

26

A case study - a New Zealand model for teacher development in information technology

Kay J. Rye

A. R. P. Ltd

P. O. Box 10, Okato, Taranaki 4652, New Zealand

Abstract

As a part of implementing the New Zealand Curriculum Framework, the Ministry of Education has provided funding for a three year nation-wide teacher development programme in Information Technology across the Curriculum (Information and Communication Skills are one of the Essential Skills in the New Zealand Curriculum Framework).

Contractors delivering the 1995 teacher development programmes had to address: the teacher's own knowledge of information technologies, including communication technologies; use of information technology across the curriculum including using information (written, graphic and aural forms), handling information (textual and numeric data), investigations (problem solving activities, interactive fiction, simulations); and development of a school policy for information technology.

My contract targeted 90 primary and 20 secondary teachers in two North Island rural provinces. School sizes ranged from a sole charge primary school with a roll of 19 students to a large (900+) single-sex high school.

To create a sense of centre for teachers coming from a wide area geographically, I asked for schools to become Focus Schools. These schools provided a venue for all workshops as well as two staff members as Focus Teachers. The role of the Focus Teacher was to assist at all workshops as well as to provide ongoing support for their workshop teachers. An added bonus was that after the contract was completed these teachers could continue to be resource people in their immediate teaching community.

Keywords

Elementary education, secondary education, professional development, information technology

1 THE PROGRAMME

Over a ten month period, each teacher attended three full day workshops and received a minimum of three in-school visits. Each workshop focused upon one computer application as well as other Information Technology tools. A week before each workshop all Focus Teachers attended a training day to familiarise themselves with the content and activities to be offered.

Workshop 1 focused upon the use of a word processor. The participating teachers were asked to rate themselves as either a beginner or expert user.

The beginners were drawn together into a discussion about keyboarding techniques and basic classroom management when faced with 30 students and just one computer. I believe that just as students need daily practise to develop reading skills so too do they need daily practise to develop word processing skills. To assist teachers to develop a classroom programme which allows this development to occur, we provided a booklet of starter activities. The beginner teachers were then sent off to trial some of the activities for themselves.

Those teachers who had decided they were advanced users were set tasks which used other Information Technology tools alongside the word processor. Some took a 35 mm. camera and created a photo essay about the New Zealand native trees in the school grounds. Others experimented with making popcorn and then recorded an audio taped recipe. The script and cassette cover were both generated on the word processor.

At the end of the day each teacher shared their work with the whole workshop group so that everyone could see the end result of each activity.

Workshop 2 (mid year) focused upon the use of a database. The other tools used were fax machine, audio conferencing telephone and a video camera. The teachers were divided into two groups for the day. Each group began the day with teachers sharing samples of student work.

I have always found the classroom use of databases limiting as it takes so long for students to gather and correctly enter enough data to have a large number of records to manipulate. A set of 30 records is just as easy to manipulate physically (each student takes one record) and the sorting and searching can be done with the paper records. Thus sample databases and questions were supplied on disk for each of the three platforms in commonly used applications (Microsoft Works for Windows, Clarisworks and Advantage) so that they could access the activities back in school.

Following a 1 hour session of working with the activities they began to create a database. We wanted the subject of the database to be something which every student had had experience with, hence we chose a 'Sweet Idea' database (the subject of the database was lollies - also called confectionery or sweets). Teachers of various school levels decided on the six field names which would be appropriate for their students. So the field names junior teachers chose were: name, cost, colour, shape, sugar coated, flavour; while the middle school teachers chose field names like: name, cost, colour, shape, size, flavour; the senior primary went for field names like: name, cost, colour, taste, texture, flavour; and secondary teachers selected field names such as: name, colour, calorific value, density, cost, taste. Using real samples, the teachers built and tested their database. They then designed some questions to accompany it.

Meanwhile the other group was coming to grips with the video camera as a means of presentation (English Curriculum Viewing strand). In groups of six to eight, they were allocated characters from well known scenarios. Their task was to produce a short video promoting their scenario. Each character was to appear in front of the camera and speak for 30 seconds. It was a surprise to find that so many participants were reluctant to appear in front of the camera despite expecting their students to do so. The resulting video was exchanged with the other group's video and viewed. Group members then prepared questions to put to the characters. A copy of the questions was faxed to each video group so they could prepare their responses. Each group then used a hand-free phone to participate in an audio conference, taking turns to ask questions and to answer questions.

Workshop 3 featured spreadsheets, together with sessions on 'Policy and Implementation Plans', CD-ROM selection and 'Techno Lusting', and 'Creating your own Graphics'. The focus of the day was more on teacher utilisation than classroom usage. The spreadsheet session followed the format of the database sessions in that they first explored some sample spreadsheets and activities before creating a spreadsheet. Again the samples and questions were provided on disk to take back to the classroom. The examples were for a mark register, a cash flow for allocated budgets, a sector survey of a pine plantation, and a costing exercise for a DIY fence.

