OVERVIEW REPORT FOR INFORMATICS, INFORMATICS ENGINEERING AND INFORMATION SYSTEMS STUDY FIELDS

2016 of Evaluation

INTRODUCTION

This report is based on the external quality evaluation of the following 9 study programmes in the study fields of *Informatics Engineering, Informatics and Information Systems* in Lithuanian Higher Education Institutions: at Kaunas University of Technology – Multimedia Technologies, at North Lithuania College – Multimedia and Internet Technology, at Vilnius College – Smart Device Technology and Electronic Business Technology, at Vilnius Co-operative College – Information Systems Implementation, at Vilnius University Kaunas Faculty of Humanities – Business Informatics, at Vilnius Business College – Media and Computer Games, at Vytautas Magnus University – Informatics and Applied Informatics.

The external evaluations were organised by the Lithuanian Centre for Quality Assessment in Higher Education (SKVC).

The external evaluations were performed according to the evaluation areas and criteria: (1) Programme aims and learning outcomes, (2) Curriculum design, (3) Teaching staff, (4) Facilities and learning resources, (5) Study process and students' performance assessment, and (6) Programme management.

Comprehensive external evaluation reports including strengths and weaknesses and concluding with some recommendations were prepared for each evaluated programme and included evaluation marks. This overview focuses on the main findings of the external evaluation of the *Informatics Engineering, Informatics and Information Systems* fields from a general point of view.

5 programmes received positive evaluation and *4* programmes received negative evaluation.

Comments on Study Fields

The Informatics programmes in Lithuanian higher education are classified into the study fields: Informatics, Informatics Engineering, Business Informatics, Information Systems, and Program Systems.

This grouping is not so different from that used in the US where there is Computer Science, Software Engineering, Computer Engineering, Information Systems and Information Technology. Accreditation from ABET, the US accrediting agency, is based on these groupings. In the UK the set of degree titles is far more diverse, running into thousands since titles are used for marketing purposes; but institutions can ask for accreditation against engineering standards, science standards or Information Technology standards. Engineering and science standards are in line with the demands of the Washington Accord whereas the Information Technology standards reflect the demands of the Seoul Accord.

During recent visits, I was struck by a number of study programmes offered as Informatics Engineering by the Colleges in Lithuania. The study programmes had some merit but because they fell under the umbrella of Informatics **Engineering** they suffered. A classification of, something like, Informatics Technologies, may help the Colleges (and also the universities) and open up a

wider range of possible degree programmes. Such a grouping must not be seen as inferior, but as being different; it is important that the Colleges and others are able to offer a rich selection of new and exciting study programmes and that these benefit the student body and the Lithuanian economy.

General Comments

Although there are a small number of exceptions, in terms of the curricula the Lithuanian institutions are not always aware of the latest developments and the latest thinking. Keeping up-to-date is not easy, and adopting modern methods is time-consuming, etc. There are rarely any incentives (e.g. awards, promotions) for excellence in teaching. The reward systems seem to focus on the publication of papers, but even then those who publish in truly prestigious journals or at the top international conferences (and that is hard!!) do not feel that their contributions are valued as they should be.

In terms of study programmes, recent international initiatives have stressed the importance of security and parallelism. But new study programmes on data science, analytics (business, teaching, etc), the Internet of Things, cyber security, machine learning and artificial intelligence are to be expected. Preparing students for the future is important. Students should be seen as agents of technology transfer who can enter employment and create appropriate change but also realizing that they need to keep up-to-date and know how to do this effectively. Many see machine learning and machine intelligence being central to most computing in the near future.

It is important that the universities, etc are places that are attractive and are a home for the very best minds. The environments that they foster need to reflect excitement in the disciplines and the latest thinking. In Lithuania staff and students do go to other countries and other institutions. But are these the top places, where great things are happening, where new developments are taking place, where staff can become involved with teams that are pushing forward the frontiers, etc.? Developing links with such places is crucial.

Related to the above, during recent visits staff made comments about the difficulty of keeping up-to-date in their subject. But the advent of MOOCs, webinars, online tutorials, e-books, etc has created new methods whereby much can be achieved from home.

Some Specific Observations

Informatics Engineering

The international community tends to see the word ‘engineering’ as protected in some sense. So engineers strive to ensure that the public has real confidence in their work. Informatics systems lie at the heart of the operation of modern planes, of railway signaling systems, of autonomous vehicles, of much medical equipment, and so on. If these fail this can result in death possibly on a large scale. So engineers must be able to evaluate risk, apply sound and disciplined methods for the design and development of systems in such a way that maintenance can happen easily and effectively, and they must have a handle on levels of reliability, etc. So engineers need to be trained in appropriate processes, in the best methods, in the disciplines of teamwork, etc. Engineering study programmes will typically undergo accreditation activities by professional bodies to ensure their fitness and there are international bodies set up to ensure comparability across countries so that engineers can work internationally.

This level of attention to the best methods was not always present in the Lithuanian Informatics Engineering programmes.

Business Informatics

In the world of business,

- Informatics has been responsible for fundamental organizational (or transformational) change.
- Entrepreneurial activity is often associated with Informatics
- New business models are needed to support online shopping, etc.

and so on. These matters are not trivial, e.g. are entrepreneurs born or can they be created and if so how?

