



Research into Teaching Project

“Development of a Basic Research Culture Amongst
Undergraduate Forensic Science Students
Through the Organisation and Monitoring of a
Regional Forensic Science Student Centred
Research-Based Annual Conference”

A Project by

Dr John Cassella
Principal Lecturer in Forensic Science
Department of Forensic Science
Faculty of Science
Staffordshire University
Mellor Building
College Road,
Stoke on Trent, ST4 2DE

CONTENTS

1. Project Background
2. Project Outcomes
3. Student Feedback
 - a. Questionnaire analysis
4. Dissemination of project information
5. Appendices
 - a. Examples of posters (A0→ A4) – PDF
 - i. separately attached
 - b. Interview with Professor Allan Jamieson –
 - i. mp3 audio separately attached
 - c. Recorded meeting with students –
 - i. mp3 audio separately attached
 - d. Example of questionnaire
 - e. Selected images of Conference
 - i. separately attached images

1.0 Project Background

Preamble

While research endeavour and teaching endeavour are believed to be conceptually related in higher education, that relationship needs active management and explicit support since the pressures to split the two apart are so powerful

Professor Roger Brown (in Jenkins and Healey, 2005)

Background

The focus on research should not simply a matter of the way in which a lecturer's research informs their teaching; but, rather, on a much broader appreciation of the relationship between teaching and research (Brew, 2001). At the core of this broader approach to the relationship between undergraduate teaching and research is the understanding that undergraduate learning can be enhanced through active engagement in their own research projects, in collaboration with other students and their teachers. The Regional Conference provides the ideal forum for such interaction.

Currently, there is little research being conducted into the field of Forensic Science. This has explicit ramifications when forensic scientists are required to defend protocols and procedures in the witness box in a Courtroom in the United Kingdom.

Research has identified that encouraging undergraduates to be engaged in research projects contributes to the overall research capacity of a Department in a way that is attractive to funding bodies and external assessors of departments' research culture (Jenkins, 2005). Through initiative such as this project, it is hoped, through time that more research may be generated, and reported in the scientific literature. Such literature will obviate the problems currently experienced in the Courtroom environment by forensic scientists giving evidence.

Forensic Institute Research Network (FIRN)

The Forensic Institute Research Network (FIRN) is an organisation that has been designed to bring together Universities delivering forensic science degrees in a collaborative research effort.

[If you would like further information about the Forensic Institute, please refer to the web site www.Theforensicinstitute.com.]

As part of the management group of FIRN, JPC was involved in discussions in which it was considered a helpful exercise, that Universities hold an annual conference (each year at a different University in the UK), where academics, students and forensic practitioners could meet.

Also, it was considered helpful to 'break-up' the United Kingdom into regions and to hold an ***annual regional forensic science student-centred research-based conference*** to help build collaborations between regional University Departments and also to assist undergraduate and postgraduate students present possibly their *first* piece of research and to appreciate the importance of research in University life.

Staffordshire were recently honoured with organising the first *ever* regional conference and indeed the first of *any* region. In this Midlands region are the following Universities; Keele, DeMontfort, Derby, Coventry, Chester, Loughborough and Wolverhampton

Staff are asked to consider any student who had work of sufficient quality that may wish to present their final year project work as either a poster or as an oral presentation.

The first meeting was held on the 4th April 2006 and although a small affair, it ran very successfully. This is in effect a 'pilot' for ***this*** project submission, and shows that the project described should be successful in its outcomes

Aim of Project

Therefore, one of the aims of the project was to inculcate the research culture further into the minds of forensic science students by empowering them to consider performing their projects not solely as piece of summative assessment, but to consider the act of practical research as part of a research process in which one end point is the preparation, delivery and reflection of a poster or oral presentation in a peer observed and peer assessed environment – the student scientific conference.

This project aimed to develop and allow a clear paradigm to be built into the support of the final year Undergraduate project process in which students could work diligently to produce robust research which had as one additional benefit – the Conference presentation.

“Value added” included allowing students the opportunity to practice giving presentations in front of their peer group and indeed academic staff from their home and regional Universities. Students would also have valuable Curriculum Vitae material to assist them in obtaining their first post-graduate job.

