Preach what you teach

Higher education and business: partners en route for TQM

0. Introduction

In two American studies **carried out by Evans[1] and Weinstein, Petrick and Saunders**[2] reviewed in Quality Progress, the central question was whether higher education in the United States was "doing the right things" and "doing things right" in respect of providing education in Total Quality Management (TQM).

A number of companies and institutes of higher education from Finland, England, Belgium and the Netherlands came together, to carry out a follow-up study on the subject in the various countries in the framework of a Leonardo project. It was called the University Enterprise Partnership for Total Quality Management, abbrieviated as UE-TQM-P. A university from the Czech Republic later joined the project. The aim of the project was to fill the gap between the demand of business and the supply of the institutes for higher education concerning knowledge, skills and attitudes of graduates on Total Quality Management.

In this article we will first describe the method used in the project (1). Then we present the results concerning the demand of business as assessed in the European survey and we discuss the gap we discovered between supply of higher educational institutes and the demand of business (2). We show the educational objectives that meet the needs of the business and industry (3). And we give guidelines for educational development (4) and for the organisation of the educational institutes (5) that can help to fill the gap between demand and supply. We finally make some conclusive remarks (6).

1. Simple methodology

It is important to state at this stage that none of the partners had scientific pretensions. The participants above all wished to exchange, develop and increase access to teaching materials (for example via their own website). To be able to do so an assessment of the demand of business and industry in Belgium, The Netherlands, Finland and Great Britain was needed. Therefore eight categories were identified.

Eight important quality Concepts and Skills[3]
Customer orientation
Practical knowledge and application of TQM tools
Fact-based decision making
Understanding work as a process
Team orientation
Commitment to improvement
Active learner
Systems perspective

[1] Evans R.J., What should higher education be teaching about quality? In: Quality Progress, August 1996, 83-88

[2] Weinstein L, Petrick J. and Saunders P., What higher education should be teaching about quality, but is not. In: Quality Progress, April 1998, 91-95

[3] The formulations were taken from: Evans R.J., What should higher education be teaching about quality? In: Quality Progress, August 1996, 84

A simple questionaire was designed wherein possible demands were stated. Those demands were:

1. **responsibility**
2. **entrepeneurship**
3. **continuous improvement**
4. **innovation**
5. **self control**
6. **teamwork**
7. **result orientation**
8. **productivity**
9. **profitability**
10. **customer orientation, expectations, satisfaction**
11. **quality as part of the business**
12. **see things as a whole**
13. **identifying and fulfilling customer expectations**
14. **communication skills**
15. **interaction skills**
16. **meeting techniques**
17. **ability to think logically**
18. **project management**
19. **7 quality tools**
20. **problem solving techniques**
21. **systematic improvement of processes**
22. **benchmarking**
23. **quality awards and self-assessment**
24. **basics of measuring techniques**
25. **knowledge of environmental, health and safety matters**
26. **process management**
27. **basics of system theory**
28. **theory of quality management**
29. **basics of statistical mathematics**
30. **statistical process control**

In all countries a small number of organisations was asked to state the importance of the presented themes and possible demands on a five point Likert scale.
The second component of the UE-TQM-P project involved a survey amongst colleges of higher education and universities in Belgium, The Netherlands, Finland and Great Britain. On the basis of a standardised questionnaire, an investigation was carried out into the degree to which existing teaching objectives and curricula today respond to the knowledge, skills and attitudes demanded by business. In fact at that moment the gap between demand and supply could be defined. However the most important part of the project concerned the "action learning" thereafter. The participants in the project developed course material on the TQM-objectives in a continuous dialogue between the educational institutes as the suppliers and the representatives of businesses as customers. In that process we formulated guidelines for the development of TQM-education.

