**Secondary PGCE students’ use of ICT in science teaching: case studies of practice***Rob Toplis. School of Sport and Education, Brunel University, Uxbridge, Middlesex UB8 3PH. Email:* [Rob.Toplis@brunel.ac.uk](mailto:Rob.Toplis@brunel.ac.uk) *Charles Golabek, School of Education, University of East London, Stratford Campus, Romford Road, London E15 4LZAnna Cleaves,**Faculty of Education, Anglia Ruskin University, Rivermead Campus, Bishop Hall Lane, Chelmsford, CM11SQ*

This paper reports case study research in progress with fifteen secondary science trainees from three different University Initial Teacher Education providers. Data were collected by survey, observation and interviews to explore how and why trainees used ICT in their second school placement. Early findings show that they use interactive whiteboards predominantly as projection screens for presentations, and that datalogging and spreadsheets are used infrequently. Trainees see pupil motivation and time-saving as important but demonstrate little use of ICT to enhance their teaching of conceptual knowledge, they use it to increase the currency of activities or use it collaboratively with pupils: on the few occasions when trainees have used ICT imaginatively they are able to rationalise its use. Additionally, there is little evidence that there is a dialogue between mentors and trainees with respect to the effective use of ICT in science teaching.

**Introduction** As part of the Postgraduate Certificate in Education courses that equip graduate students (trainee teachers) to teach in secondary schools (ages 11 to 16 or 11 to 18) in England and Wales there is a requirement of 120 days school-based training, which must be carried out in at least two different schools. This paper examines case studies of PGCE students’ use of ICT in science teaching during school experience placements. In doing so, it reports work in progress about how they use ICT and explores their reasons for using it in their science teaching. It is informed by empirical research from experienced teachers’ practice, and by reports of policy initiatives in education.Although with little established pedagogical experience, or experience of the school or science education classroom ‘culture’, trainees may have prior experience of ICT from university courses, business or industry that may make their approach to using ICT different from that of experienced colleagues. Without extensive exposure to the norms and traditions of science teaching, they may bring their own ideas and expertise into the science classroom. This research aims to answer two questions: How do secondary science student teachers use ICT in their teaching? Why do they decide to use particular ICT approaches?**The Literature** The role of ICT in science education has been widely justified. From their literature review Osborne and Hennessy (2003) discuss a number of reasons for using technology in science teaching and learning including; expediting and enhancing work production; increasing the currency and scope of reference and experience; supporting exploration and experimentation; fostering self-regulation and collaborative learning and finally, improved motivation and engagement. The British Educational Communications and Technology Agency (Becta, 2003) reported key benefits of using ICT in science. Newton and Rogers (2001: 15) comment that, although teacher training and resource needs have begun to be addressed more systematically in recent years, it is ‘probably true that the widespread and *routine* use of new technology in science teaching remains a goal still to be achieved’. To change pedagogy Scrimshaw (1997) comments that the teacher is required to see the computer,

Not as an exotic extra, but as a responsive and integral element in a classroom curriculum that has been rethought to include a view of what computers might do.

(Scrimshaw, 1997: 100)

Bell and Biott (1997) examined ICT as a ‘bolt-on’ to classroom practice with trainee teachers’ use of ICT showing a spectrum between supplementary or add-on activities and as an integral part of learning. An extensive research literature review conducted by Cox *et al*. (2003) found that some successful pedagogies included the integration of simulations into science topics, the use of collaborative approaches and changing the roles of teachers and pupils in learning. However, on integrating ICT into teaching, Wellington (2005) notes that the organisational patterns and forms into which schools straitjacket teaching and learning has been remarkably difficult to shift with teachers using ICT in a way that fits their familiar procedures and routines.

