CRA conference at Snowbird
19th July 2010, Snowbird

Sally Fincher

Why can't teaching be more like research?





University of Kent

Academic work

- *The fundamental obligations of a university teacher for teaching, research and academic citizenship are the same for all academics. All these activities are necessary for the university to perform its indispensable tasks for modern activities and modern intellectual culture and it falls to the individual academic to contribute to the best of his capacity to the performance of those tasks.*

Edward Shils

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Edward Shils

"teaching, research and academic citizenship"

- A view of the academic world to which many of us subscribe.
- And because these activities occur in the same situations – often within the same individual – we are tempted to think they share characteristics that they really don't.
- Today I'll explore some of the ways in which teaching and research are different and expose why I think that is important.

Computing Education Research

- What I'm not talking about – won't be talking about – is computing education research. I'm passionately interested it, and think it's of great importance and value.
- But there are only about 50 people in the world interested in that, and I've already talked to all of them.

Research (for a moment)

- Research is an activity that stands outside of any one institution.
- Researchers gain internal value/kudos by activity that is validated by an external community of peers and indicators (papers published, grants awarded, prizes won) over which the institution has ***no*** control.
- It happens “elsewhere”. Or, perhaps more precisely between elsewheres – in what Diana Crane calls “invisible colleges”. (An expression of what Ed Lazowska on Sunday called “persistent interaction”)

Research (for a moment)

- A corollary of this sort of external network is that research information is exchanged *between* institutions as a matter of course – I ask you about your work, about your mentor (who, it turns out, I went to Grad School with), we find out areas of intellectual commonality, I read your papers ...
- No one has to stress or strive to make it happen, it's part of the fabric of the activity.

Teaching is not like research

- Teaching is specific and situated. Context matters deeply.
- It's located in institutions, and in subject matter.
- I teach (literally) in the same room you teach in, we are seen to be doing "the same thing".
- There is no external visibility, little recognition and no extrinsic reward.
- If I'm having problems teaching `public static void main`. I want to find a better way to do it - where can I get help?

Teaching is not like research

- Institutional colleagues teaching other subjects (French, Law) don't have the domain knowledge to help
- CS colleagues from other institutions have little incentive to improve my practice.
- The *community of practice* for my teaching is my department. The concerns there are informed by a different rhetoric: pre-requisites, progression, satisfaction, retention – which are not judged by what happens elsewhere.
- Let me tell you about Tracey ...
- "I get to the end of the year and I think 'Ooh, I've got happy students. That's *good*'"

Role orientations

- I want to cast this research-teaching dilemma in a theoretical framing, which distinguishes two role orientations, “local” and “cosmopolitan”

Local-Cosmopolitan distinction

- Robert Merton first made this distinction in 1957:
- “The localite largely confines his interests to this community. He is preoccupied with local problems, to the virtual exclusion of the national and international scene.”
- ... and whilst the cosmopolitan has some interest in the local community ...
- “... he is also oriented significantly to the world outside and regards himself as an integral part of that world”

Co-Op College

- Alvin Gouldner (Merton's student), took this distinction into a study of 125 faculty members from a mid-range US university and defined his two latent organisational types:
  - **Cosmopolitans**: those low on loyalty to the employing organization, high on commitment to specialized role skills, and likely to use an outer reference group orientation.
  - **Locals**: those high on loyalty to the employing organization, low on commitment to specialised role skills, and likely to use an inner reference group orientation.

Research & Teaching orientation

- Gouldner defines these as “latent” rather than “manifest” types because people with ostensibly identical roles (“associate professor”) may, in fact, have different orientations.
- Researchers are more likely to have a cosmopolitan orientation: they have an external community from where they draw validation and specialised disciplinary skills.
- Teachers are more likely to have an orientation to local context and constraints, and draw validation from the institutional community.

What does that look like?

- Some degree of anamorphosis is going on ...

Anamorphosis – the distorted projection

Eeeew ...
... it doesn't look like that from where I'm standing ...

But what does that *look* like?

- Saul Steinberg
  "View of the World from 9th Avenue"

Mar. 29, 1976

THE NEW YORKER

Price 75 cents

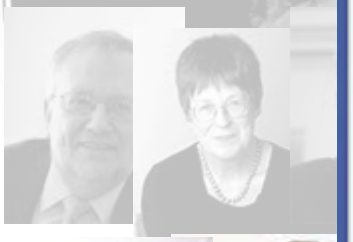
Local-Cosmopolitan anamorphosis

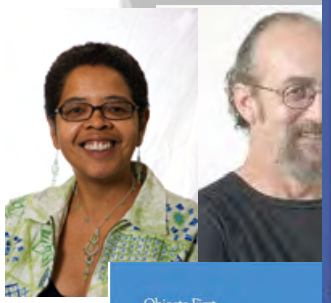
- “View of the World from my Classroom …”

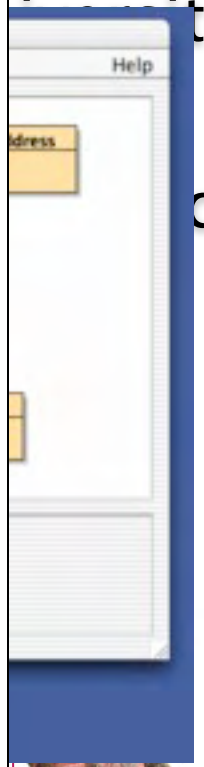
Other

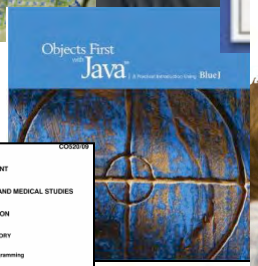
ities

chers









CO520/09

UNIVERSITY OF KENT

FACULTY OF SCIENCE, TECHNOLOGY AND MEDICAL STUDIES

LEVEL I EXAMINATION

COMPUTING LABORATORY

Further Object-Oriented Programming

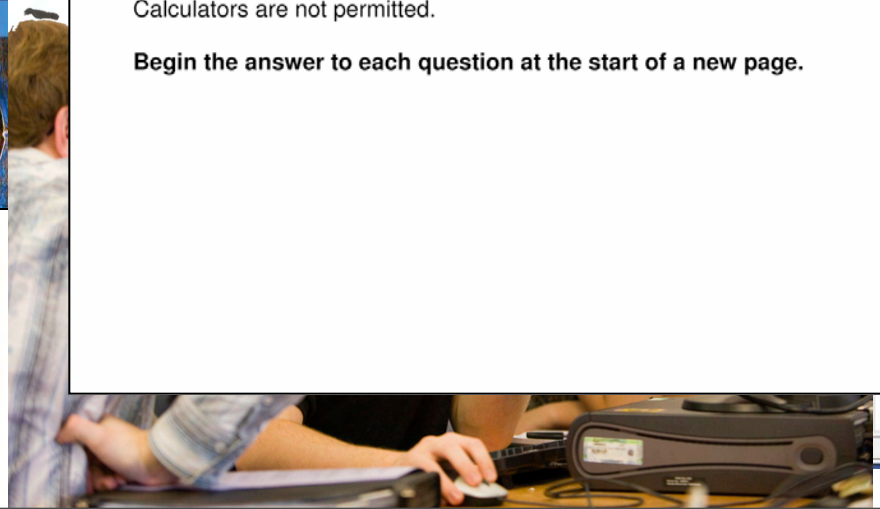
Friday, 22 May 2009 : 14.00 - 16.00

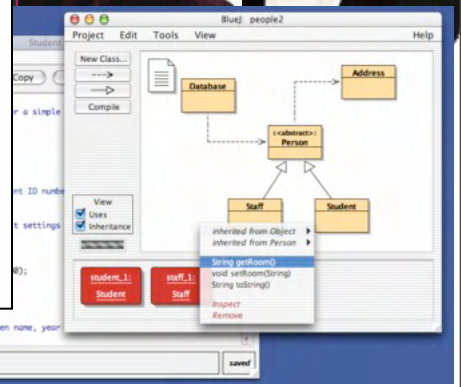
The paper contains FOUR questions. Answer ALL the questions.

Candidates may refer to a single Java textbook which may contain annotations but which may not contain additional sheets whether loose or fixed..

Calculators are not permitted.

Begin the answer to each question at the start of a new page.





Local-Cosmopolitan anamorphosis

- “View of the World from my Classroom …”

ICER

FIE 2010 WASHINGTON D.C.

