Section 2.3

Quality assurance, benchmarking, assessment and mutual international recognition of qualifications

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Abstract

The aim of this report is to provide guidance to assist in the international convergence of quality assurance, benchmarking and assessment systems to improve dental education. Proposals are developed for mutual recognition of qualifications, to aid international movement and exchange of staff and students including and supporting developing countries. Quality assurance is the responsibility of all staff involved in dental education and involves three levels: internal, institutional and external. Benchmarking information provides a subject framework. Benchmarks are useful for a variety of purposes including design and validation of programmes, examination and review; they can also strengthen the accreditation process undertaken by professional and statutory bodies. Benchmark information can be used by institutions as part of their programme approval process, to set degree standards. The standards should be developed by the dental academic community through formal groups of experts. Assessment outcomes of student learning are a measure of the quality of the learning programme. The goal of an effective assessment strategy should be that it provides the starting point for students to adopt a positive approach to effective and competent practice, reflective and lifelong learning. All assessment methods should be evidence based or based upon research. Mutual recognition of professional qualifications means that qualifications gained in one country (the home country) are recognized in another country (the host country). It empowers movement of skilled workers, which can help resolve skills shortages within participating countries. These proposals are not intended to be either exhaustive or prescriptive; they are purely for guidance and derived from the identification of what is perceived to be 'best practice'.

Introduction

Dental education is fast becoming an international resource. Dental education institutions are sharing staff and students in exchange programmes and sharing educational resources by the ever increasing use of the Worldwide Web and similar multimedia technologies. In this rapidly developing world of global dental education it is vital that the standards of educational resources, staff and new graduates are agreed upon, established and maintained by the dental education community. It is by interaction between dental educators that barriers in dental education and oral health care will be broken down and improved to the benefit of all.

The challenges in Europe brought about by the Bologna Declaration (1) have acted as a stimulus to develop standards to ensure educational quality and assessment. The aim is to mobilize the dental workforce across the European Union. It is this model that the working group has used as a basis to develop this document, which it is hoped will stimulate global convergence towards higher standards in dental education. Many countries on different continents have set up methods for improving educational quality in dentistry. Improved quality in dental education is required for a number of reasons (2):

1. Quality is an essential component of any service and production process. To be accountable to consumers, public and government, acceptable procedures on the evaluation and quality assurance are necessary.

2. Quality is an important internal and external measure of an organization's performance.

3. International cooperation requires greater insight into the quality of teaching programmes and graduates.

It is by international agreement on quality, benchmarking and assessment that the development of student and staff mobility, protection of the public and the aim of making the profession more internationally based can be achieved. An example of student and staff mobility is the new Erasmus Exchange programme started in 2007 including the European Credit Transfer System based on a modular system and defined set of learning goals (3).

Aim

The aim of this report is to provide guidance to assist in the international convergence of quality assurance, benchmarking and assessment systems to improve dental education. Proposals will be developed for mutual recognition of qualifications, to aid international movement and exchange of staff and students, including means of supporting developing countries.

Definitions

The quality cycle

This is at the centre of any quality management concept. It is a continuous process of quality monitoring, analysis and action including control, measurement, internal, external evaluation and improvement.

Quality control

According to the International Standards Organization (4), in simplified terms, quality control concerns the operational means to fulfil quality requirements.

Quality assurance

The assurance aims at providing confidence in this fulfilment, both within the organization and externally to consumers and authorities.

Quality management

It includes control and assurance, as well as the additional concepts of policy, planning, monitoring and improvement. Quality management operates throughout the quality assurance system.

A template for all of the quality systems being effective in a dental educational environment might be as follows: students are exposed to high-quality education and training within an appropriate learning and teaching environment. The students are sufficiently supported to achieve competence at appropriate milestones throughout the quality-assured curriculum (5). They are assessed in a valid and reliable assessment programme (6, 7) and thereafter graduate as dentists satisfying national and international benchmarks. These principles apply equally to other members of the dental team.

