Professional skills required to the "Food Microbial Bioinformatician"

Primary Author: Pompei F.1

Co- Authors: Alessandrini B.¹, Calistri P.¹, Cammà C.¹, Castello V.³, Conte A.¹, D'Albenzio S.¹, De Albentiis E.¹, De Benito A.⁴, Di Pasquale A.¹, Espí J.⁴, Garofolo G.¹, Pichillo G.¹, Recchioni M.³, Serrano C.⁴, Siwek M.⁵, Verkola M. E M ², Heikinheimo A.², Pomilio F.¹

- 1. Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" IZSAM
- 2. Helsingin Yliopisto (University of Helsinki) UH
- 3. Università degli Studi dell'Aquila UNIVAQ
- 4. AINIA
- 5. University of Science and Technology UTP

















(a) biopartner



Introduction

Increased accessibility and decrease in the cost of Whole Genome Sequencing (WGS) using Next Generation Sequencing (NGS) have revolutionised clinical and public health microbiology.

Currently, high resolution typing for foodborne pathogens is becoming the new standard for WGS data analysis in outbreak investigations and source attribution. The advent of the "Omics Era" with WGS data routinely produced in Food Microbiology requires professional profiles properly qualified to operate in this specific sector.

Despite the recommendations set by the European Commission and the Food and Agriculture Organisation of the United Nations, recent developments in NGS research have not always been accompanied by the implementation of specific university curricula aiming at training highly specialised professionals with multidisciplinary skills in Genomics, Food Microbiology, Statistics, Epidemiology and Bioinformatics.

Expected results

The partnership designs, tests and validates four Intellectual outputs (Figure 2).

European students enrolled in 2nd and 3rd cycle degree courses as well as professionals (Table 1) will have the possibility to improve and certify their knowledge and skills.

A specific **self-assessment tool** developed by the project will allow users to identify their learning needs. In order to fill-in these training gaps, the project will design, test and validate a multidisciplinary **eLearning course**, complemented by an **intensive study programme** with an hands-on training at IZSAM.

The "Open Badges" system will allow the certification of knowledge and skills acquired.

The project also supports entrepreneurship and self-employment by developing and disseminating useful guides and an e-tutorial (**Startupper's bricks**). All the resources produced in the framework of the project will be published online in the forthcoming **LEGO platform**.

Figure 3. Development flow for the profile definition (IO1)

The Project

The 30-month project "LEarning GenOmics for food safety" (LEGO), funded in the framework of Erasmus Plus Programme Action KA2, Higher Education - Cooperation for innovation and exchange of good practices, aims at bridging this growing educational gap by defining an innovative and interdisciplinary professional curriculum for the profile of "Food Microbial Bioinformatician".

The LEGO ad-hoc blended training initiatives compensate the lack of skills generated by the current educational system while promoting the recognition of the new profile in Europe.

The partnership is led by Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" – Italy. The expertise (Figure 1) and complementarity of partners – belonging to four different European countries: Finland, Italy, Poland and Spain – permits a balanced assignment of tasks and responsibilities for the achievement of the project goals.

Figure 2. The intellectual outputs



Figure 1. Partners expertise

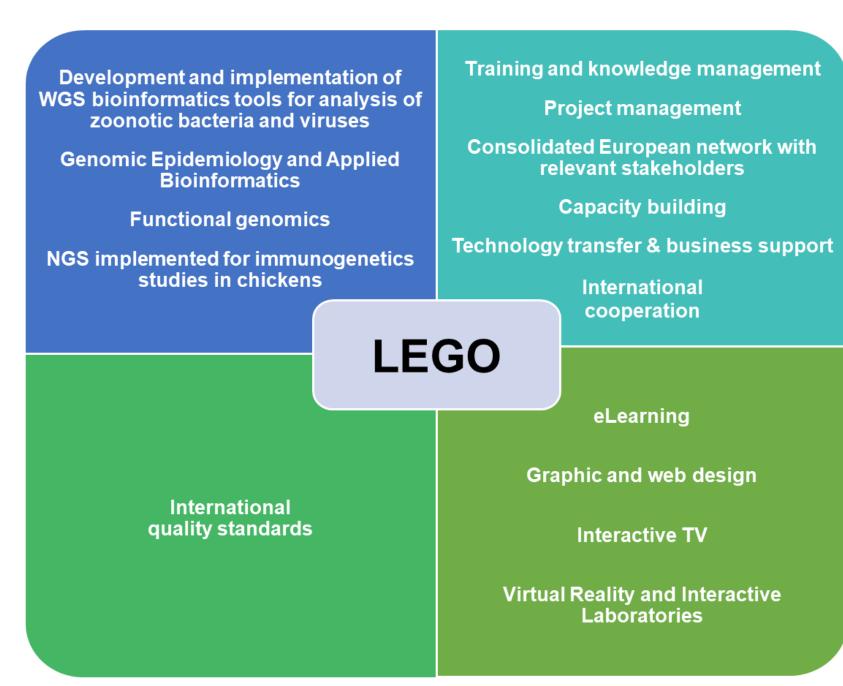
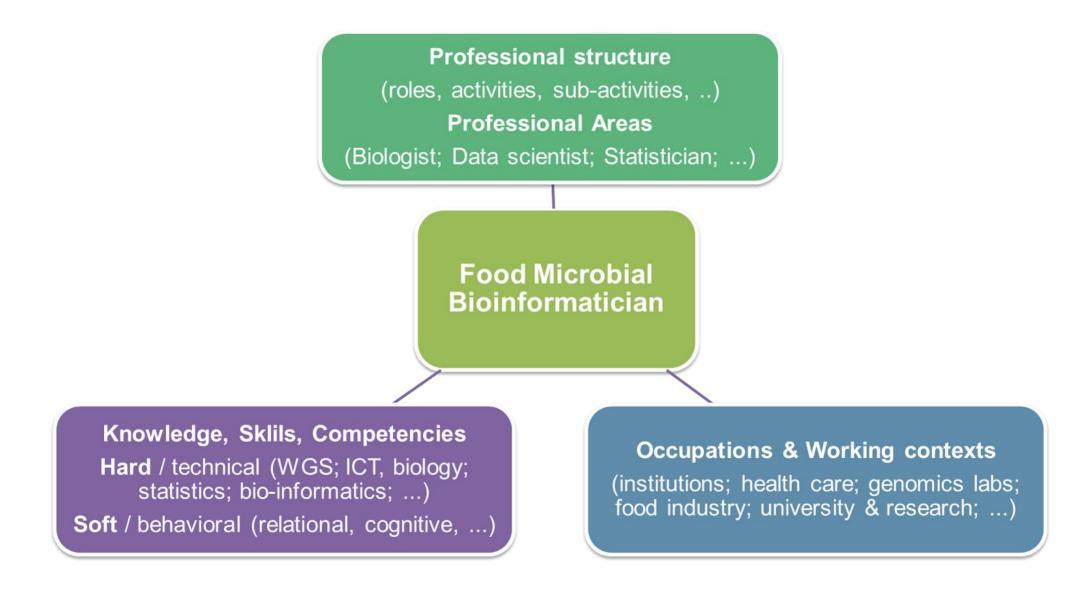