DALLAS SIGCSE 2011

ICLS CHICAGO
INTERNATIONAL CONFERENCE OF THE LEARNING SCIENCES 2010
LEARNING IN THE DISCIPLINES

Individual students

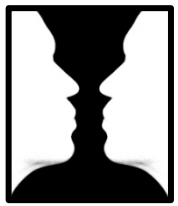
Committees, admin duties

Teaching

University of Kent

Funding councils (bids)

CRUCIBLE
research in interdisciplinary design



acm Transactions on Computing Education

disciplinary commons

Local-Cosmopolitan

- I like this model, because it gives us a tool to question some of the rhetoric surrounding teaching, about teaching innovation, about changing teaching, and about improving it.

Problematic rhetoric (i)

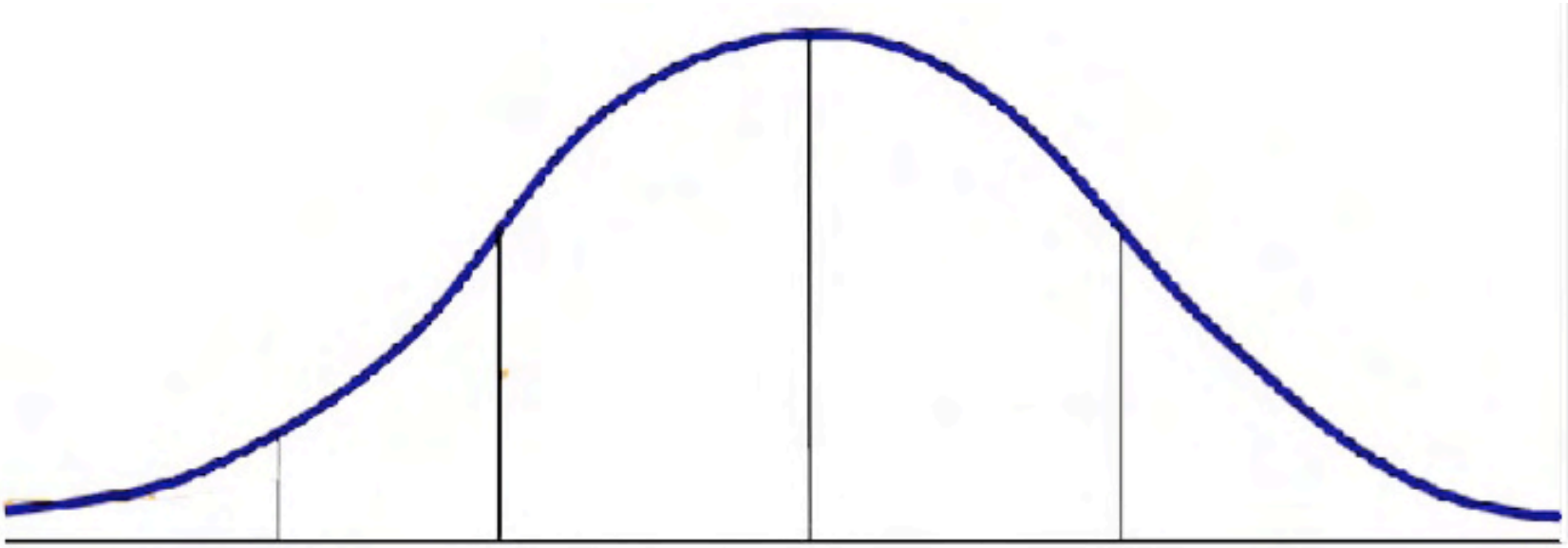
- For me, there are two forms of problematic rhetoric about improving teaching.
- One (the “best practices” rhetoric) assumes that knowledge about teaching crosses institutional boundaries in the same way that research knowledge does. That locals are cosmopolitan.

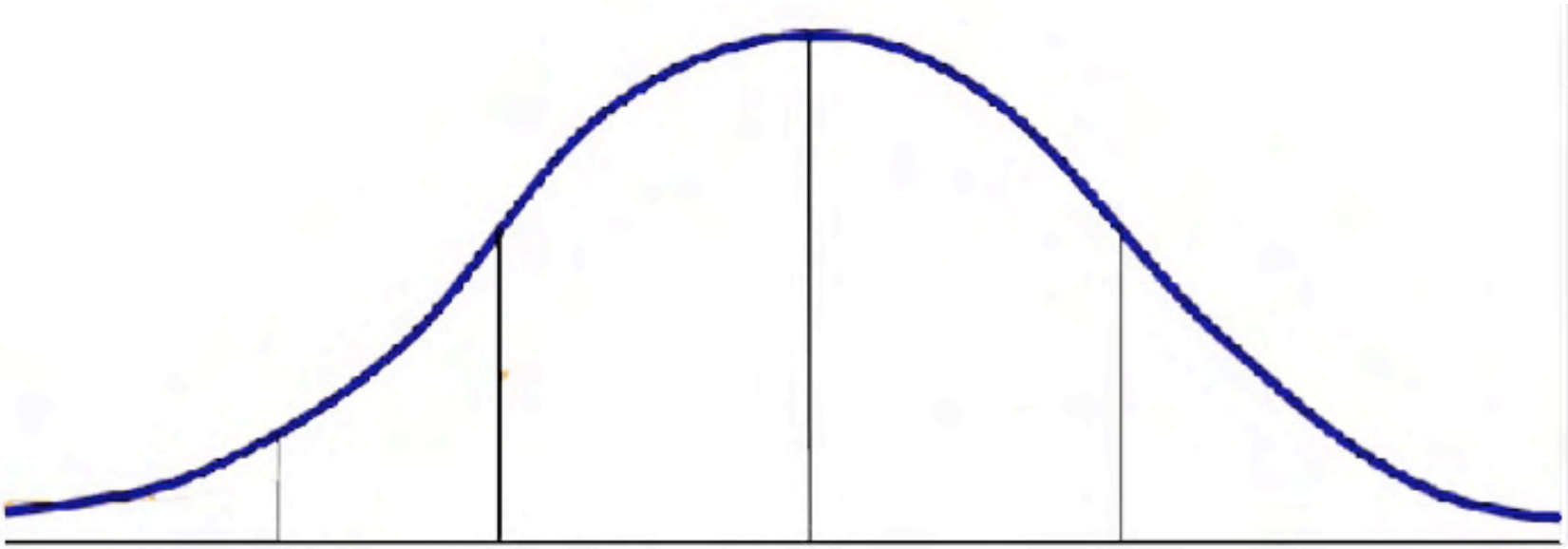
Best practices

- Changing teaching – improving teaching – depends crucially on how you think *change* comes about.
- One idea of change focuses effort on getting better products, better practices, better *stuff*.

Better *stuff*: diffusion of innovations

- There's been a lot of work done on how "innovations" diffuse through communities, largely based on Everett Rogers work.
- Let me tell you about hybrid corn seed ...





Way-hey! Look what I've found

Oh wow, that is *so* cool. We could do that, too.

I hear they're using it at UDub ...

I went to a workshop on it at SIGCSE

What new approach?

Better *stuff*: problems

- These models depend on there being a community that talks to each other
- But how does that happen for teaching?

It’s not like we don’t have innovators ...

- “I look at what Stuart’s doing, and I go look at what Owen’s doing, and I go and I look at what Mike Clancy’s doing. So I just – they’re people who I know who are always up to good, and that I always kind of have my ear to the ground on what they’re doing.”

And early adopters ...

"He said, 'My brother uses – developed – a Nifty assignment, and it's called *Critters*.'

