

# **INTERNATIONALISED MASTER DEGREE EDUCATION IN NANOELECTRONICS IN ASIAN UNIVERSITIES**

## **COMPETENCE BUILDING IN HIGHER EDUCATION**

**573828-EPP-1-2016-1-BG-EPPKA2-CBHE-JP**

### **External Reviewer Report**

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#### **Purpose**

The evaluation report aims to provide an independent and objective, as much as possible, formative feedback on the achievements associated to the first two objectives of the projects, namely needs analysis and preparation of syllabi. The analysis in the report should be considered complementary to the other formal reviews and self-evaluation report. It tries by no means to repeat the statements and judgement there.

#### **Method**

The main method for data collection and analysis is exploration of documents, that have been produced during the first half of the project's life-time.

#### **Needs analysis**

The typical for needs analysis survey method with questionnaire had been chosen for this task. The questionnaire had been a subject of peer review to assure the construct and content validity of the measurement instrument. The sample includes representatives of the three major stakeholders of this project: university students, teachers, and practitioners in macro- and nanotechnology industry. The quantitative and qualitative characteristics of the sample allow for drawing meaningful conclusions. The findings have been published and available on the project web site. What follows are some additional ideas, based on my own interpretation, which the project partners may want to explore or implement further. The main principle of interpreting the findings is to make a distinction between what people want and what people really need. Here are some of the main messages:

1. It seems the majority of the stakeholders have positive attitudes toward OER, which is a good basis for implementation of OER in the curricula and teaching.
2. Students have been more often involved in elearning activities common for most of other studies (e.g., additional learning materials suggested by teacher, searching for learning materials on internet, following courseware provided by other universities, and watching recorded lecture) then those which are more specific for micro- or nanotechnology such as conducting experiments within remote laboratories and designing integrated circuit through remote access to workstations. Some of the project partners have extensive experience with it and it should at least be shared. A relatively low score gets having experience working virtually with students from other universities', which is also something to consider and possibly to enhance by including group project-based learning in elearning course design.

3. The main concern is how effectively to incorporate OER into existing teaching. This is not only a curriculum development but also instructional design issue. The OERs that most of the students and teachers are used to (see also p.2 above) should be associated with a well-established, proven by research and practice structure of specific learning activities. It would be nice if the project partners give some more consideration of it. I do not know how feasible is to organize formal training or informal events within the project to address this issue. My sense suggests to design a course serving as an example to follow by the others.
4. In longer term for industry, with the exception of basic electronics and introduction to nanoelectronics, the percentage of 'no need' and 'low need' is high for most of the other topics and exceeds the percentage of 'high need' and 'mandatory need'. The only confusing point here is 'in longer term'. For me this finding suggest begin offering Introduction to the field with some basic knowledge and skills and then elaborate on it with some advanced and specific knowledge and skills.

It would be better to publish on the project web site the Needs Analysis Report rather than posting separate presentations for industry representatives, students and teachers as directly extracted from the survey tool.

### **Syllabi**

There have been two good ideas here: (a) using the needs analysis findings to decide upon content and instructional methods and (b) creating a template to support describing the syllabi. Not all syllabi have defined the expected learning outcomes. This project is not only to share advancements in content but also good practices in teaching. Describing learning outcomes is such simple but very good practice. It helps the instructor to figure out the levels of learning taxonomies to address (e.g., knowledge, understanding, application or problem solving), how to teach (different levels of learning taxonomy require different instructional methods or a combination of methods, e.g., video lectures are not appropriate for application of skills or problem solving tasks) and what and how to evaluate (assessment techniques should be relevant to what is assessed, e.g., multiple-choice- multiple-answer items with a vignette are more appropriate for assessing application of knowledge and skills rather than true/false of multiple-choice type of items). The missing components of the syllabi can still be included in the elearning courses, which are in process of developing.