

Conclusions and proposals for improvement from the seminar "Challenges in university education in the field of Biosciences"

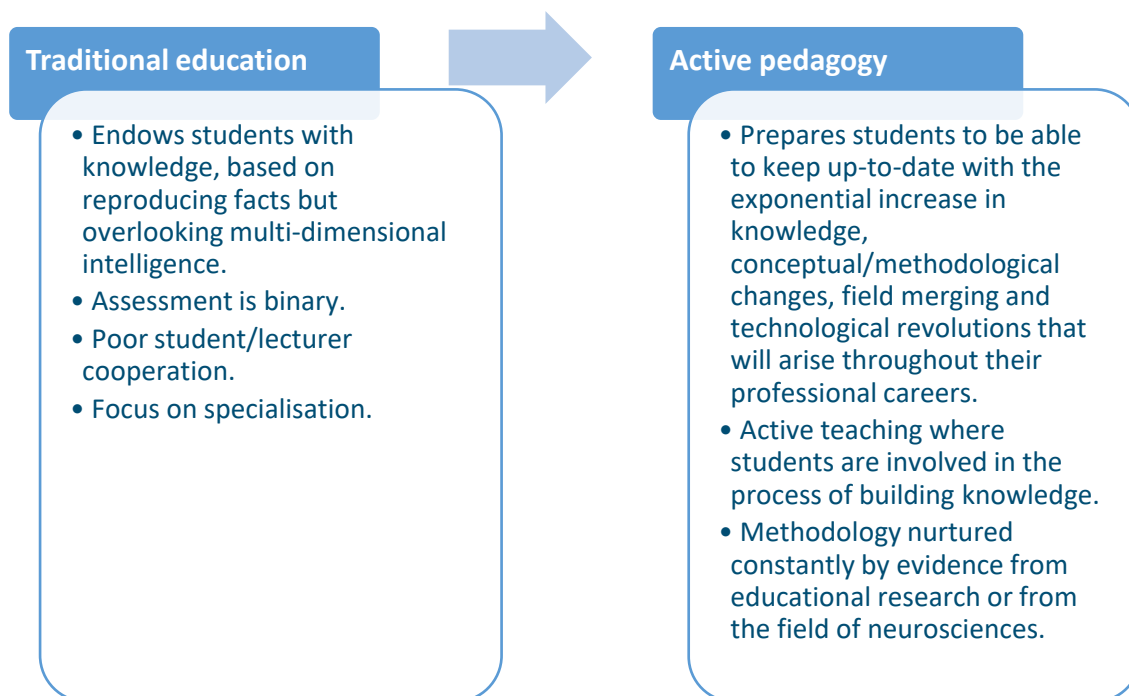
The seminar "Challenges in university education in the field of Biosciences" was held on 8 November 2019 at the Faculty of Biosciences of the Autonomous University of Barcelona. It constituted a forum for dialogue and reflection in which representatives from the business world and the university community strengthened synergies in order to achieve improvements in educational programmes.

Diagnosis and challenges in education

Néstor Torres, from the University of La Laguna, identified a host of changes that need to be addressed in order to guarantee suitable education in the field of Biosciences:

- Exponential increase of conceptual/methodological changes and knowledge (genomics, proteomics, computing).
- Field merging in biology, chemistry, physics and mathematics.
- Varied, dynamic, fast-paced... labour market.

To guarantee students are able to cope with this setting, the proposal is to shift from traditional education to active pedagogy:



In addition, Torres notes that for this methodological change in teaching to be feasible, **institutional support** is paramount:



- Innovation cannot be an isolated endeavour, it must be institutionalised. The institution must make a commitment.
- Innovation should be at the core of educational activity and should be sustainable; accordingly, it should be part of the regulations.
- Teaching professionals must not ignore developments with this change. They must foster the implementation of educational research and transfer it into their teaching practice.

Furthermore, the **AQU Catalunya employers' study** draws the following primary conclusions:

- The field of Biosciences shows excess demand for places and high satisfaction with the education received; however, the quality of access to the labour market is poorer among graduates of study programmes in Biological Sciences and Biomedical Sciences than in the remaining study programmes in the Catalan university system (a high proportion of temporary contracts and individuals on a scholarship).
- It is a highly research-oriented field: when it comes to recruitment, holding a PhD is most highly valued in this sector.
- The following cross-disciplinary skills show scope for improvement in study programmes in the field of Biosciences:
 - Problem solving and decision-making
 - Project management and leadership
 - Practical training (statistical analysis, application of knowledge in the professional setting)
- Despite the need for improvement, employers are satisfied with the skills of the recently graduated individuals they have recruited (at 7.4 out of 10).
- There are excellent prospects for growth in the sector. Skills that will become increasingly important in the near future are related to:
 - Languages
 - New technologies
 - Project leadership and management

Proposals for improvement

Bearing in mind the need for methodological change in teaching, the results of the employers' survey and the proposals stemming from the round table discussion held during the seminar, the following **proposals for improvement** are defined in order to enhance the employability of future graduates in the field of Biosciences:

1. To venture for the shift to the **active methodology**, focussed on students. To this end, it is essential for teaching innovation to benefit from **institutional support**.
2. To contribute to **enhancing the skills of teaching staff** to enable them to lead the shift to the active methodology.
3. To integrate **leadership** and **project management** into undergraduate education.



4. To encourage broader **practical skills** in order for the students to be able to apply knowledge in a professional setting, and to also enhance problem solving and decision-making skills by solving actual practical cases of companies in the sector.
5. To provide more **opportunities for employment experience** (training placements as part of or unrelated to the study plan) to strengthen professional skills.
6. **To integrate cross-disciplinary skills into Bachelor's degree programmes:** in their strategic plans, universities highlight the importance of their students gaining cross-disciplinary skills. When designing teaching plans, it is vital to ensure that consideration is given to the development of cross-disciplinary skills and that there is a clear definition of how the acquisition of these skills will be assessed. In many cases, when these skills are addressed in subjects, it is not known how to assess them.
7. **To foster specific courses for developing soft skills**, either through specific courses delivered by the university or promoting courses offered by other organisations. It would be relevant for the university to form an active part of the "ecosystem" in the field of Biosciences and to be in a position to create synergies with the various stakeholders that are part of said ecosystem (professional associations, the business cluster, scientific societies, foundations) with the aim of offering supplementary training courses to enable students, teaching staff or companies to achieve excellence.
8. **To enhance professional guidance** and awareness of employment opportunities. It was identified that a proportion of graduates in Biosciences are unaware of the jobs available to them aside from those strictly linked to research. Indeed, private enterprise conducts research as well and requires a team with knowledge of "science" and, moreover, an ability to manage it.
Furthermore, in relation to public employment, it is necessary to take into consideration that there is a limited, biased (according to the study programme of origin) number of public vacancies in this field (in the National Health Service, for example), restricting training of these professionals and, as a result, their employment projections. This limitation should be the subject of debate by public authorities.
9. To draw up a "**management-oriented**" **study pathway** by offering optional subjects in the field of management.
10. To improve knowledge of **English**: offering more classes in English, seminars, etc.
11. To adjust the range of educational programmes offered to meet the needs of the market in which, although there is employment, it is substandard at the initial stages of a professional career.
12. To encourage **student participation** in the implementation of curriculums so that the opinions and/or recommendations of end users may be taken into consideration.