FACULTY OF ODONTOLOGY
AT MALMÖ UNIVERSITY
CENTRE OF EXCELLENT QUALITY IN HIGHER EDUCATION 2007
Application for the award and reviewer's report

Malmö University, 2008
Faculty of Odontology

Editors
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As a part of the new national quality assurance system, the Swedish National Agency for Higher Education has established an award for outstanding centres of education. In January 2007, and for the first time, the Vice Chancellors of the Swedish higher education institutions were invited to nominate centres for the award “Centre of Excellent Quality in Higher Education 2007”.

The institutions of higher education were invited to nominate organisational units offering education at the first, second or third level, i.e. Bachelor, Master or Doctoral degrees, as well as vocational degrees. For example, a nominee might be a department, a programme or an organised collaboration between different units. For the receiver, the award is valid for six years.

For the award 2007, the Vice Chancellor of Malmö University, Professor Lennart Olausson, nominated the Dental Education at Malmö University. A total of 26 applications from all Sweden were submitted and reviewed by an International Review Panel. Nine of these went to a second round involving a more in-depth assessment and a site visit by the Panel.

The Agency decided to award the following five centres recognition as Centres of Excellent Quality in Higher Education 2007 (listed in alphabetical order).

- Linköping University, Control Systems at the Department of Electrical Engineering
- Linköping University, the Medical Programme
- Malmö University, the Dental Education
The Royal Institute of Technology, the Vehicle Engineering Programme
Umeå University, the Department of Historical Studies

I am very pleased that we were nominated by Malmö University and that the quality of our programme was subsequently recognized by the Swedish National Agency for Higher Education. The receipt of the prestigious award reflects the dedication of our administration, faculty, staff, and students in their common desire to seek excellence in dental education.

Aside from activities associated with the site visit by the International Review Panel with regard to this application, the compilation of this document has, in itself, played an important part in our CQI. The award provides an accolade for students and staff, of which we can be justly proud. It also confirms that the Malmö-model can be further developed and applied to other areas of professional education.

In the following document, the Review Panel’s report on the application from Malmö University is presented as well as our description and self-evaluation of the programme, which formed the basis for the Panel’s report.

Malmö, October 2008

Lars Matsson
Professor, Dean
REPORT OF THE REVIEW PANEL

Centres of Excellent Quality in Higher Education 2007

In total, 26 units submitted applications to the Swedish National Agency for Higher Education with the purpose of being recognised as centres of excellent quality in higher education. To the International Review Panel was conferred the task of assessing these applications. The following experts were appointed to the Agency:

**Marianne Stenius**, Chair of the Panel, Professor and Rector of the Swedish School of Economics and Business Administration, Finland.  
**Barbara Kehm**, Professor of Higher Education Research at Kassel University and Managing Director of the International Centre for Higher Education Research.  
**Guy Neave**, Dr. Honorary Professor of Comparative Higher Education Policy Studies, Centre for Higher Education Policy Studies, Twente University, The Netherlands and Principal Researcher at the Centro de Investigação de Políticas do Ensino Superior, Portugal.  
**Paul Ramsden**, Professor and Chief Executive of the Higher Education Academy (HEA), United Kingdom.

The Panel would wish to recommend to the University Chancellor that the following five units be honoured as Centres of Excellent Quality in Higher Education 2007:

- Control Systems at the Department of Electrical Engineering, Linköping University.  
- The Medical Programme, Linköping University.  
- The Dental Education, Malmö University.
• The Vehicle Engineering Programme, The Royal Institute of Technology.
• The Undergraduate Education at the Department of Historical Studies, Umeå University.

Short statements, which comment on the applications, are set out below. First, however, the Panel would like to dwell briefly on the review process and on the notion of "excellence".

Assessment was built around the following steps. All applications, as well as analyses of them by field experts, were presented to the International Review panel. Nine applications were retained as possible candidates and site-visits were arranged. Evaluation was based on the university's application. These showed great variety in both scope and content. Some did not meet the standards and were not considered for a second review. Others, often due to an absence of full information, were not possible to assess. In the main, site-visits served to weigh up the evidence presented in the applications, rather than as a way of exploring omissions.

As the applications show - and it was demonstrated throughout the site-visits - devotion and commitment to teaching and learning within Sweden's institutions of higher education are strong indeed. The Panel remains suitably impressed by the large number of teaching units that command both a high international standard and a high academic output. In the course of the review process several meetings were held by the Panel to discuss the applications and how the criteria proposed for the appraisal should be operationalised. Excellence takes on different forms. Some units lean to the more traditional, others embrace the innovative. The Panel focused on those units that had reached a certain degree of maturity. The evidence the presented suggested that a level of excellence had been achieved and could, moreover, be sustained. The units proposed for recognition, share certain common features.

- They are true learning communities - students, faculty and management share a common culture for learning.
- Their approach to quality assurance and quality enhancement is systematic.
- Mechanisms identifying and diagnosing problems are well established. There are examples, both tangible and real, to show
how such mechanisms and procedures lead on to continuous improvement.
- At all levels, the student voice is taken seriously.
- Between quality assurance operating on a university-wide level and its counterpart within the teaching unit, there is focus, clear alignment and concordance.
- The factors of their success have been defined and analysed.
- They stand and serve as development templates for other departments or institutions, in Sweden or elsewhere.
- Clear vision and strategy to advance internal and external change are present and evident.
- There is consistency in the presentations made by students, teachers, administration and management.
- Teachers work in teams for training new colleagues in the basic pedagogic techniques, their rationale and ethos of the unit, are established and active.
- Excellence in teaching is recognised by the leadership.
- The interplay between teaching and research generates new impulses both ways.

