Striving for Excellence: Fostering Adaptive Expertise through Professions Education

Maria Mylopoulos, PhD
Educational Researcher, Learning Institute
Scientist, Research Institute
Hospital for Sick Children

Assistant Professor, Department of Paediatrics
Cross-Appointed Scientist, Wilson Centre for Research in Education
University of Toronto
The goal of professions education is to ensure that individuals are on the path of ‘expertise’

But what does ‘expertise’ look like?

And what does that path look like?
The traditional ‘expert’

Independent

Authoritative

Always has the answer

Pinnacle of field

“Go to” person
Traditional expertise

Expertise is something an individual possesses
Expertise is a level to be attained or achieved
Corollary: Constructions of knowledge

Expert development as accrual of knowledge over time

Experience leads to an increasing number of answers in the head (cf Norman)

Knowledge as a static, crystallized resource

Something stored & accessed when problem solving
The traditional ‘expert’

“...when things are proceeding normally, experts don’t solve problems and don’t make decisions: they do what normally works.”

Dreyfus & Dreyfus
Corollary: Constructions of practice

Routine expert (the ‘experienced non-expert’)

- Efficient diagnostician/technician
- Adapts problems to known solutions
- Learns as an incidental activity (at best) – ‘practice drift’
But...

Is this what experts really look like?
Adapts/creates solutions to address new problems

Adopts a skeptical stance towards their knowledge

Purposely learns through problem solving

Uses existing knowledge to problem solve

Adaptive expert
Adaptive expertise

Construct is built upon real world practice examples
Expertise is something people do, not something they have
Expertise as ‘optimal adaptability’

Two complimentary dimensions to expert problem solving:

- Innovation Dimension – create new knowledge and learn
- Efficiency Orientation – apply past knowledge

In practice, innovation & efficiency are appropriately balanced

Giyoo Hatano & John Bransford
Expertise as ‘progressive problem solving’

Reducing number of problems
By establishing routines to handle them (experienced non-expert)

Reformulating problems at a higher level
And using freed up cognitive resources to solve them

Problematizing established routines
For improved performance and construction of new knowledge

True experts can become experienced non-experts

Carl Bereiter & Marlene Scardamalia
Expertise as ‘reflection’

Reflection in practice
Takes advantage efficiency of previous experience, but stays alert to limits
Seeks / discovers / innovates solutions when necessary

Reflection on practice
Sees the goal of learning not as achieving expert status but rather to keep getting better (experienced novice)
Considers the implications of new solutions for conceptualization of practice (intentional learning)

Donald Schon
Adapts/creates solutions to address new problems
Uses existing knowledge to problem solve
Adopts a skeptical stance towards "facts"
Purposely learns through problem solving

"So I think you have to take your experiential database...to allow you to kind of make short cuts to your thinking, that doesn't happen every time with something that's happened to you. You have to have seen twenty different variations of the theme of heart attacks to be able to recognize the common as well as the subtle atypical presentations.

"Not to the point of an anarchist or a rebel but to think the question like the two year old, 'why do zebras have stripes?' And keep going, drilling through, persevering and trying to get to the root cause. I think that sense of discovery is important.

"One of my traps or pitfalls that I fall into sometimes is that you kind of assume this is going to fall into the pattern and you kind of get anchored to that kind of getting to that level of not just accepting things at face value, but really... keep going, drilling through, persevering and trying to get to the root cause. I think that sense of discovery is important."
Development of ‘adaptive expertise’

Adaptive expertise has a distinct developmental trajectory
  Not the “last stage” of development
  Trajectory of routine expertise impedes adaptive expertise development

Approach to practice that develops early & can be taught
  Must be practiced like any skill
  Must be fostered throughout education and practice
The educational challenge

“Eventually they will quit being novices, without our having to do anything about it. The important question is what they will become. Will they become experts in their lines of work or will they swell the ranks of the incompetent or mediocre?”

Bereiter & Scardamalia 1993
The educational challenge

Adaptive expertise should not be an accident of development
Are we doing everything we can to maximize it’s development?
3 studies

Medical students

Residents

Faculty
Medical students

Research questions

1. How do medical students conceptualize innovative problem solving in daily clinical practice?

2. How do medical students view expertise and their own expert development?

Mylopoulos and Regehr 2009
Well, sure I think it [innovative problem solving] would be beneficial but I don’t think it should be the number one priority. Because really, third year clerks are there to learn.

