Statement of Teaching Philosophy

My medical education teaching philosophy is actually quite simple: I enjoy it. To this day, I can remember my first experience in the role of medical teacher when, as a July 1st intern I carefully explained, to the July 1st medical student, that when evaluating an ankle sprain it is very important to expose the non-affected ankle. While my first teaching script might not have been earth-shattering, it was the first step in a fascinating trip through the worlds of medical education, clinical research and now education research.

As I progressed through my clinical training first in Pediatrics and then Pediatric Emergency Medicine, I became more and more fascinated with the problems of teaching and learning in the hectic emergency department environment. It gradually became clear to me that there was a certain underlying order to the process that was no less rigorous than that in a classroom setting. The scholarship of David Irby and others demonstrating the science of teaching in ambulatory settings was a revelation. **I believe that the process of learning in ambulatory settings can be bolstered through explicit attention to instructional design and the interleaving of programmed instruction into the cognitive apprenticeship of medical learners.**

I have had significant roles in all levels of medical education. I have directed a Fellowship program at two different institutions, been a fourth year course director, actively taught in residency and clerkship programs and have organized and participated in a number of CME courses. In each I have tried to structure my teaching according to the principles of adult learning first espoused by Knowles. Specifically, I have anchored the design of learning activities in the clinical context believing that relevance and a problem-centered focus are important not only in CME but also for the clinical clerkship.

I began my clinical career at the same time that the PC revolution began. It was impossible not be excited by the possibilities that this new tool brought to all areas of clinical care but not least for education. I have been designing learning interventions ever since, believing that, if we can find the correct context for them, computer learning interventions can significantly improve the efficiency and effectiveness of learning in clinical settings.

While I have done a number of clinical research studies, my scholarly focus has been on the development and evaluation of educational learning interventions in ambulatory clinical learning environments. I have actively looked for opportunities where the new technologies could improve learning without detracting from patient-centered learning. There have been a number of important influences on my work. Richard Mayer’s studies show that properly designed multimedia learning activities can decrease cognitive load and increase uptake. Lave and Wenger and Dan Pratt have shown the importance of the Apprenticeship perspective in medical education while Ruth Bowen...
and David Irby have made this explicitly relevant to education in ambulatory settings. Bordage, Norman and Columbia’s Hillary Schmidt and Vimla Patel have explained many of the cognitive underpinnings of this process.

I first came to Columbia in 2000 to get a one-year Master’s Degree in Informatics. While my perspective was always educational, I gained a wonderful appreciation of how computer science can benefit the Health Care enterprise and specifically just how numerous the opportunities are for embedding educational material in the clinical process. I also was bitten with a desire to learn more about the intersection between clinicians and knowledge. In 2004 I returned to Columbia to work with the inspiring Hillary Schmidt, Steve Miller and John Black. While it has not all worked out, I have been fortunate to make excellent progress in the PhD program under the supervision of Dr. Black. I have found that the deeper I delve into the theories of education and the more I learn about how to answer the questions that arise, the more clear it is that the opportunities for development and evaluation in ambulatory care teaching still seem boundless.

Teaching Responsibilities and Pedagogical Approach

Courses Taught:

1. Medical Students

   a) University of B.C. “Effective Learning Skills for Medical Practice”
   INDE 453 is a multi-disciplinary course that will illustrate the importance of, and develop skills related to: question formulation, information gathering, and critical evaluation of the literature, decision-making, as well as advanced communication in relation to clinical practice. Assimilation and effective dissemination of medical knowledge is a pervasive theme of all components of the course. The course strives to help students acquire predispositions and skills that will enable them to effectively begin their medical practice, and to continue learning and developing throughout their careers. (10 Credits)

   I have skills in Evidence-Based Practice (EBP) having completed the McMaster Course, attended a Cochrane Collaboration Meeting and have been a collaborator with an AHRQ funded EBP Center. I taught Evidence-based Practice in this course one year and was asked to run the course the next year based on positive feedback from the students. I am still involved in the redesign of this learning through an oversight committee. As course director, my responsibilities were to develop over-arching objectives for the 10 week course and to recruit and support component captains.


<table>
<thead>
<tr>
<th>Session</th>
<th>Course Number</th>
<th>Scheduled Hours</th>
<th>Class Size</th>
<th>Hours Taught</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter 2002</td>
<td>INDE 453</td>
<td>Individual Week Tutor</td>
<td>11classes x 12 students</td>
<td>10 x 4hrs</td>
<td>EBP Tutor for Pediatrics</td>
</tr>
<tr>
<td>Winter 2003</td>
<td>INDE 453</td>
<td>Course Director</td>
<td>124 Students</td>
<td>10 x 4 hours</td>
<td>Administration and oversight of &gt;6 subsection captains</td>
</tr>
</tbody>
</table>

b) Columbia University: Clinical Preceptor
I work 16-18 clinical hours per week in the CHONY Pediatric Emergency Department where I precept medical students during my shifts. I seek to make the students comfortable in what can be a daunting environment. My teaching model is based on the one-minute preceptor method espoused by Irby and others. A key component is that the students take ownership of their patients and see themselves in an active role that includes committing to a clinical management plan and effectively communicating that plan to both their colleagues and the patient.
c) Columbia University, University of B.C., McGill University, University of Calgary: **PEM Computer Tutorials.**