In varying degrees, these operational features are present in many of the applications. Yet, these five units stand out because they - in very different ways - have provided firm evidence of meeting these criteria.

The way selection was made poses important issues. No one is compelled to apply. Others programmes, departments or units, which may rightfully claim a similar level of excellence, have opted not to take part this year. Some applicants submitted information insufficient to allow a thorough assessment to move further.

For all applications, the statements are set out below. They are summaries of the points rather detailed explanations of why a particular application should - or should not - be recognised as a Centre of Excellent Quality in Higher Education 2007.

On behalf of the International Review Panel,

Marianne Stenius
Chair of the Panel
The Review Panel report on the Dental Education, Malmö University

The School of Dentistry at Malmö University dates back to 1949. Its official title, the Centre for Oral Health Science, denotes an integrative approach to both dental education and research. The teaching approach of the school is problem based learning.

The organisation is impressive. A well-functioning quality assurance system is in place, backed by a very solid infrastructure. The system is grounded in the concept of collective cooperation and the sharing of knowledge. For example courses are not the possession of individual teachers but part of the collective responsibility of the teaching community. In some courses, external examiners accredit the students.

Teachers have permanent commitment to researching learning theory as it applies to Odontology over and above the usual commitment to academic research. Most certainly, the programme is supported by a robust academic foundation.

Its educational principles are clearly designed in accordance with the contents and the objectives of the programme which stands as the first in Sweden systematically to base education in Odontology on the principles and methods of problem based learning. This has radically restructured curriculum, quality assessment, the nature of the relationship between staff and students and last, but not least, the basic vision that underlines Odontology.

The report by teaching staff is convincing in the coherence and clarity which emerge from a conception both lucid and shared about what learning is. theirs is a continual engagement to advance this concept further. They are well aware of their strengths and weaknesses. They work progressively to eradicate such weaknesses. In partnership with students, they see themselves as a team and provide support in every possible way. In the area of patient care, students are treated as colleagues by teaching staff. Since problem based learning depends on student self-learning, the librarian is included on the team. Relationships are close between teachers and students and amongst the students themselves. A "skills laboratory", has been set up to allow the experience of older students to be handed on to their younger fellows.
The presence of a collective identity, a high degree of trust in students and team work rather than competition, all permeate this programme.

Internationalisation to a certain degree can be observed. Some teachers have worked abroad. There are some foreign students. Furthermore, the community the programme serves in the Malmö region is itself highly international. This too is important and noteworthy.

Leadership confirmed that the faculty sets an example for other parts of the university. In particular, each application for recognition of distinctive achievement and each evaluation this involves serve as occasions to reflect and improve. Research is applied and in keeping with other Departments in the field.

The school serves as a model of excellence in teaching for other dental schools nationally and internationally.

*The application from The School of Dentistry at Malmö University, including site-visits, has provided evidence of a convincing nature that the school is a centre of sustained excellence in the quality of its teaching and learning.*
THE MALMÖ UNIVERSITY APPLICATION FOR THE AWARD

The Dental Education, Malmö University

1. Overview

This document provides the basis for our claim for an award for ‘Excellent Quality in Higher Education’. It reports the successes and the success factors which underpin our proposal to be a “Centre of Excellence in Dental Education”. As you will see, our view of successes and success factors is that they are often intertwined.

Our major successes and success factors are:

- The implementation and continuing development of an integrated problem-based learning (PBL) curriculum, which aligns closely with its primary goal of improving the quality of dental education and thereby improving the quality of oral health care

  A systematic approach to education and continuous quality improvement (CQI), which sustains and develops our curriculum, the so-called Malmö-model, and our educational environment. The Malmö-model is owned and shared by both the staff and students

- Students’ progress, completion rates and achievements

- Students’ evaluation of the programme and courses

- Graduates’ continuing commitment to the profession and interest in professional education and development

All of the cited articles are published by Malmö faculty
• The favourable evaluations provided by National and International agencies, external examiners, local members of the profession, and the Malmö University’s survey of student satisfaction.

• The substantial number of publications, conference proceedings on research and educational developments and the international workshops we have provided for other dental schools who wish to change their curriculum.

These successes may also be attributed to our willingness to learn with, and from, others; environmental scanning; change-friendliness; the integration of undergraduate education, research and clinics in one environment; and our deliberate attempt to create a culture, which values collaboration and collegiality.

Aside from activities associated with a potential site visit by the Swedish National Agency for Higher Education with regard to this application, the compilation of this document has, in itself, played an important part in our CQI. An award would provide an accolade for students and staff, of which we could be justly proud. It would also confirm that the Malmö-model could be further developed and applied to other areas of professional education.

2. About this Document and its Creation

The primary goal of the Faculty of Odontology (‘Dental School’) is to improve the quality of student learning in dentistry and thereby to improve the quality of oral health care in the community. Hence the major themes of this document are the qualities of our educational environment, how these are sustained and developed and what, in our view, are its key success factors. These, in essence, are rooted in the concepts of learning organisations and communities of practice, although, at the outset, it must be said that we arrived at these concepts through reflections upon our own experiences rather than upon a study of the literature.

The compilation of this document is itself a mirror of our usual approaches. This consists of forming a nucleus of interested members of the dental school to consider any initiative or proposal, its viability and potential contribution to our development. This core group invariably
includes staff and students but it may also include external representatives. Members of the core group consult with their colleagues about findings and proposed changes. These are then implemented as part of the CQI of the school. In our experience, this change strategy may be time-consuming but it does maximise the chances of successful implementation of new initiatives. It is confirmed as effective in other contexts and it may be counted as one of our success factors.

