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Creating a Quality Culture

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Abstract

Aalborg University is based on a problem-oriented and project-organised educational concept. The concept is focused on "learning by doing" or "action learning". Each semester has a basic structure of, in principle, equal distribution between lecture courses and project work. The project work is carried out in small groups of four to six students having a teacher connected as supervisor. This article will be focused on the experience within the Faculty of Engineering and Science and on the efforts to enhance the quality of the total teaching and learning environment.

Basically, the quality of the programmes is assessed through the system of external examiners, while the internal means of continual quality assurance in a sense lies within the educational model itself.

The problem-based project work of the students reflects the relevant current and actual problems in the real world. The content of the study programme is therefore continually adjusted to reflect the professional, technological and societal development.

To manage this process of constant renewal a system of quality management is established. The system aims to manage the process of internal monitoring and evaluation, and it serves as a basis for continual improvement of the quality of lecture courses, the single term as well as the total curriculum. It is argued that establishment and management of such a system is basically about creating a quality culture.

Introduction

The nature of the universities has changed dramatically over the last decades. They have changed from being traditionally elitist educational institutions to mass education organisations with a responsibility towards a steadily growing part of the population. Furthermore, the universities are increasingly engaged in the provision of courses for Continuing Professional Development (CPD).

The universities in Denmark are funded by the state and are governed by the university bodies themselves. The funding is proportional to the number of exams passed by the students throughout the year. This principle of funding as well as the increasing number of students put the educational process much more into focus. It has become vital that the students are able to pass exams and to obtain graduation. This does not mean that the standard of the programmes is lowered – it means that the quality of the educational process and of the management of the programmes must be in focus and increased. This is the background on which one should see the increasing demand for quality assurance and quality development in higher education.

Aalborg University was established in 1974 as an innovative experiment in problem-oriented project-organised studies in higher education. "Learning by doing" has been the code of the process and a variety of programmes have been developed within the areas of Humanities, Social Science, Natural Science and Engineering.

Focusing on the Faculty of Engineering and Science, efforts have been made to enhance the overall quality of the total teaching and learning environment. The aim of these efforts is to attain some benefits, such as: a better study environment; more satisfied students, staff and stakeholders; increased enrolment and decreased drop-outs; graduation at prescribed time; better preparation for professional employment; ability to acquire new knowledge; up-to-date programmes; greater accountability; and increased competitiveness.

Having 25 years of experience in problem-oriented project-organised studies Aalborg University is confident that the educational system is promoting a high quality learning environment for the students. The concept of quality management is designed to support this basic educational concept. The basic principle of the educational model is therefore presented below. Quality should be understood as a multidimensional concept that depends upon and relates to the contextual setting of the educational model, the institutional mission, as well as the standards within a given discipline.

The Aalborg Experiment

Aalborg University is a middle-sized European university with about 11,000 students, a third of which is within the Faculty of Engineering and Science. The

Faculty offers a variety of programmes within Engineering and Natural Science such as Master programs in Civil and Structural Engineering; Architecture and Design; Electronics and Information Technology; Chemical and Biotechnical Engineering; Mechanical Engineering; Surveying and Planning; and a number of programmes in the Natural Sciences such as Mathematics; Physics; Chemistry; and Computer Science. The curriculum is project-organised from the day the freshmen arrive until their graduation.

Project-organised means that traditional taught courses assisted by actual practice is replaced by project work assisted by courses. The concept moves the perspective from description and analysing into synthesising and assessment. Each semester has a basic structure of - in principle - equal distribution of lecture courses and project work. The project work is carried out in small groups of four to six students having a teacher appointed as supervisor.

The curriculum is organised into general subjects or "themes", normally covering a semester. This provides for the use of project work as a basic educational element. The themes in total will constitute the general aim and the professional profile of the curriculum. The themes provide for studying the core elements of the subjects included (through the lecture courses given) as well as exploring (through the project work) the application of the subjects in professional practice. About half of the lecture courses are related to the theme and the other half to the curriculum in general. The study time is dominated by lecture courses in the beginning of the semester and by project at the end.

