

IATL Academic Fellowship - Final Report

Project Title:

Communication, teamwork and leadership in statistical practice.

Project Lead:

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Activities:

Applied Statistics generally involves working in an interdisciplinary team. Thus professional skills such as teamwork, collaboration and leadership skills as well as communication and presentation skills are essential to the work of an applied Statistician. In a traditional statistical methodology module, however, there is often insufficient opportunity to develop and practise these skills.

It was therefore decided to re-design the module ST404 Applied Statistical Modelling, a core module for third year students registered on the integrated Master's programmes MMORSE and MMathStat to include training on professional skills. Some elements of the re-design were funded by the IATL academic fellowship. In 2013/14 thirty-five students were registered on the module.

The aims of the re-design were:

- to deliver professional skills training embedded in a statistical modelling module;
- to engage students in practical projects and real data from a variety of application areas;
- to provide students with experience in a variety of communication tasks including oral, poster and written presentations to a specialist or a non-specialist audience;
- to enhance students communication skills with a particular focus on international communication.

At the start of the module, a representative from the Warwick Student Careers and Skills, Ms Siobhan Scanlon, gave a presentation on the importance that employers place on professional skills. She also gave advice on how to report on these skills in applications for internships and jobs using the CARE framework (Context, Action, Results, Evaluation).

For the duration of the term, students were divided into teams of five students each. The teams were chosen by the module leader and selected so as to maximise between-team homogeneity in terms of gender, exams performance and number of home students.

During the term the students completed two group projects. The first project entailed the statistical modelling of rental data. A fictional estate agent asked the teams to develop a statistical model that predicted the rental price for a property based on various characteristics such as size, location, etc. As usual in a consulting project like this, the estate agent gave input at various stages of the model development making it necessary to consider adaptations and extensions of the original model. Students were asked to complete both executive summaries in a language appropriate for estate agents, as well as technical reports giving details of the model development to a specialist audience.

In order to encourage students to complete the project in a collaborative fashion rather than using a divide and conquer strategy, the teams were asked to submit minutes that would give details of team meetings. In particular, these minutes had to report on the decision processes within the teams. Students were asked to upload the minutes as well as descriptions of individual work to a forum on the ST404 Moodle. The forum was set up so that a team member could only see the forum entries of fellow team members. Also, in order to see the other contributions, students had to make a contribution themselves. The marking scheme for the project included an individual weighting scheme that allowed a team to differentiate marks across team members. The forum submissions provided useful support in moderating the weighting factors suggested by the teams.

To prepare students for their teamwork they were asked to read material on teamwork and leadership including material on Belbin's team roles. Beside the executive summaries and technical reports teams were asked to give an oral presentation, both on their statistical work as well as on their team. For the latter they were asked to discuss the following points:

- how the team developed over time;
- which roles individual team members adopted;
- how leadership within the team developed and/or changed;
- the effectiveness of communication within the team;
- which challenges arose and how these were addressed.

Challenges that were discussed by students were mainly external issues, such as the deadline for the project submission being tight or the difficulty of finding the time to meet.

The oral presentations were filmed using equipment provided by IATL and the footage was made available online for students to view.

In a second group project the students developed a statistical model predicting the salary of baseball players based on various elements of their performance in the previous season. Again, students produced a technical report outlining the statistical model development and an executive summary in which student had to brief an agent who was negotiating salaries with a baseball club. Again, the practical application context aimed at encouraging students to consider effective writing targeted at a non-specialist audience. Additional to the report, students also prepared posters that were presented in a poster session at the end of term. In the poster presentation students had to answer questions of a technical nature as well as provide motivation of their work to a baseball agent.

Towards the end of term, a member of the Warwick Academic Writing Programme, Dr Amanda Randall, provided an hour-long session on academic writing. Elements of academic writing were assessed in a final, individual coursework component.

The funding provided by the Academic Fellowship was used for collaborative work with two members of the Centre for Applied Linguistics, Dr Sophie Reissner-Roubicek and Ms Lynette Richards.

Half-way through the first project students took part in a teamwork activity observed by Dr Reissner-Roubicek and Ms Richards. This was followed up by a workshop on intercultural communication. The teamwork activity was in the style of an assessment centre and took place in the Experimental Teaching Space of the Teaching Grid. The students were split into two groups. In each group, half of

the students took part in a group activity while the other half observed. The observing students were given a checklist on what to look out for. After the first activity was completed, the roles of observers and observees were swapped.