The nuclear group for this proposal was Professor Madeleine Rohlin, the Dean Lars Matsson, and the Vice Chancellor Lennart Olausson. The core group was:

Dan Ericson, Professor and chair of the undergraduate committee 2003 – present
Lars Matsson, Professor and Dean of the faculty 1999 – present
Aleksandar Milosavljevic, chair of the Association for Dental students 2007 – present
Maria Nilner, Professor and chair of the undergraduate committee 1996 – 2003
Kerstin Petersson, Professor and chair of the curriculum committee 2004 – present
Madeleine Rohlin, Professor and chair of the undergraduate committee 1987 – 1996
Erika Salonen, vice chair of the Association for Dental students 2007 – present
Gunnel Svensäter, Professor and responsible for curriculum development 1990 – present.

They consulted with their colleagues and wrote different sections of this proposal, which were then considered by the nuclear group. The final version was edited by Madeleine Rohlin. The production provided an opportunity to reflect upon our achievements and less successful endeavours, the possible reasons for our success and to lay the foundations of future developments. The compilation of this proposal has contributed to our development as a learning organisation as well as our development as an organisation for learning. It will continue to be used as a guide to development in our discussions within the school.
Finally, in our deliberations about our approaches to excellence, quality and success, we considered what phrase would capture the essence of our approach. It is ‘Learning together for professional and community development’.

3. The Context and the Work we do

3.1 Oral Health Care – a short Description of Current Scenario

Oral diseases are important public health problems that according to a recent WHO-report, in some countries, are the fourth most expensive diseases to treat. Promotion of oral health is thus not only a cost-effective strategy to reduce the burden of oral diseases, but also an integral part of health promotion in general, as oral health is a determinant of general health and quality of life. The oral health condition of the Swedish population is regarded as amongst the best in western European countries. One reason for this has probably been that undergraduate education, research and oral health care has always been organized in Universities as integrated Faculties of Odontology. Thus, at Malmö University, we can have the same vision and concepts of education and research, the bio-psycho-social concept\(^1\) within the school and the advantage of scientific knowledge being transferred in several environments (Fig. 1). Moreover, knowledge drawn from different disciplines underpins professional and community development. Changes in the characteristics of the community such as the ageing population and the influx of immigrants influence our curriculum so that it is fit for the purpose of improving oral health and health care. Put another way, our scanning of the external environment, the oral health needs of the community, research findings and changes in society contributes to the success and relevance of our integrated curriculum.

Figure 1. Our model of Education and Research based on the Vision: Improvement of oral health. The important features are the biological-psycho-social concept of health and disease and the flow between scientific knowledge and transfer and implementation of knowledge. Flow is created by continuous environmental scanning in partnership with the profession and community.

3.2 Scenario for Dental Education in Malmö

The undergraduate dental education was closed 1984 and reopened 1990 as decided by the Swedish Parliament. Its official title, the Centre for Oral Health Sciences, implies an integrative approach to dental education and research. When the curriculum was developed in 1990, we decided to take the changed oral health profile of Sweden and contemporary educational concepts into account. This was performed in partnership with the Education Unit of Lund University, the South Health Care Region, the Public Health Dental Service and the community. Our overall goal was to design learning environments where the students can develop their competence in primary oral health care, and as suggested by Bowden & Marton (1998) “….to prepare students, our future colleagues, to handle situations in the future. We try to prepare them for the unknown, by means of the known.”
3.3 The Functions of the Dental School

The educational, scientific, and community functions of the dental school are as follows.

(i) Education for

- undergraduate dental (n=215) dental hygienist (n=24), and dental technician (n=48) students, designated to meet the goals of the Swedish Higher Education Ordinance and standards laid down by the EU Dental Directives
- the degrees of Odont. Dr. and Odont. Lic. (n=60)
- residents to become specialists in their chosen speciality in collaboration with the Public Dental Health Service (n=20)
- the oral health team (dentists, dental hygienists, dental nurses, and dental technicians).

(ii) Research relevant to the development of oral health care and education. Research questions emanate from needs in oral health care and in higher education. The research links biological mechanisms to patient utility and community development, i.e translational odontological science. Furthermore, we explore results of our educational practice scientifically to understand and enhance learning environments. The transfer and implementation of scientific knowledge is an integral part of our research.

(iii) Community functions

Clinical service for patients of the community. In 2006, there were 22 521 patients' visits to the students' clinics and 40 379 visits of patients referred to the intramural clinics, where academic staff works as specialists

Information to society about advances in our field and contribution to the knowledge development. We contribute internationally to oral health education and policies through our WHO-collaboration centre. ([http://www.mah.se/od/who](http://www.mah.se/od/who))
4. The Curriculum - the Malmö-model

The curriculum is based on the bio-psycho-social model (see section 3). The curriculum integrates scientific knowledge with laboratory work and clinical practice. It is a spiral curriculum, which moves students from the relatively simple aspects of oral health care, revisits, extends and deepens knowledge and expertise and arrives at complex aspects, which equip a student for entry into the profession or research. It is guided by four linked principles: self-directed learning, a holistic view of patient care, a holistic view of oral health education, and teamwork. The underlying structure of the curriculum is based on the principle of alignment. This consists of creating strong links between the aims of the programme; course objectives; learning activities; content; assessment; criteria used in assessments; feedback to students; and the evaluation of courses. This model, the Malmö-model has awakened widespread interest in health education and other disciplines. We have presented it in several publications and presentations, which are available for inspection.