The Bristol InterActive project identified features of teachers’ integration of ICT in a range of subjects in both secondary and primary schools, which transformed learning (Sutherland, 2004; Sutherland et al., 2004; John and Sutherland, 2005). ICT tools were used to transform teachers' own knowledge of their curriculum areas; to expand, develop and adjust their teaching repertoire; to generate ideas for embedding ICT into teaching and learning and to scaffold work in the classroom; to capitalise on the potential of ICT to give rapid feedback to pupils and supporting pupils’ engagement for sustained periods of time. Less successful factors were associated with technical difficulties and/or the apparent belief that the technology would do the teaching rather than the teacher A Cambridge-based group conducted case study research about serving English, mathematics and science teachers’ reasons for using ICT in the classroom (Hennessy, Ruthven and Brindley, 2005; Ruthven, Hennessy and Brindley, 2004; Ruthven, Hennessy and Deaney, 2004). Teachers’ thought that technology proved particularly powerful when exploiting interactivity and dynamic visualisation in rendering underlying scientific concepts and processes salient for learners. (Ruthven *et al.*, 2004b). In some cases multimedia simulation was integrated and sequenced with complementary work (practical, exposition, plenary discussion) using projected simulation to provide visual stimulus for questioning and reasoning, and knowledge-building, similar to the construction of common knowledge found in the InterActive project. Datalogging allowed interpretation of dynamic displays with ‘real data’ (as opposed to ‘clean’ computer generated data) to stimulate whole class discussion, avoiding laborious data collection and graph drawing. Pupil manipulation of data on the Interactive White Board (IWB) was considered to be beneficial in terms of motivation, involvement in constructing graphical representation and a related increase in understanding.

Ruthven *et al.* (2004a) have set out seven broad pedagogical themes describing teachers’ perceptions of potentially effective uses of ICT. These are outlined below, as they will provide a framework on which to base the analysis of our data. In considering how and why trainee teachers use ICT, we must bear in mind that, although they come into teaching with mixed ICT experiences they are inexperienced in classroom practices and pedagogies. Barton and Haydn (2005), note that the vast majority of trainee teachers surveyed consider a number of ICT applications to be potentially useful and see them as a component of lessons rather as a separate activity Bullock (2004) found that the mentor is influential depending on several factors including: the interest and capability of the mentor, availability of hardware and software; engagement by other staff; time demands, particularly resulting from assessment; pupils skills and engagement and, trainees own expertise. **Research Methods** This study is collaboration between three university providers in and around the Greater London area. A case study approach, adopted to collect rich data about each trainee’s use, experience and reasoning, included: biographical background of trainee teachers; lesson analysis to discover which types of ICT technology were used; observation of lessons from a sample of 15 trainees to provide details about how ICT was used, and semi-structured interviews to explore reasons why trainees used particular ICT approaches.

All were PGCE initial teacher education students with the exception of three trainees who were enrolled on a school-based Graduate Teacher Programme (GTP) with University input. For each case study we surveyed their use of different technologies and interviewed them about the reasons *why* they used ICT in their teaching. They were observed in order to record *how* they used particular ICT approaches with pupils and, where available, included copies of the ICT resources used. Permission for this research was gained from all participants and they were assured anonymity and assigned pseudonyms.

One of the researchers initially coded the data for consistency and initial validation was carried out during meetings of the three researchers. Analysis was carried out using the seven pedagogical themes developed by Ruthven *et al.*, (2004a):

Effecting working processes and improving production

Supporting processes of checking, trialling and refinement

Enhancing the variety and appeal of classroom activity

Fostering pupil independence and peer support

Overcoming pupil difficulties and building assurance

Broadening reference and increasing currency of activity

Focusing on overarching issues and accentuating important features

An additional category emerged from the data: that of ‘trainee survival’.

**Findings Survey results**

Trainee teachers were asked to estimate the numbers of lessons where they used different ICT technologies and these are presented in the chart below. The full results are shown in Appendix 1:

[1: datalogging; 2: use of IWB as screen; 3: use of IWB interactively; 4: multimedia; 5: spreadsheets; 6: Internet; 7: word processing]

The number of lessons where the IWB was used as a projection screen (870) is over four times its interactive use in lessons (185). From Becta’s (2006, p3) assertion that ‘Interactive whiteboards are now prevalent in schools and colleges’ we assume that these IWBs were available but not used interactively. Becta (2006, p43) reports that between 2002 and 2005, 42 per cent of secondary teachers used the IWB in half or more lessons. The number of lessons that incorporated datalogging was relatively few (45), despite this technology being almost solely used in science. There were also few lessons involving spreadsheet use, despite being well established from the early days of computer use in science (Rogers, 2004). Word processing was used with 255 lessons but it was unclear whether this was the trainee teachers’ use or use by pupils in schools.

**Lesson Observations and Interviews**In all the lessons observed visual presentations were used to display the lesson objectives, to revise prior knowledge, to sequence explanations and questions and to provide varying degrees of visual stimuli and pupil involvement. The trainee’s reasons for using these ICT approaches are explored and discussed below, using the categories listed above.***Effecting working processes and improving production***In all lesson observed trainees used PowerPoint presentations with a digital projector to provide guided notes and diagrams with varying degrees of interactivity. A number of trainees commented on the time saving advantages of using ICT in their teaching, comments referred most frequently to Power Point, but also to three other different technologies: spreadsheets, datalogging and interactive software. For example, Christine:

You can get through more. Asking pupils to draw and put on labels for example. There is often software that uses drag and drop.