Over the years, I have developed a suite of sixteen computer tutorials for medical students and novice residents on a wide variety of situations that they may encounter in the PED. The tutorials are meant to be done in conjunction with seeing a patient either as an *advance organizer* before seeing a patient with a relevant condition or afterwards as an opportunity to *reflect and organize* their thoughts. At McGill we performed an impact evaluation of the tutorials which is appended to this teaching portfolio as is a link to a demonstration site. In the most recent calendar year, the tutorials were used over 1000 times at Columbia and at a similar rate in the other institutions.

The nature of this student-patient-preceptor-computer tutorial interaction will be the subject of my PhD Thesis.

2. Residents

a) Columbia University: **PEM Computer Tutorials.** Many of the tutorials described above are directly relevant to residents either when they are just beginning their program (e.g. Asthma Treatment) or in specialized situations (Interpretation of Cervical Spine X-rays in Trauma).

b) Columbia University **PEM Didactic Program.** When I took up my appointment in 2004 there was no regularly scheduled teaching for residents on rotation in the PED (Pediatric Emergency Dept). The first year I developed a Mock Code Teaching round each Tuesday morning that involved having the residents role play the management of simulated critical care cases, the type that come in to the PED only rarely but are extremely important when they do. During the year I expanded the role of our fellows in presenting these cases so that by the second year they were exclusively running the Mock Codes.

This past year we introduced a new Didactic program in which, every Thursday morning, we modeled for the residents (and interested students) optimal knowledge retrieval skills placing an emphasis on the principles of Evidence-based Practice. Using a case based approach, we would generate a clinical question to which no one had a ready answer. The residents then went off to search for answers. During the search Dr. Maria Kwok and I would coach them on optimal literature searching strategies and which resources are best. We emphasize that this is an important clinical skill at the level of interviewing or physical examination skills. It too, needs to be developed and practiced.

c) Columbia University **Pediatrics Morning Report.** Our Department Chair approached us to lead an effort to inject the principles of EBP into the residency program. Again working with Dr. Maria Kwok, one of our junior faculty members, I developed a 4-session one hour critical appraisal series which we delivered weekly for a year. The sessions are entitled Question, Diagnosis, Therapy and Prognosis, major areas of discussion in EBP. These are learner-centred sessions where the residents on ward rotation developed a question in the first session and then looked at diagnosis, therapy and prognosis aspects in subsequent sessions. After a year of leading the sessions, we transitioned to a Chief Resident lead model in which they lead all of the sessions with fading support from us. The sessions have been very successful – so much so that recently the Chiefs approached us to help generate new sessions on more advanced concepts.

d) University of B.C., University of Montreal, Columbia University **Tablet Computer Radiology Teaching File.** In this funded project, we are developing an image database for learning support of residents as they view x-rays for their patients. The Tablet computer, mounted right beside the PACS machine, presents fully labeled x-rays along with normal age and pathological variants. A simple version is presently implemented at U.B.C and, with programmers in Montreal, we are expanding the number of cases in the file to over 300. We plan a formal evaluation. See IRB protocol in Appendix.
e) Columbia University, University of Toronto. **Repetitive Practice for Learning X-ray Interpretation.** We have collected authentic x-rays on consecutive patients from the PED at the Hospital for Sick Children in Toronto. We have more than 400 cases each for Ankle, Forearm and Chest x-rays which we will use for a Flash Web application that presents the cases as unknowns to resident learners. Currently, in a typical rotation, a resident may learn from 5-7 cases over month. By affording the opportunity to practice on 100’s of x-rays, we anticipate improving the efficiency of learning of this important skill.

f) Columbia University. **Mentorship of Senior Resident Chief of Service Presentations.** We review the residents’ every other weekly Chief of Service presentations making certain that the presentation is as evidence-based as possible.