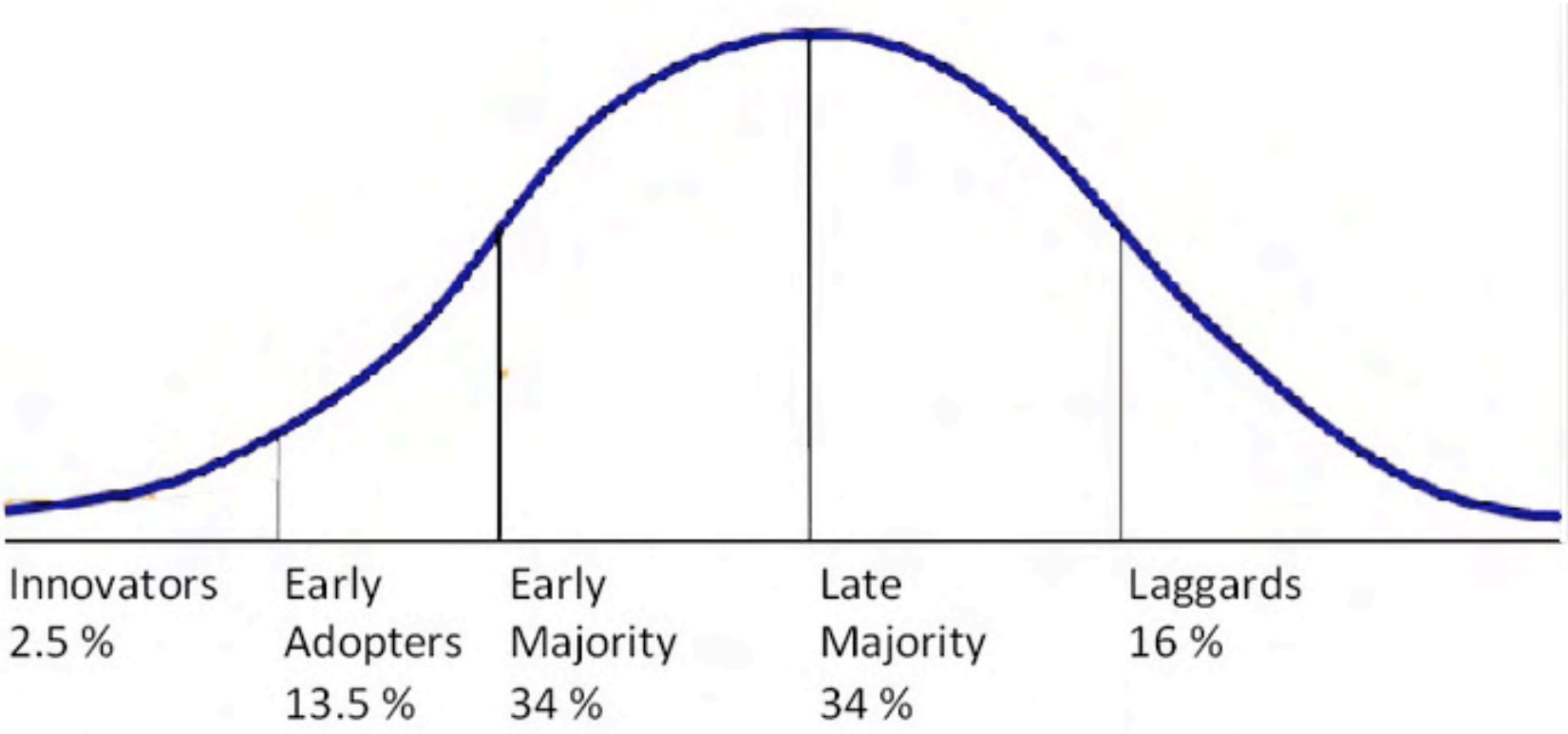
I said, '*Critters* sounds good. Is it graphical?'

And he said, 'Yes, and at the end, they run a *Critters* tournament.'

I said, 'Great. Lift it from your brother'."

Better *stuff*: problems

- What happens is that these ideas fall into what diffusion researchers call **the chasm**



To jump the chasm ...

- “the typical farmer first heard of hybrid seed from a salesman, but neighbours were the most frequently cited channel leading to persuasion. Salesmen were more important channels for earlier adopters, and neighbours were more important for later adopters”
- “The farmer-to-farmer exchange of their personal experiences with hybrid seed was at the heart of diffusion. When enough such positive experiences were accumulated by the innovators and early adopters, and exchanged with other farmers in the community, the rate of adoption took off”
- “The farm community as a social system, including the networks linking the individual farmers within it, was a crucial element in the diffusion process”

Better *stuff*: problems

- These models depend on there being a community that talks to each other. *Neighbours*.
- They depend on knowledge about teaching diffusing through a cosmopolitan-type network. *Farmer-to-farmer*.
- But locals don't have the inter-institutional networks of "interpersonal ties" that would allow them to be persuaded by others' practice: all they have is sales talk. Cosmopolitans, when they meet and work together, don't talk about teaching.
- The better *stuff* rhetoric fails to address this and simply laments localised pockets of innovation, of educators re-inventing the wheel

Problematic rhetoric (ii)

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Problematic rhetoric (ii)

- For me, there are two forms of problematic rhetoric about improving teaching.
- One (the “best practices” rhetoric) assumes that knowledge about teaching crosses institutional boundaries in the same way that research knowledge does. That locals are cosmopolitan.
- Another (the “scholarship” rhetoric) assumes that knowledge about teaching must be “scientised” - derived and presented in the same way as research knowledge to be valid. That locals should behave like cosmopolitans.

Scholarship

- The “scholarship” rhetoric assumes that teaching practices must be abstracted and decontextualised – generalised – to be of value.

Rhetoric of SoTL

- “to strengthen the University’s culture of publishing new knowledge developed through research, synthesis, practice and therefore teaching” (1d)
- “those who have little or no experience of pedagogic research or SoTL have been mentored by more experienced pedagogic researchers” (2d)
- “research on teaching and learning should be viewed as one imperative aspect of SoTL” (3e)
- “without [SoTL] they cannot pass through the portal from novice to expert teacher” (3f)

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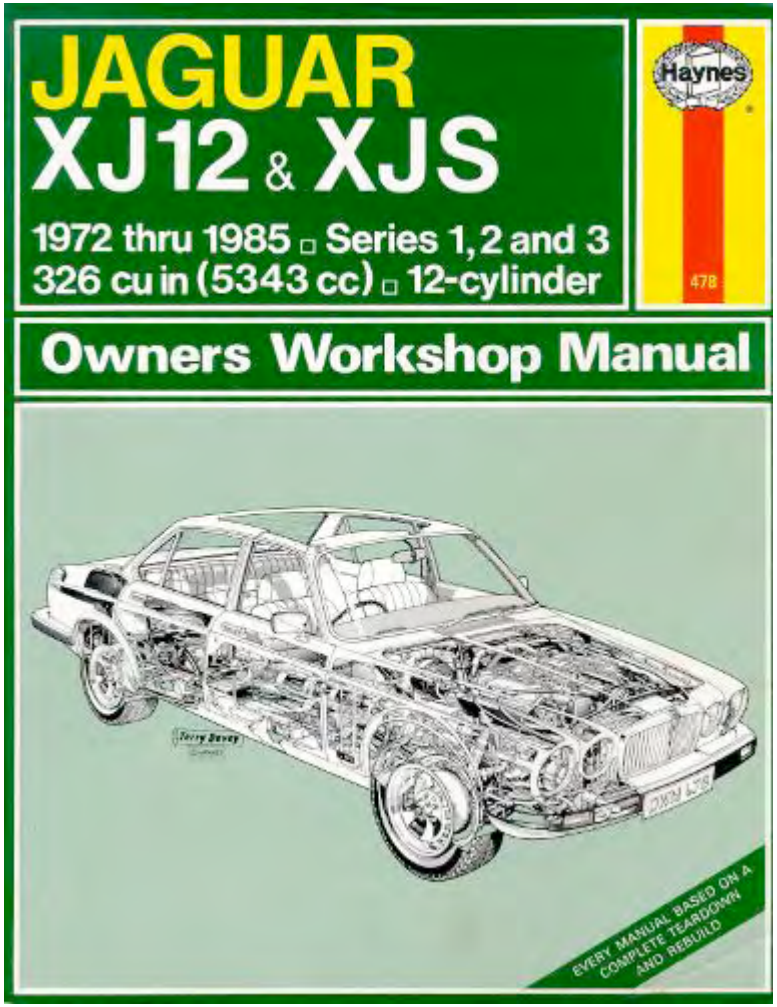
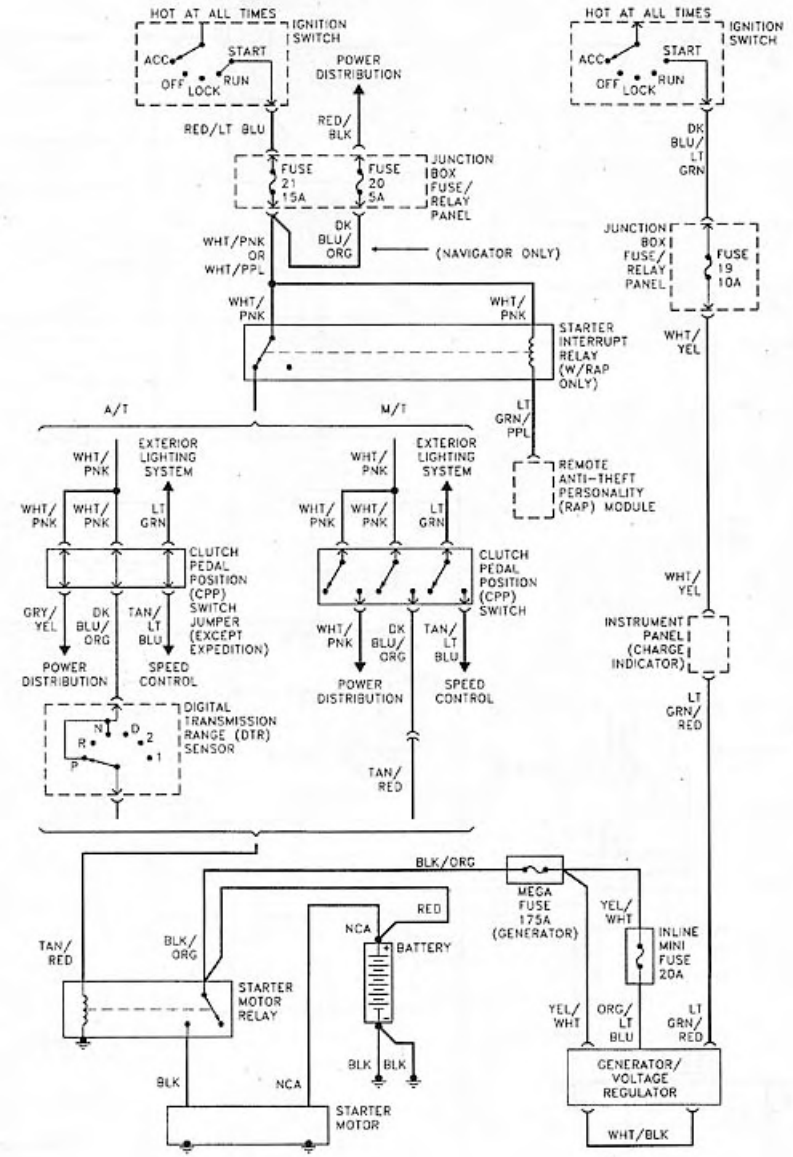
For any other practice, this would be absurd

