidence to refine practices and policies for more inclusive STEM education.

Summary

- The region faces unprecedented opportunities but also significant challenges.
- Collaboration across sectors is essential.
- STEM education is a foundational tool for economic transformation.
- Youth engagement and inclusive planning are critical to long-term success.
- Despite numerous initiatives, research over the past two decades shows persistent inequalities in post-compulsory science education requiring a multifaceted, equity-driven response.
- Research highlights stark gender and ethnic gaps, prompting a shift from student focus to a systemic approach.
- The concept of science capital has emerged to explain how knowledge, attitudes, experiences, and social networks shape aspirations.
- Recognising and valuing diverse forms of science capital can boost participation among marginalised groups.
- Inclusive teaching practices and targeted interventions help reshape student aspirations.
- Effective change requires equity-focused frameworks, inclusive strategies, and partnerships that integrate research insights.
- Data-informed self-evaluation and strong partnerships are critical for sustainable change.
- Local initiatives support broader goals of widening participation with ongoing collaboration and evidence-based planning essential to create an inclusive STEM landscape.
- Continued collaboration and leadership commitment will be key to opening STEM opportunities to all students.