3. Pediatric Emergency Medicine Fellows

a) American Board of Pediatrics Section on Pediatric Emergency Medicine: [www.pemfellows.com](http://www.pemfellows.com)
This site has been primarily the inspiration of our Senior Fellow, Dr. David Schnadower who has organized a collaborative site where Fellows in PEM across the nation can communicate, share files and links, and store all sorts of digital resources online. I am the lead faculty member on the development team.

b) Columbia University, Pediatric Emergency Research Canada. **Online Research Methods Course.** [http://www.pusic.org/rmc/home.html](http://www.pusic.org/rmc/home.html) This 11-module course takes a beginning clinical researcher through the entire process of writing a grant. Funded by the Royal College of Physicians and Surgeons of Canada and more recently a Canadian Institutes of Health Research Team Grant, this resource will be a core “text” for the research training in at least 7 PEM fellowship across Canada and in our institution. I do monthly research methods for our three PEM fellows, using the online course as the core material.
### Student Mentorship:

**Graduate Students Supervised**

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Program Type</th>
<th>Year</th>
<th>My Role</th>
<th>Assigned Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seamus Norton</td>
<td>Pediatric Resident</td>
<td>2001-2004</td>
<td>Research Supervisor</td>
<td>Published work Academic Gen Pediatrics Fellowship</td>
</tr>
<tr>
<td>Karen Black</td>
<td>PEM Fellow</td>
<td>2000-2001</td>
<td>Research Supervisor</td>
<td>Published work Adam</td>
</tr>
<tr>
<td>Michelle Clark</td>
<td>PEM Fellow</td>
<td>2003-2004</td>
<td>Fellowship Director</td>
<td>Attending PEM, Vancouver</td>
</tr>
<tr>
<td>Simi Bharya</td>
<td>PEM Fellow</td>
<td>2002-2004</td>
<td>Fellowship Director</td>
<td>Attending PEM, Vancouver; Medical Education Role</td>
</tr>
<tr>
<td>Amal Youssif</td>
<td>PEM Fellow</td>
<td>2002-2004</td>
<td>Fellowship Director</td>
<td>Attending PEM in Saudi Arabia</td>
</tr>
<tr>
<td>Matar Al-Hajooj</td>
<td>PEM Fellow</td>
<td>2001-2003</td>
<td>Fellowship Director</td>
<td>Attending PEM in Saudi Arabia</td>
</tr>
<tr>
<td>Zoe Leatherbarrow</td>
<td>PEM Fellow</td>
<td>2002-2004</td>
<td>Fellowship Director</td>
<td>Attending PEM Vancouver</td>
</tr>
<tr>
<td>Fahad Al-Hammad</td>
<td>PEM Fellow</td>
<td>2001-2003</td>
<td>Fellowship Director</td>
<td>Attending PEM in Saudi Arabia</td>
</tr>
<tr>
<td>Saleh Al Tamimi</td>
<td>PEM Fellow</td>
<td>10/01-06/02</td>
<td>Fellowship Director; Research Supervisor</td>
<td>Chair, Emerg Medicine, Riyadh; Published work</td>
</tr>
<tr>
<td>Samina Ali</td>
<td>PEM Fellow</td>
<td>07/00-06/02</td>
<td>Fellowship Director</td>
<td>Attending PEM Edmonton; Fellowship Director</td>
</tr>
<tr>
<td>Lisa Evered</td>
<td>PEM Fellow</td>
<td>07/98-06/00</td>
<td>Fellowship Director</td>
<td>Attending PEM Edmonton; Research Director; Published Work</td>
</tr>
<tr>
<td>Timothy Lynch</td>
<td>PEM Fellow</td>
<td>07/98-07/99</td>
<td>Fellowship Director</td>
<td>Attending PEM London, Ont; Fellowship Director</td>
</tr>
<tr>
<td>Helen Karounis</td>
<td>PEM Fellow</td>
<td>07/98-06/00</td>
<td>Fellowship Director</td>
<td>Attending PEM Montreal; Fellowship Director</td>
</tr>
<tr>
<td>Joseph Zorc</td>
<td>PEM Fellow</td>
<td>07/96-05/98</td>
<td>Research Supervisor</td>
<td>Attending PEM Philadelphia; Published Work</td>
</tr>
</tbody>
</table>
Undergraduate Students Supervised:

I have funded and directly supervised 22 summer students for the development and evaluation of computer tutorials destined for clinical learning environments:

- Nursing Students: 3
- Medical Students: 11
- Computer Science Students: 3
- Education Students: 1
- Pharmacy Students: 3

Teaching Evaluation Forms:

1. Medical Students

Clinical Precepting of Medical Students 2005-2006
College of Physicians and Surgeons at Columbia University
Children’s Hospital of New York
Only seven evaluations available – table includes all info available
Every text comment listed.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to Understand</td>
<td>3.4</td>
</tr>
<tr>
<td>Ability to identify important aspects</td>
<td>3.4</td>
</tr>
<tr>
<td>Ability to organize and summarize</td>
<td>3.6</td>
</tr>
<tr>
<td>Ability to Direct</td>
<td>3.6</td>
</tr>
<tr>
<td>Accessible</td>
<td>3.4</td>
</tr>
<tr>
<td>Range of Knowledge</td>
<td>3.4</td>
</tr>
<tr>
<td>Ability to Integrate</td>
<td>3.6</td>
</tr>
<tr>
<td>Scientific Information</td>
<td>3.4</td>
</tr>
<tr>
<td>Ability to anticipate problems</td>
<td>3.4</td>
</tr>
<tr>
<td>Can make situation interesting</td>
<td>3.4</td>
</tr>
<tr>
<td>Relates well w patients</td>
<td>3.6</td>
</tr>
<tr>
<td>Demonstrates clinical acumen</td>
<td>3.4</td>
</tr>
<tr>
<td>In contrast to other teachers you have encountered, how would you evaluate this faculty members’s ability to teach?</td>
<td>8.4 / 9</td>
</tr>
</tbody>
</table>

