

HEA STEM Conference

J.H. Davenport — J.H.Davenport@bath.ac.uk

28–29 January 2016

Contents

1	Plenaries 29 December	2
1.1	Head of STEM	2
1.2	Stephanie Marshall	2
2	Afternoon 28th	4
2.1	Leicester Embedding	4
2.2	Nottingham/Science Council	4
2.3	Technologies for Employability	5
2.4	5
2.5	Contract Cheating and Academic Misconduct in Examinations and Tests: Lancaster and Clarke (Birmingham City)	6
2.5.1	Freelancer	7
3	Plenaries Friday 29 January	8
3.1	Simon Lancaster	8
3.2	An Introduction to the HEA Framework series and supporting toolkits: Cole	9
3.2.1	Employability	9
4	Sections 29 January	10
4.1	Transition in GBA for Dissertations	10
4.2	Lies, Damned Lies, SET and Marks	11
4.3	Rethinking Pedagogies ...: Crick	11
4.4	Temporal Analysis of Learning Analytics	12
4.5	High-Impact Pedagogies	12
5	Plenary	13
5.1	Fellowship	13

Chapter 1

Plenaries 29 December

Theme “Inspire to Succeed”.

1.1 Head of STEM

“2016: what an exciting time to be in L&T”. Teaching Excellence is on the agenda in a way that it hasn’t been in the past. Claims this actually goes back to Charles Clarke’s HE White Paper. We should share “emerging practice” (“best practice” changes over time). Innovation, but also better understanding of traditional processes etc.

1.2 Stephanie Marshall

UK, Norway¹ and Germany are the Governments most concerned with teaching excellence. Globally, there is most concern over teaching excellence in STEM. TEF is currently England-only, but we are starting a “devolved nations” group.

Quotes from Johnson’s UUK speech July 2015. Is “satisfaction” the best measure, or engagement? Synergy between knowledge creation and dissemination. Asked how many are concerned about KIS: 20%. “Watch out for KIS2” (which might include qualified teachers). Expects WP2 to look at progression, retention and graduate jobs for WP students.

“What is the added value in AAA → 2(i)?” Note that “technical consultation” will also happen for the TEF, even though general consultation has closed. TEF-1 is just QAA audits, but TEF-2 should have discipline aspects. UK PSF is about threshold standards, and how do we go beyond this? The UK PSF is actually the thing most valued about the HEA, and we are working with 17 countries to roll this out. BIS asked me if teaching was “patchy”. 30% of staff are qualified to PSF.

¹She is also chair of Norway’s assessment panel for their initiative.

We lost over half our staff due to cutbacks. Looking at social media to enhance our efficiency. The network is becoming more global: Singapore, HK etc. Note the growth of PhD programs that also give AFHEA. We have a dual-badged scheme with RSC (also aiming at public engagement).

55 NTFs/year out of 250 applications: now over 350 NTFs. Turns out there are 6 in the room. Asked how many mathematicians, and whether there was a major fight over blackboards. In a previous job, I had a Mathematics Department, and when we refurbished, we kept the blackboards. “I really applaud blackboards”.

Q Shouldn't it be Androgogy rather than pedagogy?

A We are trying to do something novel: teaching how to learn.

Q-JHD Androgogy would be deeply sexist. Isn't this what Socrates was trying to do?

A Was that rhetorical?

Q-UCL Don't like talk of “research professors” and “teaching professors”: careers ebb and flow. Senior Management Teams are generally in position because of their research, so we need to be clear about the language we use to them

A Look at recent paper commissioned from UCL on the website.

Q We have to be careful TEF doesn't uniformise us. You don't think about DLFHE in a 9 a.m. first-year genetics lecture.

Chapter 2

Afternoon 28th

2.1 Leicester Embedding

Core modules delivered by problem-based learning. About 50 subject experts from across the university involved. Authentic Assessment. Skills modules run alongside subject modules. Assessments might be museum exhibits, POST notes, National Geographic articles. Do students see a progression of skills: can they articulate these to potential employers. These questions were themselves a FY project. Questionnaire (McMaster) of about 60% of students, then structured interview with 7. All skills listed were identified as important by students, but confidence was rated less than importance. Lectures were rated as more important than PBL sessions. Labs and field trips least effective. Students learned most through weekly homework. Project work was also highly rated.

