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Session Outcome Document

Deep Skilling for the Quantum Age: A Global Education Model for Women and Girls

Innovation Network Global (ING); Innovation Network Canada (INC); Dynamic Coalition on Emerging Technologies (DC-ET), UN IGF

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https://www.itu.int/net4/wsis/forum/2026/Agenda/Session/222

Key Issues Discussed

- Quantum readiness was defined as the capacity of governments, industry, universities and society to understand, adopt and responsibly apply quantum technologies. The principal constraint is no longer the technology but the readiness of the people who will use it.
- The future quantum workforce extends beyond specialists to a far larger population of domain experts, including healthcare professionals, engineers, educators, manufacturers, financial analysts, lawyers, policy-makers, public servants and business leaders, who require quantum literacy. The transition to post-quantum cryptography was cited as a case in which non-specialists make consequential decisions.
- Africa and other emerging regions were reframed as future producers of quantum-ready talent and innovation, not passive recipients of imported technology or externally designed education. As one panelist stated, Africa must become a major producer of quantum-ready talent.
- Quantum education initiatives should be co-designed with local universities, educators, governments, industry and communities, not merely adapted after a global model has already been designed. A global model cannot be taken into a community and applied unchanged.
- The participation of women and girls is both an entry and a retention challenge. In some regions women participate strongly through graduate education but participation falls sharply in the transition to careers, so strategies must address the full career trajectory.
- Quantum preparation should begin well before university, through age-appropriate exposure, experiential science education and the early development of analytical and critical-thinking skills.
- Emerging ecosystems can begin immediately by embedding quantum concepts into existing STEM and engineering programmes (physics, mathematics, electrical engineering, computer science, photonics, materials science and artificial intelligence) rather than waiting to establish stand-alone quantum institutions.
- International collaboration is essential because standards, cybersecurity, research and supply chains are global. Partners should share both successful and unsuccessful education models so that emerging programmes can avoid repeating costly mistakes.

Key Outcomes of the Session

Key insights and findings

- Panelists converged on a two-workforce model consisting of quantum specialists and a much larger quantum-literate professional workforce, prepared through experiential and interdisciplinary learning.
- Evidence from Open Quantum Institute programmes in Ghana and Pakistan suggested that geographic inclusion and gender inclusion can reinforce one another, with participation by women reaching approximately 45 per cent and 52 per cent respectively in selected initiatives.
- The session identified a need for T-shaped professionals, with depth in one discipline and enough fluency across hardware, algorithms, software and applications to translate between the quantum stack and real-world needs, and for quantum champions within non-quantum organizations who can identify use cases, engage specialists and guide responsible adoption.

Contribution toward a Global Quantum Skilling Framework (WSIS Action Line C4)

- The discussion surfaced six principles offered as a contribution toward a Global Quantum Skilling Framework:
    - Two workforces: quantum specialists and quantum-capable domain experts.
    - Local co-design: global principles combined with locally designed implementation.
    - Early and lifelong learning: from school exposure to professional and executive education.
    - Translation across disciplines: T-shaped professionals and quantum champions.
    - Inclusive ecosystem design: women, girls and underserved geographies included from the outset and retained through careers.
    - Shared global infrastructure: access to hardware, educators, credentials, standards and implementation knowledge.

Initiatives and access models identified

- The Global Quantum and Exponential Technologies Education Initiative (GQEI) was presented as a collaborative platform to connect and strengthen existing quantum education efforts rather than duplicate them. UNESCO, IEEE Quantum Week, CERN's Open Quantum Institute, universities and national partners were identified as complementary contributors.
- CMC Microsystems was identified as a potential model for remote, shared and subsidized access to multiple quantum hardware platforms for countries without domestic quantum infrastructure.
- The Commonwealth was identified as a potentially valuable implementation network linking established quantum ecosystems with emerging regions through shared education, mobility, infrastructure access and workforce development.

Key Recommendations and Forward-Looking Actions

- Advance GQEI as a collaborative international platform linking governments, universities, standards bodies, industry and international organizations, and co-design quantum education with local institutions rather than adapting a global model after the fact.
- Begin quantum readiness before university through age-appropriate exposure and analytical and critical-thinking skills, and embed quantum concepts into existing STEM and engineering programmes rather than waiting to establish stand-alone quantum institutions.
- Develop quantum champions within non-quantum sectors such as healthcare, manufacturing, finance and government, and T-shaped professionals able to translate across the quantum stack.
- Make the participation of women and girls intentional across the full pipeline, from early engagement through research, employment and leadership, and expand access in underserved geographies as a means of strengthening gender inclusion.
- Establish remote and subsidized hardware-access partnerships, document and share both successful and unsuccessful education models, develop shared indicators for national quantum readiness, and explore the Commonwealth as a coordinated implementation network.