2. The gap between demand of business and supply of educational institutes

The results of the survey on the demands of business on TQM were that the companies studied in Finland, England, Belgium and the Netherlands prefer attitude to knowledge. A sense of initiative and creativity, responsibility and involvement in respect of the organisation, focus on continuous and specific improvement as a function of customer needs, willingness for self-reflection, permanent learning and cooperation within a team were recognised as essential "attitudes". In respect of relational and personal skills, such items emerged as the ability to participate in meetings, ability to present and report, business communication skills, capacity to plan and comply with timing, ability to think logically and work methodically. The quality-specific skills identified related above all to identifying customer expectations, operating quality improvement techniques, implementing self-evaluations, using suitable measuring techniques, comparing own performance with that of other organisations, and the formulation of objectives. The basic ideology of the leading quality gurus, focusing on process management and system thinking, was classified at the level of theoretical knowledge. Also within theoretical knowledge, apparently, a number of more specialised aspects belong, such as mathematics and statistical techniques, and the safety, health and environment problem. One remarkable result was that the Dutch companies showed practically no interest in specific knowledge, skills and attitudes in the field of TQM. "What on earth are we supposed to do with it anyway?" Of the companies selected, only five actually responded.

A short investigation on the supply of the educational institutes in the above mentioned countries showed that no general conclusions could be drawn, in respect of a tie-up between existing curricula and the identified needs of business. The differences between the courses investigated (in respect of field of study and national integration) were too considerable to permit such generalisations. However, it can be concluded that engineering courses and courses in applied economic sciences responded fairly well to the core skills required by the professional world, in respect of TQM, even if not always at the demanded level of integration. The response from areas of study which relate more closely to the non-profit sector (education and health care) was fairly limited. Clearly, this sector is less conversant with quality thinking and quality jargon. As a consequence, the curricula from these courses would appear to be less geared towards the findings of the business study. Often, the initial response was that no teaching was provided in quality management, whilst on closer inspection, it became clear that work was being done in this field, but under the heading professionalisation and increasing the scientific content of the profession. The personal skills required by TQM were in fact taught to a greater degree within these courses, than elsewhere.

Here we can compare the results of the UE-TQM-P project with two scientific studies in the United States. Evans[4] carried out a survey amongst 13 winners of the prestigious American quality prize The Malcolm Baldrige Award. He concluded that companies above all attach importance to the attitude of the individual employee in respect of quality. A list was drawn up of the highest scoring knowledge, skills and attitudes, which recent graduates from higher education should possess. The highest scoring items were: customer orientation, continuous process improvement and teamwork. Further investigation indicated that subsequently, in training courses subsidised by companies, 16 of the 23 highest valued objectives in the field of TQM are covered. In these courses, the primary focus is practical orientation. Evans concluded from the results of his study that in the past, higher education has apparently not succeeded in teaching the required knowledge and skills. The second study, carried out by Weinstein, Petrick and Saunders[5] focused on the range of courses available. Effectively, this second study supported Evans' conclusions. The main objectives are either not, or are insufficiently focused on, in higher education. The researchers therefore called for greater awareness of the courses subsidised by business, and improved courses for business.

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[4] Evans R.J., What should higher education be teaching about quality? In: Quality Progress, August 1996, 83-88

[5] Weinstein L, Petrick J. and Saunders P., What higher education should be teaching about quality, but is not. In: Quality Progress, April 1998, 91-95

Generally speaking, we were forced to accept that the findings of the UE-TQM-P project lead to the same worrying conclusions as the two reports in the United States: students in higher education are insufficiently prepared in respect of knowledge, skills and attitude, in relation to quality. Each of the objectives formulated by business in Europe is offered in some way, but no single course or training covers all of the quality concepts and skills listed in the table above. Where the US-studies stopped, the UE-TQM-P project went further in relation to this worrying conclusion. The project above all looked at the question as to how educational organisations could better influence TQM training.

3. Educational objectives

The development of a curriculum starts with the training profiles, and the resultant educational objectives. An organisation which wishes to take TQM seriously will therefore have to first ask which key qualifications (or attainment targets) will have to be achieved in the field. The results of the assessment within business could represent a key input specification in this connection. We reframed the original terminology form the questionnaire in educational objectives.