Alumni felt problem-solving was most important. The graduates felt PBL was important, and students need more support. It was a big adjustment but the skills acquired were essential in later life. Alumni quotes kept saying "with hindsight". graduates judge the effectiveness of the programme more positively.

Q validation of McMaster with, say, industrial panel.

A not really - but matched our pre-defined aims.

Q contact time etc.

A comparable, but does require structured timetabling. Interesting to see what happens when we move to new timetable.

2.2 Nottingham/Science Council

Linked to RSci (Registered Scientist) skills. Two cohorts of UoN Biosciences placement students (14/15 and 15/16) invited to apply for RSci award. Use mahara to enable students to record and tag their activity and align to RSci

standards. Also worked with employers such as Pfizer. Also trying to align with JISC “digital literacy” (touch typing, Excel etc. where raised by students).

Two placement students; M&S and PepsiCo spoke. Nottingham has an industrial Placement Award, but the structured approach by category, and the external accreditation (not automatic award) seemed valuable.

The employers also liked the framework (helped them structure the placement year) and it increased the attractiveness of the placement. We (Nott) are also trying to get more academic linkage with the placement year, and if necessary complete RSci during the final year.

Ali Orr: there is an interview with two assessors. This focuses on developing an example from the record.

Nottingham: currently this only works for whole-year placements: looking at MSc/prior work, summer placements. This is being rolled across Nottingham Science Faculty now.

Q Cost

A If you’re a member of the relevant SciC body, £30. Some universities pay, and some employers. Also some students

Q Time taken?

A A year, but it can be cumulative.

Q Is Mahara free?

A Yes, but like Moodle it needs LTEO support. There is a problem with graduated students having logins to carry it forward.

K.Vere@sciencecouncil.org

2.3 Technologies for Employability

I have been DoS for three years in School of Computing and Communications at Lancaster.

talks about “rounding out” the CV, and describing social skills. These are described by a performance (quite short), noting that professional attire etc. is important.

One limitation is “inappropriate disclosure”

Q Social problems: some of our students refuse to sit in front of a computer.

A Voice?

2.4

Operational “How do I make it do ...” — easiest to solve.

Sociological “I’m a girl/non-geek/...” — rôle models and big picture

Psychological Almost a phobia.

Contributory factors

Context physical environment, cultural background (“women can’t do technology”), “why do I have to do this”

History First experience, and second experiences.

Education “computer anxiety is infectious”, which may be why the rate doesn’t change.

Personality Measurement: Weil, Sers & Rosen’s scale.

I teach computing at Newcastle’s business school but am doing PhD in Computer Science. So looked at both cohorts. Business school was 44% low, 25% medium and 31% high, By experiment 3, it was 75/21/4. But anonymous questionnaires get a 70–80% return: asking for userids for followup reduces the return to under 10%. Hence it’s hard to drill down. EE Foundation were 32% low, 68% medium, and CS level 3 were 71% low, 29% medium.

Implications of anxiety are avoidance (lower mark), stress and under-achievement.

Support the whole cohort (e.g. peer support, range of devices/media) assuming that a certain %age have anxiety.

2.5 Contract Cheating and Academic Misconduct in Examinations and Tests: Lancaster and Clarke (Birmingham City)

Clarke has found over 30K examples on the Internet during his career.

Contract cheating occurs when a student pays (or uses) a third party to complete assessed work for academic credit.

Note Australia has had a major cheating scandal (> 100), mostly involving Chinese students. See University of Sydney task force. Average rate of cheating in MCQ is 5%, worse in tiered lecture theatres. Exam papers stolen and shared on Internet, and toilet break/Internet use. <http://macaudoailytimes.com.mo/44793.html>. The Times 2 January 2016, especially on impersonation (based on FOI requests). Works out as 1%.

Case of impersonation at York in 2008 resulted in 9 months suspended sentence.

2.5.1 Freelancer

freelancer.com: Used to be rent-a-coder. Business is by far the most cheater-on subject. Also requests for people to take on-line job assessment tests, telephone interviews etc.

Q Surprised how cheap it is.

A This world economy .Note that many essay mills out-source these to freelancer anyway.

