

The Fourteenth World Meteorological Organization Symposium on Education and Training (SYMET-14)

Symposium Statement

The participants of the Fourteenth World Meteorological Organization (WMO) Symposium on Education and Training (SYMET-14), held online 22 November - 25 November 2021:

Deliberating on the theme "Education and Training in a Period of Rapid Change",

Noting that new advances in science, technology and meteorological, hydrological, and climate services, along with the impacts of the COVID-19 pandemic, have accelerated changes in the content and delivery of meteorological, hydrological and climate training, leading to the need to develop of new content areas, define new expected learning outcomes, offer new delivery modes, and create new forms of instructional media and new pedagogical approaches

Noting further the likely longevity and increasing pace of these changes;

Noting also the various international and national initiatives and commitments to address global issues related to natural disasters, environmental degradation, the Paris Agreement, the Glasgow Climate Pact and the need for WMO to make significant contributions to the United Nation's 2030 Agenda for Sustainable Development, the SIDS Accelerated Modality for Action (SAMOA) Pathway and the Sendai Framework for Disaster Risk Reduction;

Noting further the decisions of the 18th WMO Congress and the Extraordinary Congress (2021) on the WMO governance reform to embrace a more comprehensive Earth system approach, Geneva Declaration (2019), other major initiatives and issues that are driving change within the WMO community, such as the new WMO data requirements, arrangements and policies for data exchange against the Earth System Strategy as stipulated in the WMO Unified Data Policy Resolution, the implementation of the Global Basic Observing Network (GBON), the shift to Impacts-based Forecasts and Warnings and Multi-hazard Early Warning Systems, the Global Framework for Climate Services, as well as the initiatives and issues that are driving change within the wider education and training sector of the global economy;

Recalling the agreed upon key areas requiring further development to enable the WMO Education and Training community to address the changing and increasing education and training requirements, both during in SYMET-14, the previous SYMET-13 and previous WMO Global Campus meetings;

Expressed the following key observations and conclusions:

- The world has recently experienced dramatic and rapid shifts in our ways of living, interacting, and educating related to the COVID-19 pandemic. But rapid change driven by technological developments in particular has been recognized as the new normal for many years, and in many more ways than those resulting from the pandemic. Teaching experiences during the COVID-19 pandemic have highlighted many innovative approaches to online and blended learning that could be more widely adopted. Studies of the success (or challenges) of these approaches provide the means of testing where and for what purpose such technologies might be deployed.

- Technological innovations and social evolution continue to change our lives and work; society expects greater accuracy in and increased usability of weather, water and climate predictions, including more openness in our sharing of data and forecasts; climate change has accelerated and climate-related disasters and extreme weather and water events are now commonplace. Adapting to this change demands immediate action. At the same time, our workforce is becoming increasingly interdisciplinary, and accelerated progress in research and development uncovers new opportunities each year for service improvements.
- The WMO EC Capacity Development Panel that has been established by the Decision of the 18th WMO Congress, is providing an effective means of driving forward innovation in capacity development.
- Cooperation between the Universities, NMHS training centres, WMO Regional Training Centres, WMO/CGMS VLab, CALMet and international education and training partners provides a solid foundation for: increased sharing of teaching and learning resources and approaches; collaboration on development and delivery of education and training opportunities; developing model or common accreditation, certification, evaluation and assessment systems and their underlying quality control systems; and developing shared tools and platforms for developing, delivering and monitoring/reporting education and training activities.
- The decision to establish and promote the WMO Global Campus initiative helped education and training providers deal with changes to educational practice forced by the pandemic and many proved to be successful. The WMO Global Campus event “Responding to Challenges Beyond the New Normal”, which took place from 20 to 22 January 2021, helped to outline challenges that E&T providers are facing, served to exchange experience and offered some solutions that were successfully applied in many cases. Similarly, the [WMO Global Campus Innovations](#) publication (ETR-27), published in early 2021, highlighted many innovations in place prior to the impacts of the COVID-19 pandemic.
- Because the WMO Education and Training community works with students from many countries, language, gender and cultural awareness and diversity needs to be addressed across all activities.