CD-ROM selection and 'Techno Lusting' sessions compared the topic information available on three commonly used CDs - Encarta, Comptons and Explorapedia. The teachers were asked to consider the topic information they sourced from each CD in terms of reading age, relevance to the New Zealand curriculum and appropriateness of the information for their students.

The 'Policy and Implementation' sessions dealt with issues arising in developing a school vision of Information Technology, developing a three year plan to implement this vision, budgeting and teacher development.

2 BETWEEN WORKSHOPS

To ensure some follow up activity, teachers were asked to plan a class activity which used the Information Technology tools modelled in each workshop. The activity had to fit into their existing classroom programme. Between workshops, I visited each teacher. Each visit was initially time tabled for 45 minutes to an hour in duration. This was later changed to a half day per two teachers. During a visit the teacher and facilitator were to discuss the progress towards achieving the goals set at the workshop. Advice and suggestions could be made at this stage. In actuality more teachers used the visit time for forward planning and discussing ways of implementing the tools across the curriculum. Later the time was spent in a variety of ways: demonstrating and teaching students and teachers how to use new software packages; working alongside students as they used the tools; discussing and advising on long term plans and strategies with principals; and giving technical support (especially for remote rural schools).

Data from the final evaluation forms indicated 85% of teachers on the contract found the in-school visits useful. They commented that:

"visits clarified issues";

“visits forced me not to procrastinate”;
“visits useful for discussion and enthusiasm”;
“visits gave practise, answers to questions and refreshed my ideas”;
“visits were another way of checking that what we were doing was correct if a problem arose”.

3 EVALUATION RESULTS

Ongoing evaluation was conducted throughout the course of the contract. Each workshop was evaluated in terms of the activities offered. Each teacher's use of Information Technology tools in their classroom programmes was tracked at the midpoint and end of the contract.

A final overall contract evaluation was carried out after the final workshop (110 teachers were surveyed, and some 85 teachers responded). This evaluation looked at four areas - the teacher's personal development, the contract content and delivery, student learning and teaching gains, and teacher's use of information tools in the classroom.

The teacher's personal development was gauged on a 0 to 5 scale: 0 indicating no skills or knowledge; and 5 indicating very skilled and knowledgeable. If 2.5 is taken as being a confident user, in the area of:

WORD PROCESSING: more than half of the teachers who responded were less than confident users at the beginning of the contract. Only 3 indicated they had made little progress, all others ranked themselves higher than 3 by the end of the contract.

DATABASES: slightly less than a half had no skills or knowledge at the beginning of the contract. More than half had reached 2.5 by the end of the contract. Many Acorn users did not always have access to a software package away from the workshop.

SPREADSHEET: again slightly less than a half had no skills or knowledge at the beginning of the contract. Acorn users did not always have access to a software package away from the workshop.

GRAPHICS: despite every platform having a graphics package of some description, the teachers were not wide users of these packages. Many found the process of inserting Clipart to be involved, and not something they could do once and then leave for some weeks.

CD-ROM: the skills and experience in this area directly reflected the number of CD-ROM machines in schools.

35 mm. CAMERAS and VIDEO CAMERAS: whilst most teachers owned a camera and many also had access to a video camera, only a few enthusiasts used them in class. Developing costs and the initial capital cost of the equipment were two factors influencing student usage.

FAX MACHINES: there was, surprisingly, a high proportion of teachers who had never sent a fax, but all quickly became confident users. Recent New Zealand research indicates all secondary and almost all primary schools own a fax machine, so we have to ask where is the fax sited and who is allowed access?

AUDIO CONFERENCING: whilst the concept of audio conferencing was well received, teachers made limited use of this tool. Only two of the schools on this contract had telephone lines installed into classrooms.

INTERNET: again teachers were limited in developing skills with this tool for similar reasons - access to telephone lines, access to a provider at a reasonable cost, provision of basic equipment.

CONFIDENCE: it was a pleasure to see that nearly all respondents felt confident enough to pass skills on to their students and to try to work problems out for themselves by the end of the contract. It is to their credit that more than half felt sufficiently confident to teach another adult too.

3.1 Teacher use of IT tools in the classroom

Sixty five out of 70 questionnaires handed out were returned. Here is a summary of the responses (not all questions were answered):

Eleven out of 65 teachers used less than 6 IT activities in their classroom programmes.

Thirty seven out of 65 teachers indicated they used lots (> 15) IT activities in their classroom programmes.

Twenty out of 65 used activities in all main learning areas, a further 14 indicated language as the main learning area and a further 4 indicated social studies.

Twenty five out of 65 identified equipment as their greatest problem - equipment which was inaccessible, old, insufficient for the number of students.

Twenty five identified time as a problem. For most teachers there is a problem in finding time to become confident and competent users. Secondary teachers have the constraints of a school timetable in terms of accessing equipment which over-rode any problems they may face in terms of student / equipment ratios.

