Using Tutorials in the Development of Economics and Management Thinking Skills

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Abstract:
One of the primary goals of educating in economics and management (E&M) is to teach students to think for themselves rather than repeat text-book theories. Drawing upon my own teaching experiences, I will discuss a framework for tutorial-based teaching of applied E&M thinking. The paper discusses results to date from the use of this framework as well as lessons learned which might be applicable to a range of University and non-University based programmes teaching skills in economics and management.

Using Tutorials in the Development of Economics and Management Thinking Skills

Bryane Michael, Linacre College[1]

Introduction

At risk of oversimplification, the chief goal of economics and management (E&M) education in the University (or at any level) is to teach the student to think. The move away from teaching thinking skills in general has been noted by a number of commentators (de Bono, 1999; Sowell, 2003). Such thinking skills are as important in E&M as in other disciples because the orthodoxy of today becomes the heterodoxy of tomorrow and visa versa.[2] When I was receiving my education, three values were conveyed forcefully to me – values which have seen a secular decline as of late. First, an education should provide the student with the tools needs to teach to him or herself – and given the rapid pace of technological and social change, self-education has become commercially and intrinsically valuable.[3] Second, economists frequently invoke the need to "build intuitions." I once heard a possibly apocryphal quote from Amar Bose – the MIT professor who invented the Bose speaker -- "if you need to pick up a pen [to make calculations], you will never be a good engineer." This is not to say that precise calculation is unimportant (especially in engineering)! Instead, a good engineer should "feel" what the right answer will be....just as a good economist or manager will often "feel" the right answer and then engage in rigorous analysis. Third, the student should "sapere aude" or dare to know by questioning everything. All theories are right and wrong depending on the context. Yet, self-education, intuition-building, and critical capacity do not just develop spontaneously, they must be taught.

This paper attempts to present a framework I have found useful in developing my own and my students' thinking skills in the context of E&M. The framework seeks to develop study skills, learning skills and synthetic analysis, model-based reasoning, judgement, critical skills and promote double-loop learning. The first part of the paper will place this framework in the wider literature by discussing some issues about education in economics and management. The second section will present the framework while the third section will discuss issues related to the tutorial-based teaching methodology used by the framework. The fourth section will discuss preliminary results and lessons learned in teaching E&M, and the final section will offer conclusions. Because there are many important issues in the teaching of E&M, I must limit my discussion to method and ignore important issues in curriculum development, assessment, institutional factors affecting teaching, and alternative modes of learning.

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[1] The views expressed are those of the author, based on his teaching experiences in a wide range of contexts, and do not represent the views of Oxford University, her departments or academics. I would like to thank the various conference and workshop participants who have reviewed this piece for their contributions.

[2] In my own lifetime, instruction in economics has shifted from Keynesian approaches to classical (supply-side) approaches and back again. See Paul Krugman's thoughts on changes in macroeconomic theory at http://www.wws.princeton.edu/~pkrugman/islm.html

[3] For a further statement, see Blanshard (1973) or Seigal (1988).

The methodology I employ is that of Schon's (1983) "reflexive practitioner" – drawing on lessons I have learned while teaching myself, students in Oxford and as well as "teaching" policymakers while I was working at the World Bank and the Organisation for Economic Co-operation and Development (OECD). Such a methodology is highly personal and I do not claim the model I present here to be a universal one or even a correct one – representing the results of action-research.[4] Indeed, writing up the results of this methodology is a perilous exercise as this paper suffers from the same problem as any paper discussing applied techniques – they must be seen (and preferably experienced) to be understood.

Using the Tutorial Method in Economics and Management (E&M)

Much of the current literature on teaching economics focuses on the classroom-based lecture methodologies favoured in US universities (Walstad and Saunders, 1997). In the statistical evidence compiled by Becker (1997), of the various methods of economics instruction, tutorial-based teaching was not even listed. While Hansen (1993) describes a writing intensive methodology for teaching economics, the basic premise of classroom based education also remains relatively unchallenged. Rather than focus on the *method* of teaching, much discussion about teaching economics has revolved around the *content* of the economics-specific material taught. In a European context, Gartner (2001) looks at differences in economics teaching by comparing contact hours, curriculum focus, and type of textbook used across universities. These sample works reflect a broader main-stream trend in teaching economics, where the implicit objective of such teaching is aimed at getting students to master a corpus of economic "knowledge". Salemi and Siegfried (1999) offering the clearest statement of the profession – advocating the "Hansen proficiencies" of gaining access to existing knowledge, displaying command of existing knowledge, drawing out existing knowledge, utilising existing knowledge to explore issues, and creating new knowledge. While there is a diversity of opinions about the type of economies to be taught – orthodox, heterodox, and the like – the basic premise of encouraging greater assimilation of a corpus of knowledge remains at the key objective (Barone, 1991).[5]

