

# Developing Teamworking Skills Through Forensic Miniprojects

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# Background

- Annual cohort of 10-15 students studying Chemistry with Forensic Analysis
- Core chemistry plus Analytical Chemistry plus 20 credits per year of Forensic Analysis
- Need for lab-based Forensic work
- Need to develop problem-solving skills
- Need to develop teamworking skills

# Miniprojects

- Idea to incorporate Forensic miniprojects
- Open-ended (no set script) but in clearly defined areas
- Part of final-year Forensic Analysis Module (CH3FA2 – 20 credits)
- Hope to back up
  - Main projects (CH3PR - 40 credits)
  - Analytical Chemistry (CH3A1 - 20 credits)

# CETL-AURS Funding

- Fortunate to receive funding from University of Reading CETL funds
- Enhancing Undergraduate Research Experience
- Ideally suited to these projects
- Employed project coordinator
- Purchased set of Leica binocular microscopes plus video camera.

# Strategy

- October – December – project coordinator plus 2 UG students work on developing projects.
- January – February (5 weeks) miniprojects carried out
- February – March UG students carry out survey of effectiveness of projects.

# Areas Selected

- Interferences in Blood Tests
- Analysis of Paints
- Gun Shot Residue Identification
- Studies of Fingerprints on Different Surfaces

# Organisation

- Three Teams
- Each with team leader
- Gun Shot Residue Project not carried out after some thought
- Teams responsible for dividing up work between members
- Team leader responsible for coordinating team members

# Timetable

- Preliminary discussion in week 1. Then students free to plan strategy
- Four weeks with 4 hours each week in lab
- Writing Up
- Use of “Blackboard” to post useful info/references etc and to communicate with students.
- Oral presentation given at end of term

# What Did The Students Do?

- Each team divided up work between members
- One team leader to coordinate
- Each team member investigated part of the project
- Results combined and joint discussion forms part of final report and of oral presentation

# Fingerprints

- Looked at different methods
- Cyanoacrylate Fuming “Superglue”
- Ninhydrin
- Powder Dusting
- Crystal Violet Solution

# Paints

- Database of IR Spectra and Elemental Analysis Built Up
- Pigments and Resins Identified
- Allows Visually similar paints to be distinguished
- Teaches students about analytical chemistry!

# More Lighthearted

- One student invented crime case “The Case of the Blues”
- Blue paint on suspect’s hands – but four men each with paint on their hands say one of the others did the crime
- Tested by IR spectroscopy and EDX analysis
- Guilty party identified!

# Assessment

- Each team produced report and gave oral presentation
- However, each had recognisable individual components
- Students saw this as “fair”
- No peer assessment – yet!

# Assessment

- 30% of marks for teamworking in lab and overall team effort
- 60% of marks for individual components of project reports
- 10% of marks for oral presentation
- Reports double-marked
- Presentations marked by a number of staff

# Value Added

- **25 Students: 10 Forensic; 15 Straight Chemistry**
- **Overall Marks: Forensic 63.5; Non-Forensic 58.9**
- **Part 2 Marks: Forensic 60.3; Non-Forensic 59.8**
- **CH3PR (Main Project): Forensic 66.2; Non-Forensic 64.9**
- **CH3A1 (Core Analytical): Forensic 66.3; Non-Forensic 61.9**

# Degree Classes

- Chemistry
  - First Class – 3
  - Second Class, First Division – 5
  - Second Class, Second Division – 4
  - Third Class - 3
- Chemistry with Forensic Analysis
  - First Class – 5
  - Second Class, First Division – 2
  - Second Class, Second Division – 3
  - Third Class - 0

# The Students' View

- Which mini-project were you in?
  - Blood tests
- Did you enjoy doing the project?
  - Yes very much
- What areas of the project did you find interesting and not so interesting?
  - The theory behind the whole experiment was very interesting and researching everything about blood and detection was also. Hearing the talks from other people was good too.

# Continued

- Do you think the projects were too open ended and should have been more specific?
  - No
- Did you enjoy working in a group or would you have preferred to work alone? Why?
  - The group allowed the work to be evenly split between the group members and so I much preferred this method. We all took part in all of the experiments and understood them, and writing them all up individually would have been pointless and would give the same thing to be marked 3 times. Also it helped further develop our skills of working in a group.

# Continued

- Was the time allocated to do the projects enough or too little?
  - Definitely not too little; we had plenty of time to write it up and actually do the experiments. Think that the arrangement for lab time being in our final project lab time, which is all Tuesday, very inconvenient but easily arranged to do the experiments on different days.
- Did you have the equipment necessary to carry out the projects? If not, what equipment was not available, and how did you overcome this problem?
  - Kelly herself had to order a couple of things such as the dried haemoglobin, but other than that everything we needed was there. Also had to buy products being tested ie veg and cleaning products ourselves, but that was not a problem and we were re-reimbursed for everything

# Continued

- Are there any other resources aside from equipment that would have been useful to have but weren't available?
  - No
- Were you aware of the blackboard resources associated with this course and how useful did you find this?
  - Wasn't really aware of blackboard except for the project description not sure if there is anything else on there. Found this helpful to refer to both for the write up and to check hand-in dates.
- What is your overall view of the project?
  - Extremely enjoyable and a great way to get some more practical forensics into the course
- Do you have any further comments or suggestions?
  - John Baum was extremely helpful; I don't think I actually met Miss Shillito except in the project presentations, which seems odd seeing as she was meant to be involved somehow.

# Thanks

- Reading University CETL-AURS for grant
- Lisa-Marie Shillito for help in organising projects
- Kelly Roberts and Christine Barber (UG students) for help in testing experiments/methods etc.
- John Baum for much help in laboratory.