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4.0 REGIONAL PROJECTS

4.1 THE KIMBERLEY PROJECT

Aims & Objectives

The objective of the CAP National Element project in the Kimberley District was to:

- increase the number of students completing 12 years of education,
- increase the number of accredited curriculum options available to post compulsory students,
- improve levels of student achievement,
- develop post-compulsory strategies as a district to overcome geographic isolation,
- increase opportunities for students' personal development through interaction with peers from differing cultural and socio-economic backgrounds.

There were perceived to be particular problems in post-compulsory schooling in the Kimberley district due to the large numbers of Aboriginal students in remote communities in the region. Although the majority of these were attaining year 10 level, the reluctance of the students to leave their communities was limiting their participation in education beyond this stage. There were a number of schools in the district using Telematics successfully for post-compulsory schooling. The opportunity afforded by the CAP National Element Stage 1 Project saw 6 schools in the West Kimberley collaborate in the development of the proposal to place Telematics in their schools for the purposes outlined above. The six schools were:

- Broome HS,
- Nulungu Catholic College,
- La Grange RCS,
- Sacred Heart Catholic School (Beagle Bay),
- Looma RCS, and
- Halls Creek DHS.

The Project

After a meeting held in September 1992, at which common priorities in School Development Plans were discussed, it was decided that the region would seek funds to introduce Applied Computing (Year 11) and English for ESL (Year 11) through Telematics teaching. This project saw a close collaboration planned between Ministry schools and schools from the Catholic Education sector.

http://ro.ecu.edu.au/ecuworks/6910
The project proposed to deliver Applied Computing from Broome HS to Halls Creek DHS and Beagle Bay. The English for ESL was to be provided from Nulungu College to La Grange and Looma RCS.

The delivery schools were chosen due to the availability of experienced teaching staff and the facilities that they were able to provide to support the programme. It was planned that these schools would receive teacher relief to enable the teachers to be released from their normal teaching duties to participate in the project.

Project Preparation

Once the project received notification of its successful proposal, a training session was organised at Broome to train the delivery teachers and coordinators at the remote sites. The meeting was attended by two teachers from each of the 6 participating schools. The team from each...
school was in the main, the principal and the person assuming the role of Telematics coordinator.

The training sessions covered the operation of the Macintosh computer, use of the Electronic Classroom software, telecommunications hardware and technical support and teaching and learning strategies appropriate to audiographics.

The computing equipment was ordered and delivered to schools before the commencement of the new year. Telephone lines were ordered for all schools but in many cases were not installed in time for the project to commence. There is a major problem in providing telephone lines to remote communities in the region. Beagle Bay and La Grange received their lines in Term 2, and Looma did not receive its lines until Term 3. These delays had serious impacts on the delivery of the Telematics programmes into these schools.

Transiency of teaching staff between the time when the proposal was made and when the project was due to commence caused other factors to change. Halls Creek DHS received a new principal and a new computing teacher. The new staff were not aware of the planned Telematics programme and the existence of a computing teacher made the project less relevant than it was to have been. Staff changes at Beagle Bay also influenced the project. A new staff member who subsequently became the Telematics coordinator was also from a computing background and this eliminated the need for the project in this school.

Project Implementation

With the commencement of the 1993 school year, there were several changes that had to be made to the planned project. In the first instance, the delivery from Nulungu did not commence until Term 2. At this point in time, only La Grange had telephone lines and the delivery commenced with 2 classes, ESL and Year 11 English studies. The delivery from Broome SHS got underway to Halls Creek DHS but the late instalment of the telephone lines at Beagle Bay meant that there was no teaching to this site until late in Term 2.

Teaching from Nulungu College
To provide a satisfactory delivery area at Nulungu College, the school had a small store area reconditioned and air-conditioned. The computer equipment and phone lines were installed in this room and furniture provided to facilitate the Telematics teaching. The delivery equipment consisted of an LCII computer with modem and printer and a DUCT phone system with extension speaker.
There were two sets of lessons delivered by Telematics each week from Nulungu. These lessons were to a group of six boys studying a Fastrack course aimed at providing work and employment skills. The second lessons were given to a group of Year 11 female students completing English Studies.

The Fastrack programme was designed to provide literacy and numeracy skills for Aboriginal students completing a vocationally oriented post-compulsory school programme. The students spent 2 days per week in a work experience programme and the remainder of the time was given to school studies in appropriate subjects. The ESL programme delivered from Broome was seen as essential to the progress of the students in this course because there was no secondary English teacher in the school.

There were 6 Aboriginal boys in the class. The literacy levels of the boys was quite low due to a number of factors including many interruptions to their schooling in previous years. The boys were highly motivated to complete the Fastrack course which had the prospect of TAFE entry and other possibilities for employment. The students also qualified for an Abstudy grant while in the programme. The Telematics lessons were highly structured and sensitive to the educational and cultural needs of the students.

The English Studies lessons were delivered to 4 Aboriginal girls who were completing post-compulsory course at the Year 11 level. This programme was invaluable to the school because there was no teacher capable of teaching Year 11 English Studies at the school.

The students would sit around a large table for the first part of the lesson that did not involve computer interactions. An overhead loudspeaker broadcast the teacher's communications and gave the impression of a teacher at the front of the room. Students responded using hand held microphones that were passed among themselves. When the lesson involved computer activity, the students would move to another table.
where the computer was positioned. The students would take the microphones and sit in a position where the screen could be seen and the mouse held. The teacher would create interactive activities for the computer component of the lesson and students enjoyed using the computer to complete the activities.

Prior to each lesson, the delivery teacher would fax materials to the site. These would be collected by the supervising teacher who would photocopy and distribute them to each student. The delivery teacher had also compiled a large folder of materials for each student and these were used for reference and activities. The supervising teacher remained in the room throughout each lesson and supported the teaching whenever serious problems occurred. Serious problems included difficulties in making communications links, students not having required materials etc. In some instances classes have been held without the computer link when connections have not been able to be made.

In the main, the students responded very well to this form of instruction and learning. Many of the students knew Miss Anna from Broome and were quite happy to communicate through the telephone with her. Aboriginal students are normally very shy with strangers and will not communicate freely with them. This problem had been overcome in this setting and the students tended to communicate quite well through the telephone system.

The programme at Looma did not commence because of the problems with establishing phone lines. By the time the phone lines were installed in Term 3, it was felt that the year was too far underway to change existing programmes. As a consequence, the delivery teacher used the extra time that had been allocated for the Looma programme to extend the level of teaching given to the students at La Grange. It was not uncommon for the students to be on-line for periods exceeding one hour.
Teaching from Broome HS

The delivery of lessons from Broome HS commenced with a number of problems. The first connection made with Halls Creek DHS found that the administration of the school had changed completely from 1992 to 1993 and that no one knew about the school's involvement in the Telematics project. After this had been sorted out, a class of 5 students in Year 11 was established to study Applied Computing. The support teacher at Halls Creek had a computing background and was able to tutor students during the practical components of the course. The delivery teacher used the Telematics teaching to cover the theoretical component of the course and provided a programme for the supervising teacher to follow to ensure that the practical and hands-on component was in accord with the course objectives.

There were a number of problems encountered in the teaching throughout the year. At one stage the delivery teacher's computer broke down and was out of action for three weeks. At other times in the first term, random problems with modem connections frequently prevented lessons proceeding as planned as the computer connections could often not be made. The timetable at Halls Creek did not match that at Broome HS. There were times when the Telematics teacher was unavailable for teaching at Halls Creek due to commitments at his own school. The support teacher at Halls Creek was able to stand in but this relied on his knowledge of the subject matter.

