Dear Dr. Alvares:

In the May 2001 issue of this journal, Ryding and Murphy[1] presented, for the first time, some of the potential outcomes of the new dental curriculum developed by the Faculty of Dentistry, Dalhousie University, Canada, in the early 1990s. Planning for the new curriculum started in 1987, and since its implementation in 1992, six classes of dental students have graduated.

The objective of this letter is to provide a critical analysis of the findings of the survey. In this period of "new curricula," "problem-based learning," "student-centered learning," and "competency-based education," it is important that all dental educators, especially senior administrators, engage in a process of constructive feedback and analysis of successes and failures of these experiments. Dental education has been fraught with uncontrolled experiments with no independent assessment of outcomes. I applaud Drs. Ryding and Murphy for their courage in publishing the first outcome assessment of one of the oldest attempts to develop a new dental curriculum in North America.

According to its graduates, the Dalhousie University dental curriculum has had one major success. It has achieved a higher level of integration of basic and clinical sciences during the first two years of dental education than was the case in the former curriculum. The other findings regarding preparedness for practice in pharmacology and orthodontics are confounded by institutional and faculty changes that were not discussed by the authors. Graduates of the new curriculum reported a higher level of preparedness to "administer/prescribe appropriate pharmacotherapeutic agents" and "recognize the need for referral or consultation with a medical/dental specialist"[1] than graduates of the former curriculum. Both of these changes may be explained *not* as outcomes of the new curriculum, but rather of the decision of the Faculty of Dentistry, prior to implementing the new curriculum, to increase the time to teaching pharmacology; the devotion of one new faculty member who is a trained pharmacologist; and the introduction of case-based clinical teaching in pharmacology. The lower level of preparedness in orthodontics reported by graduates taught under the new curriculum, relative to the preparedness reported by graduates of the former curriculum, may reflect the differences in personalities and experience between the former and new full-time orthodontists who were responsible for *clinical* teaching in orthodontics. During the years of the former curriculum, an experienced orthodontist who has received teaching awards from dental students was responsible for this area of the curriculum. In the new curriculum, a newly trained orthodontist with limited experience in teaching took responsibility for didactic and clinical teaching. Ryding and Murphy[1] dismiss the reports of their former students vis-à-vis the orthodontics program, using as evidence the high success rates in the orthodontics section of the examination of the National Dental Examining Board (NDEB) of Canada. In my opinion, the NDEB results are not valid measures of the quality of an educational program. The NDEB uses division heads and faculty members from Canadian schools, as well as dentists and specialists, to define sets of questions to be included in its examinations. Consequently, students graduating from Canadian dental schools are prepared to answer the questions on the NDEB written tests, and they should be expected to achieve high success rates in all of those examinations.

The new curriculum at the Dalhousie University dental school has a significant weakness. The Ryding and Murphy survey found that graduates of the former curriculum had slightly higher, but nonstatistically significant, satisfaction with the third and fourth years of the curriculum than graduates of the new curriculum. While Ryding and Murphy refrained from providing an explanation, the administrators of the new dental curriculum did not invest resources or consider addressing the pedagogical problems associated with clinical dental education. The new curriculum did not change the clinical training paradigms that have been used for decades to prepare dental students for clinical practice.[2] Moreover, the new dental curriculum did not address the variation in knowledge, application, and teaching methods among part-time and full-time clinical faculty. Another reason for the high satisfaction during the junior and senior years of the former curriculum compared with the same years in the new curriculum may be because, in these pre-new curriculum years, seminars

and case-based teaching were used at Dalhousie University, while during the new curriculum, the discipline-based focus was lost in the loosely defined "problem-based learning" comprehensive courses. Another potential explanation for this finding may be that students who were taught in the integrated and challenging preclinical program featured in the new curriculum became disappointed when they reached their clinical education years and were forced to learn in a traditional clinical teaching program. Drs. Ryding and Murphy should consider these explanations, as well as others, when they decide on the changes needed to improve the excellent dental educational program at Dalhousie.