Unlike economics education, which generally focuses on transmitting information quickly, management education has focused more on creating behavioural patterns or specific modes of thinking useful in an industrial setting. Some examples of behavioural patterns developed include team-work skills (Mundell and Penarolla, 1999; Alie *et al.*, 1998), development of emotional intelligence (Boyatzis et al., 2003), and the adaptation to other cultures and countries (Coombs and Sarason, 1998; Allen and Young, 1997).[6]

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[4] For more on action research in education, see Stringer (1996). The classic reference for action learning remains Revans (1980).

[5] While not in the ambit of this paper, there are a number of possible reasons for such a teaching approach, most prominently being institutional limitations by Universities striving for low cost, relatively high *marginal* (but perhaps not absolute) returns to classroom based instruction (McLeish, 1968).

[6] Part of the reason may be due to the focus on the highly lucrative MBA market. Of the "skills" addressed by McMahon (1992), he focuses on content knowledge, self-knowledge, diagnostic skill, application skills, teamwork skills, and self-control.

While there is a range of innovative practices in management teaching, such as the use of case studies, simulations, group work and the like, the focus on class-room instruction which ignores teaching thinking skills prevails.[7]

Given these weaknesses in the teaching of economics and management, there have been calls for educational reform. Empirically, Becker (1997) finds that many economics students find their education unsatisfactory, while Walstad and Allgood (1999) report disheartening results from a US national survey of college seniors having taken economics. They note "what is discouraging, however, is that college seniors with economics show only a limited knowledge of basic economics. To put this score in perspective, it would be equivalent to a D- on a standard grading scale" (p. 350). Anecdotally, images of mumbling economics professors who speak with heavy accents and scrawl incomprehensible equations on blackboards abound. In this view, the current instruction of economics has failed to teach students to think for themselves. In a management context, the "failure" is less on teaching technique rather than on whether management should be taught at all as a discipline (Crowther and Carter, 2002). If it should be taught, the success of business education has been questioned by authors such as Pfeffer and Fong (2003) and Bigelow (1983).[8] While approaches to management education which do teach thinking skills -- such as problem-based learning – do exist, they still focus on a classroom setting (Dutch *et al.* 2001).

Based on this perceived failure of E&M to teach students to think for themselves, there have been calls for different types of teaching. In economics, these calls have been centered around greater use of liberal arts methods to get students to think for themselves (Colander, 1992). In management, calls for reform have centered around problem-based teaching, student teams and "skills-based" education or "fit" in the classroom (Westerman *et al.*, 2002). In general many of these proposals and criticisms are addressed in a framework proposed by Clerici-Arias (1994).[9] In his view, drawing on Bloom's (1956) taxonomy of educational objectives, he sees the objective of an economics education as developing "stages" of thinking skills -- moving from knowledge, comprehension, application, analysis, synthesis, and finally evaluation. The development of *knowledge* consists of the ability to observe and recall information (such as dates, events, places, and ideas). *Comprehension* focuses on understanding information such as "grasping" meaning, translating knowledge into new contexts, interpreting, comparing, contrasting, ordering, grouping, inferring from and predicting from information. *Application* focuses on using information, methods, concepts, and theories in new situations, often to solve problems. *Analysis* attempts to recognise and organise information into patterns. *Synthesis* looks at the combination or recombination of ideas in order to generate new ideas, theories or concepts. Finally, *evaluation* seeks to compare and discriminate between ideas, as well as assess the value of theories and evidence.

[7] See Harrison and Akinc (2000) for an attempt to reintegrate liberal arts into management education.
[8] Part of this failure might stem from the tension in management education between balancing the needs of industry with the liberal requirements of a University education (Watson and Temkin, 2000).
[9] While Clerici-Arias is used as the most prominent example, other frameworks such as Smith (2002) have much affinity which this framework.