Free Text Comments (all included):

“Dr Pusic was very helpful with getting me involved in hands on care in the ER and teaching practical skills”

“Dr. M. Pusic is an extraordinary preceptor”

“Dr. Pusic is a great attending” a good physician with good clinical judgement. He is always pleasant to work with and always willing and eager to teach”

Martin Pusic’s teaching portfolio is available with all hyperlinks at:
www.columbia.edu/~mvp19/TP.htm
2. Residents

No attending specific evaluation forms are available to me.

Most Recent Resident Lecture: “Pediatric Radiology” Feb 19/2006
Columbia University Dept of Emergency Medicine Residency Lecture Series
15 Evaluation Forms Received

Lecturer appropriately used evidence from research: n/a -1; Agree 8; Strongly Agree 6
Lecturer’s presentation skills were: Good 3; Excellent 12
Organization style was: Just right 15/15

Free Text comments (all)
“Excellent! I really like the new teaching program you’re working on”
“Great lecture, I learned a lot; Dr. Pusic is very knowledgeable on lecture topic”
“Excellent organization, informative, succinct”
“Great examples; great presentation”
“Great visual aids”
“Please do more lectures”
“I really enjoyed this lecture and feel it was useful to my practice” – Attending Comment
“Great job”
“Case-based visual stim is great way to learn/teach”
“A part two would be welcome”

3. PEM Fellows

Our Fellowship program is too small (3 fellows) for blinded unbiased feedback.

4. Continuing Medical Education

Most Recent Grand Rounds Presentation: “Patient Education as Wonder Drug” April 22, 2005
University of B.C. Dept of Pediatrics Grand Rounds combined with PEM Update Course
31 Evaluation Forms Received

Overall Rating: 1 – Poor; 4 – Good; 13 – Very Good; 10 – Excellent
Relevance to Practice 1 – Poor; 5 – Good; 14 – Very Good; 8 – Excellent
Delivery and AV 1 – Fair; 5 – Good; 10 – Very Good; 12 – Excellent

References:

1. Dr. Elizabeth Wedemeyer, Pediatric Residency Program Director, Columbia University
eaw1@columbia.edu 212.305.8504
• Can discuss my impact on the Pediatric Residency Program

2. Dr. Meredith Sonnett, Director Pediatric Emergency Department, Columbia University
fs84@columbia.edu 212.305.9825
• My director; can discuss educational impact on the Division

3. Dr. Peter Dayan, PEDNET (Pediatric Emergency Department Northeast Team) Principal Investigator, Columbia University. psd6@columbia.edu 212.305.9825
• Research Director; can discuss research aspects of my program
Course Development and Instructional Delivery

I first became interested in medical education research during my Pediatric Emergency Medicine Fellowship where my research project was a randomized controlled trial of an interactive text-based computer tutorial compared with a standard lecture on ENT emergencies in children. I found that even a rudimentary text-based tutorial could increase test scores as much as a lecture.

As a junior faculty member of the Johns Hopkins Children's Center, I obtained an Ambulatory Pediatrics Association Special Projects grant to develop computer tutorials to be implemented in the Pediatric Emergency Dept (PED). This has been a central theme of my academic activities ever since. This project resulted in two publications. The first was a survey of 75 pediatric residents to assess their attitudes towards Computer-aided Instruction (CAI).¹ We found that the residents were generally positively disposed towards CAI though they rarely purchased such materials on their own. While they valued any learning format that included a human teacher more highly than CAI, computer tutorials were preferred to other supportive materials such as textbooks and journals. Encouraged by these results, I wrote and installed two one-hour computer tutorials in the Johns Hopkins PED. These tutorials were meant to supplement a didactic lecture series that had been inconsistently attended by residents due to scheduling difficulties. We tracked use of the tutorials using computer log files. Over a 9 month period, the tutorials delivered 49 hours of instruction to individual residents.² Over 25% of the interactions occurred during evenings and weekends when regular didactic teaching was not available. One of the most important lessons was that 60-minute tutorials are too long for a resident to complete in a busy clinical environment. The residents generally took 2-3 sessions to complete a given tutorial. However, these tutorials remain in use at the Johns Hopkins PED to this day.