Bernadette and Georgina also found ICT time saving. Bernadette considered that the use of visual material during a presentation *helps to reduce the amount of time spent on explaining* whereasGeorginaused the slides to allow time for discussion:

*If I want them to have notes for revision purposes in their books and I don’t want to waste time during lesson, I prepare them on a slide before, put them up and either let them write it down before I talk about them and then let them write it down after.*

Georgina also used spreadsheets as a way of drawing graphs instead of drawing them by hand and Kulwinder considered datalogging:

*A way to get the experiment done in a shorter period of time. It gives more time to discuss the results that the students achieved.*

However, not all trainees were uncritical of datalogging. Jeremy found the technology *cumbersome* and offered the opinion that:

*Datalogging teaches children how to use computers, not to estimate, plot graphs or assess experimental data. There are some things that it is essential to use data-logging equipment with, but not that many in a KS3-KS4 environment*

***Supporting processes of checking, trialling and refinement***Little data could be ascribed to this category, which reflects research with experienced science teachers who used ICT infrequently in this category when compared with mathematics and English teachers (Ruthven *et al.*, 2004a). One trainee in our study, Pete, reported that word processing was used *only for completing year 10 coursework*, a situation where a presentable piece of work is written and refined for assessment purposes.***Enhancing the variety and appeal of classroom activity***ICT was used in a variety of ways to appeal to pupils and to engage them. In Richard’s lesson on energy conservation a large labelled diagram of heat losses from a house was used to help recall prior knowledge. There were also two datalogging practical demonstrations, one showing the temperature drop with insulated and un-insulated beakers of hot water and the other, temperature and light probe results from an average and an energy saving light bulb. Pete spoke enthusiastically about the visual effectiveness of images into presentations:

*The ability to display full colour images and video is fantastic and the kids love it.*

Morag commented that this technology engages pupils by the very fact that it is different to their usual experiences. Christine was more specific:

*I like to use the ‘Braniac’ clips. The pupils are usually interested in those. I recently used the Group 1 Periodic Table one where they blow up a bath of water with Caesium.*

Trainees also found that the motivational effects of ICT helped with class concentration: *Brain-pop cartoons settle, silence and calm a class* (Brian)

*There was a heart pumping when they walked in the room and that worked very well with them; it got their attention. It got them to settle.* (Ros)

The visual nature of a number of ICT technologies carries with it an apparent ability to motivate pupils and gain their attention, an important advantage that was not lost on the trainees in this study, who used ICT in all the observed lessons.

***Fostering Pupil Independence and Peer Support***There were examples of independent learning. When teaching a topic on the solar system Ros let Year 8 pupils do the spreadsheets and data interpretation through Excel themselves in pairs. Morag gave one reason for using ICT technologies as an opportunity to learn independently without the pressure of the rest of the class.Fatima used an interactive revision and test website.

A number of trainees used the Internet to allow pupils to research topics for particular projects. A student described a project done by the pupils using a set of networked computers:

*They did a project on microscope. So we let them have time on the internet to find a picture of a microscope and they found out what each part of the microscope was. They had to annotate what each part was so we didn’t just let them look, they made an annotation of how it worked.* (Georgina)

Lubna used pupil presentations on circulatory disease as an active and focussed approach to learning:

*Instead of sifting through leaflets students had to make a presentation about a specific area around the diseases e.g. lifestyle, diet, arteriosclerosis etc and they then presented their PowerPoints to their peers the following lesson.*

Some trainees attempted to use ICT for peer support, although this did not appear strongly in our data. Fatima provided a positive view:

In fact pupils enjoy being able to come up to the board to answer questions or reveal equations, pictures etc; usually turns into a whole class activity with class commenting if a pupil answered correctly or not.

Christine commented that using the IWB, particularly getting pupils to move things around a screen and match up words and definitions, allowed peer evaluation in a non–threatening environment. ***Overcoming pupil difficulties and building assurance***

The data for this category were allocated to two sub-categories: overcoming individual problems and enhancing conceptual learning. The first of these involved advantages of ICT in overcoming disability. Jeremy highlighted the use of digital video for hearing impaired pupils and two of the trainees referred to the advantages of using ICT with those pupils who showed literacy problems. Christine found the facility which transforms handwriting to a legible form to be useful, particularly for pupils with poor writing skills, whose writing can be changed to text so that peers can read what they have written and comment on the science, not the writing.Richard mentioned this inclusive use of ICT:

When you put up a worksheet, using the same base but different tasks, the lower ability don’t feel bad like they do when you give them a different worksheet.