Problem-based means that traditional textbook-knowledge is replaced by the necessary knowledge to solve theoretical problems. The concept moves the perspective from understanding of common knowledge into ability to develop new knowledge. The aim of the project work is "learning by doing" or "action learning". The project work may be organised by using a "know-how" approach for training professional functions, or it may be organised by using a "know-why" approach for training methodological skills of problem-analysis and application.

The difference between traditional subject-oriented education and this project-oriented educational model may be expressed in short by an old Chinese proverb:

"Tell me and I will forget
Show me and I will remember
Involve me and I will understand
Step back and I will act"

The essence of project-organised education as well as the pedagogical point of the model seems obvious when using this kind of poetry.

The focus is on “learning to learn”. The point is, that professional and technical skills can be acquired and updated at a later stage in ones career while skills for problem-solving and skills for learning to learn can only be achieved through the

process of academic training at the universities. The concept of project-organised education provides just that opportunity.

The project work also has pedagogical importance. Each student must be able to explain the results of his studies to colleagues in the project group and to the supervisor as well. This demand may be the clue to professional and theoretical cognition. Knowledge is only really established when one is able to explain this knowledge to others.

This way, quality assurance is to a large extent built into the educational model and into the organisational structure of the programmes.

Creating a Quality Culture

Quality assurance refers to the means by which an institution satisfies itself that the standards and the quality of its educational provision can be maintained and enhanced. An important aspect is the cultural context in the organisation with its capacity to either facilitate or suppress local quality initiatives.

The Faculty therefore does not believe in a strongly formalised and centralised quality assurance system. Complex systems might be difficult to manage and to control; and a centralised system may foster bureaucracy which will delay necessary local changes and which may restrain the development and implementation of adequate quality assurance measures at each department and school. The educational system demands flexibility in planning and development.

However, it is of course important for the faculty to establish an adequate organisational structure of the departments and schools particularly with regard to the delegation of tasks and responsibilities forming the overall quality framework. Means of quality assurance should then be developed at these local levels within the overall quality framework and the means should thereby reflect the culture of the local educational environments.

The Quality Management System – Curricula Development

The educational programmes under the Faculty of Engineering and Science are organised in five schools e.g. the School of Surveying and Planning. The head of each school is responsible to the dean for the overall quality management of the programmes. The dean is responsible for the quality management of the whole faculty. Each school is governed by a Board of Studies composed by five staff members and five students and chaired by the head of the school. All board members are elected by democratic procedures. The staff members are elected for a period of three years and the students for one year. The board is responsible for the content of the curriculum as well as the use of resources. The board is also responsible for analysing and adjusting the programme in a continual process.

Here it should be mentioned that Denmark does not have an accreditation system for external approval of the programmes prior to implementing like e.g. in the U.K. The content of the programmes is seen as a matter of self government for the faculty based on a general approval from the Ministry of Education. Accreditation can be seen to take place through a compulsory and comprehensive use of external examiners at important examinations. This flexibility makes it easy to adapt and improve the content of the curriculum according to the development within the relevant professional areas.

The capability and the quality of the programmes are continually evaluated within the educational system itself. This is done by a system of internal monitoring. The system serves the purpose of quality management with regard to the relevance and quality of the lecture courses as well as the quality of the entire semester concerning supervising, organisation and resources. The evaluation report is produced by the students by the end of each semester and is forwarded to the Board of Studies and to the teachers involved. The board assesses the report including any possible comments from the teachers and decides whether to take any necessary or relevant actions in order to meet any complaints or to improve the quality of some specific educational elements. The respond of the board is forwarded to the students of the semester in order to stress to importance and relevance of the evaluation as a tool for quality enhancement. The report and the respond from the Board of Studies are then used for preparing and improving the same semester the following year. The system this way acts as a circle of continual quality improvement.

The system of quality management is in a sense built into the educational model. Each semester is prepared for dealing with the topical and relevant issues within the theme in question. The profile of the lecture courses and of the theme as such is therefore assessed and adjusted prior to the start of semester. This is done by a small group of teachers and students representing the previous as well as the incoming semester. The evaluation report from last year semester is then used as a key document for improvement. Minor adjustments are adopted by the Board of Studies while major changes such as changes in the legal regulations of the curriculum are assesses and adopted by the Faculty Board.