- There is just no sense in talking about “a scholarship of cooking” or “a scholarship of car mechanics”
- Cooks and mechanics have representations of their practice – but they are ***of*** the practice, not about an abstraction of it.





Starting and charging system

GlobalCorp
Automotive Division

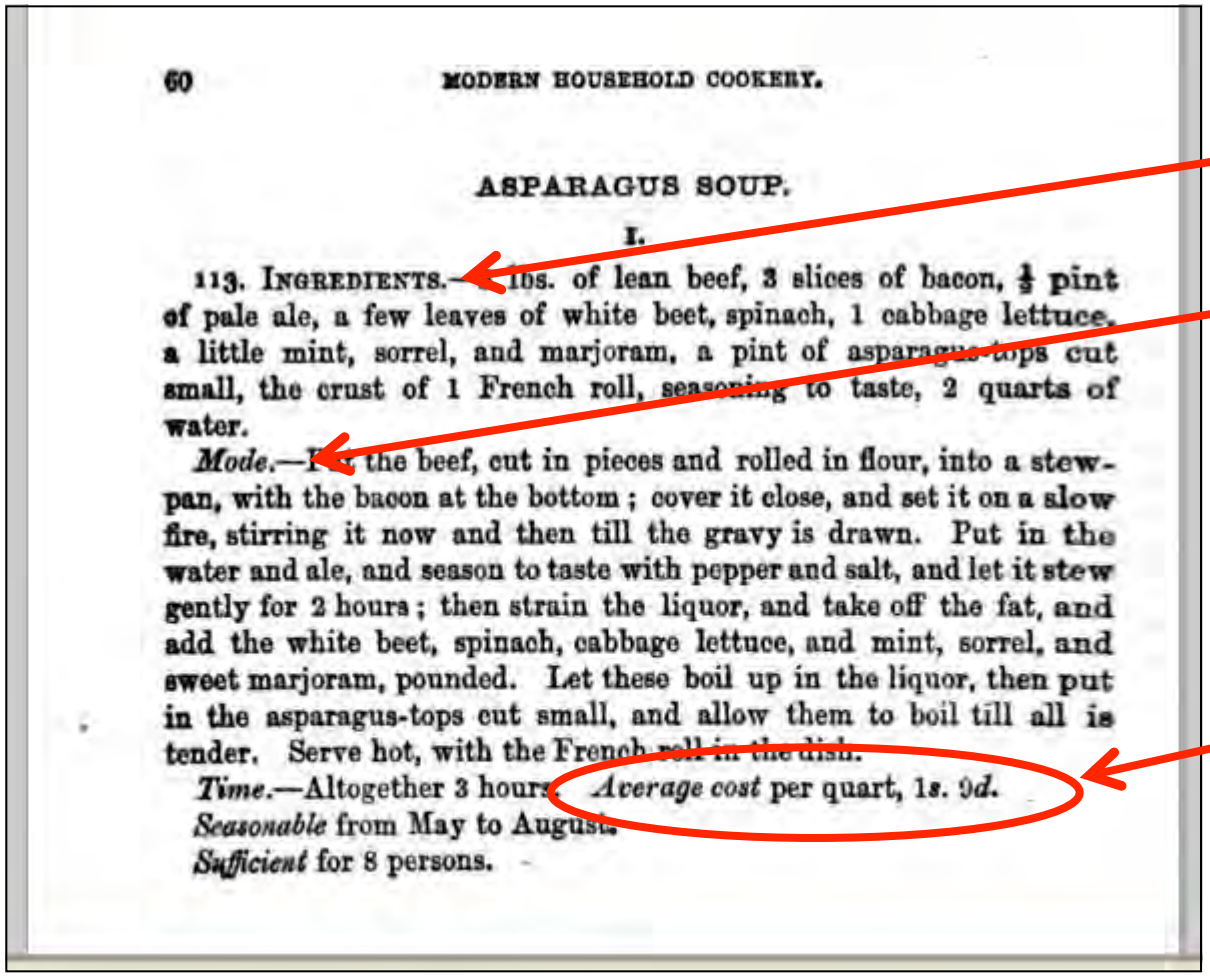
Disassembly of the BD-13 Disc Brake System

	Show Step	Highlight Parts Involved
1. Remove Lug nuts 19mm Lug Nuts – 6-point socket recommended		
2. Remove nuts from knuckle bolts 13mm nuts		
3. Slide Dust cover off of Knuckle bolts Wear a mask to avoid inhaling loose brake dust		
4. Remove Knuckle Use a hammer to loosen if parts are rusted together		
5. Remove Caliper assembly Do not allow caliper assembly to hang from brake hose		
6. Slide apart Rotor and Hub Again, a hammer might be needed, use a thick rag or towel to prevent denting either part		
Reset Animation		

NOTE: Assembly is the reverse of Dissasembly

Warning: If brake system has been in use, there will likely be some residual brake fluid in the hoses and in the pistons which will leak out with handling. Brake fluid is a category 4 corrosive and will severely damage paint. Brake fluid is also a eye/skin irritant and this procedure should always be done with AEC approved gloves. If fluid is ingested, get to an emegency room immediately.

Isabella Beeton (1863)



60 MODERN HOUSEHOLD COOKERY.

ASPARAGUS SOUP.

I.

113. INGREDIENTS.—2 lbs. of lean beef, 3 slices of bacon, ½ pint of pale ale, a few leaves of white beet, spinach, 1 cabbage lettuce, a little mint, sorrel, and marjoram, a pint of asparagus-tops cut small, the crust of 1 French roll, seasoning to taste, 2 quarts of water.

Mode.—Put the beef, cut in pieces and rolled in flour, into a stew-pan, with the bacon at the bottom; cover it close, and set it on a slow fire, stirring it now and then till the gravy is drawn. Put in the water and ale, and season to taste with pepper and salt, and let it stew gently for 2 hours; then strain the liquor, and take off the fat, and add the white beet, spinach, cabbage lettuce, and mint, sorrel, and sweet marjoram, pounded. Let these boil up in the liquor, then put in the asparagus-tops cut small, and allow them to boil till all is tender. Serve hot, with the French roll in the dish.

