



## **New Review**

developing a new approach to teaching the literature review

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Presenting some of the findings of a research project at Loughborough  
Which looked at how we could improve the teaching of the literature review to  
Civil and Building finalists

## Outline

- The problem
- Getting to the bottom of it
- Changing our approach
- Measuring its success

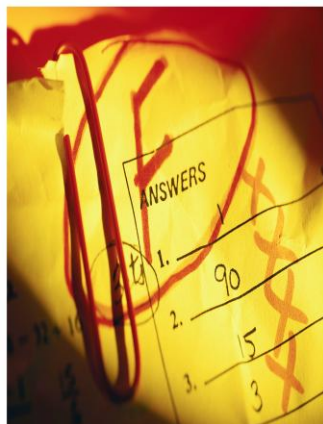


OK – here's what I hope to cover in the next 30 minutes:

- 1) The problem we were hoping to solve
- 2) Working out why the problem existed – getting to the bottom of it – i.e. Our research methods
- 3) How we changed our approach based on our findings
- 4) How we measured the success of our approach, and what we found

## What's wrong?

- Poor lit reviews
  - 50% of staff rated them either poor or very poor
- Poor references
  - Number
  - Type
  - Depth
  - Age
- Poor searching skills?



OK, so what was the problem?

18 months ago, Prof Andrew Baldwin from our dept of Civil & Building rang me to say he'd been in contact with CEBE about putting in a proposal to investigate students information searching skills, and THEY suggested he contact the Library.

He wasn't aware of any of the training or support we offered.

We adapted the bid accordingly and it was successful.

The reasons he wanted to do the research were that anecdotally, he felt that lecturers thought students lit reviews were very poor

(In fact, we found through our research that 50% thought so)

This was evidenced in the low number of references, high number of web sites, irrelevancy & age of many of the references cited.

He wondered if this was to do with poor searching skills.

## What we did

- **Student/staff survey**
  - Their view of the literature review
- **Experiments**
  - Watching students searching for information
- **Citation analysis**
  - 2008 analysis of BSc & MEng student project reference lists
- **Teaching amended** - based on evidence
- **A second citation analysis**
  - 2010 analysis of BSc student project reference lists



So what did we do?

The research took a 4-pronged attack:

We performed a survey of students to ascertain what their expectations of the lit review were – how important it was, where they expected to look for information, how much they expected to read, and what problems they expected to encounter.

We then asked similar questions of staff – i.e. How much did THEY expect students to read, what problems might they face, etc.

We also did some experimental work, watching students begin their searches for information, followed by interviews to ascertain why they made certain searching decisions.

The fourth strand was a citation analysis of the reference lists from two Civil programmes final year projects, submitted in 2008. One cohort were on a BSc programme, the other on an MEng programme. The idea was to see exactly what students were citing and where the problems lay. A wonderful side-benefit of this was that it provided us with a baseline to measure the success of any changes to our IL teaching we introduced as a result of the project.

So, based on the evidence we did make some changes to the way IL was taught to the Civil students – not just for final year students, but, significantly, at 1<sup>st</sup> year level. I'll talk about this later.

Then we performed a second citation analysis on the 2009/2010 students who had undertaken the revised teaching, to see whether their marks and the quality of their reviews had improved.

## Results of staff & student survey

- Staff had less confidence in their students' skills than they did
- Out of 11 different information skills...
  - Staff only selected "VERY CONFIDENT" about 2 students skills
  - Students were "VERY CONFIDENT" in all 11 skills
- Greatest disparity was on the skill of "judging the quality of information"
  - 9% of students were NOT CONFIDENT about this
  - 57% of staff were NOT CONFIDENT students could do this



Not going to go into detail on the staff and student surveys because of time – they have been written up if you want to pursue them. However, the main thing we found was a great disparity between student and staff expectations.