While the general direction of Clerici-Arias like frameworks may be right, teaching with them in a classroom setting can ignore many important issues which the more traditional education literature stresses. The first and most important element is that the student must see the overall picture, or form "cognitive structures" which can help the student organise learning (Bruner, 1966). These "structures" should be organised by increasing complexity along the learning curve (Reigeluth, 1992; Ausubel's *et al.*, 1978). A tree metaphor for this type of learning might be employed – where the trunk must first be placed, then main limbs and finally details of individual branches can be "hung" from the main roots. Second, learning and recall improves when there is some degree of "processing" involved rather than simple repetition (Craik and Lockhart, 1972). Such processing may often be directed at the accomplishment of a goal. Third, teacher-student interaction is important because social interaction plays a fundamental role in the development of cognition (Vygotsky, 1978; Bandura, 1977). In this way, the process of learning is often more important than the content of the learning (Knowles, 1984). A framework is needed for E&M which takes these factors into account.

An Applied Framework for Teaching E&M

Based on the need to incorporate the way students learn best into an E&M teaching framework, the proposed applied E&M teaching framework consists of getting students to develop six key skills: study skills, ability to acquire and synthesize information, think in modeling-terms, judgment skills, ability to critique material, and application skills – listed in reverse order of importance. This framework (as shown in Figure 1) addresses many of the problems identified in the literature review by focusing on a close link between the teacher and student through tutorial-based instruction.

Figure 1: Summary of Key Skills in E&M

Study skills	**Learn and Synthesize**	**Model-based thinking**	**Judgement**	**Critical evaluation**	**Application**
Reading Skills	Memorisation	Comfort with graphs	Finding parameters and criteria	Question the theory	Correct analysis
Writing Skills	Linking ideas	"Blocks and arrows"	Common sense	Question the evidence	Creativity

The first and most important skill in E&M is the acquisition of **study skills** such as the ability to read. Such reading skills include the ability to see the overall picture (by looking at section headings), prioritise information, develop vocabulary lists, and create annotated bibliographies if several readings are given for a particular week. At the beginning of my teaching, I omitted teaching these skills on the (erroneous) assumption that undergraduates from leading universities would have developed these skills. To improve these skills, I assign readings from Online Writing Labs (OWL) or assign books such as Becker (1986) and William (2001) for more advanced students.[10] In addition, I

[10] See http://www.fas.harvard.edu/~wricntr/index.cgi?section=tools for one of my favourite writing labs at Harvard or http://owl.english.purdue.edu/ for an example of an OWL.

may recommend study guides such as Kornhauser and Emerson (1993) or Pauk (2000) before tutorials begin. I also hold a reading practical where I teach students how books and articles are organised in economics and management. This is the most important part of tutorial education because without basic reading and study skills, no other learning can take place.[11]

The second skill is the ability to **acquire and synthesize information** – in other words to learn. Many students assume that reading is equal to learning. Worse yet, they will copy the book into their notebooks. Instead of wasting time doing this, I suggest that students "stare out windows" – in other words they focus on memorising, try to link ideas together, and "play" with models. If there are a number of readings assigned, I might suggest students make use of mneumonic devices to remember authors and their ideas. Another important skills is the practice of inductive or deductive thinking....either grouping information together in categories or breaking it apart analytically. One of the easiest ways of teaching synthesis skills is to draw ideas on a blank sheet of paper as boxes and ask the student to link them or fit them together. An easy way of teaching analysis is to write a problem on a blank sheet of paper, and ask the student to place all the information he or she knows about a problem, "breaking down" down this data into smaller and smaller manageable sub-pieces or problems (and then finally reintegrating).