4.1 The Alignment of the Curriculum

The alignment of a curriculum refers to the strong links between aims; objectives; learning activities; content; assessment; criteria used in assessments; feedback to students; and the evaluation of courses. The expected outcomes of the curriculum are shown in Fig. 2. The objectives of the programme and the ten semester course plans are given in Enclosures 1-12. To achieve expected learning outcomes great care is taken to design the courses so that learning activities are coordinated and aligned to objectives. They are described in terms of knowledge, skills, and attitudes (presently changed to knowledge and understanding, skills and ability, judgement and stance according to the new Higher Education Ordinance). Enclosure 4 includes a diagram, which shows how our method of aligning the overall course objective and different learning activities are coordinated. The content is based on the core knowledge of oral health care and takes into account the changing oral needs of the population and recent research findings. The problems in the PBL study groups are presented as ‘unknowns’, like an undiagnosed patient in a clinic, and built into a sequence of patient cases, which are selected carefully to match the course objectives. The method of problem solving, inspired by Kolb, is shown in Fig 3. Assessment procedures and course evaluation are described in Section 5.
Figure 3. Illustration of how the first problem 'Carin' of course 2 is presented to the students. Problem solving in the clinical setting and in the study group is based on Kolb’s reflective cycle.

4.2 Guiding Principles

The four guiding principles mentioned in the introduction are: self-directed learning, a holistic view of patient care, a holistic view of oral health education, and teamwork.

The principle of self-directed learning permeates the whole programme. It is based on insights derived from educational theory. Students are empowered by the responsibility and ownership of their own learning, an important basis for their continuing professional development. Faculty is responsible for sensitising students to what learning is and creating environments conducive to learning. The students’ self-directed learning is embedded in a programme focused upon their future career. From the second semester onwards, students have a gradually increasing responsibility for the oral health care of their patients. This approach enhances the motivation and commitment of students and it reinforces the importance of integrating their knowledge of different disciplines, oral conditions prevalent in the community and working with patients in clinical settings. This principle is supported by evidence of the importance of learning in professional contexts from an early stage in a programme.
The above principle links strongly to the holistic view of patient care. It helps students to focus upon the patient as a person from a social and cultural context not merely upon the disease he or she might have. The long term experience of working with patients and the continuity of their care provides students with an experiential continuum on which to reflect and deepen their knowledge and expertise and thereby help them to develop as competent, ‘reflective practitioners’ to borrow Donald Schön’s phrase. In turn, the holistic view of patient care provides the basis for oral health education, which is in line with our vision of ‘Improvement of Oral Health’. The patient is at the heart of our curriculum. Therefore our courses are based on oral health situations and patients’ need, not on subject areas. Clinical work is linked closely with study group work.

Teamwork, an important and often neglected feature of the professional role, is developed through study groups and in clinical settings. Collaboration with other health workers particularly dental nurses, dental hygienists and dental technicians is promoted throughout the programme. It begins during the five weeks induction course where students of dentistry, dental hygiene and dental technology work together. Dental nurses work with and teach students in clinics. Communication with dental technicians and prescribing to commercial dental laboratories is important during the last two years of the programme. Teamwork is also practised during the fifth year of the programme when students train in the Public Health Service.\(^1\) All of the above do contribute to the development of teamwork but, as indicated in the next section, this is an area for improvement.

### 4.3 Reflections on the Curriculum

The curriculum is well designed, fits its purpose and is fit for its purpose. But there are areas, which we need to develop and issues to resolve. Behavioural and Social Sciences need further integration particularly since the rapid change in society. As the learning context has a powerful impact upon the mindsets of teachers and students we have to improve the design and coordination of learning activities. In the clinic

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the student’s manual skills are often the dominant theme while in the study-group, facts and knowledge. To strengthen the integration, we use one-hour seminars after clinical sessions so that students can reflect upon their experience and link them to their work in study groups. Cooperation and the joint education of dental students and their peers in dental hygiene and dental technology need strengthening. We have recently obtained university funds for a project on this issue.

5. Assessment and Course Evaluation

We have devoted much attention to our systems of assessment and course evaluation so that they align with our aims and objectives and contribute to CQI. Further information on assessment and course evaluation is given in Enclosure 1 and in Enclosures 2-12.

5.1 The main Characteristics of our System of Assessment and Evaluation

- Aligned with objectives, content, and learning activities
- Several procedures for formative and summative assessments
- Student involvement in design and evaluation of assessments
- Criteria of assessments known to students
- Peer, self and collaborative assessment
- Self-assessment and immediate feedback in clinics, laboratories and study-groups
- Peer assessment in study-groups, clinical sessions and skills laboratory
- Students receive feedback on assessment and course evaluations
- Final clinical examination with external examiners from the Public Dental Health Service

5.2 How and When We Assess

Formative assessment, including informal feedback is an ongoing activity in clinics, laboratories, and study groups. It is supported by peer, self and collaborative assessment. In clinics, the same supervisor formatively assesses and supports a student for the whole course. The final week of each course is devoted to summative assessment. The methods used and the sequence are mapped in Fig. 4. The assessments and feedback from the external examiners are highly valued by the students. Interestingly, our studies of assessment procedures revealed that the correlations between students’ self assessments and external examiners’ assessments were higher than between self assessment and clinical supervisors’ assessments.

Figure 4. Main characteristics of summative assessment (x scientific project) at the closure of each course (C) according to ‘Climbing the Pyramid’ (Miller GE. Acad Med 1990;65:63-7).

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5.3 Course Evaluation and Students’ Role in Course Evaluation

Towards the end of each course, each study group session evaluates its group study processes and suggests improvements for the group and the facilitator. This approach develops teamwork and the skills of giving and receiving feedback. The evaluation of each course by the students and facilitators is mandatory. These evaluations provide information for the assessment groups and subsequently the course groups to reflect upon, and, if necessary, change the assessment procedure. The report of the course evaluation is fed back to the students and given to the next group of students who use it as a basis for their evaluation. Furthermore, graduate’s evaluation of the programme is undertaken (see section 10.4). The findings are used in CQI and the information given to prospective students.