Time.—Altogether 3 hours. *Average cost* per quart, 1*s.* 9*d.*

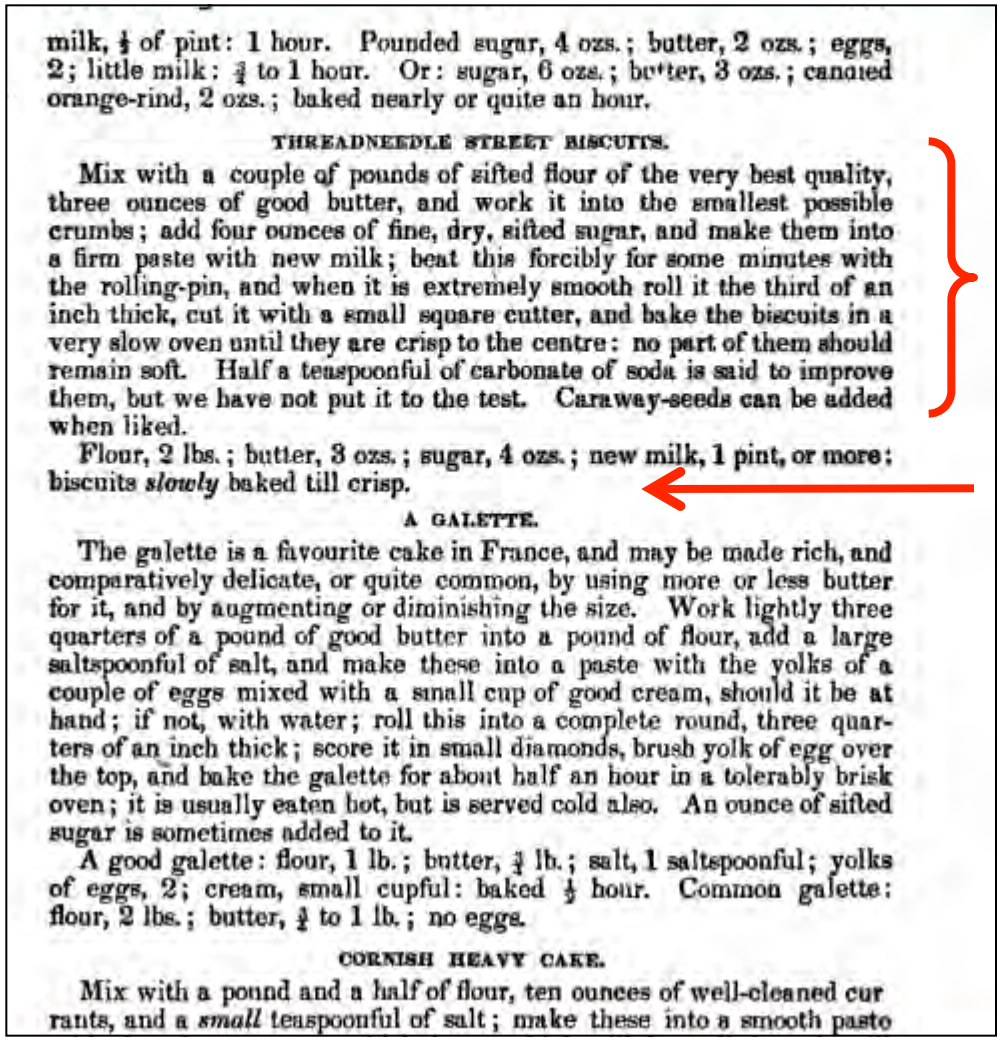
Seasonable from May to August.

Sufficient for 8 persons.

Separates ingredients from method

Adds some context

Eliza Acton (1845)



milk, ½ of pint: 1 hour. Pounded sugar, 4 ozs.; butter, 2 ozs.; eggs, 2; little milk: ¾ to 1 hour. Or: sugar, 6 ozs.; butter, 3 ozs.; candied orange-rind, 2 ozs.; baked nearly or quite an hour.

THREADNEEDLE STREET BISCUITS.

Mix with a couple of pounds of sifted flour of the very best quality, three ounces of good butter, and work it into the smallest possible crumbs; add four ounces of fine, dry, sifted sugar, and make them into a firm paste with new milk; beat this forcibly for some minutes with the rolling-pin, and when it is extremely smooth roll it the third of an inch thick, cut it with a small square cutter, and bake the biscuits in a very slow oven until they are crisp to the centre: no part of them should remain soft. Half a teaspoonful of carbonate of soda is said to improve them, but we have not put it to the test. Caraway-seeds can be added when liked.

Flour, 2 lbs.; butter, 3 ozs.; sugar, 4 ozs.; new milk, 1 pint, or more: biscuits *slowly* baked till crisp.

A GALETTE.

The galette is a favourite cake in France, and may be made rich, and comparatively delicate, or quite common, by using more or less butter for it, and by augmenting or diminishing the size. Work lightly three quarters of a pound of good butter into a pound of flour, add a large saltspoonful of salt, and make these into a paste with the yolks of a couple of eggs mixed with a small cup of good cream, should it be at hand; if not, with water; roll this into a complete round, three quarters of an inch thick; score it in small diamonds, brush yolk of egg over the top, and bake the galette for about half an hour in a tolerably brisk oven; it is usually eaten hot, but is served cold also. An ounce of sifted sugar is sometimes added to it.

A good galette: flour, 1 lb.; butter, ¾ lb.; salt, 1 saltspoonful; yolks of eggs, 2; cream, small cupful: baked ½ hour. Common galette: flour, 2 lbs.; butter, ½ to 1 lb.; no eggs.

CORNISH HEAVY CAKE.

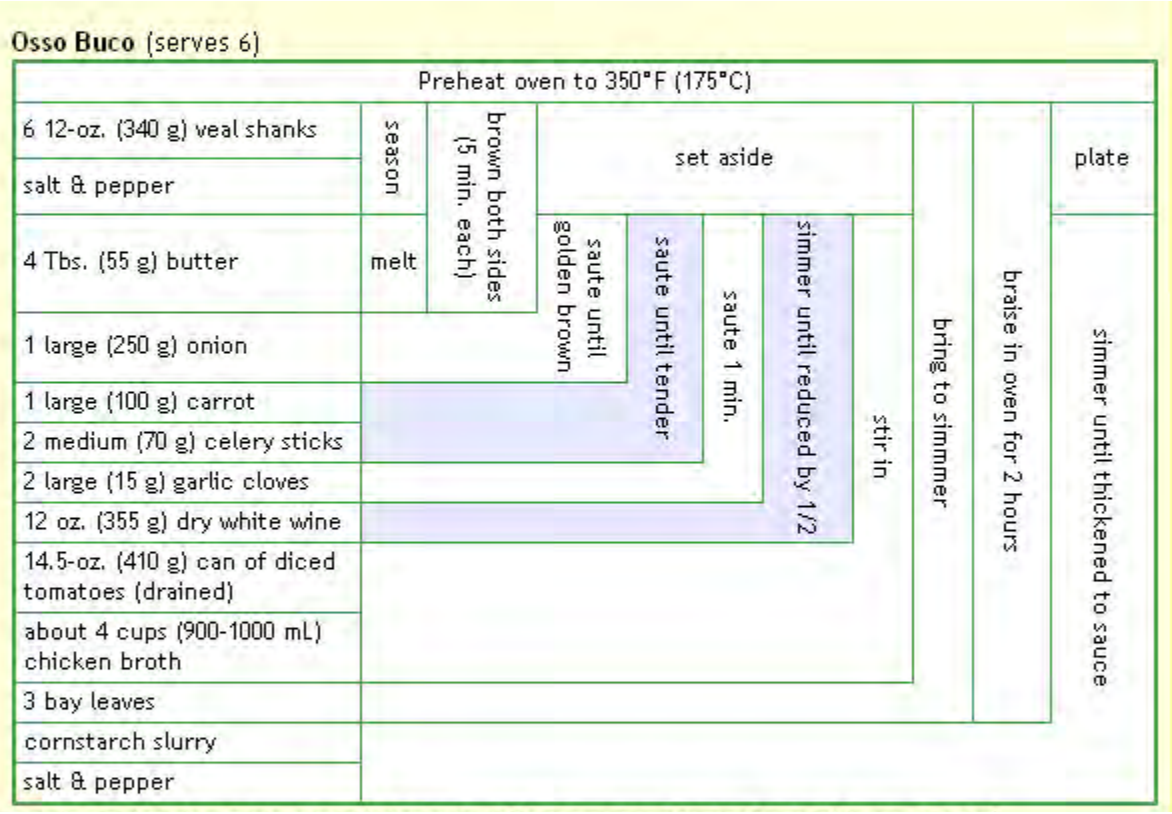
Mix with a pound and a half of flour, ten ounces of well-cleaned currants, and a *small* teaspoonful of salt; make these into a smooth paste

Narrative recipe

then summary

In effect, addressing the needs of novices & experts in one representational form

Uncommon form (i)