The third skill (related to synthesis) is to get students to **think in modelling terms.** While much of the literature is written for more advanced E&M students, such as Varian (1994), the ability to generalise and form patterns is useful across the disciplines. I might first show a particular model to a student and ask him or her to repeat it. Having developed the ability to remember the "jist" of model-based thinking, I would then proceed in later lessons to show data or ask questions and request that students use either a two space to plot a relationship or use blocks and arrows to show "deeper" relationships. While many argue that model-based thinking over-simplifies the world, perhaps the best exposition I have seen has been a vigorous defence of modelling by Krugman (2003).[12]

The fourth skill involves the development of **judgement** in the application of theories and the use of econometrics. Judgement asks "under what conditions does one use a particular model"? The application of judgement can be likened to a parameter or a "switch" (to illustrate metaphorically) which determines whether a model should be used in a particular situation. Judgement can be seen as the "meta-model" – the model which determines which model to use. For example, the decision to use classical or Keynesian economics depends on the degree of price rigidities (among other factors). The problem with judgement is that in the real world, the key parameter is uncertain or entirely unobserved. In the real world, prices are not either rigid or not, but display a variety of rigidity depending on the situation. Rather than taking a position on which theory is right or wrong, the goal is to develop the ability in the student to "chip away at zones of ignorance" and define decision parameters which affect judgement.

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[11] Many peers refuse to confront these issues, claiming that it is the job of the University or the writing department to develop these skills. I find this approach unhelpful.

[12] See Klemperer (2002) for a discussion on the right way and wrong way to apply models (an an auction theory context).

Critique is one of the most important academic and professional skills students can develop (in my experience) and certainly one which US and most UK economics education does not inculcate.[13] Once the student has developed the other skills, I will continuously challenge the student's presentation of a theory or evidence. The student will usually accept the new version and I will again present another theory or present more evidence disproving the second theory. In this way, I will keep going until the student is seized by the complexity of the problem. Once other view points have been aired, I will write one of two phrases on the paper I use for linking ideas – "Question everything" and "Everything is debatable." I write these phrases repeatedly so that the student (and the teacher!) does not forget.[14] As a heuristic to develop the ability to critique one's one work and other's work, I ask students to apply the five Ws – for whom, with what, where, when, and why does a theory not work? Another useful heuristic is Ohmae's (1991) popularisation of the Three Whys. Namely, if a student explains why we observe a particular phenomenon in E&M, I proceed to ask why twice more to discover "root causes."

The simple **applications** taught in most undergraduate courses simply mislead because the student does not have the skills needed to see why and how the application can serve outside that particular context.[15] In teaching applications, I will normally give the student data or ask a question and look for the model the student uses. In order to teach applied thinking, I might encourage the student to apply model-based thinking to a wider range of problems in the student's life than simply those in the textbook in order to build comfort with theorising about the everyday things we see around us. Because application requires critique, judgement, model-based thinking, and the ability to acquire and synthesize information, non-trivial applications of E&M theories are the most difficult to teach.

The ultimate goal is to teach the student to teach him or herself – or engage in **double-loop learning** as popularised by Argyris (1976).[16] To promote double-loop learning I share the teaching model I have just presented with the student and involve students extensively in their own assessment.[17] While the teaching of E&M material still comprises the bulk of any tutorial, some time is given to teaching the students how to look at themselves learning or to watch the tutor as he practices the skills mentioned above. I would normally offer advice from my student days – which also helps me reflect on making my learning processes more efficient.

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[13] The UK (and Europe) appears to offer a more critical assessment of E&M than the US. For critiques in economics, see the heterodox economics works of Moseley (1995), Blaug (1992), Keen (2001), Ormerod (1997), or McCloskey (1985). In management, "critical" schools are covered by Alvesson and Willmott (1992). See Smith (2003) for a useful article about teaching critical thinking skills in business.

[14] Of course, whether everything is debatable or not is an epistomologoical and ontological problem which I will leave to the philosophers. From my own experience, I have yet to falsify this proposition.

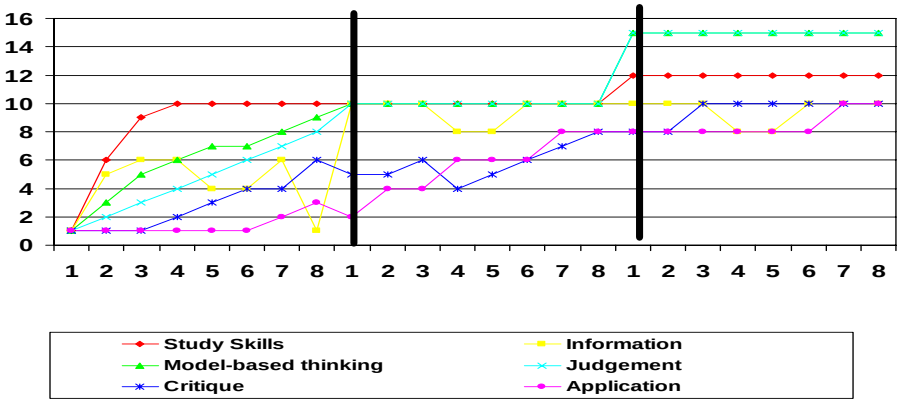
[15] For "applications" see Stockman (1986) or more recently Stiglitz (2002).