When we asked staff the same questions about how confident they felt their students were in 11 different areas, in EVERY ONE, staff had less confidence in their students' skills than they did

SMALL NUMBERS of Staff thought their students were VERY confident in 2 skills (searching in the internet, and citation)

Whereas in all areas we found at least some students happy to rate themselves as VERY confident

Greatest disparity between students and staff was on the skill of "judging the quality of information"

9% of students were NOT CONFIDENT that they could do this (80% confident, 11% very), whilst

57% of staff were NOT CONFIDENT (43% confident, 0 very confident)

## Staff/student differences

- Staff expected the internet to be the 5<sup>th</sup> most popular search tool, students ranked it 3<sup>rd</sup>.
- Students expected problems with:
  - Information overload
  - Finding specific bits of information
- Staff expected students to have problems with:
  - Poor search strategies
  - Analysing and evaluating information



What else did we learn from the staff survey?

When we asked students and staff to list the search tools they expected to be used, the 3<sup>rd</sup> most popular answer amongst students was the internet (at least it wasn't 1<sup>st</sup>!) but this was the 5<sup>th</sup> most popular answer from staff

Interestingly, Staff anticipated different searching problems to students  
Poor search strategies and Analysing and evaluating information  
were ranked 2<sup>nd</sup> and 3<sup>rd</sup> on staff list of anticipated problems – they didn't appear at all on the students lists.

The students just referred to finding information (a specific piece or type, or relevant info) and dealing with information overload.

I thought some of staff comments here were interesting.

One wrote that they feared students didn't have a "suitable plan against which to determine if the information found is relevant"

-i.e. A means of evaluating information (something we've implemented a new teaching activity on this year).

-Another put it, "filtering 'good' information from 'poor'"

One said, poignantly, "they have not been taught how to do a lit review!"

- And this raises an interesting question. Most of our teaching to date has been about finding and citing information, not about the mechanics of sifting through the material, making notes, connecting ideas,

## Experiments

- Most (10/14) went to Google first
- Those that used Metalib chose databases at random
- Basic searching skills in evidence
  - Only 3 used Boolean operators, 2 used truncation
- Main issues for students:
  - Using Metalib
    - Training issues or usability issues?
  - Information overload



So what of the experiments?

Quelle surprise, most went to Google first.

Those that used Metalib (our federated search engine) chose databases at random (no evaluation of sources)

Basic searching skills in evidence

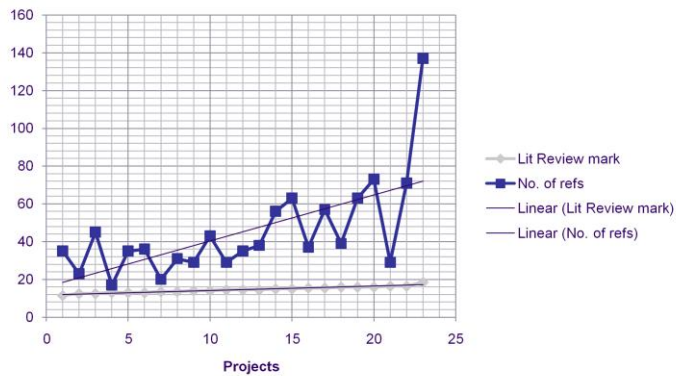
Only 3 used Boolean operators, 2 used truncation – actually more than I expected!

The main issues for students were:

- Metalib not meeting their expectations (this could have been classed as training issues or usability issues)
- information overload – essentially finding too much