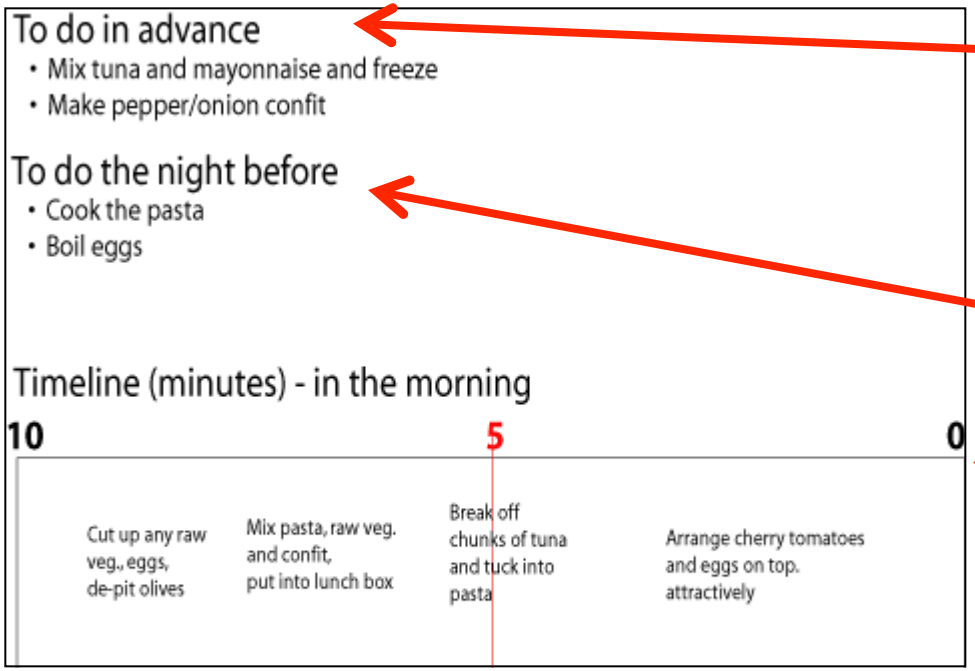
Don’t forget the garnish

Gremolata

1 clove garlic	mince	mix	chill
1 medium lemon	zest		
10 sprigs (15 g) parsley	mince		

Diagrammatic form presents ingredients on *y* axis, time on *x* axis, “action” on the intersection. Good for overview, but practically unusable (in practice).

Uncommon form (ii)



Tells you what to have in the store cupboard (*joubisai*)

Tells you what to have cooked and ready

Counts you down to "zero" – into the bag and out of the door

With a helpful "halfway" point

What do these representations share?

- Make others' practices visible
  - extend "horizon of observation" (Hutchins)
- They are close to the work. They are situated.

“Scholarising”: problems

- Representing teaching as “objective”, generalised knowledge does not improve practice. That way lies professors reading their textbooks out in lectures
- Equally we don’t *want* research knowledge to be situated & local – there would be no progress. We need results to diffuse widely through a community. Which is exactly why we write papers & books.
- “Scholarship”, is a rhetoric of legitimisation, not practice. The legitimisation that a journal publication offers is not of practice, or improvement to practice, but is at best the second hand validation of research respectability.

Departmental change

- We have – OK, I have – talked about change as if it was an individual thing.
- And in some senses it must be, if an individual doesn't change, nothing changes
- But there are other considerations – considerations of situation, and context, which make claim that the *department* is the natural unit of change.

Departmental considerations

Carl Wieman:

- “The department is the unit at research universities that decides what is taught and how it is taught in that discipline; thus any sustained attempts to change teaching practices must focus on the culture of the department