[16] This has been called Personal Development Planning by Moon (2002).

[17] More advanced students may wish to consult Jason Hong's paper full of useful advice: http://www.cs.berkeley.edu/~jasonh/advice.html or Thomson (2001).

Figure 2 shows the "idealised" learning profile over the term or the year for the student on a 15 point scale with 1 representing a base line. As can be seen, given limited time every week, learning objectives need to be sequenced with study skills being developed first, then information and synthesis, model-based thinking, judgement, critique, and application. While the time profiles shown cover an academic year, they may be "shifted" depending on the student's progress. Given forgetting, students may also move backward, making the periods on the chart not equal to calendar time. The different skills do not all converge on 15 (the maximum). For example, judgement has a relatively high impact and return (thus reaching its maximum) while critique-abilities even though having high impact take a longer time to develop than one academic year. Indeed, these idealised profiles represent my previous experiences with best practice teaching and I can not necessarily offer an *a priori* reason for this development sequence. One possible effect of this paper might be to help change the profiles listed in Figure 2 – allowing students to learn faster.

Figure 2: Expected Learning Profile



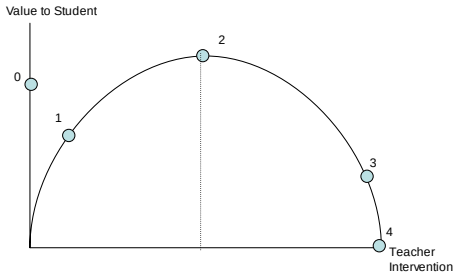
There are a number of critiques of using a framework like the one presented in this paper. First, the teaching of skills may neither be within the competency nor terms of reference of the E&M tutor. If the tutor is an expert in a sub-discipline of economics or management, but unable to teach, then using such a framework may be inappropriate. Second, this framework embodies a teleological view of education which pervades any framework based on "stages of growth." Namely, the framework assumes that students can "progress" up a natural and normal ladder to attain some academic goal akin to enlightenment. If one rejects the hierarchicisation of knowledge (where some learning or methods of instruction are superior to others), then such a framework would be invalid. Such a natural chain of progress is also affected by different student propensities to learn and differing psychological make-ups and previous experiences. Third, different specialisations within economics and management might require different learning profiles. Economics comprises a range of sub-disciplines, from game theory to economic history. Management also comprises a wide range of sub-disciplines from shop-level labour management to international strategy. The framework presented in this paper does

not deny both specific-specific and student specific modification may be necessary. Yet, given my experience, I have found a wide range of E&M sub-disciplines amenable to this framework.

A Discussion on the Tutorial Method as Applied to E&M

Given the diversity of factors affecting the transfer of the skills identified in the last section, I have found that one-to-one Socratic-method teaching provides an important way of helping to tailor and control educational outcomes. Socratic-method teaching only uses guiding questions to explore what the student has learned and test that intuitions have been developed in the application of underlying principles.[18] To address student problems in logical reasoning, I will continue asking questions until the problem becomes obvious (just as Socrates himself did 2000+ years ago). To teach synthesis and "linking skills", I start with blank sheet of paper and represent the ideas communicated by the student symbolically after each question. I draw linkages and ask questions as necessary until a "map" of the problem is produced.[19] When working with equations, I might begin with a picture and label parts of the picture with parameters until the equation becomes obvious.