Undergraduate students, currently, complete an “independent project” in Forensic Science at Staffordshire University as a 30 credit module that is core for all students taking a BSc (Hons) Forensic Science and an option BSc (Hons) Forensic Science and Criminology and BSc Forensic Science and Psychology (non-GBR).

The module runs throughout the final year of the degree, as it says in the handbook

“so expect to put in a lot of work and generate many results. However, you must make the effort to get started early in Semester 1, the later that you leave beginning your work the less you will be able to do.”

The implied process is outcome driven, without allowance for the philosophy of the reason behind research and the expectations from possible outcomes.

The ethical aspects of the “independent project” are bogged down in the completion of a variety of multi-paged forms before the project can begin and offer a hurdle instead of an ethical ‘watchful’ eye on the actions of the student upon subjects and the reporting of the outcomes in a sensitive and just manner.

The *indicative content* (bullets points below) demonstrate the mechanistic process of ‘doing’ the physical work and do not allow for the wider issues of research to be considered in the context of University life.

The final bullet point “The module will also allow you to develop skills in defending your work through a *viva-voce* examination” is a 10 minute presentation in the presence of 2 members of staff and constitutes only a very basic forum where dialogue and defence of work can be robustly completed.

- This allows you to develop and demonstrate your abilities to devise, plan, execute and report on a substantial piece of independent work in the forensic science.
- The project will be of an applied nature and may involve an external (industrial) collaborator, but can have a focus on a particular theme within forensic science or tackle a more integrative topic across the award.
- The topic selected must be agreed with an academic supervisor.
- It will normally include experimental work, fieldwork, and/or quantitative critical evaluation of secondary data which you have assembled. In all cases the project should reflect the scientific base of the award.
- The topic will not normally overlap significantly with other independent work at level 3.
- The module will also allow you to develop skills in defending your work through a *viva-voce* examination.

The *learning outcomes* make no mention of one of the truly important aspects of research, which is to be able to present this ‘new knowledge’ to the wider scientific community (apart from part ‘e’ which has been discussed above)..

LEARNING OUTCOMES –

FROM FORENSIC SCIENCE INDEPENDENT STUDY PROJECTS

- (a) Demonstrate the ability to devise, plan and execute extended independent work.
- (b) Assess the topic in the context of previous work and current literature.
- (c) Analyse data in a critical quantitative fashion and draw justified conclusions.
- (d) Demonstrate skills in writing a coherent, structured technical report.
- (e) Be able to respond to challenges to your work and conclusions under oral examination.
- (f) Be able to critically review your own performance and success in meeting the project's aims.

Research Design

The project allowed the development of skills and strategies to allow the facilitation of students to work towards a successful presentation of work, either oral or poster at the newly created annual Regional Student Conference. The project also allowed the feedback of the outcomes of the Conference to the up-coming Level 3 students so that research is seen to be conducted not for its own sake or for the completion of a summative assessment, but for the trickle down information it provides into the Subject Area.

1. Level 3 Students were supported through the stages of their projects with information about the conference, its expectations and outcomes.
2. Level 3 Students were supported by discussion of the wider issues of research in Forensic Science and how it can be used in a Courtroom.
3. Level 3 project students were supported in the production of either poster or oral materials (e.g. PowerPoint presentations) and in the rehearsal of their presentations (e.g. video feedback and reflection).
4. Level 3 students work is being used to show to Level 2 students (about to consider/choose their research topics) what type of work may be completed and how it had been received in the 'wider' scientific community, by feedback of comments from the Conference delegates.
[Students who present, were asked to complete a simple questionnaire concerning the questions asked of them, discussions that occurred with their peers and any reflections about the whole research process, so that it can be trickled down to Level 2]
5. Level 2 students were given a presentation about this process described above, and with 'case studies' of particular presentations at the first Regional Conference (held at Staffordshire University, to allow them to consider the importance of this process they were about to undertake.

Data Collection and Analysis

1. Questionnaires were devised to determine what are the pre-conceptions about research and its use in Forensic Science and in the 'Witness box' when giving evidence.
2. This was followed up by a questionnaire after the Conference to determine if there has been a change in attitude towards research – how (?) and what effect has this process had?
3. Students and staff were interviewed using standard questions to gain insights not possible through the use of questionnaires.
4. Evaluation of student IS projects grades→ are they getting better across cohorts?
5. Research publications resulting from these projects?