On qualification, members of the dental team should have developed an holistic view of patient care, accept professional responsibilities and acknowledge their limitations. They should have demonstrated an appropriate level of competence to deal with complex issues both systematically and creatively, make sound judgements on the basis of available data, and have acquired a commitment to continuing professional development.

Thus, all aspects of quality management in a dental school (and faculty) should be combined to produce efficiently a consistently high-quality dental team in a resource, time and cost-effective manner.

As stated before, quality in dental education does not exist in isolation and has to be improved and managed within the framework of the host institution and health system, for example, according to the WHO Pentagon Partnership Model (8).

Quality assessment methods

Quality is assessed against a set standard and to lay the basis for improvement. However, quality assessment *per se* is no guarantee of quality improvement. In the dental school/institutions/health systems quality assessment can be seen as consisting of two interrelated processes based on both internal and external evaluations and may focus on structure, process or outcome.

In a well-developed and mature process, results and recommendations from internal and external evaluations should be used in an integrated way to drive the improvement of education and produce graduates of a consistently high quality. An essential aspect of quality management is quality of patient care. Quality of patient care in dental education is an integral part of clinical training and the running of institutions and clinics.

Within educational quality improvement, four strongly correlated components can be distinguished:

1. Clear goals and objectives for the curriculum. Similarly, there should be objectives and standards set for the educational methods employed and also the systems and staff being used for delivery. All of these need to be clearly identified to develop an appropriate system of assessment.

2. Clear methods for the evaluation of all courses and defined learning objectives from which the curriculum is built. These should ideally be subjected to both internal and external scrutiny. In the latter instance, it is helpful to have a 'benchmark' against which to measure the performance. The reported outcomes of assessment should be carefully considered and acted upon by a clearly defined process.

3. A system for internal quality assurance should be in place, by which the improvements identified consequent to assessment (both internal and external) can be considered, actions agreed, acted upon and implemented.

4. Reviewing implemented changes to assure their achievement in terms of the desired effect in bringing about both change and improvement.

A framework for quality assurance in higher education that includes both internal and external elements was proposed by Vroeijenstijn (9). The external process is built on, and is preceded by, the internal process. Internal evaluation comprises monitoring, student evaluation and a method of institution/clinic self-evaluation. A system of external peer review is included.

The quality cycle is a systematic and structured interest in quality assurance and quality improvement within an institution. 'Systematic' means that all quality control activities are embedded in a coherent quality care and management system. 'Structured' emphasizes that all these activities are understood as a continuing process for informing about the quality of teaching and learning (10).

The quality cycle does not differ principally from the reflective or audit process, this process results in a spiral of development, as part of a lifelong holistic learning process (Fig. 1).

The essential elements for successful operation of a quality cycle and quality management are the institutions' aims and expectations and are set within the environment in which they operate (Fig. 2) (11).

Quality monitoring is the first step in the development of the process of the effective quality cycle and through this monitoring process it is possible to see quality as a measure of the realisation of an institution's aims and expectations. The analysis of strengths and weaknesses forms the basis of the information collected by the quality monitoring process, which in turn gives the institution the possible factors that are hindering their ability to reach their aims. This in turn leads to the actions required to improve the quality.

Although striving for quality – in terms of a business goal – cannot just be a leadership or management aim, it is important to involve all those involved in dental education.

The results of the quality cycle and the outcomes of quality management have to be judged internally and externally. The system of quality judgement discriminates between internal and external evaluation (Fig. 3).

The notion 'external', means that external help (from peers) is sought by an institution to provide an unbiased check of the

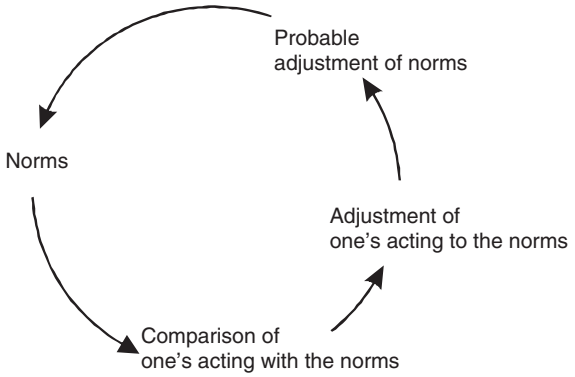

Fig. 1. Principle of a lifelong holistic learning process (10).