Many teachers identified the necessity for:

- a) small groups or pairs of students to use the tools.
- b) clear guidelines/routines/rules.
- c) support of student tutors, student peers, parents, office staff, aides, when students are using tools away from the classroom.
- d) usefulness of timetables or rosters for equipment use.
- e) being flexible within their teaching time.

Others identified the need to have good classroom organisation to address:

- a) teacher time required with junior students.
- b) time frames required by different students.
- c) low ratio of equipment to students.

I thought that two teachers were well on their way to effectively using IT tools in the classroom when they responded:

"It helps if children are accustomed to a co-operative learning model, although initially the teacher needs to be available"; "One becomes more of a 'gofer' rather than an instructor".

Responses to a question about student attitude were overwhelmingly positive:

“Children who don’t usually like language are writing a lot for their friends at other schools”;

“Comfortable using IT tools which are available and used all day”;

“Keen to use a variety of media”;

“Excellent support and follow up from interested parents”;

“Those who aren’t successful the first time are willing to have another go”.

The teachers’ perceptions of information technology before the contract were varied:

“a blur, hadn’t heard of it”;

“mainly concerned with computers”;

“did not appreciate that there was more”;

“information technology is the use of technology rather than conventional methods”.

Following the contract the perceptions had changed to statements such as:

“as a vital part of the learning process”;

“skills to access information and to develop learning”;

“using IT devices to discover, collect, organise, present and convey information”.

3.2 Student learning outcomes

IT tools: All students used computers, most students also used photocopiers and telephone technology, many students were using fax, video and still cameras.

First hands-on experience: For most children using a fax and/or photocopier was a first. Several also used fax, video, CD-ROM, video camera, hand-free telephone and e-mail for the first time.

Organisation models used: Paired or small groups of students was used most often.

Frequency of task types: Most students used the tools within skill-based activities and topic (unit) activities. Least frequently used tasks were tutorials.

Student gains/achievements using IT tools: 61 respondents reported a huge list of gains, many noting increased confidence in using the tools, especially computers, other responses commonly noted were gains in - information processing skills, personal organisation skills, problem solving skills, interaction with others, application usage (word processing, spreadsheet, database), wider knowledge of tools available and used in and out of school, professionally published written language, audio-conferencing skills particularly for reaching remote sources, willingness to be a risk taker, fun while learning!

3.3 So what happened in classrooms?

A class of Year 0 to 1 students studying the weather (in science) arranged for four schools across the North Island to fax them a series of weather reports taken throughout a nominated day. The data was turned into a series of graphs for the class to analyse and interpret. A class report was compiled and together with all the graphs was faxed back to the schools who had provided the initial data.

A class of Year 3 and 4 students were learning about New Zealand cities and towns. They faxed, phoned or wrote to Information Centres as well as using books and local knowledge (people). The information was then reorganised into a brochure targeting

tourists. A copy of the brochure was faxed or mailed to one of the featured places of interest for comment. Many places responded positively.

A class of Year 5 and 6 students were exploring healthy eating. The items available in their school canteen were individually placed on the food pyramid. Groups then faxed a random selection of neighbouring schools requesting copies of their canteen items. This information was displayed in the same way and the schools were ranked according to the perceived food value offered in their canteen. Copies of the class report were faxed to the contributing schools.

A class of Year 7 and 8 students used 35 mm. colour photographs and word processed text to compile a school profile. Working in pairs, they were required to photograph and interview all adults who were involved in the school, from the principal to the cleaner. Each interview had to be written up in an appropriate genre. The profile was published in a clear file folder and, after being taken home by a different student each night to share with their parents, was located in the school foyer for visitors to enjoy.

Secondary teachers and their students experienced significantly more problems in completing IT classroom activities for reasons mentioned above, but a Year 11 class successfully recorded photographic images of all seven of their town's World War memorials and published these with brief captions. After sharing their work with their parents they planned to give the booklet to the local Servicemen's Association.

Three other Year 11 classes successfully used audio conferencing within their social science programmes to speak to local and national personalities on the topics of 'Leadership Roles' and 'The New Zealand System of Government'.

I gratefully acknowledge and thank the New Zealand Ministry of Education for their financial support in funding this Teacher Development Contract and the Telecom Education Foundation for their support in providing equipment and advice for this contract.

4 BIOGRAPHY

Kay Rye is a trained primary school teacher who has used computers and other IT tools in her classroom. She has taught in urban and rural schools at both primary and secondary level, worked for the University of Waikato Teacher Support Services and two years ago set up a private company to deliver professional development programmes.

Currently Kay is delivering an Information Technology Teacher Development Contract for part of the week, teaching computer studies, overseeing an audiographics and satellite live television second language initiative, as well as working with two remote rural school clusters to implement innovative curriculum delivery projects through Information Technology.