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| **World Meteorological Organization** | **ETR-PAN-27/Doc. 12** |
| **EC PANEL OF EXPERTS ONEDUCATION AND TRAINING** | Submitted by: | Secretary-General |
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## Agenda Item 4.2 WMO Global Campus Feasibilty study

# 4.2.5 Determining Quality

# SUMMARY

### THE PANEL ARE INVITED TO:

1. Note that the WMO Global Campus feasibility work is further highlighting and raising the importance of quality assurance for education and training offerings
2. Note the alignment of the key quality aspects suggested in this paper with ISO 29990:2010(E), WMO-No. 1169 Guide for the Management and Operation of WMO Regional Training Centres and Other Training Institutions, and WMO-No 1114, Guidelines for Trainers in Meteorological, Hydrological and Climate Service
3. Note that NMS training institutions who are not formally accredited within their national education system are requested to follow ISO Standard 29990:2010(E) as recommended by EC-64
4. Recommend to EC-68 that institutions offering learning events to the WMO Global Campus are able to show and share the Quality Assurance items recommended in this paper
5. Further progress work on Quality Assurance either via the Panel’s proposed WMO Global Campus Working Group or via a separate Team Team that would coordinate with the WMO Global Campus Working Group

### CONTENT OF DOCUMENT:

The Table of Contents is available only electronically as a Document Map[[1]](#footnote-1)\*.

# 4.2.2 WMO Global Campus Feasibilty study Determining Quality

## introduction

1. EC-66 requested that the WMO Global Campus feasibility study investigate “ways to assure the quality of resources and activities available via the Global Campus”. See Appendix A of document 8.

2. The Panel will recall the discussion and recommendation from EC-64 (para 4.6.16 of WMO 1092) on improving the quality of education and training programmes by requesting those training centres who are not accredited as formal training providers within their national education schemes to follow ISO standard 29990:2010(E).

3. In addition, the Panel will recall publication WMO-No 1114, Guidelines for Trainers in Meteorological, Hydrological and Climate Services guidance which offers more in depth information on Quality Assurance. Further details on Quality Assurance are also included in the forthcoming WMO-No. 1169 Guide for the Management and Operation of WMO Regional Training Centres and Other Training Institutions.

4. Notwithstanding the above, and in order to facilitate a wider discussion on Quality Assurance in the context of the WMO Global Campus feasibility, a paper on “What Determines Quality in Training” was drafted by the WMO ETRO/Chief of Training. A review of some of the existing systems showed that the categories of Quality Assurance information could be framed around 3 broad categories: the *organization*, the *processes* used, and the *product* or event itself. This framing was used in discussions on quality in training at a number of ETR events in 2015, i.e.. the CALMet XI conference in Seoul and also the COCOM meeting in Nanjing in September 2015 where attendees discussed and prioritised the elements. The details are shown in Appendix A

5. Whilst the quality assurance of education and training offerings to NMS Members is something that has always been important, as the WMO Global Campus feasibly study has progressed, the discussions have highlighted, even more than before, the importance of, and need for, assuring quality of education and training offerings to the ETR community.

6. To assist the Panel in making its recommendations on Quality Assurance it may help to recall the hierarchy of available documents. In many ways it parallels the WMO Competency Framework with three levels where the third or operational level is adapted for use by the institution

## Top Level: This is an ISO international standard

## ISO 29990: 2010(E) Learning services for non-formal education and training -- Basic requirements for service providers

Second Level: WMO –No. 1100 is a general guide to quality management systems but does include specific references to elements of the wider education and training processes and procedures, in the WMO documentation this is perhaps the highest document. The proposed WMO-No. 1169 is a Guide within the WMO Technical Regulations and thus like WMO-No. 1100 cannot stipulate any Standards or Recommended Practices, WMO-No. 1114 as a guideline publication is not within the WMO Technical Regulations

* WMO-No 1100, Guide to the Implementation of a Quality Management System for National Meteorological and Hydrological Services
* WMO-No. 1169, Guide for the Management and Operation of WMO Regional Training Centres and Other Training Institutions (see Document 19 for this session)
* WMO-No 1114, Guidelines for Trainers in Meteorological, Hydrological and Climate Services

Third level: This is where institutions adapt and adopt the various frameworks to their own specific circumstances. Across the WMO Members there are education and training institutions that are ISO 9001 certified, there are other institutions, typically within NMSs where parts of the training function are included in either an ISO 9001 certified system or a QMS with similar features. Some training institutions whilst not being ISO certified are accredited within the formal tertiary or vocational education and training system in the country and others have no formal certification or accreditation at all. It is the last group that EC-64 were targeting with their request for them to at least follow ISO: 29990:2010(E).

