IMPROVING EFFECTIVENESS IN TEACHING CORE CHEMICAL ENGINEERING KNOWLEDGE AND COMPETENCIES

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Outline

• Project overview
• Project schedule
• Survey, the first results
• Highlights of the results
• Conclusions
The consortium is keen to engage as many higher education chemical engineering degree providers and potential employers as possible.

Get in touch with us through our website: http://www.iteach-chemeng.eu or e-mail the project coordinator, Dr Jarka Glassey directly: jarka.glassey@ncl.ac.uk
Project members

- Newcastle, Nancy, Porto, Skopje, Bratislava, Dortmund

Kickoff meeting Newcastle Jan 2014
Project aim

• develop a framework which will support the assessment of teaching effectiveness in delivering not only core chemical engineering knowledge, but also core employability competencies.

• More detail on www.iteach-chemeng.eu
This consortium brings together six European academic institutions (including partners from the UK, France, FYROM, Portugal, Slovakia and Germany) providing chemical engineering degrees with professional/accreditation bodies and employer organisation representatives (as associate partners of the consortium). The aim of the project is to develop a framework which will support the assessment of teaching effectiveness in delivering not only core chemical engineering knowledge, but also core employability competencies.

The project officially started on the 1st October 2013 and will complete its activities on 30th September 2016. It is divided into seven work packages.
Project schedule

WP1  Management  Oct ‘13 – Sep ‘16

WP2  Data gathering  •  Jan ’14 – Dec ’14

WP3  Assessment framework  •  Jan ‘15 – Aug ‘15

WP4  Pilot implementation  •  May ‘15 – Sep ‘16

WP5  Quality Assurance  Oct ‘13 – Sep ‘16

WP6  Dissemination  Jan ‘14 – Sep ‘16

WP7  Exploitation  Jul ‘15 – Sep ‘16
Survey

• Survey sent out by all partners in May 2014 to academic, industrial and graduate contacts as detailed in the iTeach database

• Further requests sent to EC2E2N network contacts and through associate members

• Responses were ‘cleaned’ by removing incomplete entries and duplicates (checked by IP address)

• 97 academic, 97 employer and 70 graduate responses

• Open ended responses to questions have been uploaded into NVivo software

• Looking for themes/patterns and frequencies of occurrence

• Quantitative analysis of the data also carried out
Highlights of the preliminary results

Academic survey

Disclaimer: all results presented are based on the preliminary analysis of the survey responses available to date. Final report will be available in Dec 2014

- Importance of knowledge and skills – as expected, most fundamental knowledge classed as very important
- There are some geographical group differences, although caution should be exercised due to small sample sizes
Highlights of the preliminary results

Academic survey

• Importance of **underpinning** knowledge for graduate’s careers
Highlights of the preliminary results

Academic survey

• Importance of core knowledge for graduate’s careers
Highlights of the preliminary results

Academic survey

- Predominant teaching method of core knowledge
Highlights of the preliminary results

Academic survey

- Importance of **employability** competencies for graduate’s careers
Highlights of the preliminary results

Academic survey

• Predominant teaching of **employability** competencies
Highlights of the results

Academic survey

- No statistical significant differences in the responses of S and E European academics in terms of the significance of knowledge and skills
- Chemistry, Biology, Process & Product Engineering, Data analysis and QA rated more highly by S and E European than W and N European
- Innovative design and problem based skills more highly rated by E than N European

What assessment methods a most objective/robust for effectiveness of CE knowledge delivery?
Highlights of the results

Employer survey

- Group comparisons based on the size of the company rather than geographical region, responses predominantly from technical part of the company (not HR)
- Wide range of sectors with relatively low percentages of responses from each so no comparison possible
Highlights of the results
Employer survey

• importance of core competencies for the business

- Maths: 4.49 (N=96, SD=.63)
- Chemistry: 4.62 (N=97, SD=.64)
- Physics: 4.16 (N=96, SD=.80)
- Biology: 3.08 (N=89, SD=1.2)
- IT: 4.24 (N=95, SD=.73)

• competence of graduates

- Maths: 3.91 (N=91, SD=.8)
- Chemistry: 3.99 (N=94, SD=.83)
- Physics: 3.57 (N=87, SD=.79)
- Biology: 2.97 (N=61, SD=1)
- IT: 4.02 (N=89, SD=.78)
Highlights of the results

Employer survey

• Small company (S, 1-100, N = 29), medium-sized company (M, 100-1000, N = 32), large company (L, >1,000, N = 36)

• very few statistically significant group differences between companies of different sizes

• S and L rated Physics higher than M

• L rated communications skills higher than M and S

• M rated Safety more important than S

• Competency of graduates in Chemistry, Sustainability and Practical skills rated higher by M than by S companies
Highlights of the results
Graduate survey

• Group comparisons based on the geographical region and on the size of the company and graduate position were carried out

• Wide range of sectors with relatively low percentages of responses from each so no comparison possible
Highlights of the results
Graduate survey

• How relevant are underpinning competencies for your career?

• How relevant are core competencies for your career?
Highlights of the results
Graduate survey

• How relevant are these competencies for your career?

• Answers of the academic, see slide 13
Concluding remarks

- Qualitative data analysis and quantitative data analysis is ongoing
- Discussion of the results in Q4 2014
- Basis for the draft of the framework, which will be developed in early 2015
- The framework to be piloted in late 2015-2016 (WP4)
- Anyone interested in being involved contact us

www.iteach-chemeng.eu/
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Thank you for your attention
QUESTIONS?