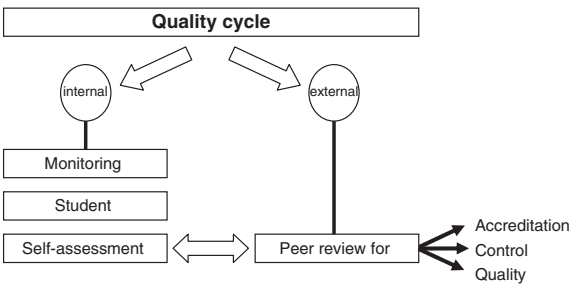

Fig. 3. The principle of internal and external quality cycles (11).

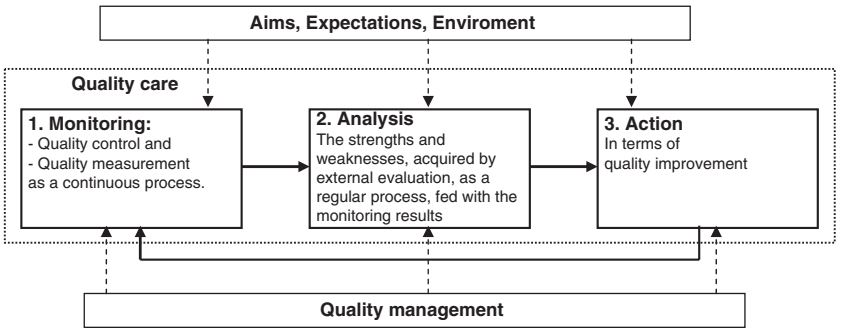

Fig. 2. A holistic quality cycle and management system [modified according to Ref. (11)].

quality of their teaching, quality cycle and quality management systems.

The visitation, reviewer or evaluation principle is simple: an institution carries out a self-analysis by internal evaluation. External experts lead a dialogue based on the results of the self-analysis. The task of the reviewers is to judge this self-representation, to indicate inconsistencies in the areas of teaching, research and/or patient treatment – particularly in relation to the institutions aims and objectives, to recognize probable strategic behaviour in the process of self-evaluation and to collect additional information in order to produce an (external) evaluation report. This external evaluation is complementary to the internal evaluation and is the logical consequence of an institutions' endeavour towards a responsible and self-confident quality cycle. Beyond this, the external evaluation serves the purpose of measuring the quality of teaching and learning in an objective way against external standards or benchmarks. The internal evaluation constitutes the backbone of the process for the evaluation of the quality. In such a framework the following concepts and processes may be included:

Accreditation

Accreditation is a process for authorization or certification. Usually, it is carried out by an external quality evaluation, in which a body formulates the criteria and standards (a benchmark) against which the institution and the programme will be assessed.

Accountability

Accountability is a concept in ethics with several meanings. It is often used synonymously with such concepts as answerability, responsibility, blameworthiness, liability and other terms associated with the expectation of account giving. This usually considers the appropriate use of resources and would include an assessment of value for money. Any resultant improvement would usually be in the form of increased efficiency.

Benchmarking

Benchmarking (also 'best practice benchmarking' or 'process benchmarking') – is a process used in management and particularly strategic management, in which the institution/clinic evaluates various aspects of their processes in relation to best practice within the dental educational community. This then allows institutions/clinics to develop plans on how to adopt such best practice, usually with the aim of increasing some aspect of performance. Benchmarking may be a one-off event, but is often treated as a continuous process in which organizations continually seek to assess their practices.

Self-regulation

Self-regulation (and autonomous systems) – is a process where quality management comprises internal setting of rules and standards, internal evaluations with linked procedures for improvement. This is aimed at maintaining high educational standards in an independent institution.