Figure 3: Teacher Intervention



In general, as shown in Figure 3, teacher intervention in the tutorial should not be too much or too little. If the teacher intervenes too little (due to lethargy for example), the student may miss important information. If the teach intervenes too much (due to hyper-activeness for example), this "crowds out" time for the student to make mistakes which will then be remembered later. For each student, the amount of intervention will be different depending on how much reading (and understanding) the student has undertaken. For some students – or for all students at certain times -- (as shown by point 0), the student will do better studying independently from the Internet and books. In other cases (as shown by point 1), both the student and/or the teacher will put insufficient time into the lesson – which unfortunately is probably the norm. If the tutor tries to overwhelm the student (shown by point 3), the student will not miss important information and become confused. Point 4 represents spoon-feeding where the student is not engaged.

If the teacher-student relationship starts or settles at point 4 in figure 3, there is a strategy to address such sub-optimal equilibria depending on whether the student is unwilling to study, unable to learn, or both. Such a situation can be analysed using Blanchard and Hersey's (1969) situational leadership model. The possible combinations are shown in Figure 4. If the student is willing and able to engage in the material, this is the "normal" tutorial where both parties can engage themselves to the fullest. If the

[18] For a critique of the Socratic method, see Reichenbach (1997).
[19] Such a procedure is akin to the Strategic Options Development and Analysis (SODA) used for larger groups.

student is able but unwilling, then the student should either set the pace (depending on their interest) or if there is some objective to be reached, then the tutor must focus mostly on motivating the student. I have found that offering stories and examples from one's own life and work greatly increases student motivation. If the student is unable but willing, then the tutor should engage in teaching method innovations (figuring out new and interesting ways of teaching) and apply energy to find a way to make the student learn by linking E&M concepts with work or other aspects of daily life. If the student is unable and unwilling, then either the tutor is reduced to the useful role of life mentor (sometimes students just want career or other advice) or else tutorial methods should not be used. To figure out which quadrant the student is in, a "signal" must be sent, encouraging the student to sort himself to the correct category.[20] A relatively challenging first meeting offers such a sorting mechanism. Students willing and able to pay the "cost" of engaging in the material rise to the challenge. Students willing but not able come with many questions and many attempts at working on the week's material. Students unwilling but able come with many speculations and interesting ideas (but not having read the assignments). And students who are unable and unwilling do nothing and are thus sorted rapidly.

Figure 4: Tutorial Strategies for Different Student

	Willing	**Unwilling**
Able	"Normal" tutorial teaching – pushing the envelope	Passive – let the student lead depending on interest
Unable	Shift gears with different methodology to develop skills	Use tutorial for personal guidance (?!?) Tutorial method not appropriate

During the course of the tutorials, perhaps the most difficult and important job of the tutor is to bring the skill in question "under control" (Deming, 1982). In other words, the skill must be applied consistently without variation. If a student sometimes uses critical analysis and at other times does not, there is high variance in student performance. Like any quality process, the skills must be brought under control (even if it means leaving critical analysis aside for a couple of weeks thereby setting the skill level at 1 in Figure 2). Once a skill is used (or misused) with some consistency, then efforts can be made to improve the systematic use of the skill.

While such an approach is costly, the benefits are enormous and many types of analysis can only be taught using tutorial-intensive methods. Figure 5 cursorily attempts to list the costs and benefits associated with tutorial-based education -- see Palfreyman (2001) or Moore (1968) for more. First, tutorials can be used to identify skills of the individual student which need improvement. However, no matter how good the economist is professionally, if the tutor does not have the skills to

Figure 5: Tutorial Costs and Benefits

Benefits	**Costs**
Identify personalised weaknesses	Poor teaching
Higher willingness to pay	Expensive
Close interaction	Need for Relationship management

[20] I abstain from making a value statement about the student's willingness or ability to learn. Some teachers would consider it a moral imperative to push the student into becoming willing and able to learn. Others would take the position that the teacher can lead the student to the trough, but can not make the student drink. Still others would argue that *de gustibus, non est disputandum* (there can be no arguing about tastes).

anticipate where confusion might arise and probe those areas, then tutorials can be inefficient.[21] Second, the tutorial method can generate higher income for the University or educational institution if the students are willing and able to pay for this higher value education. However, if revenue increases, so does cost as tutorial methods are expensive. To teach 100 students would require 100 contact hours by tutors per week. In economics and management, the opportunity cost (in terms of consulting contracts or work-for-hire publications) of the teacher could be prohibitively high. Third, the tutorial system provides for closer contact between students and teachers. Closer contact for students means access to letters of recommendation, internships, and a more "humanised" learning experience. The downside though is, like any relationship, the teacher-student relationship requires management by both parties. Natural personality conflicts arise and there is a trust which can be abused by either party through shirking or unethical behaviour.