**Quality Assurance for offerings to the WMO Global Campus**

7. Using the existing documentation and discussions at CALMet and COCOM the following Quality Assurance criteria could be associated with offerings or resources available to users through the WMO Global Campus. These could be grouped into the framing of: products, processes and organisation as follows.

Quality criteria related to the *“Product”*

1. Description of learning content and its links to qualifications or competency frameworks
2. Expected Learning Outcomes
3. Learning activities used to achieve outcomes
4. Awards (Diplomas, Certificates) associated with the Course or offering
5. How Learning is assessed

Quality criteria related to the *“Processes”*

1. How the training system is managed
2. How Learning Needs are determined
3. How materials are kept up to date and relevant

Quality criteria related to the *“Organisation”*

1. How trainers are hired, trained, monitored and evaluated
2. How the Facilities, resources and technology infrastructure are managed
3. How training is monitored, evaluated and improved
4. Application process including how the trainee is selected

8. There are other elements of quality assurance that individual institutions may choose to develop and share in addition, but the above are recommended as the minimum set needed to assure learners and institutions of the quality of offerings.

10. If these criteria were adopted for the WMO Global Campus on a self-regulating basis the individual institutions would responsible for ensuring that they meet the quality assurance requirements.

11. To assist education and training institutions in locating WMO guidance on the quality assurance criteria, an excel sheet has been prepared to show the different documents and elements that can be referred to. As an example, in Appendix B, a mapping has been done which builds on an initial mapping the RSHU prepared to show what nationally is important for their institution and what WMO guidance describes it. It is proposed that individual institutions can adapt this for their use to assist in ensuring they are addressing the quality assurance requirements. When adapting this for national use it is anticipated that the institutions would add in reference to additional national or institutional documentation.

12. Taking into account all of the above, recognising the diversity of the WMO RTC’s and affiliated institutions and noting the publications and guidance that already exist within WMO as well as nationally, the Panel are invited to make recommendations on the Quality Assurance criteria that should be associated with events or resources in the WMO Global Campus to provide users information on quality. The Panel are also invited to note that information on the quality indicators, as well as additional metadata, will be required for offerings onto the WMO Global Campus calendar. Details are contained in Document 9.

## Further consideration

1. Quality Assurance is a far reaching topic. Measures, guidelines and recommendations on other aspects of quality related to the WMO Global Campus and ETR in general will be needed going forward, for example, how to assure the quality of
* language translations
* trainer exchange
* collaborations
* IT infrastructure and support for calendar and perhaps in time catalogue and repositories
* Retention of personal information
* Intellectual Property Rights (IPR)
1. The Panel may wish to consider forming a working group to further progress this work and ensure that it is coordinated with other work on quality management and quality assurance being undertaken within WMO such as the Cg-17 proposal to develop and publish a new high-level document **“WMO Quality Management Framework”**.

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**APPENDIX A:**

**What Determines Quality in Training**

**This paper is a summary of the input from the CALMet 2015 and COCOM 2015 Meetings and has 4 Key headings**

1. Prioritization of criteria for assuring quality
2. Discussion and Methods for Assuring and Demonstrating Training Quality
3. Approaches to Quality Assurance
4. Discussion notes

**Introduction**

Early in 2015, a list of potential criteria for determining quality of WMO training (courses, resources, institutions) was developed by the Chief of Training of the WMO ETR Office and was based on a review of many existing quality management systems for educational resources. These included ISO/IEC 19796, ISO 29990, Open ECBCheck (for eLearning courses), EFQUEL (for eLearning programmes), Commonwealth of Learning (UNESCO), and the WMO Competency Requirements for Education and Training Providers for Meteorological, Hydrological, and Climate Services. Twelve frameworks were examined in total. Each of these frameworks provides guidance for quality measures, particularly in terms of training processes.

The list was categorized into three headings

* Organization,
* Processes and
* Products
1. **Prioritization of criteria for assuring quality**

The lists were further validated at a workshop with 30 participants from the training community at the CALMet Conference in Seoul, Korea, and then again at the COCOM meeting in Nanjing, China. The outcomes of these validation exercises were further analysed, prioritized and are shown below.

This resulting list for each category represents possible quality criteria that could be used within a WMO context; however the desired levels of quality, which may differ for each criterion, may need to be defined. Some of the criteria that were suggested did not in themselves appear to be “quality” criteria relevant to the offering of courses and resources, but useful information that might be shared by the learning service provider.