Project Outcomes -

1. To engender in Level 2/Level 3 Forensic Science Undergraduate students a culture whereby research is seen not as an assessed body of work, but as a necessary endeavour of undergraduate and postgraduate students and also of academic staff at all levels.
2. To allow students to participate in the wider aspects of the research culture by attending (as delegates) and reporting (as presenters) the annual ***Regional Forensic Science Student Centred Research-Based Annual Conference.***
3. To develop within the Department of Forensic Science academic staff, a deeper and more lucid appreciation of the role of the Level 3 Independent Project module as not simply another assessed module, but a tool for the creation of new scientific evidence which is robustly completed and presented to the wider scientific community.

Please detail the anticipated impact of the project (research, policy, practice) and dissemination activities

Research, policy, practice

One of the key elements within Staffordshire University's research strategy is to further develop the strong reputation enjoyed by University researchers in Health and Sciences. The strong presence of Undergraduate students at this 'Regional Forensic Science Student Centred Research-Based Annual Conference' will facilitate this element and should develop into peer reviewed journal publications, thereby contributing to this strong research reputation.

The belief that research should underpin and sustain the intellectual base of the University which will ensure that students at all levels are taught by well informed staff, is satisfied by this initiative of the 'Regional Forensic Science Student Centred Research-Based Annual Conference'. If students and staff are working together to produce Level 3 UG quality research which 'trickles-up' to peer reviewed journals and 'trickles-down' to teaching, then within Forensic Science at Staffordshire University, we can honestly say that research supports in part, the intellectual base of our delivery.

Dissemination activities

The Dissemination of the events and outcomes which are being developed are:

1. through information supplied to Level 2 students to involve the next 'cycle' or Regional Conference delegates. Separate sessions with Level 2 students discussing the Conference and its wider ramifications will focus the students on to the expectations, outcomes and future perspectives of research.
2. use of the 'Forensic Institute' and 'Staffordshire University' web site pages to show good practice and innovation in teaching/research at the Undergraduate level
3. Presentation ant appropriate conferences

2.0 Project Outcomes

This small short-term project has demonstrated that it is possible to engage students in research to successful outcomes:

- Students engaged in a programme of developing ideas for presentation into a robust and presentable body of research work
- Students engaged in a dynamic way with others students from Staffordshire University and other Universities to share new knowledge.
- Students presented work that has added basic but robust knowledge to the forensic science that can now act as incubator research for future studies.
- Student networking has facilitated the future academic networks as these students move into the world of Forensic Science.
- Some students from within this study has demonstrated an interest to continue on a research career pathway
- Students reported that they felt this opportunity was an incentive to work diligently towards the successful completion of their final year project work and believe that this has had a beneficial effect on the work they have completed.
- Students are more confident that in a job interview situation they have something of quality to discuss of which have 'ownership'.
- Students have been able to meet some 2nd year undergraduate students to share their experience of the Conference in order to trickle-down experience, good practice and to facilitate recruitment of students for the next Student centred Forensic Science Conference to be held at the University of Derby in April 2008.

3.0 Student Feedback

“A really exciting opportunity to show-off my work”

“Very helpful to be able to present the work as a poster as I didn't really want to do an oral presentation”

“I would like to do research in the field of forensics now that I've had a taste of it”

“Great to take part and even nicer to win a prize!!”

“I was stressed about putting the poster together but now I have new skill I liked the whole thing...”

“Can I sign-up for a PhD”

“It was more frightening to talk to the 2nd years to share the experience than to present the poster!”

“It was good to see what other University student projects were like. Its' given me confidence to know that mine was good in comparison”

Note: Statistical data and graphs will be presented in a fuller paper presented to an appropriate conference and written into a paper

4.0 Dissemination of Project Findings

The experiences and data from this and the first 'Student centred' conference in 2006, will be disseminated to appropriate and diverse groups of academics to show what may be achieved in this underrepresented area of research endeavour.