Playing a form of career leapfrog, my wife and I moved first to Halifax and then Montreal where I continued to do CAI projects. In Halifax I created a novel e-mail teaching intervention that solved a unique teaching problem. I presented Mock Codes each Monday morning in which residents would role-play leading the resuscitation of a critically ill child. As usual, attendance was a problem. In addition, the trainees had little time to reflect on their learning before picking up their clinical duties for the day. To amplify the residents' learning, I created an e-round in which I e-mailed the residents with a summary of the day's case and its main learning points. In addition, I sent out a second e-mail with a provocative question meant to extend the discussion beyond the content of the Mock Code. Each Friday, the residents' responses were collated with an "expert" commentary. At the end of the academic year, I carried out a modest survey of the 16 residents. Their attitudes towards the e-round were universally positive with the majority of the residents reading the e-mails. Interestingly, they rated the e-mail summary of the morning's code more highly than the subsequent discussion. Many of the residents saved the e-mails and referred to them later. A description of the intervention and the results of the survey were published in the Journal of Emergency Medicine.³ However, a more telling endorsement of the technique lies in the fact that the residents voted me to receive the Dalhousie University's highest residency teaching award.

In Montreal, I resumed my study of the use of computer tutorials in the PED. I created a suite of six tutorials on common PED problems. Learning from my Hopkins experience, I shortened and focused the tutorials so that they would take a trainee only ten minutes on average. In addition, I envisioned developing a delivery mechanism in which the tutorials would be a supplement to the clinical encounter. That is, instead of being an optional activity to be done in down time in a place removed


from the main clinical activity, I hoped that the tutorials would become an integral part of the workflow of the trainee. For example, if the trainee were to see a patient with a fracture, after the clinical encounter, they would do a 10-minute tutorial on the classification of growth-plate injuries to reinforce their learning. The tutorials were designed for medical students and were presented on a dedicated computer in the central nursing station of the PED. We evaluated the impact of the tutorials using utilization tracking and a randomized controlled trial. The students used the tutorials a great deal – 539 times over a 9-month period. In addition residents and allied health professionals also availed themselves of the tutorial. The student's attitudes towards the tutorials were uniformly positive and they rated them more highly than scheduled didactic sessions that were allotted three times more time. The students gained knowledge from the tutorials that supplemented their learning from other sources. When exposed to a tutorial on a given topic, a student showed a 56% greater gain in test score on a corresponding question when compared with their scores for questions for which they were not exposed to a tutorial (overall effect size 0.39).

Only a small percentage of the tutorials were used in a "just-in-time" fashion – ie within 8 hours of seeing a relevant patient. This is likely because of the paucity of tutorials (students were randomized to only three of the six available tutorials) and the large number of preceptors who were not aware of the specific content of the tutorials despite the investigator's best efforts. However, on an subgroup analysis, tutorials done in this coupled manner seem to be even more effective.

In subsequent years, I dedicated myself to expanding the number of tutorials available. With the considerable aid of medical, nursing, education and computer science students, we have developed a suite of sixteen tutorials on a whole series of PED topics ranging from "Seizure Classification" where a series of clinical videos of different seizure types are presented to "Oral Rehydration Solutions" where, using animations, we explain the molecular basis for why rehydration solutions are preferable to, say, juices in cases of dehydration. Our emphasis has been on bringing complementary instructional content and strategies to the clinical environment. In contrast to the situated cognition movement where authentic messy contexts are brought to the classroom to increase the transferability of abstract concepts, I have tried to bring the best of the classroom to the clinical setting in an effort to scaffold the learner’s development of robust mental models that can help them develop clinical reasoning skills. These tutorials have been successfully installed in the PEDs in Montreal, Vancouver, Calgary and the Children’s Hospital of New York. In the latter institution, they were used 1000 times in the last calendar year. An overview is appended. We are preparing the tutorials for publication. In addition, this installed base will serve as the platform for my Thesis research (described below).

In 2001 I completed a Master's Degree in Medical Informatics at Columbia University. The core curriculum in medical informatics presents computer science theories and methods as they specifically apply to Health Care. In addition, I took elective courses in the Faculty of Education in Cognition, Instructional Design and Educational Technology in order to better understand how to implement CAI in clinical environments. While there I worked with two cognitive psychologists to perform a cognitive task analysis of learning to interpretation of x-ray films. This resulted in a case-demonstration abstract that is currently being prepared for submission.