Internal and external quality assurance systems can focus on any part of the structure, process or outcome of the programme. The examples include:

1. The International Organisation for Standardisation (ISO) developed standards for quality systems (ISO 9000 series) to assess specific aspects of health services in Germany and Switzerland. These standards relate to administrative procedures (process) rather than clinical outcomes.

2. The UK General Dental Council focuses on the educational process through school visits, recommending the structure of the degree programme through its First five Years document (12).

3. DentEd visits focus mainly on the educational process (13). One of the few non-institutional assessors of the outcome of the education process is the external examiner, hence highlighting the importance of external assessors in the quality assurance process.

Quality management should be an ongoing, dynamic process as well as forming an essential and integral part of every function in the institution. Thus, quality assurance of the institution should be integrated into the general quality management process. The key outcomes of improvement should never be assumed to have been achieved simply because change has been implemented, but should be checked against what was intended in a further process of review and follow-up (Fig. 4).

Varieties of models and approaches have been presented to structure and conceptualize the assessment of, and factors related to quality. The most enduring of these seems to be that described by Donabedian (14), with its further development by Starfield (15). Their conceptual framework shows three dimensions:

1. Structure – relating to the facilities, equipment, personnel and organization available for provision of care.

2. Process – referring to actual provision of care.

3. Outcome – denoting effects of care on patient's health status.

Each of these dimensions and the dynamics of the relations between them can be assessed separately (or in combination) in relation to the quality of care provided in institutions and clinics. Again, they are all fundamental to the development of an appropriate environment for dental education and form an important part of the overall mechanism ensuring quality. The quality assurance process should involve the following:

1. Quality is the responsibility of everybody, including all those involved in dental education, including members of the dental support staff and students. Ideally, patients should also have some means of input into the quality assurance process. Student feedback, obtained through appropriate evaluation mechanisms and teacher/student liaison meetings (or forums), are an essential component of quality improvement. Feedback from patients and support staff (nurses, receptionists, etc.) is an important tool in the assessment of the quality of care provided by students and staff. Feedback from recent graduates on how the dental undergraduate programme has facilitated their ability to work as dental care providers should be included amongst the tools available for quality assurance. The views of employers or postgraduate trainers about the graduates (from the school) can also be of enormous value. Any quality improvement method employed should ensure that outcomes from the feedback and review mechanisms are communicated to teachers,

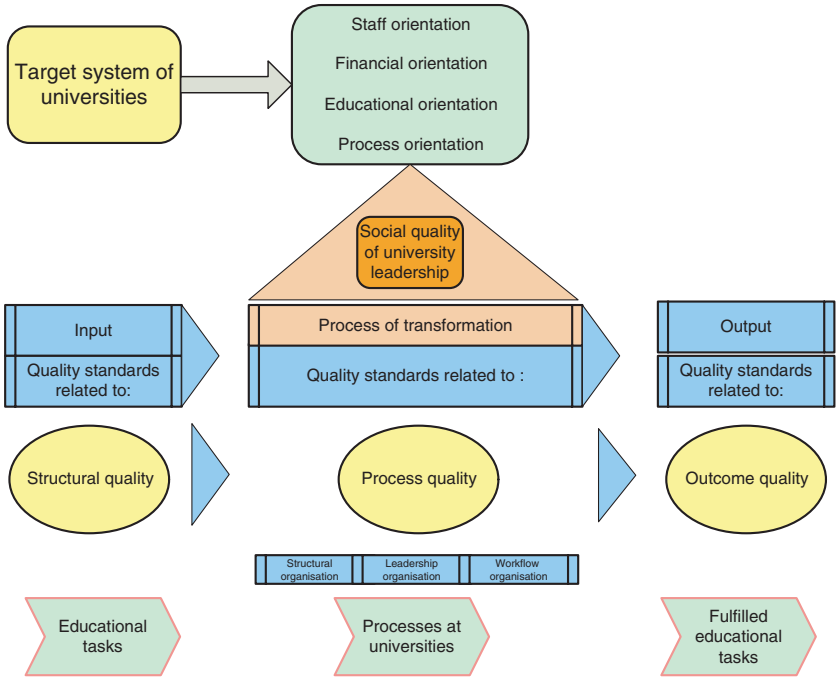

Fig. 4. Structural quality, process quality and outcome quality (12).

students, graduate and postgraduate trainers, and, where appropriate, the public. This fosters an ethos of transparency, continued professional development and lifelong learning.