The Symposium made the following recommendations:

General recommendations

- The WMO Secretariat is requested to play an active role in supporting and promoting the development and ongoing activities that comprise the WMO Global Campus initiative.
- SYMET-14 participants call for support and action at national, regional and global levels to support WMO and its National Meteorological and Hydrological Services to develop and deliver improved services to the Members through the provision of adequate facilities and resources for education and training in weather, water, climate and related fields.
- SYMET-14 participants strongly endorse the benefits to themselves, their institutions and the community of coming together to discuss the future of education and training. In the future, holding interim meetings between symposia is likely to reap important benefits for the community and help to broaden it as Earth system science and prediction changes rapidly. This would also help us to monitor the progress towards the recommendations in this statement.
- SYMET-14 participants further request the World Meteorological Organization to publish the outputs of this Symposium to enable widespread reference to, and use of, the key issues and recommendations.

- SYMET-14 participants call upon the World Meteorological Organization, international development partners, authorities of countries and territories, and other stakeholders to take into account recommendations arising from this Symposium in their recurrent and development socio-economic endeavors.

To policy makers and governments

- For NMHSs to provide the range of services required to address sustainable development and DRR goals, increased funding is required to support the initial and ongoing education and training of NMHS personnel and those entering the field. New models of funding for the education and training of meteorologists, climatologists, hydrologists and those in related environmental science disciplines, trainers in these fields and related technical staff including loans and work-study schemes are urgently needed in many countries.
- Governments and regional economic groupings to acknowledge the importance of increasing support for continuous professional development of meteorologists, hydrologists, climate scientists, and those in related environmental science disciplines, trainers in these fields and related technical staff members because of our rapidly changing disciplines and advances in scientific research. Models of funding in which resources are shared regionally or internationally are likely to yield greatest benefit at highest efficiency. This includes funding for distance learning infrastructure – including internet access for developing countries.
- Promotion of careers in meteorology, hydrology, climate science and related environmental science disciplines at all educational levels from early education to professional training schools is a high priority to attract the best students into our fields.
- To retain highly-trained NMHS staff, training center staff and University staff within the field, they need to be appropriately paid, rewarded and recognized for their contributions, particularly where their skill development makes them an attractive asset in other sectors.

To the World Meteorological Organisation and other international organisations

- The WMO Global Campus initiative is strongly endorsed as a mechanism to bring about and support existing international and regional collaboration needed to advance global Earth system science and prediction training needs. The concept should be broadened to include mentorship and peer-to-peer collaboration for the development of new resources and innovations.
- Noting international investment in Earth Systems programmes around the world, and their significant training elements, the WMO encourages relevant international programmes such as the EU Copernicus Programme and the AU GMES for Africa to participate in the WMO Global Campus, with mutual benefits for all.
- A new, sustainable technological solution that allows the WMO Global Campus goals to be met should be developed and supported. Partner resources and support, as well as commercial off-the-shelf knowledge management platforms, might provide the facilities needed to share resources and ideas within the WMO Global Campus. Partnerships or sponsorship should be explored to facilitate this, as part of broader collaboration with the private and philanthropic sectors which WMO is currently developing.
- The Board of Education and Training Collaborating Partners as a formal mechanism to achieve the goals of the WMO Global Campus initiative is also strongly endorsed.