- FORREST (Forensic Research and Teaching) Conference September 2008 to be held at the Robert Gordon University in Aberdeen.
- The 'Science Learning and Teaching Conference' 2008 organised by *Higher Education Academy* Physical Sciences Centre



The Science Learning and Teaching Conference 2007

Towards excellent science teaching in university based education

Menu

[Home](#)
[When & Where](#)
[Registration](#)
[Programme](#)
[Partners](#)
[Contributors](#)
[Sponsorship](#)
[Proceedings](#)

Aims

This national conference aims to bring together practitioners in the teaching of science disciplines in higher education to share their experiences, identify common challenges and to provide an opportunity to share effective practice. A number of themes will run through the two day Conference, including: creativity, effective feedback, research in teaching and learning, the secondary-tertiary interface and flexible delivery.

- Anduploading of materials onto Staffordshire University website for 2008

5.0 Summary of Conclusions

“the mind is not a vessel to be filled, but a fire to be kindled” (Plutarch, c46–127 AD).

Clearly, never has the educational philosophy behind this belief been more important: the changing world to be faced by today's students will demand unprecedented skills of intellectual flexibility, analysis and enquiry. Teaching students to be enquiring or research-based in their approach is not just a throwback to quaint notions of enlightenment or liberal education but central to the hard-nosed skills required of the future graduate workforce.

“ ... ***we are all researchers now***, ... teaching and research are becoming even more intimately related. ... In a 'knowledge society' all students – certainly all graduates – have to be researchers. Not only are they engaged in the production of knowledge; they must also be educated to cope with the risks and uncertainties generated by the advance of science.”

Scott (2002, 13)

Neumann (1994), in a large Australian research oriented institution, undertook in-depth interviews with students in a range of disciplines, and from first-year undergraduate to doctoral students, on their experiences of teaching and research. Her conclusions were that staff research brought tangible benefits to students, mainly because students perceived that their courses were up-to-date and that staff demonstrated interest in what they were studying. Also, staff research interests gave students “the opportunity to see their teachers as real people and to be able to glimpse what they do, how and why”

Neumann, (1994, 335).

**This project has developed students' abilities to carry out research
(Jenkins, Healy and Zetter (2007))**

- Students learn in ways that mirror research processes
- Assess students in ways that mirror research processes (e.g. requiring students to have their work assessed by peers e.g. at a Conference.
- Provide 'training' in relevant research skills and knowledge
- Ensure students experience opportunities that require them to do research projects; and that there is a progressive move to projects of greater scale, complexity and uncertainty
- Develop student involvement in research
- Develop abilities of students to communicate the results of their research in ways that are appropriate to the disciplinary community in which they are now participating.

References

Brew, A. (2001) *The Nature of Research: Inquiry in Academic Contexts*, Routledge/Falmer, London

Jenkins, A. (2005) *A Guide to the Research Evidence on Teaching-Research Relations*, The Higher Education Academy, York

SHS82300-3 Independent Project in Forensic Science Handbook 2006

Healey, M. (2000) Developing the scholarship of teaching in higher education: a discipline-based approach, *Higher Education Research & Development* 19(2), 167–187.

Healey, M. (2005a) Linking research and teaching exploring disciplinary spaces and the role of inquiry-based learning, in Barnett, R. (ed.) *Reshaping the university: new relationships between research, scholarship and teaching*, pp.30–42. Maidenhead: McGraw-Hill/Open University Press.

Healey, M. (2005b) Linking research and teaching to benefit student learning, *Journal of Geography in Higher Education* 29(2), 183–201.

Healey, M. and Jenkins, A. (eds.) (2002) *Exchange 3: special issue on linking teaching and research*. Available at: www.exchange.ac.uk/issue3.asp.

Healey, M. and Jenkins, A. (2003) Discipline-based educational development, in Macdonald, R. and Eggins, H. (eds.) *The scholarship of academic development*, pp.47–57. Buckingham: Open University Press/SRHE.

Healey, M. and Jenkins, A. (2006) Strengthening the teaching-research linkage in undergraduate courses and programmes, in Kreber, C. (ed.) *Exploring research-based teaching*, *New Directions in Teaching and Learning*, pp.45–55. San Francisco: Jossey Bass/Wiley.

Healey, M. and Jenkins, A. (2007) Linking teaching and research in national systems, paper prepared for International policies and practices for academic enquiry: an international colloquium, Marwell, Winchester, UK, 19–21 April. Available at: portal-live.solent.ac.uk/university/rtconference/rtcolloquium_home.aspx.