## Citation analysis

**The more you cite, the better your mark!**



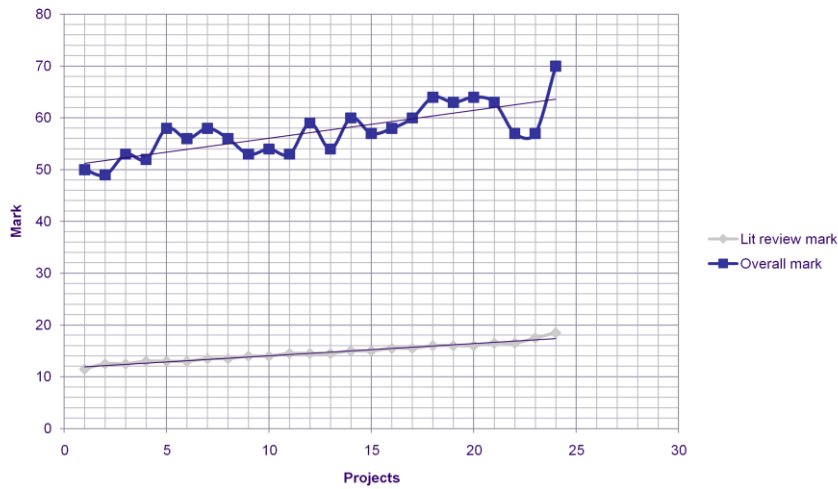
OK, moving on now to our 2008 citation analysis

First thing we did was compare the number of references cited with the lit review mark:

Result: A direct positive correlation



## The better your literature review, the better your mark



Then we compared the lit review mark with the overall mark for the project.

Result: Another direct positive correlation between the lines of best fit.

So, can we conclude that: the more you cite, the better your lit review mark, the better your overall mark?

We have! And this was one of the things we passed on to subsequent finalists.

## Citation facts & figures

- Average no. of citations 31 – 45
- Average age of citations 2000-2005
- Types of material cited:
  - MEng- journal, report, book, web site
  - BSc- book, web, journal, (report)
- Citation accuracy test
  - MEng- 53% of lists got 100%
  - BSc – 8% of lists got 100%



Here are some brief citation facts and figures:

### Citation accuracy test

MEng- 53% of lists got 100%

BSc – 8% of lists got 100% (i.e. 4/4 for Consistent, complete, no major flaws, etc)

## Citation errors

- Reference list problems
  - including [www.google.co.uk](http://www.google.co.uk) under “W”
  - Grouping references under material types “books”, “magazines”, “web sites”
- Too little information
  - Omitting place of publication for books
  - Omitting date accessed for web pages
- Too much information
  - Including the full postal address of publishers



What were some of the common citation errors?

[read slide]

Needless to say, one of our recommendations was to institute a departmental citation style.

## Making it better

- Changing final year project teaching alone – too late
- Need to address first years – assessed coursework introduced



OK – so how did this work change our teaching approach?

Well, we realised quite early on that changing final year project teaching alone wasn't enough – this was too little too late

We really need to start in Year One by addressing the first years.

As of this year, 5 of the 7 Civil programmes (not CEM or CMQS) have received 3 x 1-hour lectures from us and were offered 3 x 2-hour drop in sessions

..in order to help with some assessed annotated bibliography coursework they all have to do.

The lectures cover:

**why read?** – selling the value of information to engineers as a commodity in an knowledge economy – we show a video of the Millenium bridge and explain how information could have aided those engineers avoid that disaster.

**Finding the good stuff** – not everything is on google

**Exciting citing** – selling citation as a necessary evil that wins them marks...

## Making it better – Finalists

Before	After
<b>Generic</b> teaching for all Civil Finalists	<b>Specific</b> session for BSc programme
No academic staff presence	Module leader in attendance
How to search workshop	How to search <b>PLUS</b> Info on age, type, and number of references expected
How to cite workshop	How to cite <b>PLUS</b> Info on common citation problems & how to avoid

We haven't abandoned the finalists though!

## Measuring success

Year	Average lit review mark	Average overall mark
2010	13.66	66.74
2008	13.14	50.02



So, was it worth it?

Well looking at the results of our 2<sup>nd</sup> citation analysis, the answer is yes, definitely.

Av lit review mark improved marginally, but overall mark dramatically.