Chapter 3

Plenaries Friday 29 January

3.1 Simon Lancaster

Started UEA 14 February 2000, “to make chemicals”. Teaching was secondary. But I enjoyed it. However, I was responsible for assessment, and the students passed these, but “didn’t get it”, and claimed to have no memory of what they’d been taught. So I wanted to make my teaching “effective”.

Hence lecture capture, then ARS/interaction, then moved into peer instruction. I want to make rooms like this “do something” and increase conceptual understanding. The balance between “content” and “concept” is wrong. Hence I have a “concept” slide, rather than a “content” slide.

Do, Or do not. There is no try — Yoda.

I disagree: as an educator, I cannot do: all I can do is create an atmosphere in which students can try.

The modern university’s search for “excellence” is an meaningless search — Bill Reading.

There are a large cluster of similar meaningless words, “creative”, “innovative” etc.

Bill Freeman etc. say that active learning is better than the lecture. Defenders of the lecture end up by citing all the active learning versions that Freeman advocates.

1/3 of the audience had been involved in merging modules, and nearly as many in splitting.

The Hawthorne effect (at a light bulb factory) — changed various conditions. https://en.wikipedia.org/wiki/Hawthorne_effect — essentially, any change is good.

I teach a cohort of 100, which I believe is not enough to produce good statistics, hence I don’t formally publish on education.

- The worst thing you can do in a flipped session is start with a 10-minute summary for those who didn't do the work.

3.2 An Introduction to the HEA Framework series and supporting toolkits: Cole

Key words: “employability”, “job readiness” “skills” “WP”. Issues with DLHE/NSS and how they become metrics. Consistency (without “one size fits all”) is a challenge in large organisations. “Employer engagement” — 2% of universities have a PVC/DVC with this remit explicitly.

I was at an institution where the DVC said “it’s not about the metrics: it’s about the doing the right thing” — which really pleased me.

Our frameworks are informed by research and experience of working with institutions. All structured as “foci for change/Principles for change/Implementing change”. While we have separate frameworks for employability, assessment etc., we are aware that they are interlinked.

3.2.1 Employability

“It remains a contested term used in a range and contents” [HillagePollard1998]. “a fuzzy notion, often ill-defined and sometimes not defined at all” [Glazier1998]. The frameworks build on current practice. One important aspect is helping students recognise these activities. Placements are massively resource intensive, and not the only option. “Employability skills” are essentially the old “transferable skills”, and this is far from all “If I’m lazy, you’ll never see my skills”. Wakeham is now talking about attitudes as well as skills.

Employability needs to be looked at at the programme level: students identify with these, and it’s what they’re paying for.

As well as frameworks, look at associated toolkits, and the HEAtoZ.

Chapter 4

Sections 29 January

4.1 Transition in GBA for Dissertations

Nottingham Trent University has been moving to Grade-Based Assessment. Evidence from two science schools. Introduced with a “Big bang” in 2011, for 2012/13 academic years. The same scale used for all subjects (unlike Warwick, say, which exempted mathematics).

Percentage scales do not apply a common currency [Win2003]: notably the “whole range” argument. Should it be qualitative [Dalzeil1998]. 16 grades: {High/Mid/Low} \times {1,2(i)/2(ii)/3/fail} with zero and Exceptional First. There is a number associated to each: non-linear, so the fails are 38/28/18. There’s a matrix associating MLOs, assessment criteria and the standards. The biggest gain was getting staff to engage in relationship between assessment and MLOs. Transparency is much easier with 17-points, and feedback is easier. There are challenges when applying to quantitative, e.g. the First descriptions say “all questions relating to core concepts answered correctly” and students shouldn’t be rescued by averaging. In fact there are general questions for multi-part assessment.

Non-linearity is also a problem: Low fail= 18 means cannot be compensated. Note that the marks→grades is only a guide, and staff are *encouraged* to be holistic in grade assignment. Three approaches

Holistic

Analytic each part grades, converted to numbers, weighted average and conversion back to grades.

Numerical score each part, ad weighted cores and convert to grade.

Consistency, certainly within a module, is vital here.

We believe that GBA will help with transition to GPA.

Q Students?

A Probably more prepared than staff. Mathematics students still like numbers. before/after hybrid students liked the change.