5.4 Administrative Organisation of Assessment and Evaluation

The above activities are coordinated and monitored by assessment groups. Each of these is responsible for the assessment and evaluation of two consecutive courses. This approach is used to ensure coherence and consistency.

5.5 Reflections on Assessment and Evaluation

Overall, our approach to assessment and evaluation is rigorous. The assessments are designed to help students develop their professional competence, to improve their research skills through projects and to help them become ‘reflective practitioners’. But there are areas in need of improvement. These include: achieving the right balance between providing feedback (formative) to students and attending to patient care; developing better clinical scenarios which include behavioural and social sciences (see section 4.3) and improving the criteria for establishing professional competence\(^1\). These are areas, which are currently being explored.

6. Science and Experience

6.1 Evidence and Experience

Three domains: activities in oral health care, education, and research are integrated, like a triple helix, in our activities. As far as possible, these domains are evidence-based. However, we recognise that the empirical bases can be insufficient, and we also need to rely on indirect evidence and our experiences.

6.2 Evidence and Experience in Oral Health Care

Evidence-based oral health care implies a striving to deliver care with the use of best available scientific knowledge. It is integrated with experience and patients’ preferences. As a graduate from the Malmö-model, a student is expected to be competent to deliver evidence-based oral health care. The curriculum is structured to support the development of such competence (Section 4) and to empower students to study newly published articles. The themes are selected so as to enhance transfer and implementation of knowledge for health promoting strategies, common and novel situations in diagnosis, and interventional strategies. Integration of knowledge drawn from different fields of knowledge is required for this approach. These include Biomedicine, Basic sciences, Social Sciences and the Humanities.

6.3 Evidence and Experience in the Pedagogy in Higher Education

We have developed a rationale for our programme through the study of the educational literature, in debates with experts and reflections on our own experiences. There is evidence available that activation of prior knowledge, contextual learning and elaboration on knowledge, as implemented in our curriculum, play major roles in learning. There is also strong empirical evidence for the successes of PBL in the short and long

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term. Moreover, early clinical experience, as is the case in the Malmö-model, and longitudinal clinical exposure has been shown to be one of the prerequisites for the development of professional competence. Less tangible but, arguably important, benefits of PBL are the development of self-directed learning, team-working, time management, project management, and a wide range of communication skills including questioning, listening, responding, explaining, negotiation and giving and receiving feedback. These skills are important in professional contexts and they are more likely to be developed through PBL than traditional methods because of the intensity of research and discussion in PBL.

6.4 The Basis of Professional Competence

Professional competence is strongly linked to knowledge and understanding of oral health care, the development of skills and abilities to make judgements, attitudes to care and ethical issues. At the same time they are developing their academic skills and acquiring knowledge. This integrative approach is likely to be more effective for developing long term professional competence than traditional approaches where students are expected to acquire knowledge for a situation they have not yet experienced or been exposed to.

7. Students’ Achievement and Graduates’ Perception

7.1 What do the Students achieve?

The students’ achievement and retention rates are high. Between 1995 and 2003, 72% of the students completed their degree in prescribed time (5 years). The completion rate of students admitted 1998 to 2001, and who received a degree no later than 2006, was 78%. The results from students admitted in 2001 and who graduated in 2006 show that 82% of the students completed their degree in five years time, 93% of the individually admitted students and 72% of the centrally admitted students. In average 79% of the students pass written examinations on the first occasion. A survey of our first five cohorts (graduated 1995 - 2000) five years after their graduation revealed that 97% of the graduates worked in dentistry, two thirds of them in Sweden and one third abroad.
7.2 Graduates’ Perception of their Education

As evidenced by results from surveys by the Swedish Dental Association, one to three years after graduation, our graduates’ self-assessed level of competence as professionals is high and higher in comparison to other dental schools in Sweden. Further evidence is presented in the study of our graduates of the first five cohorts \(^1\). They considered their dental education had prepared them well for the profession. When asked to mention the most valuable of their dental education in Malmö, half of the graduates mentioned PBL and one fifth integration between theory and clinic. Other issues mentioned were holistic view, enthusiasm of academic staff and working in study-groups. Overall, their satisfaction with their professional situation was high. It appeared to be related to their confidence and willingness to reflect upon and change their clinical approaches, where appropriate. About a quarter of the respondents expressed interest in specialist training. Sixty five per cent of females and 42\% of males expressed interest in doing postgraduate research. These figures are high for dental graduates. The overall results provide further evidence of the successes of our degree programme. They can be attributed in large measure to our curriculum, the learning environment and our modes of learning.

8. Organisation, Leadership and Management

In this section we are primarily concerned with the school as an educational organisation nested in the wider organisation of the University; modes of leadership and management, and our students’ contribution to the organisation. The general principle underlying our approach is that committee structure should reflect the main functions of a School.

8.1 The Organisation of the Dental School

The major committee for undergraduate education is the Undergraduate Committee, which oversees the course coordination groups and assess-

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ment groups, a curriculum group and work-groups (See examples in Table 2). This structure is based on the principle that the committee structure should be firmly based on the organisation of the curriculum. The School has full ownership of the curriculum, not the departments, a way of organisation we believe is better for a PBL-curriculum. This harmony between curriculum organisation and administrative organisation increases efficiency, avoids unnecessary repetition of meetings, and reduces conflict. By being responsible for all aspects of undergraduate courses, the Undergraduate Committee considers how changes in one course may have consequential changes to other course, thus ensuring there is no unnecessary repetition of content and that there are links between objectives, learning activities, content, and assessment procedures. This holistic approach ensures there is coherence and consistency across the curriculum. The Undergraduate Committee consists of four undergraduates, six academic staff members, and a member of the Public Dental Health Service.

