Exploring and refining core competencies for bioinformatics: GOBLET workshop, 17 Nov 2015

Summary

Bioinformatics professionals work in a variety of settings, including core facilities, biological and medical research labs and software development organisations. The need for bioinformatics skills permeates academia, industry and the healthcare sector. As the organisation, analysis and interpretation of vast amounts of data becomes central to biomedical research, how do we define bioinformatics competency requirements for these diverse roles and ensure that there is adequate training to meet their needs? The ISCB curriculum taskforce has drafted a set of competency requirements for three distinct types of bioinformatics professional - the user, the scientist and the engineer (**DOI:** 10.1371/journal.pcbi.1003496). In Africa, this set has guided the curriculum for a pan-African post-graduate curriculum developed by the H3BioNet network (http://h3abionet.org/training-and-education).

Over the past year we've been gathering input on these requirements through a series of interactive workshops, and have modified it in response to this feedback. In this workshop we will explore how competencies can be used to shape learning in different contexts, and work together to provide input into the current version.

Programme

11:30-11:40	Why core competencies?	Cath Brooksbank, EMBL-EBI
11:40-11:50	Applying core competencies in Africa - the H3BioNet Experience	Nicky Mulder, University of Cape Town
11:50-12:00	Training needs for core facilities vs embedding a bioinformatician into a lab	Fran Lewitter, Whitehead Institute
12:00-12:10	ELIXIR's training plan	Celia van Guelder, ELIXIR Training Programme
12:10-12:20	Q&A	All
12:20-12:30	Introduction to the breakout sessions formation of groups and selection of scenarios	Cath Brooksbank, EMBL-EBI
LUNCH		

13:30-14:30	Breakouts	ALL Breakout leads: Celia, Michelle (user) Nicky, Fran (scientist) Pedro, Patricia (engineer)
14:30-15:00	Groups to report back on breakouts (4 x 5 min)	
15:00-15:30	Discussion and wrap up	All (Cath to chair)

Scenarios for breakouts

Each breakout group will choose one scenario; we should ensure that we cover all three types of professional, but depending on the preferences of the audience we've got a bit of wiggle room.

We have preselected leads for each group, and each group will need to select a scribe and a rapporteur.

When you report back to the main group, structure your response in the following way:

- Which competencies are needed for the scenario considered?
- What are the three most important competencies?
- Are you aware of/can you find appropriate training materials or courses from http://www.mygoblet.org/training-portal (or any other sources of bioinformatics training that you are aware of) that would meet these competency requirements?
- Is there anything that could be done to make the competency profiles more useful?

User 1: you need to design a course for cytogeneticists, enabling them to make use of bioinformatics databases to identify potentially pathogenic genetic variations. Your task is to work out which competencies, at which level, they need. If you have time, identify the three most important competencies for this group; how would you assess that they had gained competency in these three areas at the end of the course?

User 2: You have been contacted by the director of a master's course in genetic counselling. They are updating their syllabus and would like input on a potential bioinformatics module. Which bioinformatics competencies should be gained from a bioinformatics module for genetic counsellors? If you have time, identify the three most important competencies for this group; how would you assess that they had gained competency in these three areas at the end of the course?

Scientist 1: You are a PI in a busy lab doing genome-wide association studies to uncover genetic determinants of susceptibility to Dengue fever. You need to hire a bioinformatician fresh from a master's course. Use the scientist profile to determine what competencies your new hire must have from day one, and what new competencies you expect them to have gained in a year's time. If you have time, define how you would ensure, as part of the recruitment process, that they have the competencies required to fulfil the role.

Scientist 2: You run a bioinformatics core facility and are about to start a project to develop a new data analysis pipeline, which will identify SNPs in different strains of maize, map them to orthologues in related crop species, and predict the effect of the variant on crop productivity. You are writing the job description for the person who will do this work. You need to ensure that the pipeline can be used and adapted by a research group developing new algorithms for genotype-phenotype mapping. What competencies would you need your new hire to have? If time, define how you would determine that your candidates have the right competencies.

Engineer 1: You have just successfully gained an award from the Gates Foundation to investigate the effect of soil flora on the productivity of groundnuts. Use the Engineer competency profile to identify the competencies required by the person who will develop this platform. There are two people in your group who might be good contenders for this role and are coming towards the end of their current funding. One of them is a bioinformatician who has worked extensively on sequence assembly and annotation but doesn't have strong software development skills; the other is a software engineer who has developed data analysis pipelines for the group in the past but knows nothing about metagenomics and has no formal training in the life sciences. Of the competencies that you have identified as important for this role, which ones do you think each of your candidates will need to work hardest on? If time, try to identify appropriate training materials or courses for each of them from http://www.mygoblet.org/training-portal, www.on-course.eu or any other training sites that you know about.

Engineer 2: You are a member of a collaborative network that is developing a new, field-based platform to analyse sequence variations in cattle and correlate them with suceptibility to trypanosomiasis (sleeping sickness). You are working with a company that has developed a portable sequencer suitable for use in the field; the project needs to develop software to take the output from the sequencer and turn it into a readout that is interpretable by veterinary pathologists. Use the bioinformatics engineer profile to work out which competencies will be most important for your team of developers. One of your developers will need to lead this team. Which three competencies will be the most important for the team leader?

Outcomes

Your input will be combined with input from other workshops to refine the competencies drafted by the ISCB curriculum taskforce. This will be shared on the new ISCB community portal, ISCB connect, and the broader community will be invited to contribute further towards refinement of the competencies.