The processes of internal evaluation are described in the “Handbook of Quality Control” which is composed and adopted by the Board of Studies. The handbook is available on the Internet (until now only for the School of Surveying and Planning) and includes diagrams with a list of issues to be addressed when conducting the process of internal evaluation of the lecture courses as well as the total theme. The guidelines show that the process is not only about assessing/marking what and who may be good or bad. It is about evaluating the relevance, the content, the structure, the profile, the resources, the performance, etc. The process, this way, is carefully designed to underline the common responsibility for improving the quality of programmes as well as the quality of the total study environment.

The development and implementation of such a system is basically about creating a quality culture. Even if the general concept of internal monitoring has been used from the very beginning there is a lot of details to agree upon when the system is to be described in details and formally adopted by the Board of Studies as a tool for quality management. The responsibilities of all parties – the students, the teachers and the Board of Studies – must be mutually recognised and the relevance and benefits of using the system must be generally accepted. The students play a very key role in the process. The students at each semester should understand that only by fulfilling the duty of a serious evaluation of the past semester they can expect to benefit from having an improved coming semester themselves. This is what the circle of quality improvement is all about.

The issues to be addressed through this process of internal evaluation as well as the split of responsibilities between the parties involved may vary between each of the Board of Studies. The general concept will be the same and reflect the overall quality framework of the faculty. But the detailed structure and content of the system should reflect the culture of each study environment. Accountability and interdependence are key words in the process of building and running the system.

Quality Enhancement – Staff Development

The faculty members are organised in departments covering relevant interrelated scientific areas. The academic staff is employed on the conditions of half time teaching and half time research. This way, the departments are responsible for research activities while the schools and their Board of Studies are responsible for the educational programs. The departments then provide the educational resources needed and required by the head of the individual schools. The system includes a kind of competition between the schools and the departments aiming to optimise the total management of resources and it provides a balanced interplay between research and education. The interaction is framed and co-ordinated by the Faculty Board. Promoting a learning organisation requires long term planning and investments in staff development.

A high quality learning environment depends on the lecturer/student interface. This again, depends on the pedagogical skills of the teacher. Assistant professors therefore have to undertake a special training course designed to improve their pedagogical skills and skills for conducting the whole learning process. The assessment from completing this course can then be used when applying for a permanent position as associate professor/senior lecturer. Training courses are also designed to improve the pedagogical skills of the permanent staff whenever needed.

Finally, to reinforce the importance of a high quality learning environment, the faculty has introduced the concept of appointing “the teacher of the year”. The appointment is based on recommendations from the student representatives from each of the Boards of Studies within the faculty. The award includes a prize and

underpins that the academic merits relate not only to research but to educational skills as well.

The supervisor in the project-organised education model has to face other demands than the teacher in traditional education. Pedagogical skills for guiding the project work as well as skills for guiding the use of scientific theories and methods for analysing the problems are essential. The supervisor has the responsibility of guiding the students to complete the project work in time, and in a defensible way according to methodological and scientific requirements. This means that the traditional role of the teacher is changing from "lord of the lectern" to "coach on the side" - and the focus is moved towards "learning to learn".

The teacher also has to face the demands of constantly changing the contents of the courses, or developing new courses in order to reflect the development of the profession, new research results and the changing problems within society. These demands may be seen as a challenge rather than a problem. They also ensure the continuous professional development of the faculty.

The results and experience of the research carried out at the university are easily incorporated in the teaching programs because of the close relationship between applied science and the problem-solving process in the project work. The project work also promotes strong motivation for research by the teachers. The problems and the choice of theories and methods are discussed with the supervisor. Many essential problems can be defined through the project work and continued in the research carried out by the supervisor. Many of the student projects may also be based on the current research activities of a teacher. The project group may e.g. analyse partial problems, theoretically or empirically, and thus contribute to the development of knowledge in fruitful co-operation with the teacher. The professional development of the faculty staff is this way built into the educational model. The interaction between education and research represent the necessary dynamic element of innovative education.