Education, research and clinical practice are integrated in one organisation that enriches mutually the educational and research environments and experiences of students. The Faculty Board is responsible for these activities and its four committees (Undergraduate education, Continuing education, Research/Research training and Dental Care committees), reflect these responsibilities. The chairs of these committees together with the Registrar form the Executive Board of the School with the Dean as the Chair. The Faculty Board has 15 members, including 3 students, 6 faculty, 3 trade union representatives and 3 external representatives, one of whom is the Chair.

8.2 Leadership and Management

The composition of the Executive Board ensures close coordination and interaction between the different activities of the School. Issues or problems identified in the every-day activities can be presented to the Undergraduate Committee via the other committees and the student groups and, if needed, taken further to the Executive Board. Correspondingly, signals from the leadership conveniently reach the committees of the School.

Leadership and management also occur at other levels in the School. It is part of student learning in PBL (See Section 10.4). The academic staff
has management and leadership roles in learning and in chairing sub-committees and work-groups. These various leadership roles are supported by a management structure, which is concerned with monitoring and sustaining quality improvement. The experience of different roles is important for students in their future profession as practising dentists.

8.3 The Organisation of the University

The administrative structure of the University is based primarily upon its role as a provider of professional education, its attendant research and its contribution to community development. The University is currently considering some changes to its administrative structure to reflect more closely its vision and these will be taken into account by the School in the coming year.

The vision and the administrative structure of the dental school fit comfortably within the vision of the University. Ideas, procedures and processes of teaching, learning, assessment, course design, and quality management are shared across the six schools and committees of the University and through joint staff development activities. In addition, there are informal liaisons between members of the schools. This sharing of ideas has been mutually beneficial in research, as well as in education. Part of our success is due to our openness to learning from others in the University and in helping others to learn from our experiences. The latter has sometimes helped us to clarify our own approaches.

8.4 Student Involvement in the School’s Organisation

The students union of the dental school contributes to its decision-making processes, curriculum, assessment, school organisation, QCI, and the students’ welfare and social activities. http://www2.od.mah.se/studentkaren/default.asp

The student union has a board consisting of a president, an educational guard, and five members. It has six subcommittees. The president and educational guard sit on the Faculty Board and four student representatives sit on the Undergraduate Committee. Students sit on all major committees and various work-groups. When a work-group is formed, the student union is usually invited to send representatives. The union
also works closely with the other student associations in the University, Studentkåren Malmö, and is associated to EDSA (European Dental Student Association). These links enable the students union to contribute to and learn from educational developments in other fields and dental schools.

As described in Section 4, the students contribute to and gain from their involvement in the design of the curriculum, educational methods and assessment procedures. PBL activities are led and managed by student groups. Lectures are customised in response to students’ requests. Seminars are based on students’ questions, which are presented to the academic staff in advance of the seminar. The students manage the booking of their own patients and treat patients under supervision.

9. Resources

For a School to be successful in its quest to improve student learning, it must have a strong resource base and use it effectively. Our resource base includes staff and different facilities. Our resources are good but there is almost always a need for more resources as the curriculum and research changes. However it seems to us equally important to use one’s existing resources efficiently.

9.1 The Staff

There are 60 academic staff, 25 administrators, 65 dental nurses, 3 dental hygienists, 4 dental technicians and 2 librarians. All of these contribute directly or indirectly to the quality of our learning environments. Two-thirds of the academics have an Odont Dr degree and about half of them are docents or professors. Furthermore, most professors and associate professors are certified specialists in one of nine dental specialities. The academics teach, conduct research and provide intramural specialist clinics for the community. The combination of tasks provides a sound basis for the curriculum and its development and a role model for students who are expected to learn, study research and engage in clinical activities. The different roles of the academics in relation to learning activities are presented in Fig. 5.
9.2 Library and Information Technology

Library and Information Technology (LIT) are integrated and provide support for staff, students and local dentists; a patient management system specially devised by the faculty; a global resource base for WHO; a curriculum management system; courses for staff and for students at induction (introduction) and regularly throughout their courses. The library is open 80 hours per week and has a librarian 40 hours per week. Researchers and faculty have access to the library at all times. Databases, learning materials, curriculum organisation, assignments and reports from study groups and committees are easily accessed via the well-designed intra-net. The patient management system has been made more efficient by the use of IT.

LIT and faculty work closely to develop the students’ knowledge retrieval and management skills, which are central to PBL. The range of skills developed assist students to become ‘researchers’, an important feature of their role as dentists in the 21st Century. In the latest evaluation, 2006, dental students expressed high satisfaction with LIT and its

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staff was highly praised. The only complaint was the opening hours, which have been extended.

9.3 Classroom and Clinical Facilities
The school has 3 lecture rooms, a lecture theatre, several seminar rooms, and 16 PBL group rooms. There are research laboratories as well as a new skills laboratory. In the clinics, there are over 100 dental units for students with computerized records and radiography. The clinics provide good facilities for developing students’ clinical competence, research and our contribution to the oral health of the community.

9.4 Student Facilities
Student facilities provide informal opportunities for students to discuss their work, to socialise, to obtain advice and support and to study. Where such facilities are good and located in a school, as ours are, then students are more likely to feel part of a learning community. We have a well-equipped and well-furnished common room where we can eat, socialise and have festivities and gatherings. We share with staff, study rooms, a well-equipped computer room, a restaurant and resting room. The students union has an office for committee members and it is open to students seeking advice or information at most times. All of these make a contribution to the educational environment of the School.