The teaching was relatively successful in this mode although truancy was a big problem among the students. Of the 5 students who were enrolled, it appears likely that 2 will obtain passing grades and move onto Year 12 Applied Computing in 1994.

The students at Beagle Bay who were to receive Applied Computing via Telematics had to wait nearly two terms before the lessons commenced due to the time taken to install the phone lines. When the lines were
finally installed, these students had all left the school. It was decided to continue with teaching computing and a class studying 8131, Information Processing was formed and commenced among the Year 10 students. It was felt that this would provide a good background for these students and would be a good lead into Applied Computing the following year.

Two Telematics lessons were delivered from Broome each week. The support teacher at Beagle Bay took on the same form of role as the teacher at Halls Creek. He would be a tutor for the practical and computer based component of the course that the students would complete independently of the Telematics teacher.

There were some serious problems with the timing of the Telematics lessons. They were originally planned out of Broome to suit the needs of the Telematics teacher. One lesson was first period in the morning and this lesson was not well attended due to the fact that several students had to travel for up to an hour to get to school and were frequently late. The class did not tend to have a firm starting time in the morning although the Telematics teaching demanded this.

**Issues Arising from Telematics Teaching**

**Aboriginal students.** There was some doubt expressed at the start of the project as to whether this form of teaching would be suitable for Aboriginal students. It has been recognised that Aboriginal students often require different styles of teaching and learning than European students. In particular, the need for a personal relationship with the teacher was cited as was the need for visual cues. It was expected that the Aboriginals would be reticent to communicate with strangers across telecommunications links and the reliance of the technology on discourse and interaction would prove to be its failing. In practice none of these fears emerged. The Aboriginal students readily took to Telematics and it became a well-liked and preferred mode of teaching form many of them.

The delivery teachers gained valuable experience in delivering to Aboriginal classes and have suggested the following guidelines and information for future teaching:

- **single-sex classes,** it was noticed by the teachers that single-sex classes provided a more conducive learning environment,
- **homogeneous groups,** it is not desirable to multipoint and to include Aboriginals of different skin types in the same class,
- **computer literacy,** the students were very quick to pick up the technology and became very proficient at linking and operating the computer,
- **level of interaction,** it was judged that through Telematics the Aboriginal students communicated more than they would have through conventional teaching due to the high-level of directed teaching involved.
Problems. There were a number of problems that were evident in the early stages of Telematics among the schools in the Kimberley. These related mainly to equipment problems that were overcome as the staff and students gained experience. It is likely that these problems would not occur in future implementations if they are transmitted to new teachers training to use the technology. Some of the problems included:

- attempting to connect with incorrect modem settings,
- incompatible versions of software in different schools,
- timetabling problems causing increased student absences,
- unanticipated delays in getting telephone lines into remote areas,
- total lack of trained Telematics teachers in a school,
- lack of immediate technical support in the region to novice teachers,
- incompatible timetabling among schools in the project,
- inappropriate choice of subject for Telematics teaching.

There are now Telematics facilities in all schools in the Kimberley with a post-compulsory enrolment. Although the technology has proven itself in the region, there is still some doubt among the administration and teaching staff at many of the schools that the project can continue without central support in future years. Some of the concerns expressed by staff included:

- **Demand for contextual training**, it was argued that Telematics in the Kimberley demands specialist training that is sensitive to the region and its population.
- **Lack of flexibility in staffing**, Telematics requires both delivery and receipt teaching support, meaning in essence that two teachers are required for Telematics for a class that would normally be staffed by one teacher. This extra demand on staff was seen to limit its potential.
- **Need for a formal post-compulsory strategy in schools**. There were instances cited where the Telematics subjects were chosen without due consideration of all possibilities and a formal strategy would aid in the selection of the more appropriate subjects in future years.
- **Need for central support**. The schools in the region that have the best opportunity to deliver Telematics are those for which least can be offered in return. The concept that schools could cooperate in this regard to deliver among themselves does not seem practical in this setting.

Comparisons of Programmes.

It became apparent in the process of evaluation, that the schools in which Telematics was judged most successful were those where the programme offered teaching support that could not be achieved from conventional sources. In particular, the programmes at La Grange. There was a need in these school communities for ESL and there was no staff at the school who could deliver. The programme delivered from Nulungu contributed greatly to the education of the students who received it and there is no doubt in the minds of any of the staff involved of the value and benefits of Telematics. These schools will make every effort to maintain the
programme in 1994 and will make significant sacrifices to see that it will continue and expand the opportunity to other schools.

On the other hand, the schools receiving Applied Computing, a subject not well suited to the technology and a subject that ultimately was not required, has left staff unconvinced of the need for the programme. This outcome suggests strongly, the need for careful and deliberate planning when organising programmes. In such settings, problems and difficulties grow and become further evidence of the inappropriateness of the technology, while in meaningful contexts, problems and difficulties are met and dealt with a far greater level of tolerance and resolve.

Future Plans

The project in the Kimberleys has not been judged as a total success. Difficulties were experienced with establishing telephone lines, staff turnover, and student turnover. The teachers are convinced that the technology is successful and can be used to achieve equity and access but problems of resourcing and staffing are a significant impediments.

Broome HS has not seen the project as being in its best interests. It does not wish to continue in the project in 1994 without financial support from the receiving schools. Halls Creek DHS does not consider that it has the staff, expertise and availability, to deliver in return for lessons received. They would very much like to see continued financial support from agencies external to the school. There is likely to be very few Telematics teachers left in Kimberley schools which will also limit options.

Looma RCS and La Grange RCS have needs for Telematics in 1994 for ESL and senior English. Nulungu is looking to deliver to both these schools as required, and also to provide Maths in Practice to Beagle Bay. The school will require funding to do this and funds are being actively sought.

Discussion

There appeared to be a mixed reaction among teachers involved in the Broome project about the utility and efficacy of this technology as a vehicle for lesson delivery. While the Nulungu-La Grange connection proved to highly successful, doubts were expressed about the outcomes of the Applied Computing project. Staff expressed no doubts about the potential of Telematics as a teaching tool. Varying conditions between the two programmes caused differences in programme delivery and subsequent learning outcomes and this led to the varied opinions among the teachers.

This project was plagued by problem that were unexpected and difficult to manage. The late connection of telephone lines severely hampered the
project as did changes in school staff between the project proposal and project implementation stages. Once again, these changes resulted in subject offerings in some schools, of doubtful need and relevance. The project had to continue due to the need to trial and test the system in this region.

The very positive outcomes from the Nulungu-La Grange programme point strongly to the need to plan for subject offerings where there is a firm need. As well as this, the choice of an appropriate subject is essential. While ESL and English Studies are well suited to delivery via Telematics, Applied Computing seems less so.

The resulting ambivalence of staff in the Applied Computing project appears to be a direct result of a programme that happened but that was not appreciated strongly by all participants. The contrast with the other project suggests that Telematics must be used carefully and with prudence if it is to achieve its goals. Despite identical planning, coordination and training, different results have been achieved in the two programmes in this region.
4.2 THE PILBARA PROJECT

Aims and Objectives

The objective of the CAP National Element project in the Pilbara region was to enable the addition of a LOTE programme (Languages Other Than English) to a number of secondary schools in the region. LOTE had previously been identified as a priority area with many schools actively seeking ways to broaden their curriculum offerings in this area. It was recognised by the schools that parents actively sought schooling for their children where an element of LOTE was available. The omission of such subjects in Pilbara schools was a factor that negatively influenced retention and enrolments into post-compulsory schooling.