2. When it is introduced, an appropriate mechanism is necessary to address any deficiencies in a positive manner through the usual system of staff appraisal, training and development.

3. Quality management can only be implemented when the explicit goals and objectives of all of the functions of the institution are clearly defined. A well-described curriculum should form the basis for this process.

4. Using appropriate benchmarks, the external validation of the academic content of proposed new programmes is useful before their implementation.

5. The institutional approach should be agreed with providers of 'outreach', 'extra-mural', 'satellite' or 'placement' dental education and clinical training – for example, in clinics/hospitals remote from the main teaching institution. This is particularly important with regard to the access, by students, to appropriate library and IT facilities, and also student welfare support.

6. From a global perspective the use of internationally recognized agreements should support mobility of students and teachers, and to ensure quality assurance worldwide in dental education.

Benchmarking

Benchmarking is a method of identifying how well an organization meets a defined standard and finding ways of making improvements to meet the benchmark if needed.

Subject benchmark statements, such as in the discipline of dentistry, set out general expectations about standards for any award at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate. In other words, they describe what gives a discipline its coherence and identity, and define what can be expected of a graduate in terms of the knowledge, skills, and attitudes needed to develop understanding and be competent in the subject, aligned with local needs. They often operate at the national level, which is entirely appropriate, but could also operate at the international level to help in the achievement of equivalence of competence across borders.

Benchmarking standards

For undertaking the articulation and assurance of benchmarking the Framework of the Quality Assurance Agency of Higher Education in the UK (17) sets out a threefold approach to the specification of standards. The three parts of the framework include:

1. The production of benchmark information at subject level as a national reference point for subject standards.

2. Qualifications and credit frameworks as national reference points for standards of awards.

3. Programme specifications at institutional level for the articulation of standards within modules and programmes. These specifications are expected to guide the quality control and assurance activities that are undertaken through institutional processes and through external examining, academic review and, where relevant, accreditation and review by professional and statutory bodies.

A similar benchmarking system exists for medicine with the Bern Learning Goal Catalogue for different level of competences (18).

Thus, benchmarking information provides a national framework or 'meta-level' guide to the subject and for the subject as well as for other interested parties, including students.

Benchmarks are useful for a variety of purposes including design and validation of programmes, examination and review; they could also strengthen the accreditation process undertaken by professional and statutory bodies.

Benchmark information can be used by institutions, as part of their programme approval process, to set degree standards. The standards should be developed by the academic community itself, through formal groups of experts (e.g. dentistry). It is desirable that experts in the field (including associations and professional bodies) formulate the standards for the respective disciplines when developing benchmarks.

On qualification, members of the dental team should have developed an holistic view of patient care, accept professional responsibilities and acknowledge their limitations. They should have demonstrated an appropriate level of competence to deal with complex issues both systematically and creatively, make sound judgements on the basis of available data, and have acquired a commitment to continuing professional development.

Benchmark statements

Benchmark statements acknowledge that the requirements of professional and regulatory bodies and the standards set need to be incorporated into the design of programmes, but beyond that they allow for local innovation, development and flexibility in the overall design of the curriculum. They do not set a national curriculum for programmes leading to awards in dentistry. The essential feature of benchmarking statements is the specification of threshold standards, incorporating academic and practitioner elements, which ensure the dental team member is 'fit for practice'. They provide guidance within which higher education institutions are expected, as a minimum, to set their standards for the award. It is an expression of a professional, collective responsibility to make academic standards explicit and available to a wide audience.

The main sections of the statement, in addition to describing the general nature and extent of programmes leading to qualifications in dentistry, should describe the profession-specific expectations and requirements that characterize the profession. The statement illustrates the broad expectations of the practitioner as a professional and describes the need for a systematic acquisition of knowledge, a comprehensive understanding of techniques and a critical awareness of current knowledge, skills and attitudes.

