

Lessons learnt from a skills workshop

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**Impact workshop of the MU
Training activity**



MATHMET



Skills workshop

- › Held online 17-18 May 2022 as part of activity A2.2.2 of MU Training activity led by PTB
- › Nearly 40 participants from 25 organisations to share good practice and experience in MU training, to learn from teaching experts, and to know how to target audiences at the end of the measurement chain.
- › Agenda and presentations available on the EURAMET website

[EURAMET: For Teachers - Measurement Uncertainty Training](#)

Expressed needs

- › After "traditional" MU teaching (trainer-oriented presentations followed by exercises for the trainees), final oral exams reveal that graduates may not have acquired the desired fundamental understanding of even most basic concepts

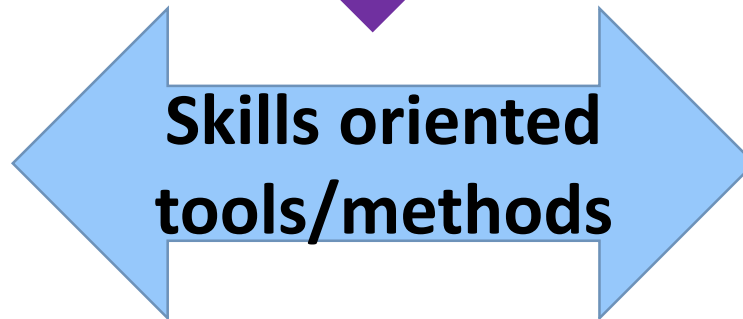
learning from
teaching experts



MU training



**Skills oriented
tools/methods**



improvement of the
skills of the learners



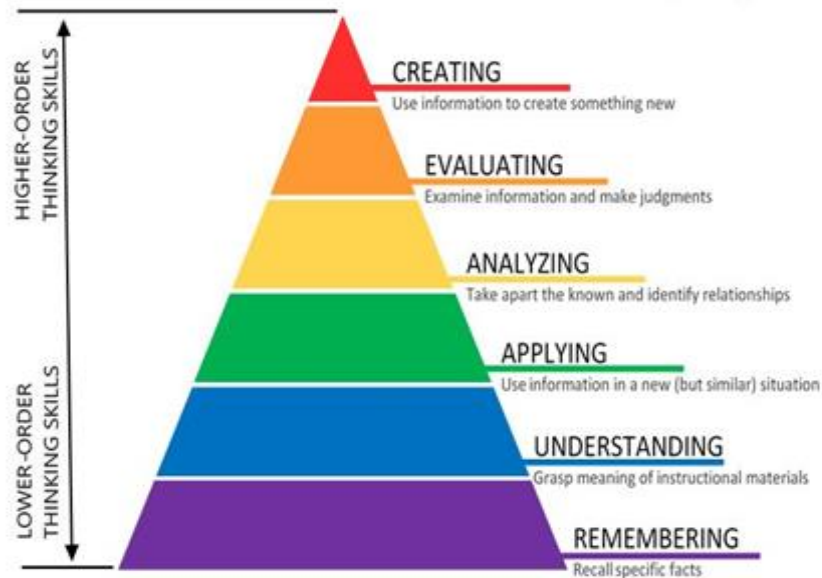
Learning from teaching experts

Skill-oriented methods

Evaluation,
quizzes

examples

BLOOM'S TAXONOMY – COGNITIVE DOMAIN (2001)



blended learning

face-to-face
classroom

online
classroom

e-learning
(modules)

flipped
classroom



Advantages

- › more effective than purely face-to-face or purely online classes to meet the needs of the learners
- › favors interactions between learners and between teachers and learner
- › more time for discussion and the application of concepts in class
- › better problem identifications of the learners through evaluation, quizzes
- › avoids cognitive overload and smoothens conceptual cliffs, especially for trainees who are less mathematically literate



Recommendations for targeting audience at the end of the measurement chain

- › Tailor the course to meet the needs and background of the audience
 - Basic uncertainty seminars :
 - › practice-oriented,
 - › end-user community not very interested in the underlying mathematical or statistical methods,
 - › awareness of a balance between effort and benefit of the uncertainty evaluation
 - Advanced uncertainty seminars:
 - › optimization of uncertainty budgets
 - › when to use alternative methods
 - › covariance
- › Build as many bridges between theory and application as possible
- › Illustrate with several examples, interactive exercises, use animations to demystify the maths/stats operations
- › Keep the GUM simple, teaching MU with a minimum of math content
- › Provide an annotated template of a simple uncertainty budget as a reference for conducting uncertainty evaluation
- › Follow-up contact should be encouraged