

A Former Dean Rediscovered the Joy of Learning

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Abstract

After a career of lecturing and giving individual exams, the author presents his experience with Team-LEAD, the adaptation of team-based learning at Duke-NUS Graduate Medical School Singapore. Through struggling as individuals, then in teams, then as a class, the students show increased understanding and long-term retention, and, moreover, become intensely engaged in their learning. The students learn how to work effectively in teams, and are still having fun learning at the end of the course.

My medical career began under the tutelage of gifted and dedicated teachers, to whom I shall always be grateful. When I came on faculty I sought to emulate them, but watched with interest innovations in medical education such as Problem-Based Learning (PBL). I also thought that medical education could be conducted in a more supportive environment. Thus, I was delighted when, in 1987, Dr. William G. Anlyan asked me to serve as Dean of Medical Education at the Duke University School of Medicine. He gave me wide latitude to institute changes in Student Affairs and Curriculum. I established an Advisory Dean system (that continues to this day) in order to provide support for students while they struggled through a challenging curriculum as well as the emotional challenges inherent in providing care to sick patients. Four mature clinicians were given responsibility for a quarter of each class, nurturing and mentoring them for the entire four years.¹ We instituted PBL in the first year, one afternoon a week; clinical problems were introduced through faculty-facilitated student interviews of standardized patients trained to reflect the affective, as well as the factual, world of the patient. Each increment of change in the curriculum required the expenditure of significant energy and political capital, leading us to compare the process to moving a graveyard!

Twenty years later in 2007, happily in retirement, I found myself being dusted off and enticed to join

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the founding faculty of a new medical school in Singapore, a joint effort between Duke University School of Medicine (Duke SOM) and the National University of Singapore (NUS) to train physician scientists who could bridge between clinical medicine and Singapore's growing biopharmaceutical industry. My role at the Duke-NUS Graduate Medical School Singapore was to serve as Director of the Body and Disease course, a 20 week course covering pathology, pharmacology, microbiology, and immunology in the second half of the first year. In addition, I helped start an Advisory College system with goals similar to those of the Advisory Dean system. The two Vice Deans for Education, Dr. Robert Kamei at Duke-NUS and Dr. Edward Buckley at Duke SOM, wanted to follow the Duke curriculum at Duke-NUS, but to deliver it through the pedagogy of Team-Based Learning (TBL). Thus, the temptation to be involved in starting a new medical school, in a country I had loved exploring as a tourist, and to innovate in medical education, unencumbered by legacy or moving graveyards, was impossible to resist. Over the past five years we have developed the Duke-NUS adaptation of TBL, termed Team-LEAD (Learn, Engage, Apply, Develop), starting with initial faculty development by Professor Larry Michaelsen of the Harmon College of Business, University of Central Missouri and Professor Dean Parmelee of the Boonshoft School of Medicine at Wright State University, who demonstrated for us the vitality of this approach and tutored us in its application.^{2,3} With no prior experience with TBL, we faced the first class with more anxiety than the students, who forgave our missteps and accepted our many mid-course corrections.

In Team-LEAD, the students are given primary responsibility for their own learning and are assigned specific preparatory material to review outside of class, including recorded lectures from Duke SOM and selected readings. On two mornings each week the adequacy of student preparation is assessed first with an individual readiness assessment (IRA) composed of 25 carefully chosen and well-written multiple choice questions. As soon as the IRA is completed, the students take the same exam in their teams of seven (the group readiness assessment or GRA) in which they must come to a consensus answer for each question. Following the GRA, we promote interchange between teams (see www.youtube.com/watch?v=BlVPLYGdBLg), concluding with a faculty summary. We look to the IRA/GRA process to ensure coverage of core material and do not require additional preparation for the exercise that follows.

That afternoon, the teams are engaged in a clinical problem solving exercise (the Application). Local clinicians act as content experts and use problems from their patients to develop Applications with our faculty. The Applications are challenging to construct, as we seek to ask questions that require integration and synthesis of multiple sources of information as opposed to a straightforward internet search. Early Applications focus on cases that build on basic science principles, while later cases increasingly require clinical reasoning and simulate problems they will encounter in clinical medicine.