The Dalhousie University experience and the outcomes reported by Ryding and Murphy raise several questions that all schools of dentistry should consider before sailing the uncharted rapids and falls associated with designing a new curriculum: Are the faculty ready for change? Do they have the same vision for change? Can the problem in the existing curriculum be resolved through evolutionary rather than revolutionary changes? What should be changed and when? Any curriculum change that does not have an impact on clinical teaching and clinical educators will fail in achieving a significant positive change in dental education. The lesson learned from the experience of Dalhousie University is that starting the reform process from the first year of dental education and moving forward is the wrong way to develop a new curriculum. The starting point should be the definition of outcomes of the clinical educational program. Unless we face the issue of content and teaching methods in the clinics, there will be no reform in dental education.

Amid I. Ismail, B.D.S., M.P.H., Dr. P.H.
Professor, School of Dentistry
University of Michigan

REFERENCES

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2. Ismail AI. The primary oral health care (POHC) clinic model. J Dent Educ 1996;60:520-3.

Reply to Dr. Ismail

Dear Dr. Alvares:

Thank you for the opportunity to respond to Dr. Ismail's letter regarding our article in the May 2001 issue. We were pleased to hear from Dr. Ismail, who is a former faculty member and department chair of the Faculty of Dentistry, Dalhousie University.

Dr. Ismail acknowledges and we agree that assessing the outcomes of a program and in particular a change in curriculum is fraught with difficulty. It is particularly difficult to control the many variables other than those specifically implemented. We believe it is important to note that our article was based upon self-reported perceptions of graduates, so casual attributions based on these data are speculative at best.

Dr. Ismail's explanation regarding the higher level of preparedness to "administer/prescribe appropriate pharmotherapeutic agents" and "recognize the need for referral or consultation with a medical/dental specialist" includes the increase in time for teaching pharmacology, the hiring of a dedicated pharmacologist, and the introduction of clinical case-based teaching. Although introduced prior to the implementation of the "new curriculum," these innovations were retained and may indeed have contributed to the pharmacology results. However, it is not clear to us how the higher level of preparedness to refer and consult could be attributed to the presence of the pharmacologist, as referring and consulting skills are probably gained from many disciplines. Further, although it is possible to explain the outcomes change in orthodontics as a consequence of the appointment of a newly trained orthodontist, we wish to emphasize that much of the clinical instruction continued to be provided by experienced part-time specialists.

Considering the time and effort devoted by the National Dental Examining Board of Canada (NDEB) to ensuring that the examinations are valid and reliable, we find Dr. Ismail's comment that "the NDEB results are not valid measures of the quality of an educational program" to be most perplexing. We wonder who should set the questions if not faculty members and practitioners. Who else would understand the competencies required of a beginning dental professional?

Dr. Ismail's assertion that the new curriculum has a significant weakness is based on our reporting of a non-statistically significant difference in satisfaction levels with the third and fourth years of the two curricula. We urge caution in the overinterpretation of these findings. Dr. Ismail's explanations for this alleged weakness include the claim that the administration did not address problems associated with clinical education. We would respectfully disagree in that the existing teaching paradigm had been seen to produce good clinicians and the administration continued to support faculty development including instructor calibration.

We have no disagreement with Dr. Ismail's contention that a curriculum must be developed by starting with the definition of outcomes; however, our view is that, once planned, the "new curriculum" must be implemented beginning in the first year. This was the approach used at Dalhousie.

We appreciate Dr. Ismail's comments; they have given us pause to reflect on our work. However, evidence-based dental education, like evidence-based dentistry, which our colleague champions, is an ideal to which we aspire, but causal attributions based on self-reported data can be only speculative. In our continuing efforts to provide a quality dental education for our students, we are encouraged by Dr. Ismail's characterization of the dental education program at Dalhousie as "excellent."

Joseph Murphy
Associate Professor, Department of Dental Clinical Sciences

Helen Ryding
Associate Dean, Academic Affairs
Faculty of Dentistry
Dalhousie University