4 Pusic MV, MacDonald WA, Pachev GS. Embedding Medical Student Computer Tutorials into a Busy Emergency Department. Acad Emerg Med 2007 Feb; 14(2);138-148

5 A demonstration of the tutorials can be downloaded at www.pusic.org/cv/TP/TP-Appendix.htm

Collaborating with Dr. Steve Miller of the Dept of Pediatrics and Dr. Vicki LeBlanc, then at the Center for Education Research and Evaluation, I carried out a two-site RCT comparing two different presentation formats for computer tutorials on the topic of x-ray interpretation. The first presentation format is a 65 screen linear presentation analogous to a PowerPoint didactic lecture. This tutorial has embedded within it 5 unknown cases that the trainee can attempt to solve by clicking on the area of suspected pathology directly on an image. The second presentation format uses exactly the same 65 screens but presents them in a goal-based scenario based on the 5 unknown cases. The other 60 screens are available to the student behind hypertext links that the student can access in any order they wish. We randomized 139 students' to one or other of the tutorials with the main outcome being the difference between pre- and post-test scores interpreting a set of x-rays. We found there was no difference in the knowledge gain between the two groups but that the web group was more efficient.7

University of B.C. In October 2001 I took up an appointment at UBC where I was appointed to 35% clinical activities in the Division of Pediatric Emergency Medicine with the rest of my time protected for educational and research activities. My projects spanned the range of medical education from undergraduate through to faculty development.

I was a co-investigator for a systematic review carried out by the Alberta Research Centre for Health Evidence looking at the use of information systems meant to translate health evidence into better clinical outcomes. This group has considerable experience in the creation of systematic reviews which was complemented by my informatics background. The main result of the study was the finding that, across a broad range of information systems, clinical outcomes could be improved by an often modest amount. Specifically, physician adherence to guidelines was increased from 52% to 58% -- far from ideal!

I was the course coordinator for INDE 453: Effective Learning Skills for Clinical Practice. The goal of this course is to allow all UBC medical students in their final 4 months of training to return to the classroom to solidify their evidence-based medicine techniques and to synthesize their knowledge before moving on to residency. I took over this course one month before its start and was able to create four online tutorials on the subjects of literature searching, bibliographic software, evidence-based practice online resources and systematic reviews. From afar, I continue to be involved in the re-design of this course, something I had pushed for!

I was a co-investigator on a project lead by the Molson-McGill Medical Informatics group which also includes investigators from McMaster and the University of Ottawa. The goal of the project was to develop an integrated e-learning tool using an object-driven template to facilitate the creation of on-line interactive medical cases. This template includes interfaces that: a) permit easy, user-friendly development; b) uncomplicated access to shared learning object repositories (National Medical Digital Repository, the eduSourceCanada network of repositories and HEAL); and c) straightforward integration of multimedia objects located in these repositories. Project development is ongoing.

For postgraduate trainees, I spearheaded a UBC resident effort to create a Learning Management Site in support of the pediatric residency program. Goals and Objectives, Faculty Presentations, Web Resources, Readings, Assignments, Schedules, Forms and even take-out menus are featured on this password protected site.

I was also active in Faculty Development being a member of the UBC Faculty Development Steering committee. I also originated and coordinated both the monthly UBC Medical Education Grand Rounds and the Medical Education Research Special Interest Group. Both activities continue to this day at UBC.

PhD Training at Teacher's College

In 2004, my wife and I had the opportunity to return to New York to wonderful career options: she as a reconstructive surgeon at Memorial Sloan-Kettering resuming a program of research in patient-reported Quality of Life while I was able to take on a role in the Division of Pediatric Emergency Medicine which allows me to progress on a PhD track under the supervision of Dr. John Black, a pioneer in the field of Cognitive Studies of Human Learning using educational technology. I have completed essentially all the coursework, passed my Certification Examination and completed my Empirical Paper requirement. I am now intensively working on my dissertation proposal which will look more closely at one of the key findings in the McGill computer tutorial study (see Figure 2 in the appended manuscript) in which it appears that students may learn more from a computer tutorial if it is timed to coincide with a relevant patient contact. I hope to have the proposal approved this spring and begin data collection over the summer.

Plans for a Medical Education Research Career

As I wind down my PhD studies in the coming year, I hope to take on a role at Columbia University which will allow me to continue my studies into the nature of learning in clinical environments. I can envisage a coherent program of research where we can use computer "Learning Probes" to better define clinical learning. We would deliver carefully defined standardized instructional packages at various points in the instructional/clinical process to contrasting effects. There are many questions we can look at including:

- Can we empirically evaluate ambulatory teaching models like the “one-minute preceptor” using standardized pieces?
  - Can we augment the student-patient-preceptor interaction to include:
    - Repetitive practice?
    - Protected time for reflection?
    - Meta-cognition?
- Are there order effects?
  - Which is more powerful
    - an advance organizer?
    - a post-encounter opportunity for generalization?
    - a blend?
- Which pieces of knowledge need to be “learned” and which are simply fodder for a clinical decision, to be forgotten once the decision is made?
  - What is the nature of the interaction between Clinical Decision Support Systems and medical education?
  - What are the curricular implications of this?
  - What are the implications for Information System design?
- How much do the computer tutorials encumber the “legitimate peripheral participation” of medical students?
  - Is their participation in authentic activities diminished?
  - How do they perceive their roles with and without the added infrastructure?
- What are the faculty development implications?
  - In this “distributed cognition” model, what teaching should remain with the preceptor and what can the technology help with?
- Can we involve the patients?