## Influence of IL sessions

Student attendance at IL sessions	No. attending	Average lit review mark	Average overall mark
No session	6	13.25	65.33
One session	16	13.53	66.41
Both sessions	7	14.32	68.71



But can we put this down to our IL sessions? Well here is a breakdown of the marks of those students that attended:

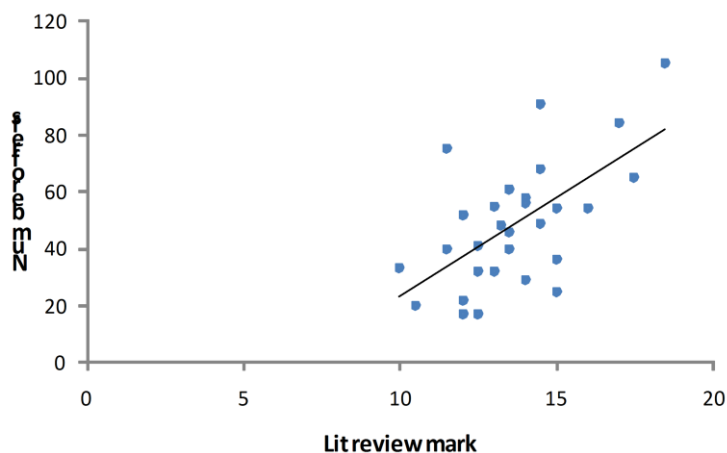
No sessions

One session and

Both sessions

Can see a statistically significant correlation between attendance at our sessions, and both lit review and overall marks for their final year projects.

## More you cite the better your mark – confirmed



We took another look at the data on the no of refs and the lit review marks, and this time found an even stronger positive correlation between the no of refs cited and the lit review mark.

This is not rocket science – obviously, the more you cite, the more you've read –  
**and it's the reading not the citing** that improves the quality of the work.



## More recent research cited

	2010 students	2008 students
References from last 8 years cited	58%	44%





We found for the latest cohort that they were also beginning to cite much more recent work.

In 2008 only 44% of the references were from the last 8 years.

In 2010, 58% were from the last 8 years,

showing a clear move toward accessing and reading more current material

More journal articles cited				
	2010 students		2008 students	
	Number	%	Number	%
Books	493	35.1	267	42.3
Journals	386	27.5	111	17.6
Web sites	248	17.7	121	19.2



Perhaps as a corollary of this, we found the 2010 cohort were citing a far higher proportion of journal articles than the 2008 cohort.

Namely, 27.5% of sources were journal articles, rather than 17.6% in 2008.

## Citation accuracy improved

Cohort Year	Complete	To a style	No major flaws	Consistent
2010	65.5%	89.7%	68.9%	86.2%
2008	56.5%	52.2%	13.0%	43.5%



And the final improvement we noticed, was an improvement in citation accuracy.

We marked citations subjectively against four criteria:

- Were they complete (not missing bits?)
- did they try to adhere to a standard citation style
- were they consistent in the style they adopted
- And could they be said to have no major flaws (i.e. Sticking down [www.google.com](http://www.google.com))

-In 2008 only 13% had no major flaws

-In 2010 69% had no major flaws – a major success

-In every other category, citation quality improved.

## What next?

- Have repeated sessions this year including this data
  - Took register so we could continue to measure improvements
- Summarised our findings for Civil & Building
  - Got some extra teaching
- Provided data for other Academic Librarians
  - For promotional purposes

## Further reading

- All papers are listed on Loughborough's Institutional Repository
- GADD, E. ... et al, 2011. Using the evidence: a comparison of Civil and Building lecturers and students' approach to the literature review. *Journal of Professional Issues in Engineering Education and Practice*, (doi:10.1061/(ASCE)EI.1943-5541.0000077).
- BALDWIN, A.N., GADD, E. and BALATSOUKAS, P., 2010. A study of students' information searching strategies. *CEBE Transactions*, 7 (2), pp. 3-25.
- GADD, E., BALDWIN, A.N. and NORRIS, M., 2010. The citation behaviour of Civil Engineering students. *Journal of Information Literacy*, 4 (2), pp. 37-49.



I've included a bibliography of some of the relevant papers on this research. I've written a fourth paper on the 2010 citation analysis which we're in negotiation with a publisher about at the moment. If anyone wants a copy, please email me.

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