![Pilbara Schools and Connections](image)

The unavailability of LOTE in the area was seen as a serious equity issue. Language teaching demands specialist teachers, however, the size of the Pilbara schools is limited and no one school could totally support a language teacher. The capability offered by Telematics to share a language teacher between schools provided the necessary mechanisms to
consider adopting a LOTE programme. Japanese was considered by all schools to be the most appropriate language for study.

In order to study Japanese at Year 11 and 12, students must pass six units of Japanese at lower secondary level. Through the CAP project it was intended to introduce Japanese into the lower secondary classes in the participating schools so that in time, there would be students from these classes able to undertake post-compulsory studies in this subject.

The Project

A submission was prepared through the active participation of principals from Exmouth DHS, Paraburdoo DHS, Wickham DHS, Tom Price HS and Newman SHS. Karratha SHS, although a non-PCAP school, had an existing Japanese teacher and it was planned to use this teacher in the delivery of the lessons to Year 8 students at the schools.

In concert with the Telematics submission, primary schools in the region expressed interest in developing a Japanese LOTE program. The development of the secondary programme would be well supported if a primary programme existed. The development of an active primary programme was likely to occur if the secondary project was undertaken and shown to be successful.

In applying for the funding, all the schools recognised the potential of Telematics to provide access to other subject offerings frequently unavailable to secondary students in country schools. The cooperation and collaboration between the schools raised possibilities of sharing courses between each other.

The planned project was to have the Japanese teacher at Karratha deliver Japanese at the Year 8 level to three classes:
- a face-to-face class at Karratha with Telematics to Tom Price,
- a Telematics class from Karratha to Wickham and Paraburdoo,
- a Telematics class from Karratha to Newman and Exmouth.

On this basis, funding was sought for the additional teaching time required for Karratha SHS to support the project and appropriate computing and communications facilities at each of the schools. Each school installed two new telephone lines for the Telematics teaching and purchased an LCII computer, modem, hands-free telephone and a data display panel.

Project Preparation

Two staff from each of the participating schools attended a 2-day Telematics training session conducted in Karratha by staff of the WA
Ministry of Education Telecommunications Support Unit. In this session, staff learned the use of the communications software, Electronic Classroom. This session also trained teachers in the technical skills associated with using computers in a communications mode. An instructor at the course was an experienced Telematics language teacher from another regional school.

The telephone lines were installed and equipment delivered to the schools. Changes in staffing at some of the schools occurred after the planning stage and new staff had to be inducted into the programme. Another 2-day course in Perth in 1993 was held for staff who had not been trained previously. Despite these changes and the very tight time frame in which the project had moved from planning to implementation, the project commenced early in the first term of 1993.

In preparation for the new subject offerings, parents of Year 7 students at the appropriate schools were informed of the plans to offer Japanese at Year 8 level. Students wishing to participate were invited to apply for the limited positions available. Staff vetted the lists and the more able and highly motivated students were accepted into the programme. Parents and students were required to promise a commitment to the project. Each of the receiptal schools organised a small class of up to 7 students.

Project Implementation

The changes in staffing at Karratha SHS saw the PCAP field officer undertaking the role of delivery teacher from this site to Paraburdoo and Wickham. The Japanese teacher that was appointed to Karratha was a recent graduate and it was not considered appropriate for that person to be required to undertake Telematics teaching without adequate preparation and training. Fortunately, a teacher with appropriate skills and training for teaching Japanese was available in Newman and this person agreed to become a part-time teacher at Newman SHS and to deliver lessons from Newman to Tom Price and Exmouth while teaching small classes in face-to-face mode.

Teaching from Newman
The project saw the teacher at Newman delivering 4 lessons per week. The teacher taught in a mode with face-to-face students and Telematics students. Group A had 6 Newman students and 7 students at Exmouth. Group B had 2 Newman students and 6 students at Tom Price.

The Telematics equipment at Newman was established in a special purpose Japanese teaching room that was used solely for this purpose. The equipment and phone lines were installed in a room at Tom Price that was self-contained and in the library, set aside for Telematics lessons alone. The room had a viewing panel to the library enabling staff to be
able to monitor activities in the room from outside. A support teacher was appointed at Tom Price to coordinate the receipt of the lessons. The tasks included maintaining a close liaison with the delivery teacher through fax and phone, checking and monitoring students' work and sending and receiving work and student responses. The Telematics coordinator at Exmouth acted as the support teacher in that school.

Figure 4.6
Delivering Japanese from Newman to Exmouth.

The teaching of Japanese normally involves a high degree of animation and activity on the part of the teacher to act out and demonstrate vocabulary and language. There are a number of activities such as singing and role playing that accompany lessons. In these Telematics lessons, the teacher attempted to incorporate as many elements as possible from conventional teaching and improvised cleverly to overcome the lack of visual cues between teacher and student. The teaching was being delivered to a group of highly motivated and able students and the teaching was judged to be extremely effective.

Teaching from Karratha
For the first two terms, Japanese was delivered from Karratha SHS by the district PCAP officer. Lessons were delivered twice per week to Paraburdoo and Wickham simultaneously. The initial classes consisted of 6 students at Paraburdoo and 5 students at Wickham.

The delivery room at Karratha was a small room set aside for Telematics in the library. At Wickham, the receive room was also in the library but this was not a special purpose room and was used by many different people during the week. The equipment was placed in a computing room at Paraburdoo. This room was also used by many groups and frequently had other students in it during Telematics lessons. In both Paraburdoo and Wickham, the equipment was placed on tables that were pushed together with seating around the tables to accommodate the students. The overhead projection panels were not effective in these settings with
students preferring to view the small computer monitor during computer interactions.

There were some problems with the equipment at Wickham. It was common for lessons to be held up by failed communications preventing the computers from being linked. The telephone line was stable and enabled voice interaction to occur and in some instances lessons had to proceed with computer link-ups. These problems were traced back to others interfering with the equipment and after steps were taken to prevent this, the communications problems were significantly reduced.

Supervision at Paraburdoo was carried out by several staff on a roster basis with one teacher assuming overall responsibility for the students. At Wickham, students were supervised on a day to day basis by library staff who could view the lessons through a large viewing window into the room. The principal assumed the role of the coordinator. The teacher used the fax machine to send worksheets to the students and the coordinating teachers would distribute these worksheets prior to lessons and collect and return completed work and assignments to Karratha.

The Japanese teacher at Karratha SHS took over the role of Telematics teaching at the commencement of Term 4. The new teacher had been trained by the previous teacher in delivery techniques during the past terms and had sat in on a number of lessons to learn the skills and knowledge associated with Telematics teaching. Other changes that occurred during the year resulted in Wickham students withdrawing from the Telematics Japanese lessons and moving to normal classroom teaching provided by a Japanese intern teacher who was appointed to the school after the commencement of the project.

**Project Outcomes**

The outcomes from this project were considered a total success by all stakeholders. The technology proved generally to be robust and reliable
and as proved in other districts, very well suited to teaching LOTE in the manner in which it was used.

Interviews were held with school administrators, teachers and students to gain some indication of the measures of success of the programme. All teaching personnel indicated a high level of satisfaction with the learning outcomes achieved by the students. The students that were selected for participation in the project, represented the more able students in the cohort. Their performance and achievements were judged overall to be outstanding. There was no doubt in any minds of the effectiveness of this mode of teaching and its capacity to successfully replace conventional teaching in this instance.

A residential camp was held towards the end of the year to enable students within the Pilbara project to meet with each other and their teachers. From face-to-face interactions with all the children, it was judged that their language development suffered in no way from the unconventional teaching format. Progress was judged by the teachers to be as good as might be expected from conventional teaching.