One of the methods we use to promote learning in the Applications is to challenge the class to come to consensus on questions where there is significant disagreement among the 8 teams. On one occasion, only one of the teams had reached the correct answer, but was able to convince the other teams. It turned out that only one student had initially come to the correct conclusion!

We have been fortunate to have small classes, growing from 26 to 56 students, and to have a stable core faculty that was fully committed to this pedagogy. Our biggest initial challenges were writing high quality exam questions, constructing the Applications, and discovering how best to structure and facilitate class discussions. We have learned to pay attention to faculty behavior, resisting the temptation to limit student discussion by commenting too soon. Our initial comparison of the performance of the first three classes of Duke-NUS students with US medical students shows that our students had comparable scores on the

Comprehensive Basic Science Exam and on USMLE Step I.⁴

We have found that Team-LEAD helps the students become clear about what they do and do not know. Since honesty about one's limitations with self and others minimizes the chance that physicians will do harm, the faculty give explicit permission to the students to say "I don't know" without shame. Indeed, we encourage appeals when teams disagree with our answers and overtly join our students as fellow learners, delighting when they teach us. We see the Team-LEAD process as learning through struggle, as an individual, as a team, then as a class, and as a process that builds critical thinking skills. We were surprised to find that students can gain significant mastery of preparatory material even in the absence of discussion by local faculty, so that now all faculty-led discussions of core material occur after it has been reviewed and tested. The beauty of this process is that faculty can concentrate on issues that students find perplexing and complicated.

When the students' individual struggle with the IRA ends and they turn to their teammates for the GRA, a moment I never tire of witnessing, the ensuing discussion reveals that they may not know the facts they thought they knew, or understand the concepts they thought they had mastered. At this juncture, the students are ripe for learning and greatly enjoy teaching and learning from each other. Indeed, on a number of occasions students have come to class sick and wearing surgical masks, as they are reluctant to miss the team discussions. Remarkably, the students remain every bit as engaged at the end of the course as in the beginning. The close bond that develops between team members moved us to keep the first year teams intact in the Advisory Colleges.

Our experience is that if the IRA is too easy, the teams do not have to struggle during the GRA, providing less opportunity to learn from each other. We try to set the difficulty of the exam so that the IRA average will be about 75%, which often results in GRAs above 95%. The inter-team discussions result in additional learning; then, the key concepts we have driven home through the IRA/GRA process are reinforced during the Applications. We have confirmed that weaker students enhance their learning from the team process, while the stronger students learn even more from teaching their fellows.⁵

Koles, et al., have demonstrated superior exam performance with TBL.⁵ We now have data to show that Team-LEAD improves understanding and retention of core material [unpublished results], confirming the findings of McNerney and Fink.⁶ In my experience, the Team-LEAD adaptation of TBL is less expensive of faculty time than PBL and far more efficient for the learner. But what recommends this approach even more is the joy experienced by the students in a learning process that is both effective and fun. It is a dynamic process, and I rediscover the joy of teaching every time I observe the room go from quiet concentration to tumultuous energy and cacophony, as the students turn to their teams to learn together. What a contrast with lecturing to a sparse audience of somnolent students! Instead of “How well are we teaching?” our faculty now ask, “How well are our students learning and how can we help them learn more?”

Traditional lecture-based medical education assessed with individual exams has typically provided few opportunities to learn from the exams or to reinforce student learning. The active process of Team-LEAD magnifies the effectiveness of self-directed learning by allowing teams of students to experience the value of collaboration. Encouraging the teams to confront each other’s conclusions increases the students’ comfort with ambiguity and uncertainty in medicine and gives them the beginning tools to make judgments based on incomplete information. The students also learn the rewards of struggle, a process that not only cements learning, but builds resilience for the challenges they shall face during their medical careers.

As I look back on my experiences at Duke-NUS, I wonder whether the student/faculty collaboration fostered by Team-LEAD will result in more trusting relationships among physicians and an openness to learn from others in a lifelong pursuit of knowledge, competence, and caring. I know that for me, Team-LEAD has been the adventure of a lifetime.

Notes on Contributor

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