

Workshop on Statistical Literacy and Metacognition ELIXIR AHM in Rome, Italy 23 March 2017

Description: This workshop will demonstrate a new approach to teaching and learning *statistical literacy*. The difference between statistical analysis and statistical literacy is exemplified by the roles “producer” (carries out statistical analyses) vs. “consumer” (reads, interprets, uses the outcomes of such analyses) of statistical analysis or arguments based on them. Metacognition, the awareness and understanding of one's own thought processes, is important in both of these roles and especially in teaching and training around each. There are nine elements to statistical literacy: 1) Define a problem based on critical literature review; 2) Identify or choose – and justify - the measurement system; 3) Design the collection of data; 4) Piloting, analysis and interpretation; 5) Discerning “exploratory”, “planned”, and “unplanned” data analysis; 6) Hypothesis generation based on planned & unplanned analyses; 7) Interpretation of results; 8) Draw and contextualize conclusions; and 9) Communication. Participants will learn and practice these elements in exercises that simultaneously build metacognitive awareness. Integration of metacognition into the statistical literacy training promotes sustainability of the learning, encourages learners to seek further training that can address self-identified learning needs, and introduces the metacognitive developmental trajectory that leads to qualification to diagnose and remediate future trainees in statistical literacy and other content domains.

Target audience: Individuals who have completed the ELIXIR-EXCELERATE Train the Trainer program are specifically solicited for this pilot (although that would not be the target audience of a workshop like this in future). We are also seeking enthusiastic and reflective teachers, particularly with interest and experience in metacognition.

Prerequisites: Familiarity with Bloom's taxonomy and its relevance in education; and with training needs across ELIXIR nodes are required. Prior experience with the scientific method will be helpful; statistical expertise or experience is not essential but *some* experience with reading and/or evaluating arguments that involve data (e.g., research manuscripts or proposals) is preferred.

Aims: The aim of this training (if it is adopted) is to introduce statistical literacy as a learnable, improvable skill set that attendees can continue to use and develop beyond the workshop. The aim of this *workshop* is to use statistical literacy to highlight how trainers can develop the general abilities to diagnose and remediate for trainees during training - around any content. The knowledge, skills and abilities (KSAs) required for statistical literacy will be introduced and practiced in an interactive session. Activities focus on Bloom's taxonomy as it underpins each KSA to demonstrate the role of metacognition.

Activities: Each participant will:

- Work to recognize the nine elements to statistical literacy – what they are and how they interrelate; generate evidence of recognition/recall level engagement with each.
- Explore the differences between recognition/recall level and higher level (synthesis, evaluation) engagement with these elements.
- Align research questions (based on a critical literature review) and the correct data collection method(s).
- Recognize what statistical (inference) tests actually do.
- Explore the representativeness, reproducibility, and rigour of example analyses with respect to p-values and effect sizes as well as conclusion, contextualization, and communication.

- Map the initiation and development of statistical literacy onto activities that can be categorized according to what Bloom's taxonomy levels they engage, support, and require.

Format: Presentations, small- and large-group discussions.

Duration: 4-6 hours workshop; 2 hour debriefing (maximum 8 hours).