Quality Control – Examination and Assessment of Standards

A system of external examination serves the purpose of external professional and academic control. External examination is used to cover at least one third of the curriculum including the most important parts and of course the final thesis. The reminding part of the curriculum is assessed through internal examination using faculty staff as examiners and using the same procedure as for external examination.

The emphasis at the examination is on the evaluation of the project. At the examination, the members of the project group will each present a part of the project. This is followed by a defence of the project report. The examination is conducted by the supervisor and will normally last for half a day. One or two external examiners are present. Normally one of the examiners is representing the

professional world/industry, and another is representing the academic world/universities. The purpose of the defence and the following discussion is to assess the knowledge possessed by the individual student with regard to the project issue and the connected academic disciplines, as well as to assess their broad insight and professional knowledge. The examination system thus allows for external control of professional relevance and academic standards as well as control of the entire educational system.

Each discipline in higher education has its own corps of external examiners appointed by the Ministry of Education based on recommendations from the institutions and the current chairman of the corps. Following each examination the examiners must file their comments to the chairman. These comments will compose the basis for a yearly report published by the chairman. The report thus allows for external quality control of the curriculum.

The examination of the general courses is normally held at the end of the semester, in which they are lectured. This examination does not differ from the examinations at other universities. These courses are assessed on a pass/fail basis.

The theme-related courses are assessed as a part of the examination of the project. The standards used at the examination of the projects are based on the study program regulations as adopted by the Faculty Board. The regulations present the knowledge expected to be possessed by the student after completion of the semester. The students are graded individually and all marks on the diploma can be documented by the reports and assessed by trade and industry when the graduates are applying for jobs.

Concluding Remarks - Lessons Learnt

A key feature of quality assurance is to acknowledge that a university is a self-critical academic community striving to enhance the quality of the total teaching on learning environment as well as the quality and capability of the graduates**.**

In the case of Aalborg University this has led to the establishment of an effective educational system. Comprehensive evaluations of the programmes in engineering and science have proved the project-organised concept to be an effective system which produces readily adaptable graduates with strong qualities in the fields of management, problem-solving, co-operation and project work.

The means of Quality Assurance are to a large extend built into the educational model. The means are summarised below:

The quality management system is aiming to assess and improve the content of the lecture courses, the project work as well as the total study environment. This concept relates to the project-organised educational model and it is seen as the basis engine for constant renewal and improvement. The concept is well

developed and the implementation reflects the characteristics of the different study environments within the faculty. The implementation of such a system of quality management is basically about creating a quality culture at local level.

The main lesson learned is that things take time. The system has to be acceptable and agreeable to all parties. The responsibilities of all parties involved must be clearly expressed and understood. Accountability and interdependence are key words in the process of implementing and running the system. Just adopting a system a system is not enough. The system must be accepted and maintained as an integrated part of an overall quality culture.

Furthermore, it is argued that the system of internal monitoring should be expanded to include a yearly survey of the four or five year graduates. Such a survey should be carefully designed to support the reasoning behind the continual adjustment as well as to provide the background for more basic changes of the curriculum.

The quality enhancement system is aiming to develop the professional and pedagogical level of the faculty staff. This system relates to the lecturer/student interface of the project-organised learning environment. The system also relates to the interaction between education and research representing the necessary dynamic element of innovative education.

The traditional focus on only the research merits in the academic world now tends to be changing. This is due the increased focus on the educational issues and on the quality of the teaching and learning environment. The increased focus on a quality culture seems to be beneficial.

The quality control system is aiming to control the examination procedures as well as to assess the overall professional level and academic standard of the curriculum. The system ensures that the profile and quality of the programmes and the standard of the graduates are in line with the academic demands of higher education as well as expectations and needs of the trade and industries.

The lesson learned is that it is important to describe very carefully the knowledge expected to be possessed by the student after completion of the semester as this is the basis for the examination. This is particularly important in order to understand and to assess the progression of knowledge and cognition expected to take place during the studies from freshman to graduate. Furthermore, the formal contact to the external examiners provides a basis for continual dialogue about and improvement of the content of the programmes.

Finally the quality of the university programmes is assessed and developed through the process of external validation from the National Evaluation Centre. This national means of quality assurance is described in separate chapter in this book.

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