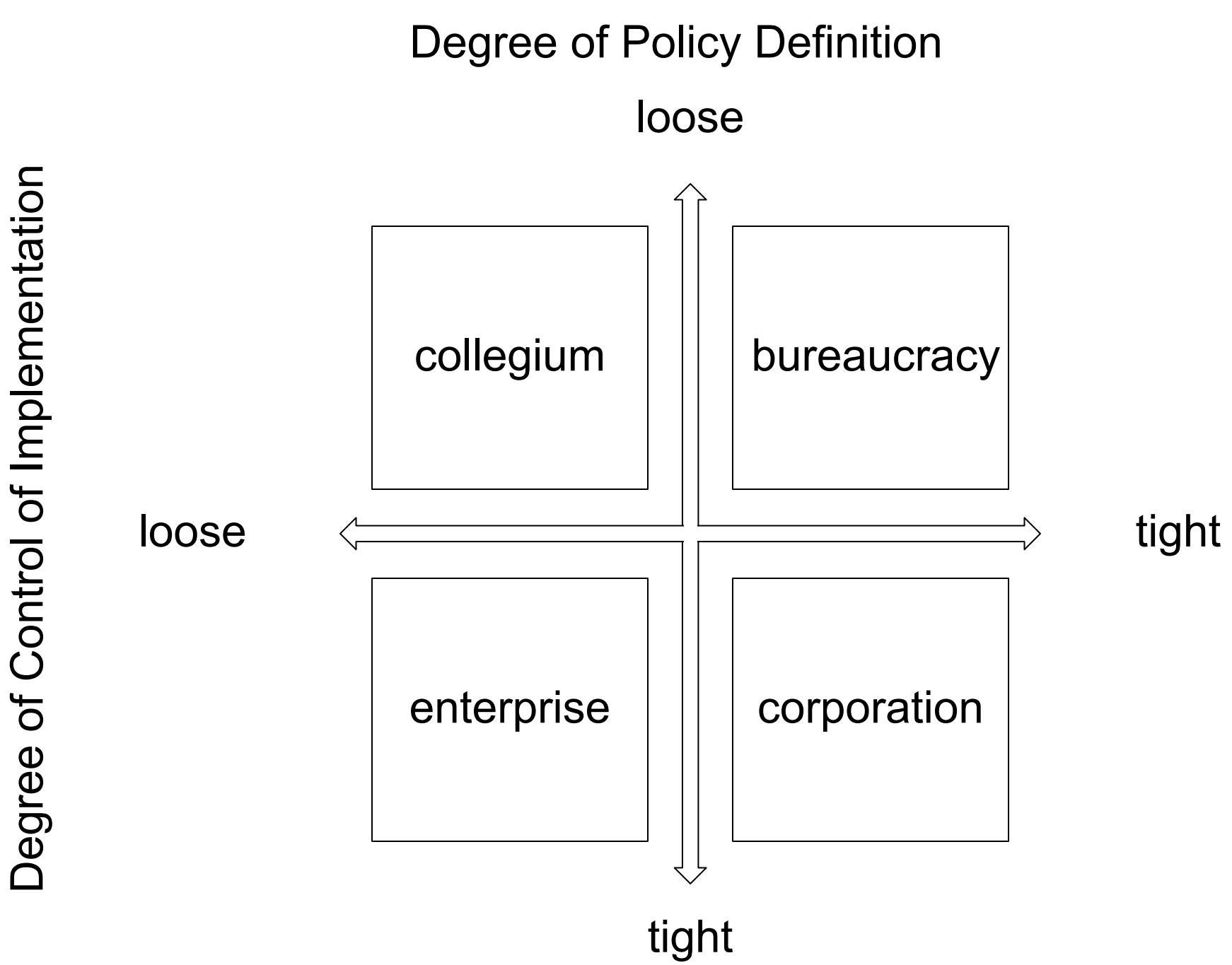
Departmental considerations

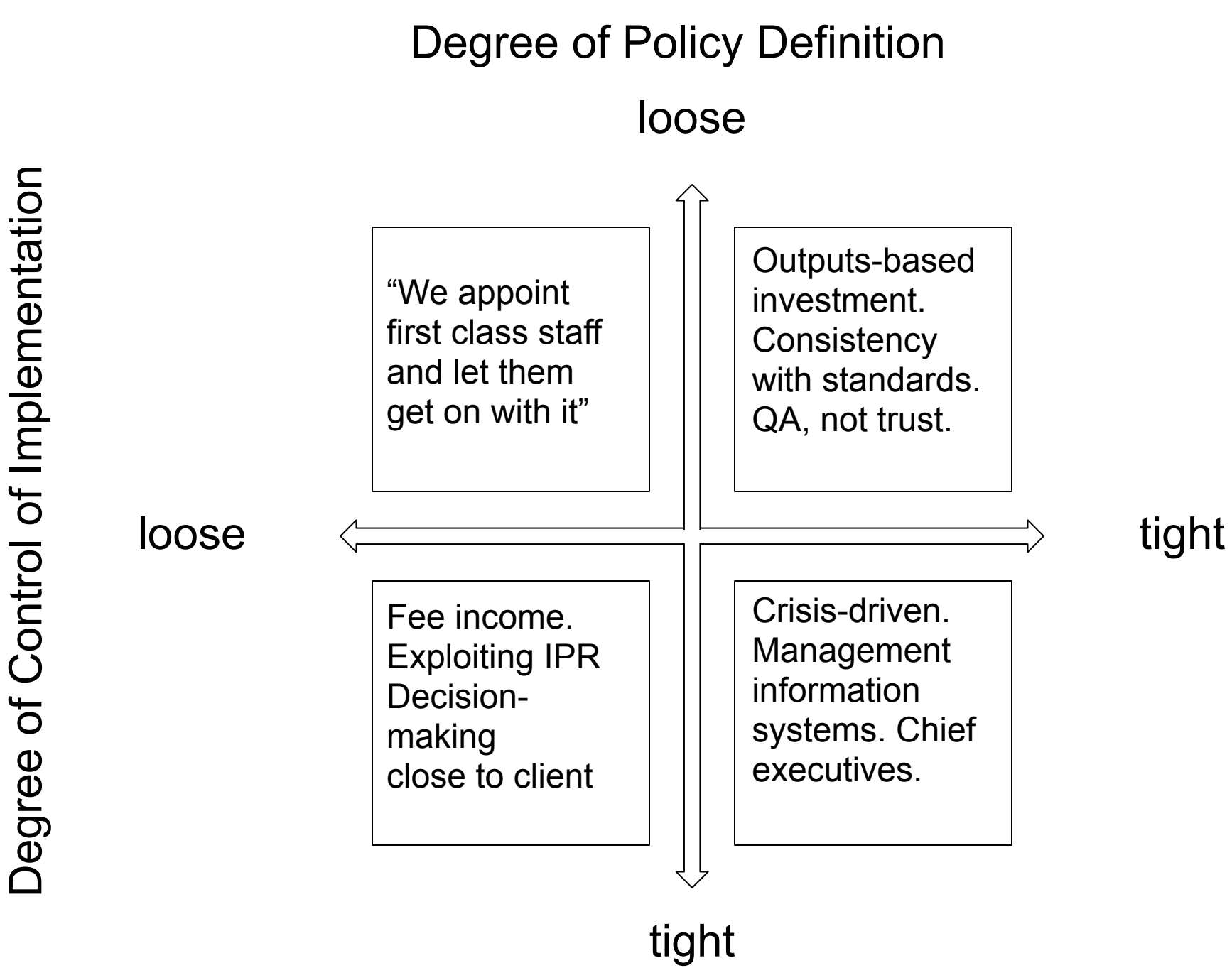
Carl Wieman claims:

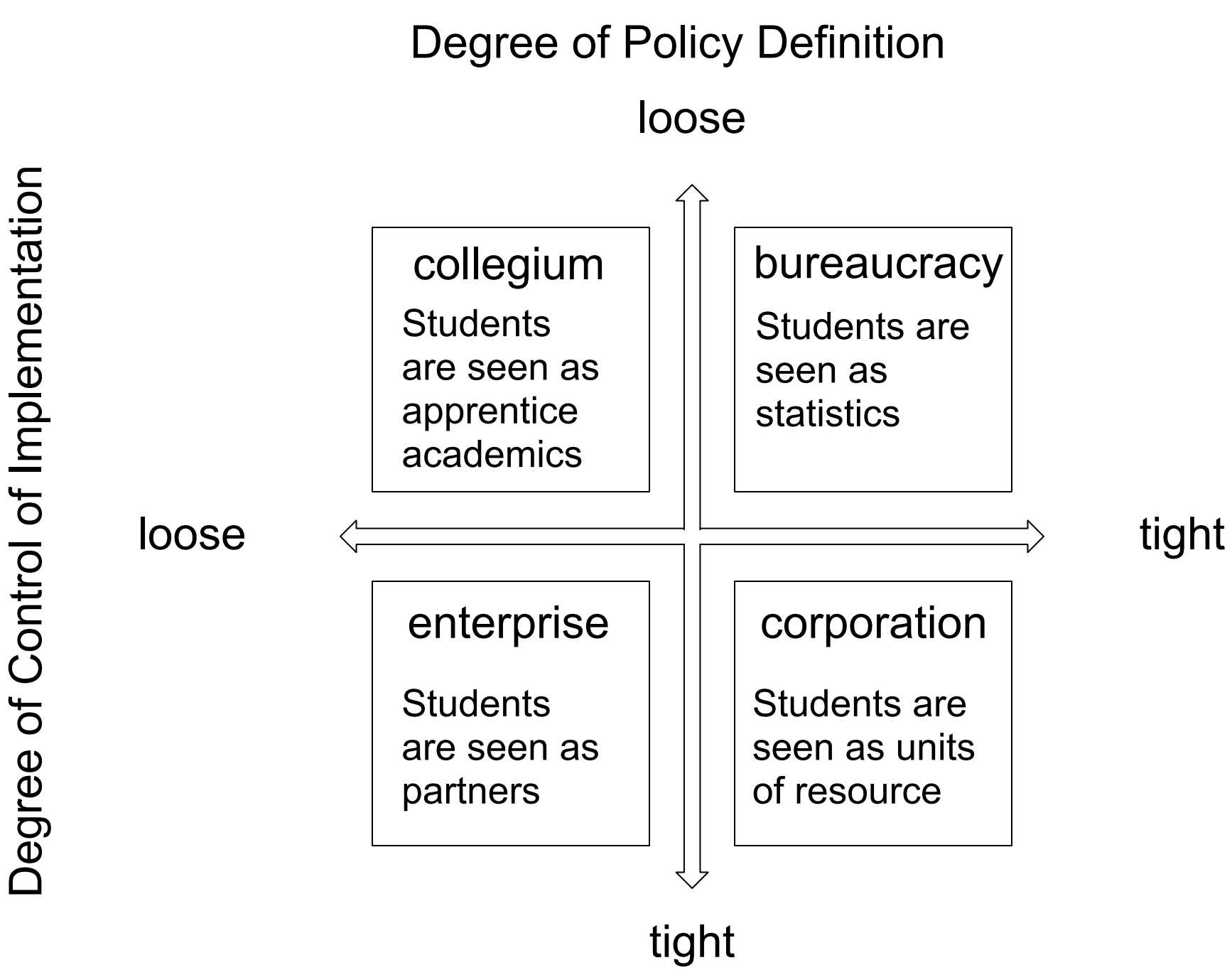
- The department is the unit at research universities that decides what is taught and how it is taught in that discipline; thus any sustained attempts to change teaching practices must focus on the culture of the department. To change that culture, one must affect most undergraduate courses and involve most faculty members. Science departments at large research universities are substantial entities, with dozens of tenure-track faculty, numerous non-tenure-track instructors, and budgets of up to tens of millions of dollars per year. The scale of the change effort must be consistent with this size.

Departmental considerations

- What does it mean to change teaching practice in/for a department? Surely something more than the accumulated effect of individuals, as Wieman suggests.
- McNay has a model of organisational culture that it interesting in this context


Degree of Policy Definition
loose
Degree of Control of Implementation
collegium
bureaucracy
loose
tight
enterprise
corporation
tight


Degree of Policy Definition
loose
Degree of Control of Implementation
loose
tight
"We appoint first class staff and let them get on with it"
Outputs-based investment. Consistency with standards. QA, not trust.
Fee income. Exploiting IPR Decision-making close to client
Crisis-driven. Management information systems. Chief executives.
tight


Degree of Policy Definition
loose
Degree of Control of Implementation
loose
tight
collegium
Students are seen as apprentice academics
bureaucracy
Students are seen as statistics
enterprise
Students are seen as partners
corporation
Students are seen as units of resource
tight

McNay's model used in anger ...

- Graham Gibbs: *Departmental Leadership of Teaching in Research-Intensive Environments*
- MIT, Oxford, Stanford, Helsinki, Lund, Edinburgh, Utrecht, Sydney, Leuven
- Picked only departments demonstrably excellent in teaching

Departmental Leadership of Teaching in Research-Intensive Environments

- “The study was conducted because it had been observed that where very high quality teaching could be seen in these universities it emerged from within departments, rather than being initiated from the centre, and the universities in the network wanted to understand how the departments had managed to create such an environment”

What *doesn't* matter

- Discipline – teaching excellence happens in all disciplines
- Department size
- Country
- Sort of change
  - Change may be *emergent* (from individual teachers/practice up & out, neither centrally driven or derived)
  - Change may be *planned* ("We're all going to do active learning")

What *does* matter

- Disciplinary culture
  - Science & Professional disciplines much more likely to embark on “planned” change – often as a result of external drivers (e.g. accreditation, or threat of loss of accreditation)
  - *No* example of “planned” change was discovered in Humanities
  - *No* example of emergent change occurred in response to a problem or external driver
- Organizational culture
  - “Collegial” managerial styles do not work in a “Corporate” culture – and vice versa
  - In Gibbs’ study (remember they were all research-intensive institutions) there were mostly collegial cultures, with some entrepreneurial. Bureaucratic & corporate were rare.