Feedback from students indicated that all students planned to continue with Japanese via Telematics into Year 9. This showed a high level of satisfaction among the students with the course and the new mode of learning. Many also indicated a willingness to continue their Japanese studies into upper school although it was considered a little early for this to be discussed.

**Issues relating to programme delivery.**

The success of the project in this region was judged to have been caused by a number of factors in the preparation and delivery of the teaching. Some of the administrative processes that were strong influences on the success of the programme were judged to be:

- **subject selection**, the identification of subjects for Telematics teaching on a needs basis, LOTE was an identified priority among the participating schools.
- **student selection**, the selection process by which students were invited to join Telematics teaching saw committed and enthused students.
- **school profile**, Telematics had a high profile within schools at which it was delivered and strongly supported by staff from these schools.
- **administrative support**, strong administrative support within schools saw the teaching closely supervised and monitored.

There were a number of problems identified with the equipment and resources provided for the programme. The following items describe these problems. Suggestions to improve the equipment are also listed:
- audio equipment, the hands-free telephone system used by delivery teachers and students provided a poor quality sound system that needed to be upgraded. A DUCT conference system would be a useful and obvious replacement,
- printer, access to a printer at both the delivery and receival end would provide significant benefit and advantage,
- overhead projection panels were generally not able to be used in the planned manner and were not essential items of equipment at the majority of sites,
- furniture and equipment placement needed more attention. In areas where 6 students sat around a computer, there was a need to consider ways to maximise viewing potential as well as the capacity to interact with the keyboard and mouse, and
- the use of a graphics tablet could improve the capacity of the system to handle character and letter formation tasks, a principal use of the computer system in the teaching of Japanese.

There were a number of areas identified as areas that impeded and limited the success of the project. It was felt that being aware of the need to attend to these areas in future implementations could improve the teaching and learning outcomes. Limiting factors in the teaching process were identified as:
- transiency of staff and students. In several schools, conditions changed after the planning had been carried out removing the need for the planned Telematics teaching.
- the large distances between schools in some clusters. The inclusion of Exmouth in the Newman programme meant that students and teacher were over 1000 kms apart. This limited the form of contacts that could be made between the teacher and students.
- timetabling, the inconsistency in lesson times between school saw students having to leave classes to attend Telematics sessions, attending lessons over lunch and other breaks and general interruptions.
- unexpected interruptions caused by differences in school programmes between participating schools.
- placement of Telematics equipment, the equipment needs to be placed in an area that is restricted to use of Telematics alone. In instances where the equipment was placed in general areas, there were problems with interruptions to lessons caused by others in the room and equipment being tampered with between sessions.

There were a number of positive elements identified in some of the schools that could be applied generally to improve Telematics in general. These referred mainly to procedural and organisational activities and included:
- strong support from the coordinating teacher at the receival site, this teacher needed to be proactive in the learning environment,
• the inclusion of the programme into the School Development Programme to ensure its continuance and tenure,
• selecting subjects on the basis of need rather than simply using the technology for programmes that could be done other ways,
• organising for the participating students and teachers to meet in a face-to-face environment,
• developing community interest and support for the programme,
• expanding the Telematics programme to embrace other activities within schools, for example professional development and primary programmes.

Future Plans

The district is very positive about Telematics and all participating schools are very keen to keep the project going despite the loss of the PCAP funding. The enthusiasm came from the administrative level of the schools and there is much hope seen in this technology for improving equity and access problems.

Future Programmes

In 1994 it is planned for Newman SHS to deliver Japanese at Year 8 and 9 level to Tom Price and Paraburdoo DHS. Karratha SHS plans to deliver to Exmouth and Wickham DHS and Pannawonica Primary school. The schools in the region have met several times to consider and plan their programmes, to the extent that timetables have been changed in some schools to enable them to come into line with other schools.

The bulk of the delivery will be form the Senior High Schools. Although they will be delivering with no real payback from the contributory schools, each has good reasons to participate. Karratha SHS sees itself as being able to use the Telematics equipment for delivery and reception of in-service and courses for upper school students. Newman SHS and Karratha SHS are investigating the prospect of sharing Calculus and Physics at upper school level to improve subject offerings to students. Newman SHS is also very dedicated to the development of LOTE programme in the region and makes very effective use of the delivery teacher who teaches local students concurrently.

Discussion

The outcomes of the Telematics project in this region were very impressive. The project more than achieved its stated aims and provides a sound model for others to follow. Indicators of its success were:
• high performance and achievement by the participating students,
• the establishment and maintenance of strong support structures for Telematics in the schools,
• the continuance and growth of the project in 1994.
The principal elements that led to the successes achieved in this region appeared to be:

- the use of Telematics to support an area of need considered a priority in all schools,
- the inclusion of Telematics as a key component in the School Development Plans,
- the prudent selection of participant students,
- the leadership shown and support given by the larger schools in the region,
- the high level of communication and cooperation between schools,
- the sound planning, coordination provided by the Project Coordinator, and
- the effectiveness and success of the training programmes that enabled the delivery and support teachers to get it right.
4.3 THE GERALDTON PROJECT

Aims and Objectives

The objective of the CAP National Element project in the Geraldton region was to increase students' access to the higher level units in the lower secondary school curriculum. A cluster of schools comprising Mt Magnet DHS, Carnamah DHS, Meekatharra DHS, Jurien DHS and CBC Tardun collaborated in the development of the submission targeting Mathematics, English, Social Studies as subjects for inclusion in a Telematics project. The schools recognised that students lack of access to high level units in these areas was a factor that caused students to be sent from the district for schooling. All schools saw a need to provide an educational programme for the more able students and considered Telematics as a means by which this could be achieved.

There were 3 main aims in the project. These were the improvement in the educational:
- participation,
- achievement, and
- personal development of Year 10 students capable of studying higher level units.
The Project

A submission was prepared by the 5 schools with the intention of establishing Mt Magnet as a base for the Telematics delivery. It was planned to deliver lessons from 3 schools, Mt Magnet, Meekatharra and Carnamah DHS for reception at the other sites. The chosen units were all level 5 and 6 Mathematics, English and Social Studies, units for which there were experienced teachers in the delivery schools but not at the other sites.

The submission sought standard equipment (Computer, modem, OHP panels, OHP machines and hands free phone) for 4 schools with Mt Magnet purchasing a system as well as a bridge to enable multipointing from each of the delivery schools through Mt Magnet.

Project Preparation

The principal and a staff member from each school attended the training programme in Term 4 1992 to learn to use the system and to consider teaching and learning issues. The phone lines were installed into each of the schools and the equipment delivered to enable the programme to commence in Term 1 1993.

In preparing for the commencement of teaching in 1993, Year 9 students from each of the schools were selected for participation in the programme. This selection was on the basis of academic ability and a capacity to study in the independent mode. Each of the units normally involves 4 lessons per week. It was planned to deliver 2 Telematics lessons per week and for students to spend the other two sessions completing work that had been set by the Telematics teacher. Students were to work independently on this material but supervised overall by a coordinator in the school who would monitor work and liaise with the delivery teacher.

Project Implementation

When the project commenced in Term 1 1993, there had been several changes to staffing and students that necessitated changes to the original plans. The planned Telematics Maths students at Mt Magnet left the school and Mt Magnet had to withdraw its services from this delivery of Mathematics. This was ultimately taken up by DEC (Distance Education Centre) which delivered Maths lessons to Meekatharra, Tardun and Jurien Bay with the students enrolled in a DEC course.

The Principal and coordinating teacher at Tardun left the school and the incoming principal and replacement teacher were not well versed in Telematics. The new teacher was able to teach Mathematics. The school
continued in the project and chose 2 students for the mathematics component despite the availability of similar instruction face-to-face.