Q External examiner in a school using this. I have been vitriolic in my comments to the institution. The nonlinearity is a major problem for staff having to hold both sets of numbers is their heads.

A Noted. Apparently St Andrews has no numbers attached to their GBA, but leaves it to departments how to combine (great inconsistencies, e.g. Maths/Physics)

Next steps, get rid of the numerical equivalents,

4.2 Lies, Damned Lies, SET and Marks

SET = “Student Evaluation of Teaching”. Tom from Nottingham (an Ecologist).

Shows a negative correlation between student evaluation and medical school effectiveness. [LancasterFanshawe2015]. Nottingham have 5 questions for the module and 5 for the teacher, on 5-Likert. SET and SEM are strongly related ($r=0.529$). One question accounts for 50% of the variation, a second for a further 25%. First is “I am happy”, second is “module better than teacher”. Academic year is the only general component correlated with anything (PC1), and “second year is much less happy”.

Looking at marks. Notes that relative marks is what really matters. Showed the Bath-like graph. The slope of the line is a measure of discrimination. R^2 is the predictability. By looking at this, he was able to spot an Excel sorting error. Exam modules are much more discriminatory than coursework modules.

Relationship. Note that SEM is performed after CW marks, but before exam marks. Students like the modules in which they are doing well: $r = 0.54$, more so when there is coursework.

Above all, collation and analysis of exam marks is both feasible and useful.

4.3 Rethinking Pedagogies . . . : Crick

Cardiff Met and Bath are very different institutions. Bath is in Science, CM is in Management. Showed Google auto-complete on “computer science is . . .”. “There is no digital economy: there is one economy which is digital” — Neelie Kroes.

“Software carpentry” has been around for a long time in research computing. It’s a practical craft. Noted the GDS Design Principles: doesn’t necessarily agree with all of these but they are worth looking at.

“Computational Thinking” has become a buzz-phrase. See [Win08].

Cardiff Met used to be

Level 4 2×10 programming

Level5 20 credit OO

Level6 20 credit OO

New

Level 4 20 principles of programming and 20 developing quality software I

Level5 20 software carpentry and 20 developing quality software II

Level6 20 credit advanced programming

School reform will mean several years of increasing diversity in the intake. Note new subject benchmarks, which references the ACM curricula. Our IAB has helped us develop firms/SMEs/Government Offices we can use for deep involvement in the teaching.

4.4 Temporal Analysis of Learning Analytics

Can we measure engagement to predict performance? time uploads, requests and browsing. Collect/pre-process/general linear model/interpret. Currently look at student ID, date of log, total number of server requests in the session, and student's grade. Session is defined as not having 15 minutes of idle time.

Q You've shown us means, what about s.d. etc.

A We have the data: not done yet?

4.5 High-Impact Pedagogies

Student engagement tends to be behavioural: present, hand up etc. Asked 116 NTFs and got 135 answers. Wide range of active/passive; using/creating etc. Really complex search (psychology search engines don't grok "or"!). Had 21K abstracts, which we filtered down to 1741 articles (many misleading abstracts). 13% "high quality" (her + 2 colleagues' judgement: science articles were much easier to rate as high because of the clear methodology), 48% US (15% UK), 31% STEM (29% SS). The STEM articles were very focused on; curriculum.

21st century learners: students and change and research partners (tokenistic in the literature), students as self-regulators (is this allowed in the curriculum). Nothing we saw in the assessment area surprised us. One of her goals is "how do the assessments fit together" — asking the students gives very different (and varied) answers, BUT doing this improves the NSS.

Chapter 5

Plenary

5.1 Fellowship

The HEA does not intend to impose membership fees or CPD on current fellows.

Was a Software Engineer, then moved to HEA, but still teaches. Note that there are fewer PFHEA than professors. Guardian says that AFHEA is the third most important thing for PhD students to do.

PFHEA is still about learning and teaching, but *must* be trans-disciplinary, and *can* be cross-institution.

Noted York St. John — 100% engagement, and the VC held a dinner *for the mentors*.

Bibliography

- [Win08] J.M. Wing. Computational thinking and thinking about computing. *Philosophical Transactions of the Royal Society of London A: Mathematical*, 366:3717–3725, 2008.