Skills, training, education

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The problem

- Nanotechnology is by nature interdisciplinary, involving numerous scientific and technical disciplines
- Nanosafety is an obligatory aspect that adds further disciplines: Biology, Medicine, Environmental Sciences, etc.
- Where do you find the experts for that?

NanoEIS CSA: Education meets jobs

- Nanotechnology is a KET that penetrates more and more industries. Accordingly, a job market develops.
- In response, universities have set up various study programs at bachelor, master and PhD level.
- Question: Do education contents meet job market needs?

11 Partners, 3 years

UNIVERSITÄT SALZBURG

AGH University of Science and Technology

CERTH

Malsch TechnoValuation

microTEC Gesellschaft für Mikrotechnologie mbH

NANOfutures

FUNDACIÓN PRODINTEC FACTORY OF FUTURE

NIA Nanotechnology Industries Association

PAN

VTIA ORT

UCD Dublin

Industry skill needs

SKILLS	NOW
Health and safety issues	31
Characterization techniques	26
Nanocoatings/smart surfaces	26
Nanochemistry	22
Regulation/standardization	20
Marketing and communication	18
Nanomanufacturing	16
Pilot lines/scaling up processes	14
Environment/disposal/recycling	14
Nanostructures/composites	13
Nanoelectronics	12
Metrology	12
Nanobiotechnology	10
Design	9
Modelling/simulation	8
Nanoptics	5
We don't need any now	2
Other*	1

Fig. 3.11 *Ranking of related skills/knowledge required by the companies NOW according to number of answers received (*knowledge about business)*

http://www.nanoeis.eu/sites/default/files/downloads/NANOEIS%20D2.1%20Report%20on%20European%20industry%20needs.pdf

The (students) job market

SKILLS	5 YEARS TIME
Health and safety issues	26
Regulation/standardization	23
Environment/disposal/recycling	23
Nanochemistry	23
Nanocoatings/smart surfaces	20
Nanobiotechnology	18
Nanostructures/composites	17
Nanomanufacturing	17
Marketing and communication	15
Pilot lines/scaling up processes	14
Modelling/simulation	12
Metrology	12
Nanoelectronics	11
Characterization techniques	10
Design	9

Nanotechnology industry needs in 5 years:

http://www.nanoeis.eu/sites/default/files/downloads/NANOEIS%20D2.1%20Report%20on%20European%20industry%20needs.pdf

Other (social) employers

NanoEIS identified three ‚ecosystems‘ of employment:

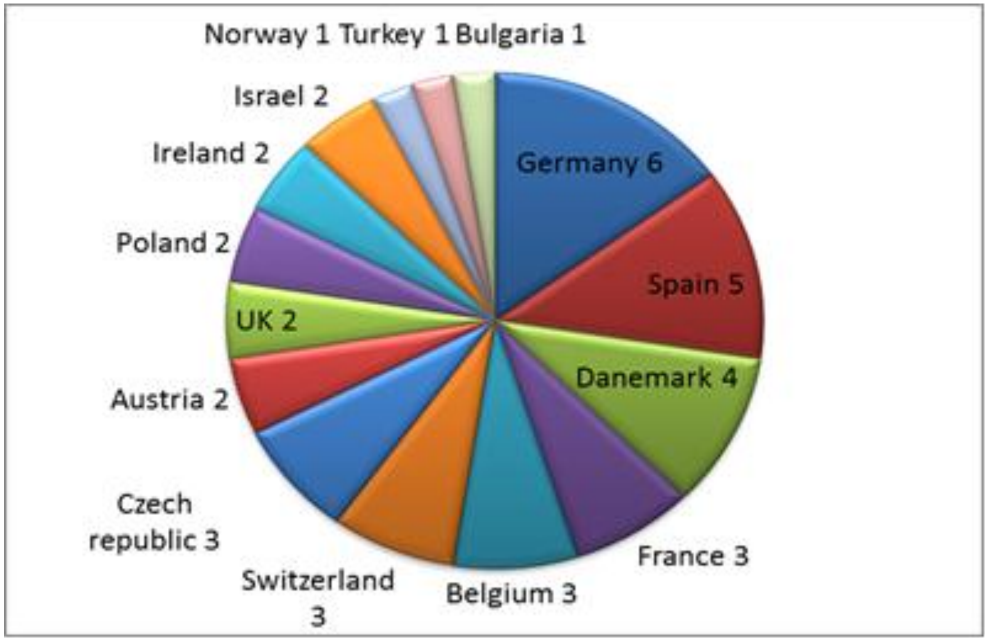
A) Dialogue & Communication (either stakeholder dialogue or public awareness raising and education – defined by target audiences; includes media)