I could go on and on (and, in fact, hope to….)

Martin Pusic's teaching portfolio is available with all hyperlinks at:
www.columbia.edu/~mvp19/TP.htm
Educational Leadership and Research

Membership in Professional Education Associations:
- Canadian Association of Medical Educators: 2000 – present
- Society for Academic Emergency Medicine: 2001 – present
- American Association of Medical Colleges – RIME: 2001 – present
- Association of Medical Educators of Europe: 2002 -- present
  + various clinical memberships: CAEP, APA, AAP

Education Meeting Attendance:
- 2007 – Association of Pediatric Program Directors*, AERA (April), SAEM* (May), CAEP*(June)
- 2006 – SAEM, Pediatric Emergency Research Canada*
- 2005 – AERA, Slice of Life*, AAMC*
- 2004 – CAME*, SAEM*, AAMC, Slice of Life
  * denotes presentation given

Relevant Publications:

- Pusic MV, MacDonald WA, Pachev GS. Embedding Medical Student Computer Tutorials into a Busy Emergency Department. Acad Emerg Med 2007 Feb; 14(2);138-148

Recent Abstract Presentations:

Recent Invited Presentations:

2007 May  Association of Pediatric Program Directors.  “Workshop – Teaching Evidence Based Practice to Pediatric Residents”  Toronto, Ontario


2005 October  Pediatric Grand Rounds, McGill University  “Computer Aided Instruction in Medical Education”  Montreal, QC

2005 April  Pediatric Grand Rounds, University of B.C.  “Patient Education as Wonder Drug”  Vancouver, BC

2004 June  Pediatric Grand Rounds, University of B.C.  “Knowledge Translation for Clinicians”  Vancouver, BC

Teaching Awards:

IWK-Grace Health Center Pediatric Resident Teaching Award.  1998
Dalhousie University Resident Teaching Award.  1998
Children’s & Women’s Health Centre of B.C.  “Attending of the Year Award”.  2003
Columbia University Dept of Pediatrics Residency Program – Runner-up “Attending of the Year Award”  2006

Peer Reviewed Competitive Fellowships:

Royal College of Physicians and Surgeons of Canada Medical Education Travelling Fellowship.  2000
Fonds de la recherche en santé du Québec Training Fellowship.  2000
Canadian Institute of Health Research Training Fellowship.  2000

Educational Committee Service (Member):

U.B.C. Dept. of Pediatrics:  Pediatric Education Executive Committee,  2001-2004
U.B.C. Dept. of Pediatrics:  Faculty Appointments, Reappointments, Promotions and Tenure,  2001-2004
U.B.C. Faculty of Medicine:  Information Technology Management Committee,  2002-2004
U.B.C. Faculty of Medicine:  e-Learning Steering Committee,  2002-2004
U.B.C. Faculty of Medicine:  Undergraduate Curriculum Evaluation Committee,  2002-2004
U.B.C. Faculty of Medicine:  Faculty Development Steering Committee,  2002-2004
B.C. Children's & Women's Research Institute:  Research Education Committee,  2002-2004
U.B.C. Faculty of Medicine:  Year 4 Restructuring Committee
Representative Workshops Given:

"Developing a Computer Based Education Station for Pediatric Residents". Ambulatory Pediatric Association Annual Meeting, New Orleans, Louisiana. May 1998. Designed and Presented the Workshop


"How to Practice Evidence-Based Child & Women's Health". Sponsored by UBC Dept. of Peds and Cochrane Child Health Field, Vancouver, B.C. Mar 2002. Designed and Presented the Workshop


Arranged all conference speakers for this 150 clinician 3-day conference

"Putting Evidence Into Practice Workshop", Emergency Medicine Small Group Session Designer and Leader, University of Alberta, Edmonton, AB, October 2003

"Creating Interactive Computer Tutorials for Students or Residents", University of B.C. Faculty Development, Vancouver, B.C. Mar 2003. Designed and Presented the Workshop