Subject benchmark statements thus provide reference points and can be non-prescriptive rather than prescriptive. Institutions will provide information in their programme specifications on the structure and functions of their particular programme of study and specify learning outcomes.

Benchmark statements should include teaching, learning and assessment. They should draw attention to the central role of practical experience in the design of learning opportunities for students and the importance of ensuring that professional competence developed through practice is adequately assessed and rewarded. They should also reflect the essential nature of integration of theory and practice as a planned process within the overall arrangements made for teaching and learning.

An example of well-developed national benchmark statements for dentistry is to be found at the website of the Quality Assurance Agency for Higher Education in the UK (19). In summary, benchmark statements can be used to achieve the following:

1. Provide academic staff and institutions with a point of reference in the design and development of degree programmes, and a framework for specifying intended learning outcomes.

2. Provide one of a number of external sources of information that can be drawn upon for the purposes of internal and external review, and for making judgements about the threshold standards being met.

3. Provide an immediate starting point for discussion and reflection within teaching teams and between teaching teams and reviewers, for example during a periodic review.

Programme specifications

Benchmark statements are usually developed on a national basis, but can also be formulated at the international level. They set out the standards of a discipline as agreed by the subject community. To complement these subject benchmark statements, institutions should develop programme specifications that contain the following features.

The intended learning outcomes of the programme

1. The teaching and learning methods that enable learners to achieve these outcomes and the assessment methods used to demonstrate their achievement.

2. The relationship of the programme and its study elements to the qualifications framework.

Programme specifications reflect the details of a programme provided by an institution that can then be compared against the benchmark statements developed nationally or internationally. These documents should be widely available to permit scrutiny of local provision compared with the national standard.

Behaviourism vs. constructivism

How multifaceted the aspect of programme specifications is and what consequences they have for benchmarking is demonstrated by the work of Gibbs (20), in which solutions are offered for problems arising in eight areas of difficulties in actual teaching/learning situations (Table 1).

If the programme evaluation demonstrates no aims or objectives, there are a number of possible methods to resolve the problem, depending on the philosophy. For example:

1. In a curriculum with a behaviouristic approach the methods are the use of objectives in the implementation of highly structured courses.

2. In curricula with a constructivist approach the methods are different, in fact opposite. They are based on the use of learning contracts and implementation of a problem-based learning format.

Assessment of student learning

Dental education aims to produce safe, competent and ethical practitioners equipped with the necessary knowledge, skills,

TABLE 1. Constructivism vs. behaviourism (21)

Areas of difficulty in actual teaching/ learning situations	Behaviouristic approach	Constructivist approach
Lack of clarity of purpose	Use of objectives	Use of learning contracts
	Highly structured courses	Problem-based learning
Lack of knowledge of progress	Objective testing	Development of student judgement
	Programmed instruction and computer-aided learning	Self-assessment
Lack of advice on improvement	Assignment attachment forms	Peer feedback and assessment
		Automated tutorial feedback
Inability to support reading	Use of set books	Development of students' research skills
	Use of learning packages	More varied assignments
Inability to support independent study	Structured projects	Group work
	Laboratory guides	Learning teams
Lack of opportunity for discussion	Structured lectures	Student-led seminars
	Structured seminars/ workshops	Team assignments
Inability to cope with variety of students	Pre-tests plus remedial material	Variety of support mechanisms
	Self-paced study	Negotiated goals
Inability to motivate students	Frequent testing	Engaging learning tasks
	High failure rates	Cooperative learning

behaviours and attitudes appropriate to the practice of dentistry. The rapid growth in knowledge in the health sciences demands demonstration of competence covering several domains, e.g. professionalism; communication and interpersonal skills; diagnosis and treatment planning; operative skills (5). The goal of an effective assessment strategy should be that it provides the starting point for students to adopt a positive approach to effective practice, reflective and lifelong learning (22). All assessment methods should be evidence based or investigates as to their effectiveness. The assessment outcomes are a measure of the quality of the curriculum.