B) Regulation (Government, EU and international agencies)

C) STI Promotion (Policy development, funding /coordinating research and facilitating innovation; *e.g.* REA, DASTI or FWF)

http://www.nanoeis.eu/sites/default/files/downloads/NanoEIS%20DeliverableReportotheremployersfinal.pdf

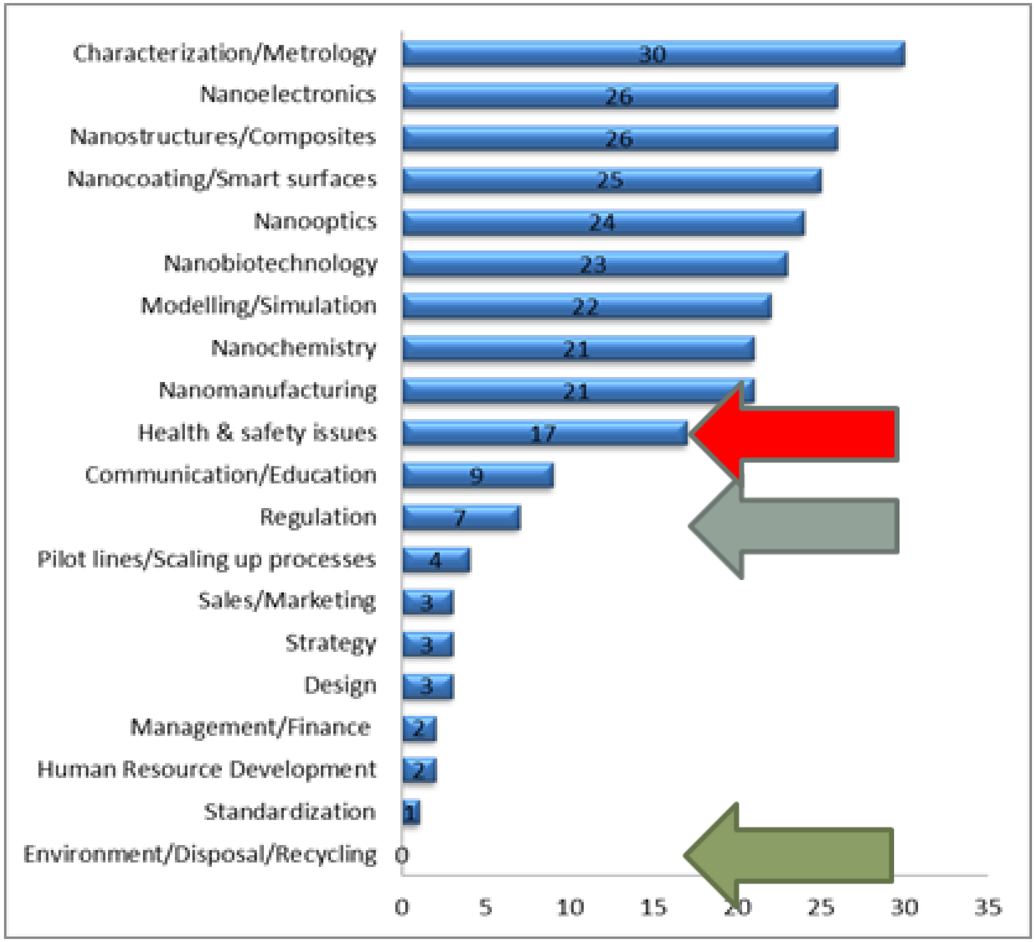
The university side



35 representative university curricula were studied:
10 BSc, 19 MSc, 6 PhD programs.