The second sub-category, enhancing conceptual learning, highlights the visual uses of ICT for pupil understanding. Ros was observed to teach a conceptually difficult area of gene cloning to a Year 13 (17 – 18 years) class, where she introduced new information by using the sequencing facility offered by PowerPoint in conjunction with explanation and questioning. Three presentations were used to sequence, explain and question. In Georgina’s case this involved pupils moving labels to their correct positions on a diagram and in John’s case it involved a pupil moving part of the diagram to demonstrate the dynamo effect as part of a revision lesson.

We have found that trainee teachers use ICT to model representations – and real recorded events – of scientific concepts to further conceptual understanding. ***Broadening reference and increasing currency of activity***  Trainees used some of the ICT tools to increase currency by providing pupils with a sense of ownership of their activities. In Jeremy’s case this was achieved by using the pupils’ own results:

*I put up pupils own results from a Year 8 experiment. They hadn’t done that sort of thing before. The graphed the results and then I had a work sheet for them to do about the graphs and what they showed.*

Richard broadened pupils’ frame of reference by comparing the light energy and heat energy given off by an energy saving and a standard light bulb. In Kulwinder’s case dataloggers were used, not only to save time, but to obtain graphs that are more like the expected theoretical graphs.Similarly, Morag used dataloggers with topics looking at temperature and pHbecause

they give more accurate results which better represent those seen in the pupils’ books and tests.

Trainees found that using ICT increases the currency of the activity by providing increased pupil involvement and a sense of importance by showing how science works in a broader context than the science classroom.

***Focusing on overarching issues and accentuating important features***A few of the trainees gave reasons for using ICT as a way of focussing attention on important features and ideas, the key ideas in science. While Brian referred to the timesaving advantages in allowing him to *recap a topic’s main points in three minutes*, Georgina used projected slides to provide a focus for class discussion:

Both Christine and Richard, provided a focus for the main points of a lesson, using the digital projector screen. John used PowerPoint slides during a Year 11 revision lesson. When asked why he had chosen this approach, he responded:

*You can just crystallise an easy plan of key information because you are not looking to go through information. Just looking to summarise so It’s very easy for that.*

Our data, like the data reported from the Cambridge study, showed how individual trainees were able to use ICT tools to offer clearer or more visual explanations and to free themselves from the more subsidiary tasks or ‘subordinate working processes’ (Ruthven *et al.*, 2004a: 270), such as note taking, in order to focus on the main points of the lesson. ***Trainee survival***

Trainees gave their own individual reasons for using ICT in their teaching which we loosely refer to here as ‘survival’. One student (Pete) was openly pragmatic about using ICT to help him qualify as a teacher; *I used the data-logging equipment mainly to cross off one of my standard tracker marks.* In Christine’s case, the digital camera was used because she did not have access to a computer. A novel activity was created where pupils made stills and sequenced them for an animated presentation of an idea, e.g. subduction*.*

Using presentations in lesson planning featured with a number of students. Richard, a dyslexic student, used the technology to overcome any issues with his handwriting and as a way of referring to lesson objectives:

As a trainee with dyslexia I frequently use writing in Power Point to waylay writing inaccurately. It saves worry and I can concentrate on the activities. I like it a lot for putting up learning objectives. You have to remember to refer back to them.

John noted the efficiency of prepared PowerPoint slides:

And I think it saves time writing on the board. It’s easier just to click through the slides than write on board. And also partly it’s for a record of what I’m doing; it helps me form in my mind..

Three trainees mentioned ICT as an aid to class management. Ros, commenting on her use of a projected animation of a beating heart, noted that:

*It got them to settle, especially on a Wednesday when they always come in late. That was a management as well as a teaching tool and it worked very well.*

Georgina combined class management with the idea of pace that ICT presentations provided:

*If you take your eyes off them and have your back to them while you draw on the board, they will fiddle and become distracted, they will get bored very easily.*

Trainee teachers have pragmatic reasons for using ICT to ‘survive’ their training year: to meet the training standards, for collecting resources, effective planning preparation and presentation and for classroom management.