- WMO to re-consider the competencies required of trainers to operate within a WMO Global Campus, which are broader than those traditionally acknowledged. There is a need to revise WMO documents 1114 and the trainer competencies in 1209 to reflect the evolving needs of WMO.
- The evolving requirements of users, increasing regulation and resource accountability by national governments and development partners requires managers in NMHSs to possess increased planning, communication, legal awareness, advocacy, financial and personnel management and change management skills. Part of the remit of the WMO Education and Training Programme should be used to help NMHS managers to develop these skills.
- New technologies have begun to break down language barriers that have traditionally prevented further sharing and cooperation. WMO is advised to seek and share guidance from other organisations on how best to take advantage of these new approaches.
- To ensure that learning needs are identified, the regular WMO training needs surveys and the Community Platform be used to seek community input.
- Gaining commitment from member states, institutions, and individuals is vital in the success of the WMO Global Campus. WMO could explore awarding public credentials to institutions or individuals who fully contribute to the WMO Global Campus to a level proportional to their size and resources.
- The proposed Board of Education and Training Collaborating Partners to develop a pilot system to support the adoption of micro-credentials through the use of open badges and a mutual credit sharing system that can be tested by a subset of institutions on a voluntary basis.
- Consideration of the local context for developing new training approaches should be paramount, including continued interaction between partners. This includes training in appropriate technologies, the technological constraints and appropriate localisation of case studies and examples. The proposed Board of Education and Training Collaborating Partners should produce guidelines for the community on ensuring the appropriate local context.
- Workshops that develop skills in learning assessment, competence assessment, and training impact evaluation should be organised.
- It is important for partners to promote and aid the transition to training for impact-based forecasting and warnings and multi-hazard early warning systems, drawing on the excellent work already done in many countries.
- Ensure the WMO Capacity Development Strategy makes appropriate reference to education and training. This should be future looking and collaborative in nature to promote innovation in training development and delivery.
- Working together, partners are recommended to ensure that training initiatives are in compliance with the development strategies of those served and that the selection of training participants and beneficiaries is in alignment with the intended learning outcomes of the training

To the education and training community

- The community is recommended to review the continuing professional development needs of their staff in the light of the rapid changes in Earth system science and education and training practice.
- The community is encouraged to review of their curricula in light of the new BIP-M and BIP-MT specifications and future Basic Instructional Packages and competency frameworks. The emphasis on a broader range of skills for meteorologists,

climatologists, hydrologists and those in related environmental science disciplines in the new BIP-M and BIP-MT specifications should encourage training institutions to consider the market need for new courses, including joint degrees, that link physical, social and technical science fields.

- The community is encouraged to advocate for greater cooperation wherever possible, particularly between NHMSs and Universities. One important aspect of this collaboration could be the offer of on-the-job training/work-based learning from Universities and requesting Universities to add this element into their curricula where otherwise currently not available.
- The community is encouraged to commit the time of their staff to participating in the WMO Global Campus initiatives identified above, including the proposed Board of Education and Training Collaborating Partners. They should communicate this commitment to the ETR office, in return for the new recognition of their collaborating status.
- As part of this commitment, a set of institutions are invited to partner with WMO for the trial of micro-credentials and credit sharing.
- Community institutions are strongly encouraged to continue to develop and deliver training using online, blended learning and face-to-face modes, which would support reductions in the greenhouse gas emissions associated with training. Additionally, they are encouraged to explore new pedagogical approaches for teaching and assessment, embracing the new discoveries and skills acquired during the pandemic. As expertise, resources and ideas are developed, these should be shared through the WMO Global Campus and other collaboration mechanisms.
- Community institutions should develop mentoring schemes for staff at all levels, regardless of their job role. These initiatives are critical for retention of staff and ensuring equity for all people irrespective of nationality, gender, race or cultural background
- Community institutions are encouraged to use open licenses, such as Creative Commons, that allow for reuse and derivation of shared resources, and to design resources that facilitate translation and adaptation.

We express appreciation to WMO for hosting SYMET14 and for bringing together a broad group of institutions and experts to discuss the future of education and training during this particularly acute period of ongoing rapid change.

This statement was discussed and approved by the participants of SYMET-14 on the 25th of November 2021. 280 participants registered to attend SYMET-14, from which 253 attended live online sessions on the SYMET-14 Programme. SYMET-14 participants represented 61 countries including all WMO Regional Associations.