In evaluating Business Informatics study programmes in Lithuania most, if not all, institutions provided business courses given by faculty members who were not from a Business School and who were not undertaking research or scholarship in the role of Informatics in Business; typically they had an informatics background. Students sensed this and generally were unhappy with the business element of their study programme. For such courses to have real significance, selected staff from Business Schools who have been looking deeply at the various issues should be educating the students. Thus Informatics faculty need to be far more outward looking, seeking appropriate partnerships.

Strengths and Weaknesses Across the Six Evaluation Areas

Although there have been some exceptions, the following is intended to give an overview of the strengths and weaknesses across the six different evaluation areas of assessment.

Programme aims and learning outcomes

Strengths

- Programme aims and learning outcomes tended to be one of the stronger elements of submissions
- The needs of stakeholders were often reflected in the aims and objectives of study programmes
- Generally the study programmes were valued by industry and business

Weaknesses

- The classification of study programmes, e.g. as Informatics Engineering, were not always appropriate

Curriculum design

Strengths

Weaknesses

- See earlier comments about study programmes in Business Informatics
- See earlier comments about study programmes in Informatics Engineering
- Generally, and although there were some exceptions, there seemed to be a reluctance to engage meaningfully with other departments to provide high quality and targeted support for study programmes
- See earlier comments about preparing students for the future, including keeping up-to-date
- Generally the curriculum in mathematics (including statistics and probability) would benefit from review to ensure that it was truly relevant for modern computing

- There was not always an appreciation of the work of international professional bodies such as the ACM, IEEE Computer Society or AIS on the development of (international) curricula. Curricula review processes should take account, not just of the views of stakeholders, but of developments in the field so that leadership is demonstrated.
- Software engineering (including agile methods), the human computer interface, cyber security, and underpinning statistics tended to be areas that would merit attention.

Teaching staff

Strengths

- The staff generally were a terrific asset and they had to be protected, retained and motivated. Not enough was being done to support them in their teaching and learning.
- There were instances of some young staff who are enthusiastic about teaching and education, but who needed guidance and leadership

Weaknesses

- Often the practical experience of staff in the College sector did not comply with the requirements to have 3 year experience in their subject;
- Keeping the practical skills of staff up-to-date had to be seen as important
- Generally there was a need to be outward looking and to engage with the international community (both in research and in teaching). There should be encouragement for existing and prospective university teaching staff to gain degrees from prestigious foreign universities.
- There should be greater emphasis and rewards for publishing in high quality international journals and conferences.
- There was a need for a greater awareness of international developments in teaching and learning (e.g. of published international curricula from bodies such as ACM, IEEE Computer Society and AIS)
- Greater attention should be paid to pedagogical issues, in particular with students in the early years (e.g. so that drop-out rates are reduced)
- Greater use could be made of MOOCs and other online possibilities to keep up-to-date and to stimulate students to keep up-to-date in the future

Facilities and learning resources

Strengths

- There were instances of very effective support from industry, e.g. through the involvement of social partners
- Social partners were generally seen as a very valuable asset and were active in providing support for students through practices and often in project work

Weaknesses

- Both staff and students needed easy access to the top international literature (e.g. as captured in the ACM / IEEE digital libraries); the use of consortia might be used to ease the costs
- Access for disabled students was often an area of concern

Study process and students' performance assessment

Strengths

- Generally the students were a great asset to their institutions
- Students were in generally in great demand by the employers

Weaknesses

- A general dislike of theory was evident and needed to be addressed (e.g. by carefully considering the context in which theory was taught)
- Support systems did not always pay particular attention to students who might drop out in the early years of a study programme
- The teaching of programming was often problematic especially in the early years; some attention to pedagogical issues might be employed to address this
- Assessment mechanisms would benefit from review to ensure that there was visible quality control of the processes so that external scrutineers could be convinced that this is being managed carefully and consistently. In this process there should be disincentives for setting questions that relied purely on memory work, for multiple-choice questions, and for the reuse of questions with greater attention being given to questions that involved problem solving.
- Often students were unaware of their role in bringing about change and how to approach this

Programme management

Strengths
Weaknesses

- There was a lack of incentives to encourage excellence in teaching and education
- There was little evidence of encouragement to staff to visit (e.g. via sabbaticals) recognized centres of excellence in Informatics and use these to create bridges that would have beneficial impacts
- There was a general lack of attention to the creation of learning environments that are exciting and stimulating
- Generally feedback from social partners, graduates and alumni should be treated more formally so that these views could be properly considered by the study programme committees
- Feedback from students (e.g. via questionnaires) was not always effective; the numbers completing questionnaires, for instance, were frequently on the low side. Also students could often be better informed of change resulting from their feedback
- Representatives of students and social partners on study programme committees should be acquainted with their colleagues and be in a position to properly and effectively represent their views

Conclusion

In providing a concluding comment, there would appear to be two main issues: there was a great need to be outward looking and engaged much more heavily with the international community; strong leadership was needed at all levels to chart a way ahead and to ensure that study programmes remain up-to-date in the face of the inevitable change.

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