***Organization***

X=prioritized by one or more Calmest small group, C=prioritized by COCOM

|  |  |
| --- | --- |
| XXXC | How trainers are hired, trained, and evaluated |
|  XXXC | Existing accreditation that covers vocational training, or existing quality assurance processes |
| XXXC | Reputation with customers, responsiveness (compared to similar institutions), timely delivery |
|  XXXC | Numbers, roles, and qualifications of training staff members (including access to content expertise)  |
| XXC | Location/country, accessibility (including online presence) |
| XXX | Facilities, resources, and technology infrastructure |
| XXX | Financial status [uncertain if this can/would be shared] |
|  XC | Training policies in place, including gender and equal opportunity |
| XC | Clear mission and focus |
| XC | Demonstrated innovation |
| XX  | Student support services, including pastoral care |
| XX | Student metrics (number served, pass rates, variety of students (countries, etc.), return students, alumni)  |
| XX | Years of experience, Past publications/products, courses, track record of success |

***Processes***

Some of these might be merged into “Good development processes”, but details could be lost?

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| XXXC | how learning outcomes are specified and how they inform the training content and activities |
| XXXC | Good development and delivery processes, documentation of processes, ISO certification (if used) |
| XXC | How learning needs are determined |
| XXC | how training is evaluated and improved |
| XC | How intellectual property issues are managed |
| XC | how student assessments are determined, developed, and implemented |
| XC | how student records kept, registration managed, kept secure  |
| XC | Processes for external and internal collaboration |
| XX | how training is advertised, marketed |
| XX | how students are advised, student orientation |
| XX | Participants care, including cross cultural effectiveness |

 ***Products (including both courses and resources)***

|  |  |
| --- | --- |
| XXXC | currency of the content (up to date) |
| XXXC | learning activities match learning outcomes, opportunities for students to apply what they learn |
| XXC | the relevance of course content to job competencies |
| XXC | assessment methods, matched to learning outcomes |
| XXC | performance-based learning outcomes |
| XXC | Timing of courses (Duration and scheduling) |
| XXX | the results of past evaluations of this course or resource (or related ones), student recommendations |
| XC | content presentation and clarity |
| XC | accessibility of learning and learning resources |
| XC | Competitiveness (Cost) |
| XC | Student success (demonstrated that training improved job competency) |
| XC | Credit transfer available? How does it work? |
| XC | Language used |
| C | Links to other QA information |

**2. Methods for Assuring and Demonstrating Training Quality**

Decisions on the minimum quality information to be used are a critical step, but determining methods communicating these and providing evidence, when required, are just as critical.

As those who must undergo external accreditation or certified quality management processes can attest, demonstrating and researching quality related to training courses and resources is time-consuming for both providers and users. This can be a barrier to sharing. When possible, the process should be kept simple enough to encourage participation, but be meaningful enough to ensure that quality is communicated usefully.

Goals for a global standard might be:

* Keep the number of required criteria small.
	+ Institutions can always provide more quality information if they have it and wish to share it.
	+ More formal institutions, such as universities and RTCs, will also be required to meet quality established standards. The additional requirements for these institutions are likely to be small, but some additional “Product” information, at minimum, will be required.
* Include a variety of methods.
	+ Training institutions vary tremendously, from universities to small NMHSs, and the methods need some flexibility.
	+ Providers should use those methods most appropriate for them.

**3. Approaches to Quality Assurance**

General approaches to generate quality assurance data, depending on type of criteria (product, process, institutional), include:

* Self-Assessment and reporting
* External Review (formal)
* Peer Review (by similar institutions)
* User Review (students and users)
* Others?

For example, the community could generate quality data through:

* A voluntary, reciprocal peer review network
* A template for self-assessment
* External review body
	+ Voluntary or for fee
* User comments and ratings

A few possible methods for sharing the quality information:

* Included within announcements
* Embedded or linked to metadata
* Links to self-assessed information

A few things to consider in making your recommendations (many other questions might be raised):

* What forms of existing accreditation are sufficient? What accreditation information should be shared?
* How frequently should **Institutional** quality be reviewed and shared?
* What infrastructure will be required to document and communicate quality?
* If they are included, how would user evaluations be managed? How to ensure they are objective? Should we have standard evaluations?
* What would stimulate and sustain a peer review network?
* What would make you confident in self-assessments?
* Would product quality information have an expiration date?
* Consider a phased in approach…
* ISO 29990 should be a goal… but alternatives are possible.

In addition to the few comments above, participants from the Russian Federation provided a white paper stressing the importance of meeting quality criteria, and arguing for accreditation standards to be met and documented by training providers. In related comments, some COCOM members seemed to imply that ISO 29990 Certification might be a prerequisite, and that this standard would capture most of the quality criteria.

* 1. **Discussion**

As work continues to decide how quality information might be shared, in a WMO Global Campus Shared Calendar and future learning resource Registry, for example, the discussions to date should provide some useful input, but also raise several issues for further debate.