Mathematics from DEC
With Mt Magnet unable to provide the Mathematics component of the programme, DEC was able to stand in and to deliver to Meekatharra, Tardun and Jurien. In the terms 1 & 2, Level 5 Mathematics was delivered to 4 students at these schools. The students did not make the progress that was expected and this was judged in the main to be as a consequence of a lower academic ability than was required for these units.

The students studied conventional DEC units and were supplied with booklets that formed the basis of each lesson as well as providing assignment and private study material. The difficulties faced by the students were compounded in some instances by low motivation and this resulted in poor completion rates of the assigned work.

The Meekatharra students left the project at the end of Term 2 to return to normal teaching at the lower levels. Three students from Jurien joined in. Terms 3 & 4 saw Level 6 units being studied. Once again, the delivery teacher judged this material to be too hard for the majority of the students and low performances were evident.

Social Studies from Meekatharra
The lessons from Meekatharra were received by 3 sites (Camamah, Tardun, Mt Magnet) simultaneously with 9 students in each lesson, including 2 face-to-face. Early sessions were hampered by communications difficulties caused by the multipointing and the use of the bridge at Mt Magnet. With time, the communications difficulties were solved and the link-ups proceeded smoothly. Voice linking was achieved through Telecom Conferlink and Telecom initiated links in each lesson by calling each of the participating schools.

There was a large difference in ability among the students from each of the schools and it became apparent that some of the students were working at a level beyond their abilities. This came about by the planned students leaving their school and the school continuing in the project with replacement students.

There was a problem with supervision at two of the schools early in the programme. The Telematics students were being left totally to their own resources during sessions and during the private work time afterwards. There was little follow-up by coordinating staff and the students in these schools fell behind quickly. Once the coordination and supervision was sorted out, the students tended to keep up with the work and students scripts were returned to the teacher more frequently for marking and assessment.
The difference in ability levels of students persisted and tended to influence learning outcomes. While the more able students were keen to participate and contribute in lessons, the less able students were distracted at times and felt left out of the discussion. They were unable to contribute effectively and often would chat among themselves at their remote sites.

The delivery teacher was very concerned with the progress of the two less able students and travelled several times to their school to provide remediation and extra instruction. The teacher found it very difficult to adequately cater for the individual needs in the Telematics session. The students were extended in their efforts by the staff at the school and questioned about their commitment. It became evident to the teacher that selection of students to the units was critical and when students are in units above their abilities, the Telematics teaching compounds the existing learning difficulties. These students ended up with D grades. It was felt would have been far better served in the conventional classroom at their school.

**English from Carnamah.**
The English lessons from Carnamah were delivered to two sites, Jurien and Tardun. The problems with supervision among receiving students was also evident in the English teaching and this identified and rectified early in the programme. It was evident at all times that supervision of the students was a factor that would influence the effectiveness of this form of teaching.

The English lessons made significantly more use of the audio link than the computer link and the sound quality of the receiveal Telematics rooms was a problem on several occasions. The rooms were sparsely furnished and caused echoes that interfered with clear listening at other sites. The schools used Voicepoint hands-free systems for the audio link and these generally proved to be satisfactory in this usage.
The delivery teacher was unable on occasions to make a computer link with one of the schools. It was judged that poor quality telephone lines were causing this problem. In lessons where one school was unable to link the computer, all schools had to forego the computer for the lesson. This was judged not to be a significant problem in the English lessons because the conceptual nature of the teaching and the high levels of discussion and dialogue saw only minimal levels of instruction with the computer. The computer became more of a motivating force behind lessons with finishing activities often being computer-based to stimulate and reward good behaviours.

Project Outcomes

All students who remained with the project throughout the year appear to have achieved passing grades in the subject that they sat. In some instances these grades are not as high as might be expected but the results are understandable in light of the conditions that existed in the different schools.

The judgements of the teachers, coordinators, administrators and students in this project on the effectiveness of Telematics as an alternative delivery method were very positive. It was judged that Telematics is a viable alternative to conventional teaching and an effective methodology for increasing the access of country students to subject choices.

In all schools, there was an element of learning to make best use of the technology and although problems existed in this pilot project, it was evident from the actions within the schools that steps could be taken to overcome all the problems. It was evident that the technology provided adequate reliability and the system had sufficient features to provide an interesting and stimulating teaching mode for the students. The bulk of the problems that were faced demanded better administrative and implementation systems rather than technological changes.

The teachers judged that preparation for the Telematics lessons took considerably longer than for conventional lessons. Materials had to be prepared and faxed to schools before lessons. In some instances, courses had to be prepared and to cater for the external delivery, this involved a considerable amount of work. It was judged that access to distance materials would aid considerably in teaching through this mode.

Programme Delivery and Receiveal
Communications between the participating schools took place continually throughout the year and culminated in an important regional meeting in September to formalise plans for 1994. The meeting was held in Geraldton and was organised by the PCAP field officer in the district. It was attended by the principals from the participating schools and
was attended by the principals from the participating schools and feedback was gained from each on the 1993 project and views on directions that Telematics could take in the region in 1994.

Weaknesses in the existing project were discussed and listed. The following descriptions have been taken from the minutes of this meeting:

- **Limited common time between schools.** There were many difficulties arising from an inability to find common time for Telematics teaching among the differing timetable structures.
- **Inadequate supervision.** Some schools did not have the staffing flexibility to make provision for supervision of Telematics lessons. In most instances, this resulted in a less effective teaching and learning situation.
- **Limited commitment.** In some schools, there were lesser degrees of administrative and staff commitment than in others. This reduced the effectiveness of the programme in these schools.
- **Inadequate communication between staff.** A need was apparent for all staff involved in Telematics programmes to make regular contact to ensure the continuity and effectiveness of the teaching.
- **Incorrect target group.** Some students had difficulty with the level of work being offered. The work was too difficult for them to complete especially through this mode.
- **Limited monitoring of student progress,** caused by insufficient supervision and support.
- **Too many units,** it was felt that there was an over supply of units and that the region should focus a little more on particular needs.
- **Poor audio link,** in one school the use of the Voicepoint audio system was limited by noise of other machines and an alternative system was needed.

It was generally agreed among the participants in the National element Project that Telematics was an effective and robust medium for teaching. Both staff and students responded positively to the medium and grades achieved by students provided further evidence of its success. The strengths of the project in the region were identified as:

- a reduced need for multi-unit classes,
- broadened curriculum availability, and
- establishment of students networks between schools.

Guidelines were agreed upon among the principals at this meeting that for future Telematics teaching, the following procedures were required to overcome problems and impediments identified through the 1993 project:

- regular teleconferences to increase communication among Telematics personnel in the schools,
- circulation of school planners to advise teachers of special events and activities likely to interrupt teaching,
- whole school information, to aid in the creation of whole school commitment, the programme needed to be taken to all teachers in schools,
• all schools to provide academic profiles of their students to the delivery teachers,
• student supervision, an agreed duty statement was compiled for the support teacher in each school. Duties to include;
  - receiving and distributing faxes to students before lessons,
  - collecting and returning assignments to delivery teachers,
  - monitoring student progress,
  - keeping students on-task during lessons,
  - being a contact person for all communications from delivery teacher.
• The need for more in-service training for teachers in the area to support 1994 activities.

Future Plans

The majority of the schools are very positive about the capacity of Telematics and will continue and expand offerings for next year. Tardun will not be participating in 1994. The project was not considered to be a success in this school. Problems were caused by the transfer of the project planners from Tardun before the project was underway and changed conditions eliminating the need for the Maths programme even though it was still delivered.