Focus on efficiency

Our medical students speak...

Answer-filled expert

I think to be an expert you have to know more about a particular area than somebody who’s not in your area.

Achievement-based expertise

To be an expert is to have a lot of experience. And studied it in school or some formal education.
Medical students

Did not believe that being innovative was part of learning
   No balance between innovation & efficiency

Viewed expertise as product of education & experience
   No investment in a lifelong ‘approach to practice’

Conceptualized expertise as the accumulation of knowledge
   Routine expertise

Challenge for teaching:
   How are student models of expertise shaped by medical education?

Mylopoulos and Regehr 2009
Residents

Research questions

1. How do residents conceptualize expertise and expert development?

2. How do residents view their own learning in the developing expert trajectory?

Mylopoulos, Regehr & Ginsburg, 2011
I guess at the beginning everything is sort of non-routine and then you’d hope that by the time you get to the end of your residency, more things are routine than not.

**Continuing goal of routinization**

Our residents speak...  

**Sophistication of ‘routine’**

So the first year, just learning to knowledge acquired. And more get to familiarity with something. What do I do about it? Or if five people have pneumonia, do I treat them all the same way?

**Appreciation of ‘non-routine’**

I just gained a certain level of comfort stepping outside the box and thinking of new solutions. ... you’re never going to know and considering new problems. You become a lot more comfortable with that uncertainty.
Residents

Continued effort toward routinization

Evolution in understanding of the routine
  Not just knowing the answers
  More a process of progressive problem solving
  Context matters

Increased appreciation for the non-routine
  Has a role to play in practice

Challenge for teaching
  How can we explicitly foster development of innovative dimension?

Mylopoulos, Regehr & Ginsburg, 2011
Snapshot of our learners

Achievement – based, answer-filled model of expertise

Focus on routinization

Increasingly see the complexity of ‘routine’

Recognize the value & inevitability of non-routine
The educational challenge

How are student models of expertise shaped by medical education?
How can we explicitly foster development of innovative dimension?
Research question

1. How do faculty understand innovative problem solving in daily clinical practice?
Engagement in innovation for practice improvement

Our faculty speak...

Innovation as an outcome

I think that if you were to look at what goes on in the context of innovation, it's not that Herculean or monumental. It's just...a little bit of an, I don't know, a little bit left of center, a little bit left of center...it's really just the kind of things that you do on the side to make things work a little more smoothly...it's not really that innovative innovation.

Compartmentalized Innovation

I think the notion that innovation is compartmentalized, that it's actually only possible in research, you know, that you can't do it in practice, actually it's the other way around. It's the more serendipitous, the more spontaneous, the more you do in practice...you're apt to do more things as you go along.

I think that the notion of compartmentalizing innovation is just a misconception. It's really just a matter of mindset.
Faculty

Had an ‘innovative’ approach to their daily work
   Always looking for ways to improve their practice

Did not value practice improvement as innovation
   Outcome–based model of innovation

Viewed innovation as a research activity
   Rather than as a pervasive, complementary part of practice

Challenge for teaching
   Can you teach an activity that is not “visible” to you?

Mylopoulos & Scardamalia 2008
Key points for today

Traditional models of expertise do not capture scope of true expert practice

Construct of adaptive expertise captures additional, important facets of expert practice

Adaptive expertise can be understood as a learned approach to practice

Must be fostered throughout development & practice: should not be an accident of process
maria.mylopooulos@utoronto.ca

Educational Researcher, Learning Institute
Scientist, Research Institute
Hospital for Sick Children

Assistant Professor, Department of Paediatrics
Cross-Appointed Scientist, Wilson Centre for Research in Education
University of Toronto
Expertise as ‘knowledge building’

Inform and improve community practice
  Improvable ideas

The social process of creating & improving ideas
  Collaborative
  Iterative

Important for sustained innovation
  Beyond best practice

Carl Bereiter & Marlene Scardamalia