### Grants Received:

<table>
<thead>
<tr>
<th>Granting Agency</th>
<th>Subject</th>
<th>COMP</th>
<th>$ Per Year</th>
<th>Year</th>
<th>Principal Investigator(s)</th>
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<tbody>
<tr>
<td>Ambulatory Pediatrics Association</td>
<td>Computer Tutorials in the Pediatric Emergency</td>
<td>C</td>
<td>10,000</td>
<td>1995</td>
<td>Martin Pusic</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Kevin Johnson, Anne Duggan</td>
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<td>Canadian Association of Emergency Physicians</td>
<td>Predictors of Sequelae Post Concussion</td>
<td>C</td>
<td>5000</td>
<td>2000</td>
<td>Martin Pusic</td>
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<td>CIHR Training Grant</td>
<td>Just-in-time Learning in the PED</td>
<td>C</td>
<td>68,000</td>
<td>2000</td>
<td>Martin Pusic</td>
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<td>FRSQ Training Grant</td>
<td>Just-in-time Learning</td>
<td>C</td>
<td>89,000</td>
<td>2000</td>
<td>Martin Pusic</td>
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<td>Royal College Medical Education Travelling Grant</td>
<td>Just-in-time Learning in the PED</td>
<td>C</td>
<td>21,000</td>
<td>2000</td>
<td>Martin Pusic</td>
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<td>James Cimino</td>
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<tr>
<td>Royal College of Physicians and Surgeons</td>
<td>A Problem-Based Online Research Methods Course for Subspecialty Fellows</td>
<td>C</td>
<td>23,347</td>
<td>2002</td>
<td>Martin Pusic</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Morrison Hurley, Ruth Milner, U.B.C.</td>
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<tr>
<td>B.C. Children’s &amp; Women’s Research Institute Establishment Award</td>
<td></td>
<td>NC</td>
<td>50,000</td>
<td>2001-2002</td>
<td>Martin Pusic</td>
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<tr>
<td>Alberta Heritage Foundation for Medical Research</td>
<td>Computer-based delivery of health evidence: a systematic review of the impact on clinical practice</td>
<td>C</td>
<td>69,998</td>
<td>2002</td>
<td>Terry Klassen, Alberta Research Centre for Child Health Evidence, Martin Pusic</td>
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<td>Martin Pusic</td>
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<tr>
<td>McGill Molson Medical Informatics Project</td>
<td>Just-in-time Learning in the PED</td>
<td>NC</td>
<td>21,000</td>
<td>2002</td>
<td>Martin Pusic</td>
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<td>Wendy MacDonald, David Fleiszer</td>
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<td>Association of Canadian Medical Colleges - CIHR Medical Education Grant</td>
<td>Constructivist versus Behaviourist Strategies for Learning X-Ray Interpretation</td>
<td>C</td>
<td>16,000</td>
<td>2002</td>
<td>Martin Pusic</td>
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<td>Vicky LeBlanc, Steve Miller, Columbia University</td>
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<tr>
<td>UBC Teaching and Learning Enhancement Fund</td>
<td>Just-in-time Learning in the Pediatric Emergency Dept.</td>
<td>C</td>
<td>49,000</td>
<td>2002</td>
<td>Martin Pusic</td>
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</tbody>
</table>

Martin Pusic’s teaching portfolio is available with all hyperlinks at: [www.columbia.edu/~mvp19/TP.htm](http://www.columbia.edu/~mvp19/TP.htm)
Michael Smith Foundation for Medical Research

Research Unit Funding

C xx? 2003 Shoo Lee

Nikki Shaw, Mark Ansermino, Martin Pusic

UBC Teaching and Learning Enhancement Fund

Just-in-time Learning in the Pediatric Emergency Dept.

C 42,000 2002 Martin Pusic

Joan Fraser, Sandra Whitehouse, Navid Deghani, Deborah

Royal College of Physicians and Surgeons

Climbing the Learning Curve: A New Approach to Teaching Non-radiologists Radiology Interpretation

C 50,000 2005 Martin Pusic

Kathy Boutis

University of Toronto Dean’s Excellence Fund

Climbing the Learning Curve: A New Approach to Teaching Non-radiologists Radiology Interpretation

C 50,000 2006 Kathy Boutis

Martin Pusic

Canadian Association of Emergency Physicians

A Tablet Computer For Interpretation of Pediatric Emergency X-rays

C 5,000 2006 Michel Roy

Martin Pusic

Teaching Activities with Groups Outside the University


We developed a successful online research methods course (see Course Development Section) at the University of B.C. We have modified the 11-module course to be presented to PEM Fellows in all 9 training programs across Canada. The development of the course is described earlier. For this multi-center project, I am the overall coordinator responsible for identifying local champions and editing/revising/updating the course in response to Fellow suggestions.

2006-present. www.pemfellows.com

I am the faculty sponsor of a fellow-developed website dedicated to improving the communication of PEM fellows across the >40 Fellowship programs in the U.S. and Canada. The site includes a number of functions including sharing of presentations, EBP materials, web links, web discussions, information sharing etc. Sponsored by the section of Emergency Medicine of the American Board of Pediatrics and by the MS-CHONY.
APPENDICES TO TEACHING PORTFOLIO

1. Descriptions of Medical Student Computer Tutorials

2. Curriculum Vitae – Standard 4-Page Version

3. Online Teaching Portfolio Demonstrations and Downloadable Material

4. Key Article – “Embedding Medical Student Computer Tutorials Into a Busy Emergency Department”