Leading change

- As well as paying attention to Departmental and University “culture” and their match, there is another problem: change in teaching is (in Ronald Heifetz’ terms) not a technical challenge, but an adaptive one.
- A technical challenge is one that can be solved by an expert. You're ill; you go to the doctor; you have heart surgery. Your car breaks down; you call a mechanic; he replaces the broken part. (Remember “best practices”?)

Leading change

- An adaptive challenge is where we're part of the problem, and it's we who have to change.
- The mechanic tells us the problem isn't the car: it's how we drive it.
- The doctor tells us that if we're to avoid a relapse we're going to have to change our lifestyle

  (and post-surgery compliance of behaviour change is about 20%)
- Teaching is (almost always) an adaptive challenge.

Process

- So how do you give educators the opportunity to challenge and alter the way they do things?
- Another way of thinking about change in teaching is as a process.

Berg & Östergren

- Barbro Berg & Bertil Östergren posit that change does not happen *within* a system, but *to* a system.
- "*When the equilibrium is disturbed, there is a change ... which can be designated as an 'unfreezing'. The next phase in the change process is 'moving': this continues until a new equilibrium is reached, which we refer to as 'refreezing'. We have found these three phases between them to characterise the whole span of an innovation process.*"

Berg & Östergren

- System is in equilibrium unless something intervenes (“frozen”).
- Something disturbs the equilibrium – and an innovation is frequently a disturbance (“moving”).
- Change must be embedded in new practice: (“refreezing”). Otherwise it will “slip back” to its previous state, as all the old forces are still in place.
- Freeze – unfreeze – refreeze
- How to pay attention to “unfreezing”?

Other disciplines, other practices

- It turns out, many other professions have ways of "stepping out" of the everyday and examining practices critically & reflectively
- Medical practitioners: Balint groups
- Architects & studio-based arts: Crits
- Musicians/Dancers: Masterclasses
- Theraputic professions: "Supervisions"

So what can we do?

- What would it mean for us to have a forum – a community – that respected teaching as a local activity?
- That did not try to make teaching into something else, to document it like research in journal papers (a paper is a *terrible* way to represent teaching) or to expect knowledge of teaching to jump between institutions.
- What would that look like?

http://www.disciplinarycommons.org

Disciplinary Commons: Aims

- To document and share knowledge about teaching and student learning.
- To establish practices for the scholarship of teaching by making it *public*, *peer-reviewed*, and amenable for *future use and development* by other educators: creating a teaching-appropriate document of practice equivalent to the research-appropriate journal paper.

Disciplinary Commons: Structure

- A *Commons* is constituted from 10-20 educators sharing the same disciplinary background, teaching the same subject – sometimes the same module – in different institutions.
- Meet monthly throughout an academic year.

Disciplinary Commons: Participation

- In meetings we reflect, we share. We observe, we review.
- We have the deep and meaty discussions about the minutae of our practice.
- Part of the sharing is cross-institutional peer observation of teaching.
- We gain an unusual depth of knowledge about practice in other institutions. Knowledge normally only otherwise acquired through a process of “charismatic embedding”

Disciplinary Commons: Reification

- Documentation of teaching practice is:
  - Rare
  - In non-standard (& therefore non-comparable) forms
- *Commons* portfolios have:
  - Common form
  - Persistent, peer-reviewed deliverable
- Power of portfolios is multiplied when there are several examples available for a disciplinary area
- *Commons* archives provide a rich set of contextualised data

Disciplinary Commons: Portfolio form

- Have six sections:
  - Context
  - Content
  - Instructional Design
  - Delivery
  - Assessment
  - Evaluation
- Each section consists of an artefact and a commentary.
- Detail and discussion.
- Evidence and narrative.
- What and why.
- Personal, but not idiosyncratic

Benefits of the *Commons*

- All *Commoners* are expert
- *Commoners* work together to discover, interpret and re-interpret new material
- Resultant public documentation is contextual, comparative and collegial – and inevitably one step (or 10, or 17 steps) from singular tacit, embodied experience

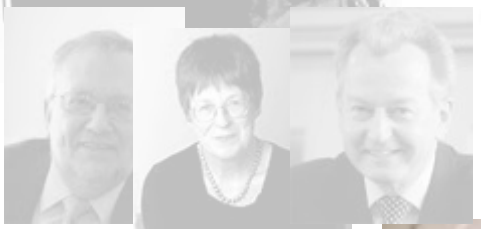
Professional Bodies

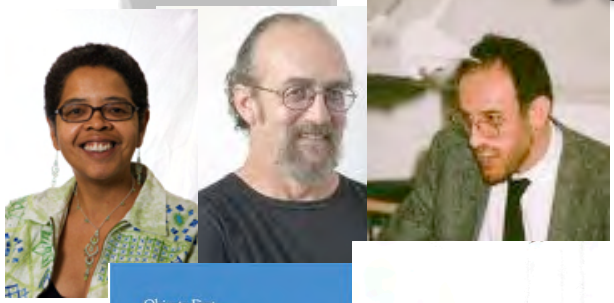
SIGCSE mailing list (not SRHE)

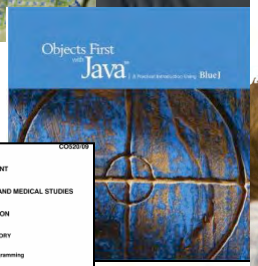
Developer Blogs, Technical Reading

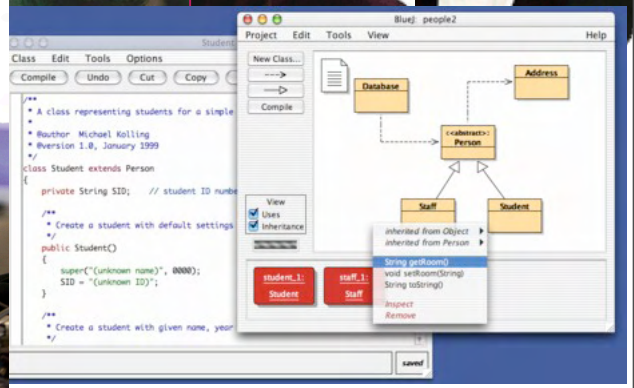
Other Universities

Other Teachers









ICER

FIE 2010 WASHINGTON D.C.

DALLAS SIGCSE 2011

ICLS CHICAGO
INTERNATIONAL CONFERENCE OF THE LEARNING SCIENCES 2010
LEARNING IN THE DISCIPLINES

Individual students

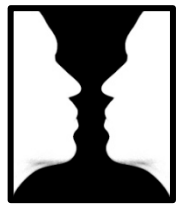
Committees, admin duties

Teaching

University of Kent

Funding councils (bids)

CRUCIBLE
research in interdisciplinary design



disciplinary commons

acm Transactions on Computing Education

Problematic rhetoric (reprise)

- There are two forms of problematic rhetoric about improving teaching.
- One (the “best practices” rhetoric) assumes that knowledge about teaching crosses institutional boundaries in the same way that research knowledge does. That locals are cosmopolitan.
- Another (the “scholarship” rhetoric) assumes that knowledge about teaching must be “scientised” - derived and presented in the same way as research knowledge to be valid. That locals should behave like cosmopolitans.

Commons as a model to appropriately address

- Does not work with decontextualised “best practice”
- Does not “scholarise” teaching, expecting documentation to be abstracted “eduspeak”
- Retains – celebrates – disciplinarity
- Creates an extended opportunity for “unfreezing”, for supporting adaptive change
- A *Commons* does not treat locals as cosmopolitans, but creates a community of “well travelled” locals.

Going forwards ...

- Peter Lee and Ken Gabriel were talking here yesterday because this room is the gateway to an enormous pool of raw CS research talent.
- Equally, you represent a vast resource of expertise with regard to CS education.
- There is tremendous scope to document, share and develop outstanding teaching practices beyond the contexts in which they have been developed - but very little of this scope is currently exploited.
- I hope that you think it might be worthwhile to take up the challenge, to explore this further.

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Gibbs' "nine clusters" of leadership activity

- establishing credibility and trust
- identifying teaching problems and turning them into opportunities
- articulating a convincing rationale for change
- devolving leadership
- building a community of practice
- recognising and rewarding excellent teaching and teaching development effort
- marketing the department as a teaching success
- supporting change and innovation
- involving students