The remainder of the schools have worked to establish a series of units for 1994. Meekatharra delivering Social Studies to Carnamah, Jurien and Mount Magnet DHS. Carnamah delivering English to Jurien. Jurien delivering Maths to Carnamah, Meekatharra DHS. Many primary schools in the region have acquired Telematics systems and are looking to use these for LOTE and PEAC programmes. It is likely that there will be a considerable level of Telematics in this region in 1994 despite the need for schools to fund their own teaching programmes.

Discussion

There were a number of factors beyond the control of the planners of this project that limited the successes that could be achieved. The transiency of staff and students in several schools resulted in Telematics being delivered in places it wasn't needed and wasn't necessarily wanted. Nevertheless, in the remaining schools, Telematics proved itself to be a sound technology well able to achieve the established aims and goals.

There was a lot learned from the implementation in this region and this information will be extremely valuable to schools that seek to establish similar programmes. The project made major use of multipointing in the delivery of its programmes and this was a unique characteristic of the Geraldton project. The trials have ironed out problems that occur with
multipointing activities and the region is in a strong position for its activities in 1994.

The high degree of commitment among administrative and teaching staff in the schools in this region was evident in the planning that took place for 1994. Despite the need for self funding, these small schools have established a timetable for 1994 that sees Telematics playing a significant part in preparing students for post-compulsory schooling. With this timetable, the schools have also adopted a standard set of practices and procedures to ensure the smooth and efficient running of the project.
4.4 THE KALGOORLIE PROJECT

Aims

The purpose of the project in the Kalgoorlie region was to:

- provide all students with opportunities and appropriate background to complete 12 years of schooling,
- provide all students access to a range of education and training opportunities similar to those enjoyed by their peers living in metropolitan areas,
- improve student achievement in language,
- improve student achievement in numeracy,
- increase student awareness in career and further education,
- reduce the incidence of gender bias in educational opportunities and processes, and to
- increase student interactions with peers and adults in other towns and institutions.

Particular problems in equity and access were evident in the Kalgoorlie region. In the first instance, there are only two schools in the region with a formal post-compulsory programme. In addition, the vast size of the region sees many schools in remote communities with recently graduated teachers and relatively inexperienced administrative staff and among both these a high transiency rate. Particular problems in curriculum programmes and offerings were identified in such areas as:

- support for Year 8 students at risk,
- extension for academically able students in years 8 - 10,
- vocational and career education in years 8 - 10,
- high level mathematics and science units,
- post-compulsory programmes, and
- individualised support for DEC students.

The project identified 9 schools in the region with student profiles that suited participation in a Telematics programme. These schools had all identified similar priorities in their School Development Plans and had made commitments among themselves to compromise in terms of rooming, staffing and timetabling to support the project.

Several schools in the region were unable to be participants in the project due to problems in establishing the necessary extra phone links. Telematics teaching necessarily makes strong demands on communication channels and in some regions there were judged to be insufficient lines and channels for this use. Discussions with Telecom in the region revealed that some centres in the region had only 30 lines through their exchanges. Current peak usage during the day was of the order of 25 lines. The use of Telematics in these regions could realistically require up to 10 lines and it was predicted that there may often be times when there would simply be insufficient line through the exchange to support this
use. In other words, some schools might be able to link while others would not.

With these restrictions in mind, it was planned and proposed that a trial Telematics project be undertaken in the region with Mathematics being delivered from Kalgoorlie District Education Office to Remote Community Schools and English to students in the District High Schools. The schools that chose and were able to participate were Laverton, Leinster and Leonora District High Schools and Blackstone, Menzies, Warburton, Warakurna, Wiluna and Yintarri Remote Community Schools.

Project Preparation

Once funding had been approved for the project, the equipment was purchased and telephone lines ordered for each of the participating schools. Two teachers from each of the participating schools attended a two-day in-service course designed to familiarise them with Telematics, the Electronics Classroom software and procedures and practices associated with coordinating and managing Telematics classrooms.
The schools in the region were supplied with Macintosh LCII computer, modem and a DUCT conference system. A teacher was selected to undertake the role of delivery teacher in the region from the Kalgoorlie District Education Office. This teacher was appointed on a full-time basis.

Equipment that was provided at the District Education Office for the delivery of the programmes included a Macintosh IIci computer, printer, flatbed scanner, modems for multipointing, a facsimile machine, and handsfree telephone system with headset. This teacher was a competent Macintosh user and attended a two-day in-service course to learn the procedures for teaching with Telematics using Electronic Classroom. Further training was gained from a visit to the Esperance region to observe Telematics lessons being given by Ms Dale Watkins.

The PCAP field officer at Laverton was given 0.4 FTE time release from other duties to act in a coordination and assistance role and to provide technical assistance to schools in the project.

The project in this region was considered to be a trial project. A principal aim was to investigate the utility and efficacy of this alternative mode of teaching. The stated aims of reviewing the technology saw teachers and schools participating in the project with two purposes. There was the educational benefit that would be derived from the specialist programmes but there was also an intention to work with the technology and to determine whether it could successfully serve the needs of remote schools in this region.

Project Implementation

The teaching component of the project did not commence until the second term of 1993 with lesson delivery from the Kalgoorlie DEO. There were a number of changes to the original plans that had been made.

- Transfers of teaching staff saw a number of schools starting the project with no trained Telematics teachers.
- Telephone lines were not installed in time in several of the schools and this caused delays in their entry into the programme.
- New administrative staff in a number of the schools saw many questions raised about the suitability of the subjects that had been chosen for the Telematics projects.

Term 1 was spent installing equipment and completing trial link-ups with schools. This procedure enabled the new staff at many of the schools to become familiar with the equipment and the software and to spend time planning for its implementation in Term 2.

For reporting purposes, it is useful to consider the programmes delivered to the District High Schools and the Remote Community Schools.
separately. Conditions and outcomes appeared to be relatively consistent within these groups.

**Leinster, Laverton and Leonora DHS**

The Telematics lessons in these schools were planned as a trial implementation as educational support in the area of language for students considered to be at risk. The lessons were delivered to classes with up to 6 students. The students received 3 lessons per week in the subject.

The schools adopted different approaches to the Telematics teaching. For example at **Leonora DHS**, the Telematics students worked independently of other language programmes in completing English 3.1 by Telematics. The entire programme was coordinated and delivered by the Telematics teacher while a support teacher in the school assumed responsibility for liaison and communication. The students received materials from the Telematics teacher, completed these through class and independent activity. The role of the support teacher was to ensure that completed work was returned by post to the Telematics teacher. There was no role assumed in the actual teaching programme.

![Figure 4.10](image)

Lesson delivery from Kalgoorlie.

At **Laverton DHS**, the language teacher in the school taught one component of the English 3.1 unit in a face-to-face lesson with the other two lessons being delivered by Telematics. The face-to-face lesson was in a topic not well suited to Telematics. This topic related to the study of short stories and novels and involved periods of independent activity on the part of the students as they read the materials. In this way, Telematics was delivered in a form of team teaching with the support teacher playing quite an active role in the teaching process. Student responses to Telematics were positive. Their progress was satisfactory and the project judged to have been very successful.
The project was seen to be very successful at Laverton. The Principal is keen to keep the project running in 1994 and sees great promise in Telematics for teaching in remote schools. There will be no Telematics teachers in the school in 1994 and there is a need for constant in-servicing to keep this project buoyant. The Principal was concerned that in general, other staff made little attempt to involve themselves in Telematics. There were low levels of computer literacy among the staff and it was considered that this may have been a contributory factor.