Core competences of young graduates in higher education in the field of TQM: business needs	
Original terminology from the questionnaire	**ATTITUDES (which drive performance, a form of "readiness": willingness, desire, suitability ...)**
- responsibility, entrepreneurship, continuous improvement, innovation **- self control** **- teamwork** **- result orientation, productivity, profitability** **- customer orientation, expectations, customer satisfaction** **- quality as a part of the business** **- see things as a whole**	**Organisations which operate quality management in a systematic and integrated manner in their business practice have been shown to select as their employees those who ...** **- have a sense of showing initiative, and the ability to show responsibility and creativity in permanently improving and innovating the organisation;** **- are willing to opt for permanent learning, self reflection, self evaluation and self regulation;** **- feel at home in an environment where cooperation is natural;** **- are willing to combine personal contributions and objectives with the results aimed at by the organisation, and the expectations of customers or other interested parties in the organisation;** **- to translate the goal of "excellence" into their daily tasks, and at the same time, wish to place their position within the entire organisation.**
Original terminology from the questionnaire	**SKILLS (integrated knowledge and understanding acquired in practice, and ability to use in these in new situations)**
- identifying and fulfilling customer expectations **- communication skills** **- interaction skills** **- meeting techniques** **- self-control** **- ability to think logically** **- project management** **- 7 quality tools** **- problem solving techniques** **- systematic improvement of processes** **-benchmarking** **- quality awards and self-assessment**	**- are capable of employing techniques for identifying customer expectations** **- master their own language, written and verbally, are able to express themselves clearly, and are able to communicate in a businesslike manner** **- are able to issue verbal and written reports** **- can give presentations** **- can handle meeting techniques** **- are able to listen** **- are able to plan and respect timing** **- are able to think logically and work methodically** **- are capable of independently acquiring new knowledge** **- are able to define, plan and budget, organise or follow-up and evaluate a project, on the basis of the results achieved** **- are able to read and interpret graphs, tables and statistics** **- are able to employ the key quality improvement techniques such as cause and effect analyses, determination of basic causes, brain-storming techniques, process analysis using flow charts, etc., analysing problem situations, formulating measurable objectives, preparing action plans, evaluating effectiveness, and correcting current practice.** **- are capable of comparing the results of their own organisation with the performance of other companies, and derive improvement or innovation objectives on that basis** **- are able to carry out total or partial self-evaluation according to the reference framework of a quality award model, such as the European Quality Award**

- basics of measuring techniques	**- are able to use the key measuring techniques relevant to the subject**
Original terminology from the questionnaire	**KNOWLEDGE (ability to reproduce, summarise and describe ...)**
- knowledge of environmental, health and safety matters **- process management** **- basics of system theory** **- theory of quality management** **- basics of statistical mathematics** **- statistical process control** **- process capability** **- measuring customer satisfaction**	**- are able to outline the main legal stipulations in respect of environmental, health and safety problems in the working environment** **- are able to describe the organisation in terms of processes (input - throughput - output) and can indicate how the key processes may develop under managed conditions (i.e. with a reasonable chance of a good result** **- can explain the difference between product quality, process quality and system quality** **- are able to explain in their own words the contributions from the leading quality gurus (Deming, Crosby, Juran, Imahi, Oakland ...), in respect of the progress of quality thinking** **- are able to translate the importance of this thinking in respect of their own organisation** **- are able to explain statistical and mathematical basic techniques and to indicate possible applications in respect of quality assurance, for example for measuring and assessing variation in processes, estimating the capacity of a process, measuring customer satisfaction, etc.**

Clearly, higher education faces a major task, if it wishes to integrate the summarised demands in its curricula. Above all, because business clearly has greater need of socially well-adapted, communicative, eager to learn and involved employees who are willing to actively work towards a permanent improvement of their organisation, than theoretically-trained quality technicians. In other words, the teaching methods and didactic approaches employed should perhaps take up a more central position in this discussion, than the "learning materials" which traditionally have been considered so important. Perhaps the key question is less what teaching materials the institution for higher education should provide its students, and more how can the institution teach its students a critical, self-adapting and permanent-learning attitude. And indeed, what work forms should be used to achieve this objective, and how the educational organisations themselves should rethink their situation, in relation to society, and the professional fields. Companies and educational organisations in the partnership did formulate a number of key areas for attention for adapting the courses provided in this field.