Definitions associated with assessment

1. Blueprinting – test content should be carefully planned against learning objectives, a process known as blueprinting (22, 23).

2. Validity – relates to the match between what is intended to be measured and what is actually measured, e.g. does it contain a representative sample of content covered in relation to desired learning outcomes? The movement towards integrated competence means that authenticity must be present in all levels of assessment (22, 23).

3. Reliability – concerns precision and the consistency of results obtained, the reproducibility of the scores obtained from an assessment and is improved through the use of specific, manageable criteria in the process of assessment and multiple sampling of the skills to be tested. The predominant condition affecting reliability of assessment is domain and content specificity, because competence is highly dependent on context or content (7, 22, 23).

4. Standard setting – the appropriate standard of a test should be set in advance, e.g. minimum competence. Various methods are developed, to establish credible and defensible acceptable pass marks, but the choice of method will depend on available resources and the consequences of misclassifying examinees (23).

5. Feasibility – is concerned with what is actually achievable in a given setting. For example, what is possible in one institution may not necessarily work in another, for logistical or educational reasons. Some assessments are more costly than others in terms of resource, accommodation and faculty time and may not always be appropriate, however educationally 'sound'.

International recognition of qualifications

Restrictions for international recognition of qualifications exist for a number of reasons, most commonly political and perceived protection of patients. It is not the purpose of this document to discuss the political issues, but to encourage development of processes leading to education co-operation and convergence of education programmes, such as quality assurance visitations [e.g. DentEd (13)] using international external assessors that are independent of political and other barriers.

Mutual recognition of professional qualifications means that qualifications gained in one country (the home country) are recognized in another country (the host country). It empowers movement of skilled workers, which can help resolve skills shortages within participating countries. However, mutual recognition only works where there is substantial commonality between the nature of the professional activities, education and training in both the home and host countries.

The process of international recognition is moving forward and it is hoped that this will continue. The sharing of information and the evaluation of quality, benchmarks, standards and assessment processes can eventually lead to greater international acceptance of qualifications and there are currently a number of examples of good practice:

1. Australia and New Zealand.
2. Canada and the USA.
3. The European Community.
4. The Southern African development community.

Recommendations

Recommendations for quality assurance

Internal review

Every institution should carry out, on a regular cyclical basis, internal quality assessment and review of the provision of the teaching programmes. This process should be overseen at the appropriate level. Self-regulation is probably the most

fundamental quality assurance method and can be seen as the basis for achieving robust quality management which will encompass all of the key processes in an institution, including education, research and patient care.

All of those involved in, and associated with, learning and teaching should receive regular formal appraisal based on documentation that might include a personal portfolio. This will identify training and development needs, whilst identifying good practice for dissemination. There should be a strategy and associated budget for the development of all staff involved in learning and teaching. There should be a properly documented period of 'educationally related' training for all new (and returning) teaching staff with clear guidelines and achievable targets. This should form part of the overall strategy for the training and development of staff.

Institutional review

The institution should ensure that a larger wide-ranging periodic quality assessment (a review) of the dental programmes should take place – approximately every 5 years. Ideally, the individuals making up assessment panels should be drawn from those in cognate discipline areas but should also include student and external representation.

External review

There should be some periodic external assessment of the educational process and or structure, for example, by a national body to ensure consistency amongst institutions in the state/country or between collaborating nations. Ideally, this external periodic review process should include the use of external assessors (representatives from other institutions in the same state/country and/or a different state/country). Such assessors should be experienced in visiting, assessing curricula/examinations and be prepared to comment on the appropriateness of the programme and its component courses as compared to other institutions both national and international (e.g. DentEd/Association for Dental Education in Europe [ADEE]). There is a benefit in including student representatives in this process.

Recommendations for benchmarking

1. National benchmarking statements provide a national framework or guide for the subject. These should be used as a point of reference to assist the design and validation of degree programmes and a framework for specifying intended learning outcomes.