Table 1. Project beneficiaries

| Direct Beneficiaries | | | Indirect Beneficiaries |
|---|--|---|--|
| Category 1 | Category 2 | Category 3 | |
| European students enrolled in 2nd and 3rd cycle degrees in: Veterinary Medicine Bioinformatics (Micro) Biology and Biotechnology Public Health Agriculture Biomedical Engineering Medicine | European students enrolled in 2nd and 3rd cycle degrees in: > Statistics > Computer Science > Mathematics having also at least three years of research or professional experience in the microbiology sector | Professionals (microbiologists, bioinformaticians, epidemiologists, veterinarians, statisticians, etc.) willing to enter into a formal educational path for the recognition of their competences in the field of genomics and food safety | Universities National Competent Authorities Relevant Private /public research institutions working in Food Safety field Technology Centres Umbrella organisations and companies operating in the food, chemical, cosmetic, pharmaceutic and biomedical sectors and relevant production chains VET institutions IOs and NGOs active in the fields of food safety, research and health Federations of professionals Consumer Organisations |

State of the art and background analysis on the latest techniques for the sequencing of food pathogens Comparative analysis of existing gaps in terms of training A new Professional Research Profile created: Validation of the profile Definition of the profile the "Food Microbial Bioinformatician" Analysis of gaps existing in the labour market in terms of knowledge and skills Job profiling Delphi Method

Figure 4. Profiling the «Food Microbial Bioinformatician» (IO1)



Methodology

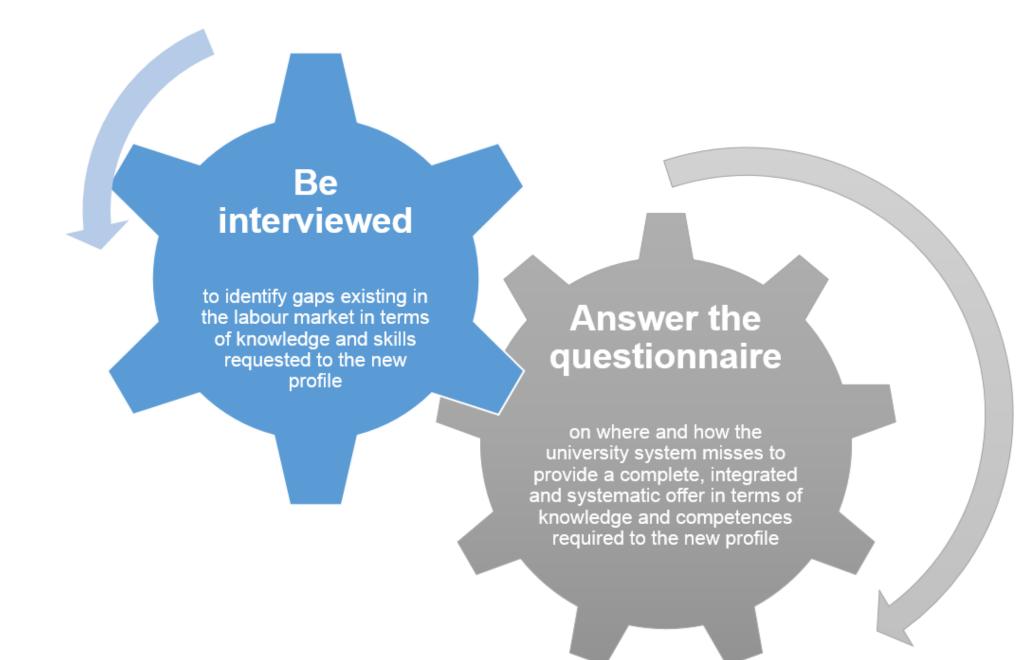
The project adopts a dynamic system of knowledge elicitation, mainly based on the application of the **Delphi** method.

The profile definition is supported by a **comparative analysis** defining the state of the art of the Higher educational system offer in Europe with reference to the new profile.

A gap analysis identifies the specific knowledge and skills required to researchers and professionals working in the field of NGS applied to Microbiology and Food Safety (**Figure 3 and 4**).

Get involved!

Figure 5. How to get involved



Students, opinion leaders and international stakeholders will be involved in order to address the design of the professional profile fully in line with the market demands and the new research trends in the project field.

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