4. Guidelines for the development of TQM-education

In developing education, especially education on Quality matters, didactic techniques have a very important role to play, so we discovered. Quality management is not simply learned by listening, but by doing. The didactic work forms should encourage the student to learn to practice actively, in authentic learning situations from the world of experience of the student and the professional context in which he or she will take up a position, following graduation. These should be work forms which facilitate interaction with co-students and lecturers, and as a result promote multiple feedback moments, within the learning process. The paradigm of the powerful learning environment and the transition from lecturer and course-oriented education to student and question-guided education makes its presence clearly felt, but from an unexpected source.
In the UE-TQM-P project, an assessment was made of the material available, following studies at colleges of higher education and universities in the affiliated countries. This material was analysed from the point of view of objectives and work forms employed. In this assessment, a matrix was used, in which the vertical axis was made up of objectives, and the horizontal axis consisted of the didactic work forms, taken from the Didactic Vademecum[6]. These didactic work forms have been categorised from providing (starting with lectures, in which the lecturer is the person controlling the lesson), through to independent working (ending in independent study). Against this background, for each objective, it was possible to determine the degree to which educational examples were present, in which exercises were already used. In developing new material, therefore, to a considerable degree, independent work forms were chosen, for using case studies, interactive media, etc.

In developing teaching materials, as far as possible, authentic learning situations were sought out. This assumes situations from the world of experience of the student, and the professional world into which he or she will enter, following graduation. An example is the module in which the ISO 9000 standards and the description of procedures are not dealt with in extensive theoretical blocks, but where instead, students were asked to develop the process stages for a "complaints handling system for their own course". Another example was a course within which the Deming circle was explained by demonstrating the degree to which in the students' own courses, measures are actually taken based on previous evaluations.

[6] Didactisch Vademecum, DOZ3, uitgeverij HvUPress, new impression autumn 1998.

On the other hand, in developing a course focused on the acquisition of TQM skills and attitudes, it is important that knowledge integration takes place in and with the practical situation. This could be achieved by calling in practice from outside, in the form of guest lecturers, problems and case studies from the real world, or by going out from the course in traineeships, company visits, project work, etc. Possible examples of project work to be set up are: students of fiscal studies collating, investigating and responding to specific questions from professional practice, on the basis of a sort of "helpdesk" function; or HRM students who as trainees in a consultancy agency assist in preparing, holding and processing a staff satisfaction survey, within a specified company. **Here we stress the importance of the business representatives in the development stage of the education in the UE-TQM-project.**

In developing teaching materials and didactic work forms, finally, interactivity should also be aimed at. Practice does not only mean applying knowledge, but also receiving feedback at the right moments (something which by the way fits in perfectly with the Plan-Do-Check-Act circle). Learning is more than an individual, cerebral activity; it demands social interaction and critical dialogue.
We decided to present the lessons learned in the development of the teaching materials on TQM in "guidelines for the educational development".

Summarised:

Guidelines for the educational development of TQM formulating key qualifications / attainment targets didactic work forms which encourage the student to take up active learning and practice situations recognisable to the students bringing the outside in and going outside, in order to integrate knowledge and practice involve the businesses in the developmnet of the education interaction and feedback

5. Guidelines for the educational institutes themselves

The courses which aim to generate the above mentioned TQM skills and attitudes amongst their graduates should ideally themselves serve as role models, and implement TQM thinking in practice. The educational organisation itself should also be able to translate this goal of excellence into daily practice. Both in the relationships between employees and the organisation where they work (superiors and colleagues) and in the relationship between the student and the educational institution with which they are registered (lecturers and co-students), example behaviour is a factor which will determine success or otherwise. Are the educational institutions and their employees capable of themselves applying the target key qualifications of their graduates? In other words, is the student, as the most important interested party within the educational institution, able to actively experience how a learning organisation with a constructive and customer-oriented TQM culture actually functions? An educational course should also be focused on continuous improvement and process management. After all, the student then not only learns through education what TQM is, but also experiences its effects as a "consumer", on a daily basis.

In this field, a range of experience has now been acquired in higher education. In the UE-TQM-P project, experiences of the participating educational organisations were collected, in particular in respect of the translation of the ISO 9000 standard into higher education (EHSAL Brussels), and the translation of EFQM into higher education (Fontys Eindhoven). The process of introducing the ISO 9001 certificate at EHSAL has been included as a case study, which can be inspected on the Leonardo project website. Attention is focused on consecutive annual work plans, system description, success

stories and bottlenecks. An EFQM diagnostics instrument "the method for quality improvement in higher education according to the EFQM model" has been developed for seven colleges of higher education in the Netherlands, with both a Dutch and an English language version. On the basis of this method, a two-day training course for members of staff of educational institutions has been developed, according to an extensive educational case study. This case study is also available via the website.

