Tufts University Sciences Knowledgebase (TUSK): Improving Health Sciences Education and Teaching Through Technology

Mary Lee, MD[a] , Susan Albright[a,], David Damassa, PhD[a], Tarik Alkasab[a], Donnie McGrath, MD[a,c] , Martin Glassman, DMD[b], John Hammond, MBA[b], Susan Kline, MD[b], Donald Shapiro, DSc[b], Maurice Mars, MBChB, MD [c]

[a]*Tufts University School of Medicine, Boston, Massachusetts, U.S.A.*
[b]*New York Medical College, Valhalla, New York, U.S.A.*
[c] *Nelson Mandela School of Medicine at the University of Natal, Durban, South Africa*

Tufts University Sciences Knowledgebase (TUSK), an award-winning digital curriculum and knowledge management system, was developed in 1995 with National Library of Medicine funding to manage the multi-media curriculum for health science teaching and learning. Extensive student and faculty feedback has driven continual improvements in quality and function. As a result, TUSK receives over two million hits per year from 2500 students and faculty from Tufts' medical, biomedical sciences, dental, veterinary, and nutrition schools. Many schools expressed interest in TUSK, and between 2001-2003 successful migration of this database-driven system has occurred at two institutions in the U.S. and in South Africa.

Tufts first partnered with New York Medical College (NYMC), and subsequent collaboration occurred with the Nelson Mandela School of Medicine at the University of Natal in Durban, South Africa. From these experiences, Tufts analyzed and quantified the process, and has identified several key elements for a successful transfer. These elements include: 1) *collaborative personnel* including an installation programmer and project manager to coordinate involved staff from medical education, library, and IT departments; 2) *development of internal expertise, training and user support* to enable faster faculty and student adoption, and faculty independence for course content upload and management; 3) *nominal costs* for hardware purchases and personnel. (Tufts has established a no-cost licensing and user agreement with the intention to eventually develop open-source licensing for all TUSK modules); and 4) *transferability of the TUSK infrastructure* from multiple servers with Unix to another configuration e.g. a single server with Linux for NYMC.

TUSK's advantages consist of a unique combination of database infrastructure with searching and indexing using ULMS across the health sciences curriculum; a content repository for course management and delivery using XML and web-based authoring; user and course administration; and, a built-in student self-assessment and course evaluation. Transfer benefits include ease and low cost of installation; customization through selection of preferred modules and functions; limited software development; demonstrated success in operating system independence across Unix to Linux; modifiable open source code; mutual benefits derived from leveraging each site's curricula and intellectual capital; and the resulting shared application development. Planned improvements focus on TUSK's broader access and transferability and include interfaces with public and proprietary digital resources, rights management, open source code, and curricular concept and content mapping.

Through TUSK, health sciences faculty can focus on core concepts for teaching and learning, and students begin their lifelong professional learning process using a robust tool for education and research. Use of database-driven technology such as TUSK presents a global opportunity for knowledge sharing by developing a collaborative open source infrastructure, decreasing the information gaps that exist between both institutions and countries, and ultimately enabling adoption of international standards for health sciences education.