http://www.nanoeis.eu/sites/nanoeis.eu/files/downloads/D32-corrected-public.pdf

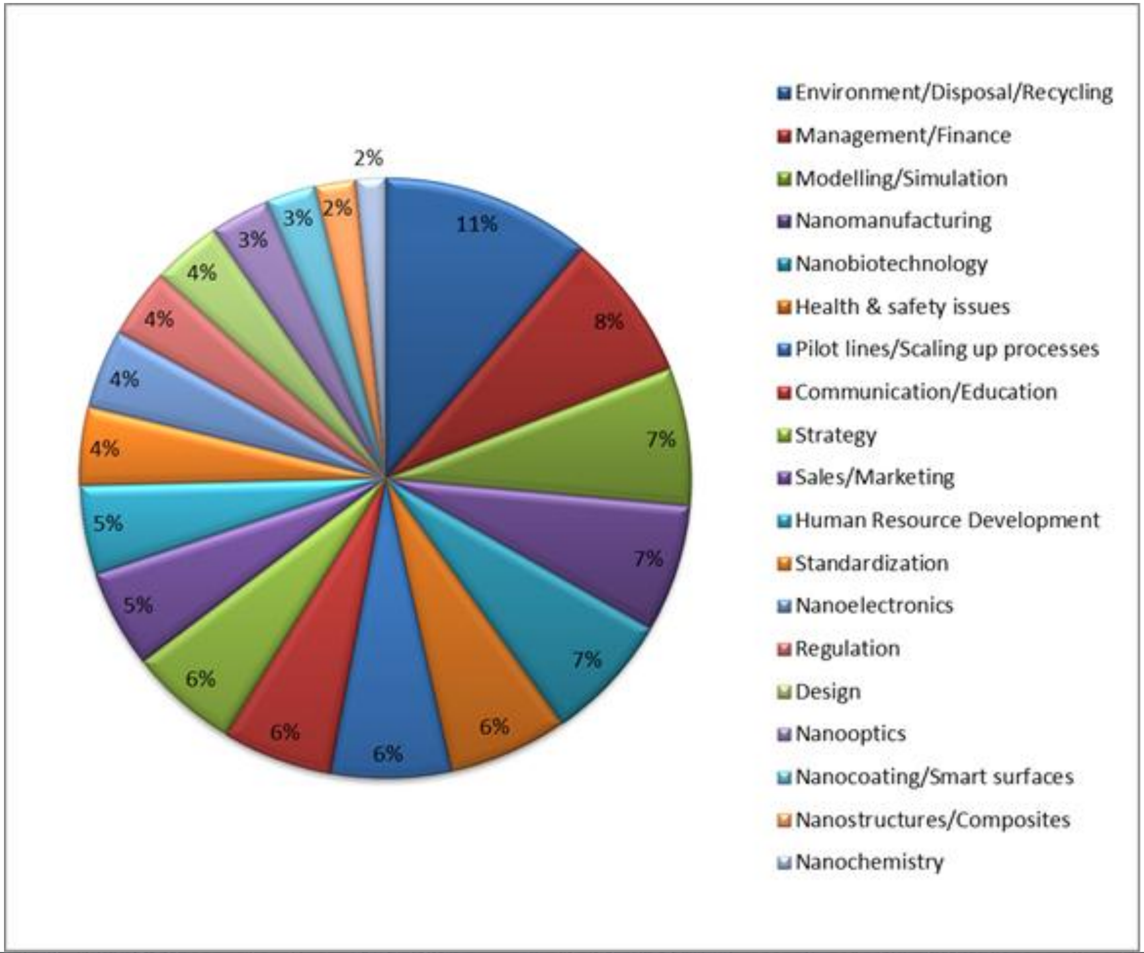
Do you teach ....?



University teaching contents differ strongly from industry needs: The fields offered are the same in both studies!

http://www.nanoeis.eu/sites/nanoeis.eu/files/downloads/D32-corrected-public.pdf

What is missing in your study …☆



☆ … but you think employers want from you?

http://www.nanoeis.eu/sites/nanoeis.eu/files/downloads/D32-corrected-public.pdf

Solutions

- Curriculum reform in universities
- Offer more on-the-job-training opportunities
- Involve industry in teaching (that works, but for example an industrial advisory board does not)
- Integrate nanotechnology into secondary school teaching

- *None of these options can be reached quickly …*

Roles for the Cluster

- Many PhD students and young postdocs work in Cluster projects, they are the most readily available experts for nanosafety
- They come with practical experience, knowledge and a network (via their project and via the Cluster)
- This is already ongoing and could be improved

Improvements

- Support the education group now being formed
- Make contribution to it mandatory for future projects
- Let projects develop teaching modules that can be used by others
- Increase activity to link young scientists from different projects

Practical example


COMMUNICATING SCIENCE, RISK COMMUNICATION AND STRATEGIES IN CASE OF CRISES

NanoTOES and EIMID ITN have jointly designed and carried out a course on **Risk communication.**

A booklet produced by the fellows is freely available.

The Cluster could become a repository for **teaching module** contents.

http://www.nanotoes.eu/wp-content/uploads/2013/01/booklet_communicating_risks.pdf

Summary

- Action by the NSC is warranted because nobody else well take care very soon.

- I thank all members of NanoEIS and of NanoTOES for their data and help, and FP7 for support.