At Leinster DHS, the programmes that were delivered changed from term to term to meet the needs of the school. The language programme taught in the first term was taught totally by Telematics with a support teacher acting in the normal role. The profile of the students at this school differed considerably from the profile of the students in the other two schools and this was reflected in the subject that was taught. The subject was Performance Poetry and this was very well suited to the Telematics teaching. The assessment of the unit saw students using the Telematics environment as a broadcasting radio station with the teacher a passive listener. The students acted as the disk jockeys and presented their own writing in an oral format. The quality of the writing and poetry that the students were able to demonstrate in this fashion was judged to be of a very high standard and was a strong indication of a very successful teaching programme.

Remote Community Schools
It was the initial intention that the Telematics teaching to these schools would focus on the lower school mathematics programme and provide educational support to students perceived to be at risk. Although the bulk of the initial teaching programmes were given to mathematics, subsequent programmes in other terms were changed to reflect the needs and wishes of the teachers in particular schools.

Warburton RCS. The lessons delivered to Warburton RCS covered remedial mathematics and were delivered to a class of up to 10 students in years 8 to 10. The programme was continually impeded by the transiency of the students with many students frequently missing sessions. The students quickly established an appropriate level of computer literacy and could independently take the steps to link the computers for a Telematics session.

The trial was a positive demonstration of the potential of Telematics, although frequent problems occurred with phone lines and multipointing linking. Overall the technical problems were less than anticipated and the equipment was able to support its position. The delivery teacher’s strong background in Aboriginal education was judged to have been a significant factor in the success of the programme. The girls in particular were very keen with the programme and anxiously looked forward to Telematics sessions.
Menzies RCS. Menzies has a small number of secondary students completing DEC programmes. The Telematics was used to support the students on this programme. Lessons were delivered for Year 8,9 Social Studies (5 students), and Year 10 Mathematics (2 students). At one stage the Social Studies lessons were multipoint lessons involving students at Wiluna.

The secondary students in this school were studying through DEC and the Telematics was seen to provide a good support for this. The delivery teacher was able to provide extra help to the students, many of whom found the independent work materials provided by DEC to be very difficult and hard to complete.

Wiluna RCS. This school received programmes in English and Mathematics designed for students judged to be at risk in these areas. The numbers of students in the classes varied from 1 to 14. There was a real problem in transiency and a lack of continuity in the programme. This problem was as significant in face-to-face teaching at the school.

The programme was judged to have been useful at this school but not particularly effective. At times there were large numbers sitting around the computer and the programme was not able to maintain their continued interest and attention. The technology was judged to be suitable to students in the school but it appeared that there was a need to be selective in the subjects chosen for study and in the groups that attended the lessons.

Once again, the school has a high turnover rate of staff and in 1994, there will be no trained Telematics teachers in the school. Under such circumstances, it is not likely that the school can plan any activity in 1994. This situation demonstrates the need for a centrally organised Telematics programme that schools can elect to join once staffing and subject needs are known early in the school year. The beauty of Telematics is that there does not have to be a lot of time wasted between planning and implementation and once schools know their needs, programmes can be quickly developed.

Blackstone RCS. The staff at this school did not receive Telematics training prior to the start of the programme and needed to develop skills through their own initiatives. This was achieved and the teaching commenced in Term 2. The Telematics equipment was positioned within an existing classroom and this created problems for itself with multiple groups working simultaneously. The Telematics sessions aimed to provide remediation for students. While groups were being taught by Telematics, other students in the class were being taught in a face-to-face mode.
Technical problems were evident throughout the programme with lines dropping or failing to connect being major problems. The DUCT system also posed difficulties in the noisy environment with the system cutting people off and being hampered by the background noise. It was judged that the trial was successful in demonstrating the potential of Telematics although refinements to the project were needed to ensure that the potential could be achieved in practice. It was judged that the subjects used in the trial did not truly demonstrate the true value of the technology. The subjects could have been taken by staff within the school. More valuable lessons could be planned, for example, literacy in the students' native tongue.

**Yintarri RCS.** The teaching programme at Yintarri was delayed by problems in installing telephone lines. In the end only one line could be installed. The teachers at this school had not been in-serviced on Telematics and had difficulty learning about the system and providing appropriate support to the delivery teacher. At Yintarri, the programme was used to provide remedial Mathematics and Social Studies to up to 10 Year 8, 9, and 10 students. The Telematics programme provided an alternative form of instruction to these students. Furthermore it enabled the secondary teacher some time that did not have to be prepared for and was seen as a means of relieving this teacher from some of the formal duties. Although the teacher supervised the Telematics lessons, there was no planning involved.

The school is very positive about Telematics. The Principal feels that there is a need to consider subjects where there is a real need. In other words, it could be used for subjects where existing staff have no expertise. In 1994, all experienced Telematics staff will be leaving the school and this will mean that if the school wishes to participate in more Telematics, new staff will need to be trained.

**Warakurna School**

Warakurna became a Telematics school in order to help achieve the school and community's objective of providing post-primary schooling. There was no secondary trained teacher within the school and the capacity to provide secondary courses to local students was a big drawcard of Telematics. The prospect of increased professional development opportunities was also provided by becoming a Telematics school.

The implementation of the project provided a number of positive outcomes. The secondary students were well served by the delivery of a special curriculum from Kalgoorlie. The school staff saw the technology as making valuable contribution to schooling and this in turn led to renewed interest in other forms of technology. There were definite improvements observed in the learning outcomes achieved by the students participating in the project. Some concerns were expressed by school staff in relation to the dependence of the technology on oral communication. A number of the Aboriginal students were observed to
be too shy to use the programme effectively, oral communication not being a normal method of communication for these children.

The school experienced many problems with telecommunications links caused by poor quality phone lines. This caused particular problems in lessons involving multipointing where one school would often find itself without computer connections. Although they staff were very impressed with the capability of the system, future use was in doubt because of the perceived inability of the school to fund further activities from the limited resources available. It was felt by all members of the school community that some form of external planning and organisation was the best route to take to ensure that Telematics would continue in the future.

**Project Outcomes**

There were two main aims in the Kalgoorlie Telematics project. The first was to enhance the educational programme of the secondary students within the schools in the region and the second was to trial the use of Telematics as a tool for this enhancement. In essence, the second was the vehicle by which the first was to be achieved.

There were many doubters among staff involved in the Telematics project that this technology could be employed successfully in this district. This was brought about by so many new players with no experience with the technology and a very high proportional of Aboriginal students in the district for whom the technology potentially posed particular barriers.

Feedback from staff involved in the project reveals a firm belief that Telematics has strong potential for enhancing curriculum offerings in this region. Strengths of this teaching format were seen to include:

- its capacity to maintain student interest and attention,
- students' motivation from learning this way,
- the development of students' IT skills in meaningful contexts,
- the development of students' self esteem through the independence required for this form of learning,
- the enhancement of students' verbal and communications skills,
- the provision of a vehicle for interactions with peers beyond the immediate community,

Both the delivery and receival staff provided feedback on factors that tended to limit the success of Telematics teaching. Staff were aware of the experimental nature of the project. The feedback that was provided had the potential to enable future implementations to be more successful and to suffer less interruption if applied carefully.