2. Benchmark statements do not set a national curriculum, but acknowledge that the requirements of professional and regulatory bodies, and the standards set, need to be incorporated into the design of programmes. They should also allow for local innovation development and flexibility in curriculum design and content.

3. Programme specifications set at an institutional level should include intended learning outcomes of the programme, teaching and learning methods that enable learners to achieve these outcomes and assessment methods used to demonstrate their achievement. The relationship between national benchmarking statements and institutional programme specifications should be explicit.

4. Benchmarking statements need to define threshold standards, incorporating academic and practitioner elements which ensure the member of the dental team is 'fit for practice'. Academic standards should be explicit and available to a wide audience.

5. Standards should be developed by the academic community itself, through formal groups of experts (e.g. dentistry). It is desirable that the experts in the field (including associations and professional bodies) formulate the standards for the respective disciplines when developing benchmarks.

6. Benchmark statements can be used to assist internal and external review, and to make judgements about threshold standards being met. During the review process they may form a starting point for discussion and reflection.

7. Benchmarking statements and programme specifications should be available to all interested parties allowing external agencies, students, potential students and others have the opportunity to scrutinise local provision against a national standard.

Recommendations for assessment of student learning

1. Clearly defined criteria for learning outcomes and assessment should be made in writing and communicated to students and staff. Institutions should include their assessment philosophy in the mission statement.

2. Various methods of assessment should be used and multiple samples of performance should be taken to ensure validity and reliability.

3. Both formative and summative assessments should be employed and students should receive regular feedback on their performance, both academically and clinically.

4. It should be clear how assessment links with content, methods of teaching and learning, learning outcomes and aims of provision. In other words, there should be demonstrable alignment of appropriate assessment.

5. Clinical assessments should include an estimate of performance of the dimensions of competence: knowledge, skills, attitudes and safety of prospective graduates.

6. All assessments should have defined criteria and marking or grading schemes which are prospectively available to students and staff. Consider the required level of performance and express in assessment guides about what is required to 'pass' (be competent) and what will happen if a student fails to achieve the required level of competence.

7. Tools should be used which promote reflection, critical thinking and continued learning, e.g. use of self-/peer-assessment and portfolios.

8. Clinical activities should assess the quantity and quality of the performance: sufficient quantity of clinical activity is necessary to ensure breadth of experience.

9. Internal and external review of the assessment programme must be in place to ensure quality of process and its potential enhancement.

10. Where possible, teaching and assessment of the basic and biological sciences should be integrated into the clinical part of

the programme to facilitate the development of the evidence base for clinical dentistry. Consideration should be given to the assessment of learning styles and meta-cognition.

11. Provide academic staff development to all those involved in the teaching and assessment of students. This will benefit the calibration of staff as well as encouraging staff development.

It is acknowledged that the methods used to reach these goals may vary amongst institutions and countries.

Recommendations for international recognition of qualifications

1. A common quality assurance and educational framework should be adopted to promote internationalization and increased cooperation.

2. Mobility of students and staff should be encouraged between countries to develop a sense of common value.

3. Dental educators should encourage governments, regulatory bodies and institutions to break down the barriers to facilitate the free movement of dental team members, within the common quality assurance and educational framework.

4. The common quality assurance and educational framework should allow for diversity between institutions. Diversity in dental education maintains student choice and allows the dental team to be fit for purpose for national and international needs in dental health care.

Conclusions

It is hoped that the recommendations contained in the document will help to set and ensure international standards in quality assurance, benchmarking and assessment of learning. It is by acceptance of agreed standards that international recognition of dental qualifications will move forward.

It is not expected that all recommendations will be achieved by all dental education programmes immediately, many institutions may find them aspirational. There will be a process of development towards these goals and even those institutions that can achieve them will have a process of quality assurance and improvement in place to enhance dental education.

Quality assurance does not just apply to the teaching programme/curriculum; rather it must apply to every activity of an institution. Quality assurance linked to benchmarking, assessment and external review is fundamental to achieving convergence of teaching standards. International recognition of qualifications should be the global aim for dental education. It is hoped that the International Federation of Dental Educators and Associations will set a timeline to achieve this aim.

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