10. Continuous Quality Improvemnet (CQI)

10.1 Strategy
The focus of our Continuous Quality Improvement (CQI) strategy is the improvement of the students’ educational environment and learning. By focussing upon CQI, Quality Assurance and Quality Maintenance and Development naturally follow. The strategy we developed is to involve staff and students and appropriate resource providers, such as external consultants and dentists working in the community. Their role is to ensure that our approach aids us in our quest for coherence, consistency, closure and relevance across the curriculum so it is ‘fit for purpose’ and the ‘purpose is fit’ for the long term vision of improving oral health care.
This approach, in line with the quality plan of Malmö University, has an educative function for students who, as professionals, will be required to monitor and improve the quality of their own work, that of their teams and to report systematically care-related provision and incidents to regional and national registers.

![Cyclical Model Closure of CQI in the Malmö-model](image)

Figure 6. The cyclical model closure of CQI in the Malmö-model.

Our approach to CQI is based upon a cyclical model. Its components are shown in Fig. 6 Review of one component may lead to consequential effects on other components. An example of the cyclical approach is our exploration of admission procedure which began in 1991. We introduced a new selection procedure involving tests and interviews to investigate whether it would reduce the number of dropouts and so increase the completion rates within the recommended time limit. The performance of two cohorts, which included traditional and individually selected students, was followed through from admission to graduation. Predictors for good study results were found such as assessments of high social competence during training and good results on interviews, as well as high scores on empathy and non-verbal intelligence\(^1\). Based on these results half the cohort is admitted by individual admission. This has reduced the number of dropouts significantly. The study has also had con-

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sequential effects upon the curriculum planning. It has provided us with insights into students’ own agenda and their reasons for 'being learners' at a particular point in their lives, for applying for admission to a dental school and their reasons for becoming a dentist.

10.2 CQI-processes

Two inter-related processes are involved, external and internal cycles of CQI\(^1\) and the closure of these cycles is important (Fig. 7). Changes in the curriculum may arise out of internal evaluations or external evaluations. For example, recommendations by DentEd (an EU-funded initiative for Dental Education in Europe) that more opportunities for international student exchanges should be implemented has resulted in that over one third of our students now having international experiences. However not all recommendations from external evaluators are implemented. For example, site visits often yield a broad array of recommendations, some of which may not be consonant with our mission and underlying philosophy. The recommendations are considered carefully by an internal group who decide upon the viability and value of the recommendation.

Figure 7. External and internal cycles of CQI with closure of the feedback loops.

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10.3 External Evaluations and their Value

These include visits by agencies and reports from international consultants, external examiners and consultants. These have helped us to consolidate our strengths and focus upon areas for improvement. In the past ten years we have had two official visits by the Swedish National Agency for Higher Education (1997, 2004) and one visit by DentEd (1999). Their reports were highly favourable. The DentEd evaluation concluded that the school played ‘an international key role in education and educational innovations’ and ‘The Malmö dental school has taken a worldwide lead .......”. Their view is evidenced by the substantial number of publications in internationally refereed journals, conference papers and the international workshops on pedagogy, which we have provided. We regard these as both a success and as a factor, which contributes to our success. It has enhanced our reputation as an international centre of excellence in dental education and the process of doing pedagogical research has itself contributed to the development of our curriculum, teaching and assessment.

The most recent report from the Swedish National Agency (2004) praised the coherence of our curriculum model, the introduction of external examiners and CQI. They suggested that we should monitor the input from the medical faculty and consider developing more teamwork with professions allied to dentistry. These issues have been addressed and funds from the University are currently supporting work to develop and enhance teamwork.

Further evidence of CQI is provided by the results of ‘Students at Malmö University – Barometer 2003-2004’. The Dental School scored highly on most aspects of the survey except for one: student harassment. We found this result alarming and our student union, with our support, immediately began an analysis. The results were disseminated in 2006 and a plan was launched, which focuses on increasing awareness, and the training of clinical supervisors in conflict management. This year, the students are conducting a survey to monitor the effects of the actions.

10.4 Internal CQI

The internal CQI system is a series of procedures ranging from the informal when immediate action can be taken to the more formal, reflec-
tive procedures. This model is applied at the individual student level, through their self- and peer-assessment or more formally in staff-student conferences, study group level, and course levels. At the course level, students undertake course evaluation during the examination period at the end of each semester. The course evaluation is approved by the undergraduate committee and presented to the students. The closure of the feedback loop (Fig. 7) is essential for CQI at all levels. It ensures that reflection leads, where necessary, to action, it helps to create purposeful meetings and it provides students with experience of CQI. Such closure makes a valuable contribution to our success in maintaining and developing the curriculum.

10.5 Components of CQI

Figure 6 shows the components of our CQI system, which is in line with the Quality plan of the University and Table 1 presents how these components are analysed to establish priorities in CQI.

Table 1. Component and tools for analysis in CQI

<table>
<thead>
<tr>
<th>Components</th>
<th>Goals</th>
<th>Present status</th>
<th>Actions</th>
<th>Evaluation Improvement</th>
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</thead>
<tbody>
<tr>
<td>Planning, Recruitment, Admission</td>
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<tr>
<td>Induction to programme and courses</td>
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<tr>
<td>Objectives, Content, Learning activities</td>
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<tr>
<td>Assessment and Examinations</td>
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<tr>
<td>Student achievement</td>
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<tr>
<td>Student guidance and support</td>
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<td></td>
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<tr>
<td>Follow-up of students and graduates</td>
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</tbody>
</table>
10.6 Staff Development and CQI

We find it important to involve all staff-members as we are all responsible for creating and sustaining a good learning environment. Our view is that it should be a natural process of reflecting upon specific tasks, taking responsibility and working together to solve problems in line with the PBL-approach. Where there are problems on which additional expertise is required, we involve external resource persons to work on the problem together with groups of staff. For example, Professor emeritus George Brown from Nottingham, the UK, has been our mentor for several years. This approach is more effective than directing staff to attend different workshops. Staff-members have the freedom to choose which areas of expertise they wish to develop. However, every year, we invite international experts to provide lectures and workshops on areas of work we wish to review. Attendance at these events is usually high. Staff development also occurs when staff provides workshops for colleagues from international dental schools or other national educational environments. Often teaching a topic develops one’s understanding of it and one gain from other people’s perspectives. Projects and work-groups are established by the undergraduate committee as exemplified in Table 2. The group function as learning nucleus is of great importance in staff development and our ownership of the learning environment.