Experiences with TQM in the educational sector have shown that commitment from the top of the organisation is essential. It is also essential that quality be included in the regular policy cycle of the organisation, that quality measurements are visibly carried out, and that the PDCA circle is indeed completed. If a high degree of independent working and social interaction is demanded of the student, it may also be expected of the organisation and its employees that they view self-evaluation and teamwork as natural processes. The customers (students, work field and government) must be taken seriously. Within the organisation, a culture emerges within which working on systematic, continuous improvement is a clear area for attention. There are people who have the drive and energy to push total quality improvement projects along, but TQM must in the long term become a routine matter for everyone. The organisation makes it possible for everyone to participate, at all levels, as a function of willingness and skill, quite independent from the classic hierarchical and functional structure. Finally, a whole range of experiences with peer review and visitations have demonstrated that self-evaluation and subsequent (external) audits massively promote internal quality management.
We presented the lessons learned in the "guidelines for educational organisations concerning the application of TQM".

Summarised:

Guidelines: Application of TQM in educational organisations
training in an integrated system approach is required (e.g. EFQM, ISO 9000)
commitment from the top
inclusion of quality objectives in regular policy cycle
increasing visibility of objectives achieved and progress made
completion of the PDCA circle
role model behaviour of the organisation and its employees
the customers (student, work field, government) and their needs must be recognised and responded to
focus on permanent improvement
"pioneers"
possibilities for contribution and participation as a function of willingness and skill
self-evaluation and external auditing

6. In the end: It's common sense, but not common practice

One important finding of the UE-TQM-P project may at first glance seem obvious, namely the skills and attitudes in respect of quality management are considered more important by business, than knowledge and understanding. This is implicitly an excellent confirmation of the studies by Argyris and Schön[7] into theories of activity and learning systems of organisations, which indicated for example that in an average organisation, there is a huge gulf between "acknowledged values" and "actual behaviour".
In order to meet these needs, the traditional, school-type education available is probably insufficient. Not only the study programmes and teaching objectives should be updated, but also the didactic work forms, the study materials used, and the role of the lecturing staff. It almost appears that the school itself as an "educational system" must undergo a fundamental rethink. "Learning to teach", or in other words

[7] Argyris, Chris. Leren in en door organisaties. Het hanteerbaar maken van kennis. (Learning in and by organisations. Making knowledge useful.) Lannoo Scriptum Management, 1996

following introspective reflection altering one's own teaching behaviour represents the core of future-oriented teaching, but also plays a crucial role in expanding a creative, learning organisation. The ability to switch from "to know" into "to do", for example by solving specific problems in real situations, and vice versa, translating practical experience into new, reusable knowledge, are essential skills for students in higher education in the 21st century, but also for lecturers, staff workers and governors who together are working towards educational innovation and quality improvement.
And this is a process which never ends; not for the student following graduation, and not for the educational institution, following an excellent evaluation or visitation report, the awarding of an ISO certificate, or a quality prize. Student and lecturer, customer and organisation in the long term are all in the same boat; they are all permanent learners. Indeed, all parties can learn a great deal from one another. Learning is an interactive activity, or in other words, it is the result of a dialogue. The learning of the student is supported by the lecturer, who in turn receives feedback from the student about his or her teaching performance. The college of higher education as an organisation develops a training programme, which is geared towards the input of its lecturing staff, its students and society as a whole. "Life long learning" and "mutual, interactive learning" are indeed key terms in any innovative educational vision. They also indicate that the strict separation between the school and the professional world, between "learning" and "working", are merely artificial barriers, which to much too great a degree hinder "learning through doing"; in other words true skills training and attitude forming.

Clearly, the findings of this "University Enterprise Partnership" open up the road to a far-reaching and complex process of innovation in higher education at both an organisational and educational level. Many players will be involved, including policy makers at meso and macro level, lecturers and students, all with their own approaches and needs. The UE-TQM-P partnership wishes to make a contribution to this process - hence this article, the website on which the key results can be accessed, and the conference on this theme to be organised in the autumn of 1999, the primary objective of which will be to bring together good practice in the field of active learning, focused didactic work forms, and the implementation of total quality management in higher education. After all, in the orientation phase of the quality cycle, the exchange of experience is essential.

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