

## University of Groningen

### Measurements in medical education

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## Summary and Conclusions

This thesis addresses the issue of measurements in undergraduate medical education and its implications on assessment of quality of educational programmes. The thesis attempted to answer two questions. The first; what measurements should be considered in the assessment of quality in undergraduate medical education? The second; what are the values of these measurements in predicting practice outcomes?

The literature review in the introduction helped in developing a glossary for the definition of terms and the conceptual framework for the thesis. The proposed conceptual model addressed several issues related to assessment of quality of educational programmes, learning outcome measurements and their value in predicting future performance of graduates of medical schools. The model differentiated between programme outputs, learning outcomes and practice outcomes. The relation between evaluation of different types of curriculum, particularly the “learned curriculum” and the “used curriculum” as indicator for measuring quality was proposed. A hierarchical pyramid of levels of measurements of learning and practice outcomes in medical education have integrated these ideas. The core studies in the thesis were organized around the proposed model of input, process, output, learning outcomes and practice outcomes. A summary description of the research in chapters III to VIII is given below:

Chapter III *Professional skills programme in a problem-based learning curriculum: experience at the College of Medicine and Medical Sciences, Arabian Gulf University*, a description of a Professional Skills Programme, in a Problem Based Learning Curriculum at the Arabian Gulf University in Bahrain is presented. It describes the scope, rationale, goals, structure, and implementation of the programme. Professional medical skills are essential in acquiring clinical competence. A wide spectrum of skills is related to expected future performance. The content and process of learning of these skills may have an impact on outcomes of medical education. The professional skills programme is considered an element of input, possibly also process when evaluating quality of the AGU undergraduate programme.

Chapter IV *Application of “VITALS”: Visual Indicators of Teaching and Learning Success in reporting student evaluation of clinical teachers*. This study Identifies indicatives of teaching

and learning success in the clerkship phase of the curriculum as perceived by the students. A method is described of evaluating clinical teachers. The impact of the process of students evaluating teachers is discussed. This study reflects a process and could be considered as an important indicator in evaluating quality.

Chapter V *The Integrated Direct Observation Clinical Encounter Examination (IDOCEE) – an objective assessment of students' clinical competence in a problem-based learning curriculum.* This examination is one of the assessment methods used at the end of the educational programme. It measures an indicator of learning outcomes student's clinical competence "shows how". It has the characteristics of a long station OSCE and an improved structured long case examination. The examination was found to have face validity, feasibility and acceptance by the students and faculty.

Chapter VI *Reliability and Validity of the Integrated Direct Observation Clinical Encounter Examination (IDOCEE).* In this study the reliability and validity of the IDOCEE is examined. The results showed good interrater agreement on score, ranks and pass/fail classification of student performance. Generalizability theory studies showed a high generalizability coefficient (0.8) with the four patients encounter assessed over 180 minutes. The examination was found to have content and concurrent validity and provides unique information about students' clinical competence. Its closeness to assessing performance in real practice and in relation to other tools used in measuring outcomes of medical education at the point of graduation is stressed.

Chapter VII *A comparative study of performance on Bahrain Licensure Examination by medical graduates from a Problem-Based Community Oriented Curriculum and graduates from a Conventional Curricula.* This preliminary study is an attempt to evaluate programme outcomes by comparing the performance on the licensure examination of graduates from a PBL curriculum and graduates from conventional curricula. The results of the study showed better performance by the AGU students as graduates of a problem-based curriculum than the graduates of a conventional curriculum mainly on the patient management problem written examinations. The study has several limitations, particularly the small number of graduates

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## Conclusions

1. Evaluation of quality matching between the "learned" and "used".
2. Definition of terms is Of particular importance and of "performance"
3. The terms 'output' and Output data are needed programme. Learning
4. Measurement of outcomes and practice selecting the best available shortcomings and limiting
5. Measurements of effectiveness should take place at

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taking the examination. Results on licensure examination could be valuable indicators of learning outcomes if constructed in a valid and reliable way.

Chapter VIII *Best Evidence Medical Education (BEME) Systematic Review Protocol on: Predictive values of assessment measurements obtained in medical schools and future performance in medical practice.* A protocol for a systematic review of the best available evidence on outcomes measurements and the extent to which they can predict future on the job performance of graduates is presented. The protocol clarified the principles of a Best Evidence Medical Education methodology for a systematic review and discusses the rational and theoretical background of this complex issue in medical education.

### Conclusions

1. Evaluation of quality in medical education is a complex task necessitating examining the matching between the different dimensions of the curriculum, “declared”, “in action”, “learned” and “used”.
2. Definition of terms is important for identification and operational measurement of indicators. Of particular importance is the definition of “competence” what the student/trainee can do, and of “performance” what the graduate actually does in real practice.
3. The terms ‘output’ and ‘outcome’ should be differentiated and each term used appropriately. Output data are needed, but are not useful in judging the quality of an educational programme. Learning outcomes and practice outcomes are better indicators of quality.
4. Measurement of outcomes should consider different levels of assessment of learning outcomes and practice outcomes as depicted in the conceptual model. This will help in selecting the best available, valid, reliable and feasible measurements. It will also identify shortcomings and limitations of these measurements.
5. Measurements of effectiveness of educational programmes is measuring of outcomes. This should take place at the end of the educational programme (learning outcomes) and at