Table 2. Examples of on-going projects for research and CQI in the Dental School

<table>
<thead>
<tr>
<th>Quality in learning</th>
<th>Work-groups:</th>
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<tbody>
<tr>
<td></td>
<td>• Assessment of professionalism</td>
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<tr>
<td></td>
<td>• Judgements and stance</td>
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<td></td>
<td>• Improving feed-back to students</td>
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<tr>
<td>Individual admission</td>
<td></td>
</tr>
<tr>
<td>Training of clinical instructors</td>
<td></td>
</tr>
</tbody>
</table>

1 Rohlin M, Petersson K, Roxå, T. Competence development in a learning organisation. Staff development at the Dental School in Malmö during the 1990’s. Tidskrift for Odontologisk Pedagogik 1993;1:9-23. (In Swedish)
To summarise, our approach to staff development is mostly problem-based, with a generic pedagogic base provided by the University. It gives staff freedom to learn and it is primarily concerned with improving the learning environment. Such an approach makes a useful contribution to CQI and to our success, as evidenced by external reports.

### 11. Success and Success Factors

What counts as success in educational environments is contestable. For us, success is based upon: a curriculum, which is fit for its purpose and fits its purpose; student achievements and student satisfaction; positive views of graduates, the profession, the community and expert curriculum evaluators; and the National and International reputation of the School as a Centre of Excellence for education.

Most of our success factors are attributable to our willingness to learn from others, help others and most importantly, reflect upon our crises and failures as well as our successes. Our successes have been aided by our organisation for learning. Students’ and past students’ achievements and satisfaction owe much to their integration into a learning community where they can move relatively smoothly from the periphery towards the centre of the profession. Below we list some success factors that can be seen as proof of an excellent educational environment as well as some underlying reasons.
• The closure of our undergraduate programme in the mid 1980’s. We do not advocate closure as a success strategy but closure did force us to rethink, to be more responsive to the external environment, to be open to new ideas, to be change-friendly, to reflect and act.

• The curriculum: the Malmö-model and its CQI. This incorporates knowledge of the community and our profession. It is based on evidence from educational research and reflections on our experiences. It is an open system, which incorporates changes in knowledge of research and educational research and community needs and feedback from internal and external sources. Some of the main characteristics are given in Table 3.

• Committed students and staff. Students are actively involved and take responsibility. Students and staff work together and are learners together. Students are seen as future colleagues. All staff-members are partners of the educational environment. The core group of teachers, who designed and implemented the curriculum are initiating younger colleagues into the principles and values underlying the Malmö-model. In this way, the core group guarantees sustainability.

• Commitment from the community and oral health care sector that make a valuable contribution to education and research. The close collaboration within education, research and health care gives credibility to ‘learning from uniting community’. Patients visiting the dental school exhibit a diversity that is representative of society of today. This is a prerequisite for variations of what is learned.

• First dental programme world-wide to implement the PBL-approach. This is not only a success and a success factor, it is an honour! It challenged us to reflect, explain orally and in writing, be listened to and defend our approach in many diverse national educational environments. Internationally, this has given us a key role and exposure in dental education. Our list of publications and conference papers on pedagogical research, international workshops we have provided and international visitors we have received provide evidence that we have made a substantial contribution to national and international research and development in dental education. It has enhanced our reputation as an international centre of excellence in dental education and the process of doing pedagogical research has itself contributed to the development of our curriculum, teaching and assessment.
• The excellent results of external evaluation. We have had very favourable evaluations from external agencies, graduates and students and success in our applications for funds for educational development and research in our universities and the Swedish Council for the Renewal of Undergraduate Education.

Table 3. Main characteristics of the Malmö-model contributing to success

<table>
<thead>
<tr>
<th>Characteristic</th>
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<tr>
<td>Early clinical experience to close the gap between theory and practice</td>
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<td>Learning in context, which is based on the integration of knowledge, skills</td>
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<tr>
<td>and attitudes needed for oral health care</td>
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<td>The problems are designed to require health oriented explanations in terms</td>
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<tr>
<td>of processes, principles and mechanisms based on the bio-psycho-social model</td>
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<tr>
<td>Focus on students’ learning and their responsibility for, and ownership, of</td>
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<tr>
<td>learning</td>
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<tr>
<td>Learning based on students’ own questions and self-generated discoveries so</td>
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<tr>
<td>they construct their own meanings</td>
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<tr>
<td>Outreach education in the Public Dental Health Service</td>
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<tr>
<td>Assessment procedures and feedback to students</td>
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<tr>
<td>Training in self- and peer-assessment and in teamwork</td>
</tr>
<tr>
<td>Education, research and oral health care integrated and practised within</td>
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<td>good facilities</td>
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<tr>
<td>Organisation, management, leadership reflect the main functions of the</td>
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<tr>
<td>Dental School and its educational approach</td>
</tr>
<tr>
<td>COI - systematic strategy, staff development together with national and</td>
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<tr>
<td>international expertise, several evaluations</td>
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