# Discussion

Trainees’ use of ICT in science shows many of the features seen in the work of experienced teachers and in our discussion we will position our work in the context of work carried out by the Cambridge and Bristol research. In analysing our data using the categories developed from the Cambridge research we needed to make decisions because, although much of the data showed similarities with the Cambridge framework, there were situations where interpretation was needed. One example concerned the assignment of data that involved the visual advantages of using ICT; here we had to look at the *purpose* of the visual material and as a result much of it appears in the category of ‘Enhancing the variety and appeal of classroom activity’. However, where trainees indicated that the purpose was to help with pupils’ conceptual knowledge we decided to assign some of the data to ‘Overcoming pupil difficulties and building assurance’. In these situations meetings of the three researchers was beneficial. Some of our data was unique to trainee teachers of science and therefore we created the additional category of ‘trainee survival’.

Like experienced teachers the trainees in this study frequently used ICT to expedite working practices and increase the pace of lessons and coverage of work (Ruthven *et al.*, 2004a). The priority of using ICT for time saving may arise because of trainee perception of an overburdened and prescriptive National Curriculum that translates into equally overburdened schemes of work and syllabuses and a feeling that trainees need to cover a good deal of factual matter. Teacher thinking about ‘getting through the work’ appears to have been transferred, consciously or not, to trainee teachers.

Datalogging equipment can by-pass the need for pupils to collect, record and process data, in the same way that using multimedia simulations of investigations always produces perfect of ‘sanitised’ data (Baggott La Velle *et al*, 2003: 196). Trainee teachers, who seldom use data collection hardware nevertheless seem to be familiar with the argument in favour of using ICT technologies that pupils avoid the drudgery of data collection and processing and can then progress to higher-order skills (Wellington, 2005). The rapid feedback afforded by ICT that may support the construction of knowledge (Sutherland *et al*, 2004), although Jeremy’s critical comment reducing pupils’ skills of estimating, graph plotting and assessing experimental data touches on a problematic dimension with the use of ICT in science: that of removing some of the ‘authentic labour’ from a learning activity (Wellington, 2005: 31).

At one level the ‘novelty effect’ of using ICT as something different from traditional approaches to provide pupil motivation was supported by the trainees, a situation also noted by the Cambridge group among experienced teachers where they recorded comments such as ‘something different’ and ‘a different way of doing things’ (Ruthven *et al.*, 2004a: 266-267). At another level, the visual nature of animations as a method of communicating the excitement of the subject has been reported here and similarly from survey data by Rocha Mello (2006: 100) as a positive influence in ‘developing enthusiasm’. Whilst we must exercise caution that visual ICT displays alone may not lead to learning but as a tool to aid the readiness to learn, they may be an important factor as part of a teacher’s emerging pedagogy (Rogers and Finlayson, 2004).

Among experienced teachers Ruthven *et al.*, (2004a: 272) note:

Relatively little emphasis was found in this study on technology use as promoting pupil independence and collaborative working.

We have found that examples where trainees fostered pupil independence and peer support in their science lessons, were relatively rare, but notable. Ruthven *et al.* (2004a) report considerable pupil confidence and expertise with using ICT, a situation paralleled in our data where trainees reported pupils’ ability to independently use spreadsheets, digital cameras and presentation software. Clearly, out-of-school use of ICT by pupils has an effect on pupils’ expertise within school where they are able to draw on both sets of experiences (Sutherland *et al.,* 2004).

Few of the trainees in our study reported or were observed to use ICT for promoting conceptual understanding and where they did, the evidence indicates that the ICT tools were used by the trainees for explanation rather that the pupils for modelling or trying to answer ‘what if?’ questions (Osborne and Hennessy, 2003: 25). Although there is a danger that unguided use of interactive simulation CD-ROMs by pupils may lead to the acquisition or reinforcement of misconceptions, we suspect that the main reasons for little uptake of ICT for conceptual understanding is due to access, availability – or awareness of the availability – of appropriate resources and the confidence to incorporate their use in their teaching.

The data from our trainees’ use of ICT with their pupils show examples of ways in which the currency and authenticity of schoolwork can be enhanced beyond those resources already available (Osborne and Hennessy, 2003). It clearly links to the greater emphasis that has emerged in science education policy concerning a focus on how science works (Department for Education and Skills 2005) and provides additional reasons for using ICT to enhance science teaching.