While the Socratic method can be used in a classroom setting (such as in many US law schools), there are three problems. First, the Socratic method in the classroom does not focus on each student's strengths and weaknesses. Given the large number of students to be addressed, there is little time to discover and address each skill for each individual student. To keep the conversation going in a classroom setting, the teacher must address the last student's comment which may not be an area of concern for the next answering student. Second, classroom-based Socratic methods are often adversarial – encouraging aggressive behaviour by either the professor to probe weaknesses quickly or by other students to show-off. Third, the Socratic method in the classroom may be simply an imperfect surrogate for individualised tutorials. Becker and Watts (1998) represent one example of the call to make the classroom more like the tutorial by involving students more in working groups and stopping lectures to involve students. Yet, if the optimum is tutorial teaching, why settle for a second best (given resource constraints)?

Within the last 5-10 years, information and communications technologies have increasingly been seen as a way to foster tutorial-like education by overcoming resource constraints – substituting network capital for teacher labour along the educational isoquant. To the extent that such substitution is possible, it might be beneficial for the teacher and student. However, more often than not, capital and labour are complements. Katz and Becker (1999) – as representatives of many of the proposals for the use of technology to improve economics teaching, stress the benefits of computers on enlivening presentations. Yet, simply adding visual appeal or even a bit of ease for students does not address the core development of skills addressed in this paper. Personally, I shun the use of computers in teaching, preferring paper and pen based methods of instruction. If the Internet is used, I encourage students to use on-

Figure 6: Uses of ICTs in the E&M tutorial

Dos	Donts
Reference for vocabulary	Spoon-feed material
Alternative treatments of identical material	Give fancy presentations
Find popular treatments of subjects	Simply material to find into computer formats

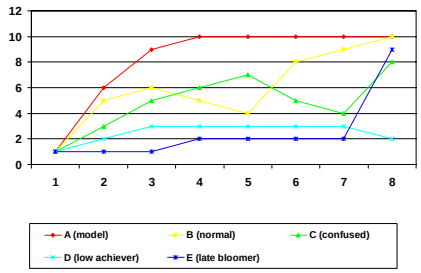
[21] For an example of a good economist as a bad teacher, see Freedman (2001) or März (1992) for a more glowing assessment.

line resources to help them develop research skills and achieve academic independence (see Figure 6 for some dos and donts).[22] Elementary-level computer-based educational materials are also very useful in developing basic intuitions which can later be built upon in main readings -- and web links to lecturer notes will often be assigned as background reading. Given the range of universities and teaching styles, I am able to select lecture slides that correspond to the mathematical and interest background of the student.

Empirical Illustrations and Lessons Learned

Unsurprisingly, different students perform differently against the idealised skill development chart portrayed above in Figure 2. Some examples of skills evolution are shown in Figure 7 for five "composite" students. The first "idealised" student understands the material as well as the skill trying to be developed and shows rapid progress. This profile was most common for study skills and information. The second type of student was "normal" in that the student was able to apply the skill after it was vigorously stressed but then ceased to use it – possibly because they were concentrating on developing another skill or had relapsed into old habits. After being reminded of the fault, progress continued. The third type of student acquired the skill but then seemed to become "confused" in that he or she over time became unable to continue with the skill until a certain time. It appears this pattern is invariant to teaching technique and rests within the student's psychology. For example, one student had developed the ability to synthesize material well over the first part of the course but then simply became unable to synthesize material – perhaps due to fatigue – but then finally recovered on the last tutorial. The fourth profile is the low achiever who has little interest in the subject; performance starts low and remains low. In some cases, it is because the student needs the course for a requirement or is at the University simply to socialise and travel. The final profile is the late bloomer; the student requires a "paradigm shift" or a new way of thinking to absorb the material and generally shows little progress until one day the student seems to have completely changed.