While much training has been provided up to now with limited quality assurance, many have expressed discomfort about not having some accepted quality assurance criteria and processes going forward with the WMO Global Campus searchable calendar and subsequent initiatives. If for example, only accredited institutions were to be included as contributors (in a WMO Global Campus, for example), the issue is somewhat moot, but academic accreditation does not automatically signal vocational training quality, particularly as it relates to online resources. And even in the best institutions, products are not of uniform quality, and some communication of their unique qualities can be useful. Regardless of whether the WMO Global Campus feasibility was happening or not, this topic should be further discussed and addressed.

But what level of “ISO 29990 alignment” or accreditation is expected of contributors? Some seem to feel that accreditation or ISO certification is necessary. However, this would exclude even many existing RTCs. (Even though new WMO RTC criteria are much in line with ISO 29990, the review process is less rigorous than going through a full ISO certification.) If the goal is to be inclusive of training units within NMHSs who might also provide useful resources and courses for the global community, defining a subset of similar quality criteria *without* a certification or accreditation requirement would be useful. The criteria presented here could help define that subset. An alternative approach is that used within the aero meteorological community of them having implemented a QMF process and encouraging ISO certification.

Note that all NMHSs involved in providing Aeronautical Meteorological Forecast services must have a QMS in place, which would theoretically also apply to their training offerings related to aeronautical meteorology.

We might consider several levels of quality assurance methods as acceptable, and leave the choice up to the provider. External assessment and peer assessment would have more status, of course, but self-assessment-only would be more feasible and affordable for many institutions, and can also be rigorous with good assessment templates. However, even self-assessment requires resources at both the source and at some approving body.

User reviews are a growing in acceptance as measures of quality, and may be most appropriate for resources, but also useful for courses. While there is some level of technical overhead for sharing user reviews or ratings, they can probably be included in any system that is put forward. There may be some reluctance in sharing user reviews, because they might not be considered authoritative judgments. Also, we should note that those with voluntary user reviews in place (the COMET Program, for example), report low usage.

Some flexibility seems desirable and not harmful to those institutions that choose, or must abide by, the most rigorous quality methods.

How quality information is communicated, via a shared calendar or registry, or from the source of the products themselves, still requires discussion. But this is likely a lesser concern than deciding WHAT quality information needs to be provided and how that information is validated.

# APPENDIX B:

**Key factors of the Quality Assurance Policy applied to the WMO Global Campus**

**for Organization, Process, and Product**

Ensuring the quality of education and training primarily falls on the E&T Providers themselves and thus created the basis for responsibility of the current system of professional E&T within each member-state.

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|  | Criteria | **What they define?** | **Partially described in the WMO ETR Publications** |
|  1(Product) | Quality of educational content/course | What do we teach? | Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology WMO-No. 1083 |
|  1(Product) | Expected Learning Outcomes | What is the participant expected to learn? | Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology WMO-No. 1083Background knowledge and skills from the second level competency statements |
|  1(Product) | Learning Activities | How is the learning developed? | Guidelines for Trainers in Meteorological, Hydrological and Climate Services (WMO-No. 1114) |
|  1(Product) | How learning is assessed | How do we know whether learning has occurred? | Guidelines for Trainers in Meteorological, Hydrological and Climate Services (WMO-No. 1114) |
| 1(Product) | Awards associated with the course or offering | What is the formal level of the learning? |  |
| 2(Process) | Quality of technical provision and methodological support of the training process | How well training supported? | Guidelines for Trainers in Meteorological, Hydrological and Climate Services (WMO-No. 1114) |
| 2(Process) | Quality of teaching technologies applied | How teaching organized? | Guidelines for Applying for a WMO Fellowship (WMO-No. 1104) |
| 2(Process) | Quality of the knowledge and skills testing  | How check of the knowledge and skills done? | Guidelines for Applying for a WMO Fellowship (WMO-No. 1104) |
| 3(Organization) | Quality of Enrollee or Trainee  | Who do we select? | Guidelines for Applying for a WMO Fellowship (WMO-No. 1104) |
| 4(Organization) | Quality of Trainers  | Who teaches? | Competency Requirements for Education and Training Providers for Meteorological, Hydrological, and Climate Services |
| 5(Organization) | Quality of management system  | How training is managed? | Guidelines for Trainers in Meteorological, Hydrological and Climate Services (WMO-No. 1114)RTC Guide (WMO-No. 1169) |
| 6(Organization) | Accreditation / Reputation  | Is there external recognition in place? | Guidelines for the Recognition or Reconfirmation of WMO Regional Training Centres (RTCs) |

1. \* In MS Word 2007 or 2003, go to “View” > “Document Map”. In MS Word 2010, go to “View” > “Navigation Pane”.
In MS Word on a Mac, go to “View” > “Navigation Pane”, select “Document Map” in the drop-down list on the left. [↑](#footnote-ref-1)