It is useful to consider feedback from the delivery and the receival teachers separately as many of the issues are unique to each particular setting.
Issues Relating to Programme Delivery

Many of the factors that were perceived to limit the effectiveness of the Telematics teaching in this region were similar to those suggested by other delivery teachers. The following list describes the sorts of events and conditions that were problems to successful lesson delivery that could be overcome by changes to the administration of the programme:

- unexpected disruptions to the receival school programme causing students to be absent when connections were made,
- not knowing the academic background or capabilities of the Telematics students,
- infrequent and haphazard submission of assigned work and homework from students,
- positioning of Telematics equipment in existing classrooms causing distractions to all groups of people,

There were particular problems in this region with equipment failure and breakdowns. These problems severely hampered lesson delivery. Some of the more serious and more frequent problems included:

- **Hardware malfunctions** by the delivery teacher's computer. This computer needed to be taken away on several occasions and was away for a considerable period of time causing great interruption to the teaching,
- **Problems with applications software.** The delivery teacher had access to a flatbed scanner but due to problems with the software was unable to use this peripheral at any stage during the year,
- **Electronic Classroom problems.** There were many occasions when the teacher was unable to perform procedural tasks using the Telematics software. Files could not be opened, stored images and lessons could not be opened. The error messages were not able to provide any help and much time and effort was expended in trying to overcome annoying and unnecessary problems.
- **Systems errors.** Many problems with systems errors when multipointing requiring valuable teaching time to solve.

Connections and communications with remote sites often took considerable time to establish. Some of the recurring problems included:

- Students dialling with *wrong size screens* causing systems errors.
- **Communications failures.** Lines would drop out infrequently and often connections could not be made due to incorrect modem settings at receival schools.
- **No audio signal.** Students frequently made connections with the mute switch on the microphone activated, or failed to hang up the handpiece after dialling.
- Machines having *incompatible fonts* installed causing problems when transferring screens.
- Hardware *components missing* from sites. Schools would sometimes make contact and students would find that the mouse or an important cable was missing from the system.
There were many problems encountered in designing and delivering appropriate and effective lessons. Some of the frequently recurring problems included:

- **Student absences**, it was very rare for a student to turn up regularly for lessons. It was quite common for students to miss many lessons causing continuity problems with the teaching.
- **Interruptions**, it was not uncommon for lessons to be cancelled due to such occurrences as air-conditioning breakdowns, no teacher support available for a lesson and problems within the communities themselves.
- **Individual differences**, there were large variations in the abilities of students in a Telematics lesson making it very difficult to pitch instruction that suited the class. This was also apparent in multipoint sessions where students in one school would be clearly less able than the group at the other school.
- **Teaching materials**, materials that were faxed to students for use in Telematics sessions frequently did not find their way into students' hands for the lessons.
- **Broad teaching programme**, remedial teaching that uses one delivery teacher places a huge burden on that teacher to be aware and familiar with a range of pedagogies and teaching content.
- **Teacher support**, the programme made heavy demands on support teachers within the receiveal schools but did not formally recognise their contributions. Staff were expected (and needed) to perform a large number of vital functions in their own time. When these tasks were not performed, the quality of the teaching suffered.
- **Inadequately trained staff**, some support staff did not have any formal Telematics training and were unable to provide the technical support required at the school end.

**Issues Relating to Programme Receival**

A number of issues were raised by the teachers at the receiveal sites in terms of the factors that contributed to and hindered the programme and the learning outcomes:

- **In service training**, a number of the teachers at the receiveal sites had no formal Telematics training and were required to develop the skills and knowledge independently. This had limited their involvement in the programme.
- **Telephone lines**, establishing the communication lines took far longer and was more difficult that had been perceived. Some schools had to wait many months for their lines and in one instance, there could only be one line installed.
- **Limited feedback**, a number of the teachers expressed concern that they had little access to information about Telematics, were uniformed as to what was happening elsewhere and what were current developments.
- **Multipointing** did not work as well as it might have due to problems with the communications links and systems.
- **Computer installations**, the Telematics equipment had to be placed in public areas in some of the schools and this was not considered by the teachers to be the ideal placement.
- **Teacher support.** In some schools teachers were compelled to support Telematics teaching while teaching their own classes. The added burden made it impossible to do a good job in either instance and the Telematics teaching tended to be the one that suffered most in these instances.
- **Telematics coordination.** There was a person appointed in this region to support the Telematics but the scope of this support was not formally stated and problems appeared to arise in teachers knowing the person to contact in response to problems that required solutions. eg training, hardware support etc.
- **Programme relevance.** The English programme that was delivered to the three district high schools was not particularly relevant to their needs. There were English teachers in each of these schools capable of delivering a programme of this nature.
- **Support Teaching.** There was general agreement that the role of support teacher was a very important position in the project and one that required a committed and supportive teacher. In instances where the teacher support was not strong, outcomes were less evident.

**Strategies for Improving Telematics**

The outcomes of the trials in this region have provided some information that could be used to improve further Telematics applications in the area. Some suggestions for improvement include:

- the delivery teacher being able to visit the schools to meet personally with students,
- keeping class sizes down,
- obtaining from the receipt school, a calendar of events that disrupt school programmes,
- obtaining clear academic profiles of each Telematics student,
- receiving regular contact with and feedback from the support teacher concerning student performance and progress.

**Future Plans**

As with other schools in the CAP project, few people in the Kalgoorlie region doubt the capacity of Telematics to contribute to enhancing the educational programme of schools in the district. The doubts that may have existed prior to the trial have been removed and there are very positive feelings about the potential of the technology.
Firm plans have been made to continue using Telematics in the region in 1994. A submission seeking PCAP General Element funds has been put forward to finance a Telematics programme for the region. Links have been made with Esperance SHS to enable students in the District High Schools to join LOTE programmes, for example Japanese. It is intended to also use Telematics for PEAC programmes in the primary schools.

Schools in the desert region are looking to participate in Telematics programmes delivered from schools in the Northern Territory. A serious problem that faces many of the schools is the departure of the Telematics teachers. There will be a number of schools in the region in 1994 without Telematics teachers and this is likely to reduce the likelihood of their involvement at this stage. A significant number of the appointees to these schools are recent graduates. The situation suggests a strong need for teachers to receive some grounding in Telematics during their teacher training.

Discussion

There appears little doubt in the minds of the teachers in this project that Telematics is a successful technology that can be used to provide education from a distance to remote community schools and to Aboriginal students. The project in this region has clearly demonstrated the potential of the medium but at the same time has highlighted major areas that need to be addressed if use of the technology is to succeed.

There were a number of factors that severely hampered the success of the project. This have been described earlier and include student transiency, individual differences, programme interruptions, lack of trained staff and difficulties in the provision of support for the instruction. Most of these problems severely hinder classroom teaching in the district so are not unique to Telematics. The fact remains though, that if large sums of money are to be expended in providing Telematics instruction, steps must be taken to ensure that the money is spent on an effective teaching programme.

It was suggested by some of the teachers that more relevant programmes could be offered through Telematics. For example, language and cultural studies. With the technology now available in the remote schools, it may be possible for delivery to be coordinated locally rather than from sources beyond the district. It was felt that a programme that catered for local and immediate needs may see more advantage. On the other hand, the primary schools in the region with a TOPS component (secondary students), still require the forms of teaching that were delivered in this project and effective forms of delivery should still be investigated.
5.0 RESEARCH FINDINGS

The main purpose of this research project was to evaluate the PCAP project according to a number of criteria established by the coordinating team. The principal focus of the PCAP evaluation was to gather data that would provide feedback on the success of the steps and procedures taken in the conceptualisation, design and implementation of the project. The main focus of this component was on the administration of the project at both the system and school level. In addition to the administrative inquiry, data were gathered that enabled questions of an instructional and pedagogical to be investigated.

The following research questions were used to direct inquiry into the factors relating to the quality of the teaching and learning processes at the classroom level.

1. What are the factors that influence the effectiveness of Telematics as a teaching and learning tool?
2. What management and coordination strategies are required to support an effective Telematics project in rural schools?
3. What are the skills and competencies required by successful Telematics teachers?