Figure 7: Example Profile in Skills



Based on my experience, there are four lessons learned which are important for M&E education. First, the use of logic is one of the biggest student weaknesses. As already mentioned, a useful way to address this is, on a blank sheet of paper, to write the statement and conclusion offered by the student on separate sides of the page, and "map" intermediate arguments. Over a short amount of time, progress occurs rapidly. Second, a road-map should be provided with the Socratic method as students feel uncomfortable with only questions. Giving an overall outline of where a line of questioning is going

[22] Some resources I have assigned have been the Learning and Teaching Support Network Centre for Economics (Economics LTSN) available at http://www.economics.ltsn.ac.uk/ and a wide variety of very focused sites for specific material

provides more comfort to the student. Third, reflecting the tension referred to in teacher intervention mentioned in Figure 3, problem sets can be useful. However, the strategy should be toward teaching the student to ask the questions necessary to devise their own problem sets. Fourth, students often try to compartimentalise their learning into "academic" and "real world" contexts. As many students engaged in tutorials are in their penultimate year and thinking about career choices, I try to use popular job search guides like Wet Feet or Vault guides to try to show students the same skills they use in academics are those used in the real world.

While the results presented refer predominantly to undergraduate teaching, many of these techniques have been used (and even discovered) in professional and policymaker education. Examples of these issues can be illustrated from two workshops I helped organise in Istanbul in 1999 for the OECD: "Investigative Journalism in Transition Economies" and "Promoting Public Procurement in Eastern Europe and Former Soviet Union."[23] In the meeting on promoting public procurement, about 20 senior procurement officials were invited from Eastern Europe to share experiences with each other and with procurement officials from the Former Soviet Union (FSU). The investigative journalism workshops involved participants from Eastern Europe and the FSU and was aimed at teaching journalists to be critical, using a case study called "Carpatia."

In both workshops – as well as in most workshops organised by large international organisations, education more often takes the form of peer education – where participants learn from each other -- and from the trainer as a peer rather than as a teacher. While the undergraduate tutorial is a bilateral exchange, the policymaker trainer is a "multilaterally bilateral exchange" (representing bilateral exchanges by a number of parties sequentially). In the public procurement workshop, public procurement officials were asked to write a briefing paper about reforms in their public procurement office. Each country was then given the chance to present its practice and receive questions from other countries in the region. For the investigative journalism meeting, participants had to engage in hands-on exchanges individually with trainer and with each other.

To accomplish their goal, participants at both workshops had to engage the five principles discussed above – however the learning format was different. In the case of study skills, the pressures of work forced the discovery of more efficient study methods. Information and synthesizing, judgement and critique were forced by the nature of the problems to be tackled as was model-based thinking. Indeed, model-based thinking turned out to be key because these issues were at the cutting edge of policy and models had to be generated during the training to understand the new phenomenon of public procurement reform and investigative journalism training in Eastern Europe and the FSU. In the idealised model shown in Figure 2, application is the last skill to be fully developed. In this case, this skill acted as a platform for the continuous development of the other skills. Unlike in the undergraduate education where these skills are "managed,"

[23] For more information, see http://www.worldbank.org.ru/wbimo/doc/AgndaApril00.doc for investigative journalism and http://www.oecd.org/pdf/M000014000/M00014159.pdf for public procurement. For more about these activities, see Michael (2002).

in policymaker training, these skills are taught by peers in the course of their work – often building upon an extensive base of academic, professional, and life experience. Just as undergraduates forget skills, so do policymakers and such peer-education well justifies the expense of these exercises. While these types of workshops do not specifically aim at teaching policymakers to think, proper design of the workshop can do much for developing and using important thinking skills.[24]

Conclusion

One of the problems with education in economics and management is its lack of focus on teaching thinking skills. While many people have written about teaching economics and management, few have written about how to use economics and management as a platform to teach thinking skills. This paper has attempted to draw together the lessons I have learned from my experience in teaching myself and others important thinking skills such as study skills, learning and synthesis skills, model-based thinking, judgement, critical skills and double-loop learning. The lessons here are not new and appear in various forms in other literatures in education and in E&M. However, the use of tutorial-based education in teaching these skills has been under-estimated in the literature. Tutorial-based education provides the focused student-specific instruction needed. However, tutorials are costly and are not always appropriate. While tutorials may not always be appropriate, I hope this paper may serve as an important entry point or *vade mecum* for E&M teachers wishing to teach thinking skills, especially in a tutorial context.

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[24] The treatment of policymaker training here has been brief and a further paper will expand upon these ideas.

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