Towards a format for effective teacher training

Why bioinformatics in biology education?
The recent flood of data from genome sequences and functional genomics has given rise to a new field, bioinformatics, which combines elements of biology and computer science. Bioinformatics is nowadays an inherent part of molecular biology. Gelbart and Yarden write that a bioinformatics learning environment promotes the construction of new knowledge structures of the genomics domain and therefore influences students’ acquisition of a deeper, multidimensional understanding of the domain.

Research question
Which training characteristics are effective in preparing biology teachers to use bioinformatics tools as part of their genomics related education?

Educational design research: combining three ingredients results in a design

Inquire attitude and knowledge of teachers
Bioinformatics is a very good context for learning about DNA and proteins
Bioinformatics is necessary and desirable in biology education
The bioinformatics approach in molecular biology is relatively unknown to teachers

Analysis of necessary competences of the teacher
Teachers should be able to
→ Understand the relevance of bioinformatics in biology education
→ Work with authentic bioinformatics sources (databases) and tools (BLAST, ClustalW)
→ Develop small student assignments linked to biological subjects

Study of literature on teacher training strategies
Relevant learning activities are:
- Experimenting (try-out)
- Reflection on one’s own teaching practices
- Using external resources
- Interaction with other teachers

Teacher experiences: I don’t want information only, but time to translate the new knowledge for use in my class
These characteristics can be combined in a Community of Practice.

Context
This training format is a first step towards answering: What expertise is needed to use bioinformatics tools in genomics classes and how can science teachers be facilitated to acquire this expertise and to incorporate bioinformatics into biology education?

Design of teacher training in bioinformatics
Giving relevance to bioinformatics:
Expert-talk (in what way does a researcher use bioinformatics?)
Short modules (in what way can bioinformatics connect to the existing biology curriculum?)

Empowering teachers:
Supporting teachers to develop their own education module, with help from decision trees.

Involving students:
Working on computers is very easy for students, but it is often much harder for the teacher. That’s why we would like to invite students to the training. Teams of teachers and students can work together in making modules.

International network
The Netherlands Bioinformatics Centre (NBIC) disseminates bioinformatics at various levels in education in the Netherlands. We would like to set up a network of people who are involved in bioinformatics education e.g. didactic research, development of educational material etc.
If your interested in joining us, please let us know!

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