In the first activity, students were given a set of competing tasks of a fictional statistical consultancy unit and asked to rank these in order of priority. This activity was time-limited. In the second activity, students were given a questionnaire in the style of Hans Rosler's ignorance survey, that is, students had to answer multiple-choice questions on various world statistics. While there was no formal time-limit for the second activity, the two groups answering the questionnaire were competing against each other, with the progress being monitored and visualised using the space race facility in the student response system Socrative.

Thus, the second activity was less similar to tasks traditionally set in an assessment centre. However, with the time pressure being less immediate and students being able to act as experts on their home countries, it seemed a task that was more conducive to team integration and to working collaboratively. Of course, given there were only four sub-groups participating in the assessment centre activities it is not possible to draw conclusions. Also, the outcome will have been influenced substantially by the individual students involved. However, it seems reasonable that the nature of a task will influence how the team operates.

In the week following the assessment centre activity, Ms Richards and Dr Reissner-Roubicek delivered a one-hour communication workshop. They had observed in the assessment centre activities that there were a number of students taking a much less active role in the team work activities. After an introduction into elements of intercultural communication, the students engaged in practical activities that were focussed on active listening techniques. This was aimed at providing the quieter students with an opportunity to make contributions and thus participate and integrate more fully into a team. It was encouraging to see that some these students found their voice in the session and made some insightful contributions.

Outcomes:

The coursework submitted by the students was academically strong. In particular, the oral presentations were of a high standard. The poster session overlapped with a poster session by fourth year students presenting on their final year dissertations. Encouragingly, the posters of the ST404 cohort compared very favourably with those presented by the fourth year students. These posters are now being used in Open Days and similar events and attract regular interest by attendees of these events.

The feedback from students was mixed. It is worth keeping in mind that this is not an optional but a compulsory core module. Thus, the fact that the module covered material other than statistical methodology and used assessment methods not usually used within the degree course was bound to create some tension.

The usual negative aspects of team work were raised such as the difficulty to find time to meet. This is particularly pronounced for the Statistics M-degree cohort, whose flexibility in terms of module choices means that students have highly differing timetables. However, students showed great initiative in using tools such as Facebook, Google hangout and WriteLatex.com to work as a virtual teams. Students also raised the issue of disparate contributions across team members. The marking

scheme for the first project included an individual weighting scheme that allowed a team to differentiate marks across team members and students generally welcomed this scheme. Tight deadlines in order to fit the project work into a busy term created additional pressures on the students.

While students on the module were from various cultural backgrounds, they were fairly homogeneous in the statistical training they received to date. The project work had varied elements including technical report writing, writing for a non-statistical audience, making presentation slides and a poster. Nevertheless some teams found it hard to identify distinct roles for their members. This was particularly an issue as, by nature, statistical model development is a sequential process.

The staff from the Centre for Applied Linguistics have used their experience with the ST404 students in their development of an intercultural toolkit for students. Further details on the toolkit can be found in the YouTube video listed under the section [Resources](#). The video also contains positive statements from three students enrolled on the module. It is planned to develop further the existing collaboration with the Centre for Applied Linguistics and Dr Reissner-Roubicek through PhD research work on intercultural teamwork.

Most encouragingly, some students stated that they found the professional skills training and in particular the assessment centre and associated feedback from the CAL staff helpful in finding internships.

Unfortunately, the timing of the Science Teaching and Learning Showcase which, like the module, took place in Spring Term, meant that I was unable to present on the project. However, Dr Reissner-Roubicek and Ms Richards will be presenting at the Institutional Teaching and Learning Showcase in June. I hope to be presenting at the next Science Teaching and Learning Showcase and at future HEA events.

Implications:

Equipping students with the skills to work effectively in a team is an ambitious aim for a module that also needs to deliver on subject specific knowledge. Observing students engaging in group activities such as the assessment centre proved an effective way of diagnosing issues for the specific student cohort. The workshop delivered by Dr Reissner-Roubicek and Ms Richards presented a first step in getting students to reflect on their interactions in an intercultural team and to consider communication techniques that allowed all students an opportunity to make contributions.

Resources:

For details of the NCUB Global Graduate Intercultural Toolkit see the following YouTube video <http://www.youtube.com/watch?v=BCfiNDJJzb8&feature=youtu.be>

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