## Conclusions

Trainees in this study showed a number of positive uses of, and views about, integrating ICT in the science classroom. They expressed the importance of using ICT – principally spreadsheets, datalogging and PowerPoint – as ways of increasing efficiency by saving time and improving pace in what was perceived by some to be a busy and packed curriculum. Motivation was seen to be an important feature of ICT by providing visual appeal and helping with concentration, interest and enthusiasm as an aid to readiness for learning. However, the visual advantages of ICT were only used by a small number of trainees to help develop conceptual learning in their pupils with few of the trainees fostering independence by using ICT tools that enhanced pupils’ research and presentation. Another uncommon theme was using the technology to provide a measure of currency and authenticity to trainees’ science teaching, two notable examples being the imaginative use of datalogging and producing animations using a digital camera. Most common was the widespread use of PowerPoint to provide projected information on to an IWB, more often without pupil interaction, and to accentuate the important points of a topic, a use that helps to provide lesson starters and plenaries. Trainees also used ICT, again often PowerPoint, as survival tools for the organization and management of lessons.

Although a number of the trainees in this study come into teaching education with prior experience in the use of ICT, we conclude that there is limited use of this experience with trainees apparent rapid immersion into the established classroom culture of school science where ICT use may be added to existing pedagogies, rather than constructing new ones. Several influences (Sutherland *et al.*, 2004: 415) may explain this, crucially the prevailing school ethos, but also the subject, the National Curriculum and the National Strategy (DfES, 2002) which guide, for example, their use of ICT tools to achieve pace, whole-class teaching, classroom organization with starters and plenary sessions. An emphasis on whole-class teaching mitigates to some extent against teaching styles that promote pupil independence, interactive work and peer support. The trainees seem to be operating at the survival level or acting like their perception of a teacher in order to focus on performance and classroom organisation (Furlong and Maynard, 1995) which, being teacher-centred, is a ‘safer’ option than allowing much pupil interaction or independence.

Further research may be needed to investigate the role of the school-based mentor, further research and development work on more interactive use of the IWB and how training providers, as well as schools, can encourage specific ICT pedagogies.

Trainees’ prior experiences with using ICT in higher education (HE) or the workplace would seem to be a valuable and creative resource that is being overlooked during teacher education. They have a good deal to contribute to developing technology-based pedagogies in schools and their associations with two placement schools, as well as each other during attendance at HE institutions, provides opportunities to share their ideas and experiences. It is this contribution to learning communities that may develop both new approaches to ICT use in science and to trainees’ own professional lives.

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# Wellington, J. (2005) Has ICT come of age? Recurring debates on the role of ICT in education, 1982-2004. *Research in Science and Technological Education*, Vol. 23, No. 1: 25-39.*Word, Excel, Publisher* and *PowerPoint* are all commonly used computer software packages developed and marketed by the Microsoft Corporation.AcknowledgementThe authors are grateful to the Higher Education Academy who funded this work through an ESCalate Development Grant. Website: http://escalate.ac.uk

# Appendix 1: Trainees’ use of different ICT technologies

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| **Trainees' Use of ICT: Quantitative Data** | | | |  |  |  |  |
| **Trainees** | **Datalog** | **IWB screen** | **IWB interact** | **Multimedia** | **Excel** | **Internet** | **Word** |
| Ros | 2 | 6 | 0 | 3 | 1 | 20 | 10 |
| John | 2 | 80 | 10 | 10 | 2 | 10 | 7 |
| Georgina | 3 | 50 | 70 | 20 | 5 | 2 | 12 |
| Christine | 5 | 25 | 2 | 2 | 1 | 3 | 2 |
| Richard | 10 | 40 | 5 | 15 | 1 | 15 | 3 |
| Jeremy | 9 | 40 | 2 | 10 | 1 | 5 | 3 |
| Bernadette | 0 | 150 | 0 | 0 | 0 | 1 | 0 |
| Pete | 1 | 30 | 0 | 3 | 4 | 0 | 4 |
| Brian | 0 | 90 | 1 | 0 | 4 | 3 | 0 |
| Nasreen | 0 | 40 | 9 | 10 | 0 | 2 | 2 |
| Kulwinder | 3 | 25 | 10 | 10 | 0 | 10 | 0 |
| Morag | 10 | 200 | 30 | 80 | 4 | 40 | 160 |
| Fatima | 0 | 50 | 40 | 25 | 4 | 25 | 45 |
| Lubna | 0 | 4 | 2 | 3 | 0 | 0 | 2 |
| Shalini | 0 | 40 | 4 | 0 | 0 | 0 | 5 |
|  |  |  |  |  |  |  |  |
| **Total** | **45** | **870** | **185** | **191** | **27** | **136** | **255** |