Healey, M., Jordan, F., Pell, B. and Short, C. (in submission) *The research teaching nexus: student experiences of research and consultancy*.

Healey, M. and Roberts, J. (eds.) (2004) *Engaging students in active learning: case studies in geography, environment and related disciplines*. Cheltenham: Geography Discipline Network and School of Environment, University of Gloucestershire.

Available at: www2.glos.ac.uk/gdn/active/student.htm.

Jenkins, A. J., Blackman, T., Lindsay, R. O. and Paton-Saltzberg, R. (1998) Teaching and research: student perceptions and policy implications, *Studies in Higher Education* 23(2), 127–141.

Jenkins, A., Breen, R., Lindsay, R. and Brew, A. (2003) *Re-shaping higher education: linking teaching and research*. London: SEDA/RoutledgeFalmer.

Jenkins, A. and Healey, M. (2005) *Institutional strategies to link teaching and research*. York: The Higher Education Academy.

Available at: www.heacademy.ac.uk/resources.asp?process=full_record§ion=generic&id=585.

(accessed October 2007)

Neumann, R. (1994) The teaching-research nexus: applying a framework to university students' learning experiences, *European Journal of Education* 29(3), 323–339.

Scott, P. (2004) Knowledge work in a knowledge society: rethinking the links between university teaching and research. Paper presented at the Higher Education Academy Learning and Teaching Conference 2004: Delivering Excellence, 29 June–1 July, The University of Hertfordshire.

Bibliography

Breen, R. and Lindsay, R. (1999) Academic research and student motivation, *Studies in Higher Education* 24 (1), 75–93.

Brew, A. (2003) Teaching and research: new relationships and their implications for inquiry-based teaching and learning in higher education, *Higher Education Research & Development* 22(1), 3–18.

Coppola, B. (2005) Undergraduate research: bringing in students as intellectual partners, presentation at Oxford Brookes University.

Available at: www2.warwick.ac.uk/fac/soc/sociology/research/cetl/ugresearch/coppola_presentation.pdf.

Kinhead, J. (ed.) (2003) *Valuing and supporting undergraduate research: New Directions for Teaching and Learning* 93. San Francisco: Jossey-Bass.

Knight, C. (2006) Biolog-E and other undergraduate research E-Journals. Available at: www.heacademy.ac.uk/research/celia_knight.ppt.

Seymour, E., Hunter, A., Laursen, S. L. and Deantoni, T. (2004) Establishing the benefits of research experiences for undergraduates in the sciences: first findings from a three year study, *Science Education* 88 (4), 493–534.

Willmott, C. J. R., Clark, R. P. and Harrison, T. M. (2003) Introducing Undergraduate students to scientific reports, *Bioscience Education e-journal* 1(1). Available at: **www.bioscience.heacademy.ac.uk/journal/vol1/beej-1-10.htm**.

Appendices

Examples of posters (A0→ A4) – PDF

PDF - separately attached

Interview with Professor Allan Jamieson –

mp3 audio separately attached

Recorded meeting with students –

mp3 audio separately attached

Example of completed questionnaires

Selected images of Conference

separately attached images

“Research into Teaching” Questionnaire

Name: _____

Stage as Undergraduate (1st/2nd/3rd year) : _____

1. Have you started thinking about the topic for your final year project? (Y/N)

2. If 'yes' where did you get the information from?

3. Are you finding/have you found SHS82206-2 Research Skills in Forensic Science helpful in understanding the nature and importance of research to Forensic science?

4. How many journal articles do you think you have read this academic year?

- 4.1. 1-5 papers
4.2. 5-10 papers
4.3. 10+ papers

5. Why have you read these articles?

6. Do you think that research is important in your degree (Y/N)

- 6.1. If 'yes' why ?

6.2. If 'no', why not?

7. Do you think that research is important in the area of Forensic science? (Y/N)
7.1. If 'yes' why is it important?

7.2. If 'no', why is not important?

8. Do you think that research can be used when giving evidence as an Expert Witness in the Courts? (Y/N)

9. Do you think it is important to read research articles as a forensic scientist?
9.1. If 'yes' why?
