

THE ROLE OF THE COMPUTER IN LEARNING NDJ BBANA

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ABSTRACT

While Computer Assisted Language Learning (CALL) is being superseded by an integrated approach to language learning and technology, it still has great potential to assist indigenous peoples in becoming print-literate in their own languages. This can also help to combat the disempowerment experienced by indigenous people as their world is penetrated by others with radically different backgrounds. This paper reports on research on an application of CALL implemented among the Kunib dji, a remote, indigenous Australian community. It focuses on the use of talking books in Ndj bbana, a language with only 200 speakers; the books were displayed on touch-screens at various locations in the community. Investigations into the roles of the computer to support language learning and cultural understanding are also reported. The computer was found to be a useful tool in promoting Kunib dji collaboration and cultural transformation.

INTRODUCTION

The history of the Kunib dji and the history of CALL are two diverse narratives that have only recently intersected. The 200 Kunib dji people all live in Maningrida which is a remote community on an indigenous Australian reserve in North Australia. All the Kunib dji people have strong links to land and seas in and around Maningrida, as they have for centuries. While all Kunib dji children learn Ndj bbana as their first language, as adults they converse in a variety of languages that are spoken by other Indigenous Australians who live in Maningrida.

About 10 years ago, I arrived in Maningrida. In the last few years, I have had the honour of working with the Kunib dji to implement CAN. My ethnographic research is based on observations and participation in the process of creation and presenting CAN resources around the Maningrida, while working as a teacher at the school. I am not a Kunib dji person, so this paper is presented from the perspective of a non-indigenous Australian.

At the same time as the settlement of Maningrida was being developed, CALL was evolving in other parts of the world. When computers were finally made available to the Kunib dji children at school, CALL was used to support the teaching and learning of English. Computer-assisted Ndj bbana (CAN) was developed in an attempt to support the teaching and learning of Ndj bbana on the computer. This paper examines the role of the computer in CAN in an attempt to find some transferable processes that could be used in other indigenous contexts where the computer is used to support a minority language.

Justification for Introducing CAN to the Kunib dji

Many past reasons for introducing CALL do not apply directly to the Kunib dji situation owing to the different cultural context. Nevertheless, one good reason for implementing CAN is to make the complexity of Ndj bbana print more accessible to the students. McKay (2000) classified Ndj bbana as a non-Pama-Nyungan language as it makes use of prefixes as well as suffixes for derivation in inflection. (p. 155). Ndj bbana verb morphology is "rather complex" (p. 156) and when children begin writing and reading Ndj bbana they soon encounter complex words. For example, *Barrar djibanja nalak rrbibiba barrayirr yanja* translates to English as "A boy and a girl walking along the road." While CAN does not change the complexity of Ndj bbana, it may provide a useful way of integrating the text with a variety of literacy cues available in the different channels of multimedia.

A second justification comes from the repeated requests from the Kunib dji community over the past 20 years to maintain a Ndj bbana bilingual program that promotes Kunib dji involvement in the school and improves the children's literacy. CAN has the potential to respond to these requests through the creation and presentation of interactive Ndj bbana resources. Kunib dji electronic literacies can be initiated through the use of CAN in the Ndj bbana bilingual program. Warschauer and Donaghy (1997) describe how students have begun their electronic literacy development in their first language with a similar immersion program.

A third justification for implementing CAN is to support the empowerment of the Kunib dji by increasing their available means of expression. The electronic literacies that will be developed during the production of the interactive resources will embody a new meaning-making system that can be used to express Ndj bbana language and Kunib dji culture. This is not the first time that the Kunib dji have been exposed to a new meaning making system. The development of the Ndj bbana orthography more than 20 years ago contributed to the construction of the Kunib dji culture as "dynamic, open and forever undergoing transformation" (Cope & Kalantzis, 1999, p. 205). The electronic literacies that are incorporated in CAN give the Kunib dji a wider range of available means of expression to understand and contribute actively to their changing life-worlds.

The role of the computer in this study will be investigated in the context of supporting print literacy through multimedia, promoting indigenous involvement in the creation of electronic texts and exposing the Kunib dji to a new means of expression that is linked to powerful global discourses.

Why Examine the Role of the Computer in CAN?

There are at least two reasons to examine the role of the computer in CAN. First, it provides a revealing contrast with the roles of the computer originally developed in CALL. The tutor-tool framework identified by Levy (1997a) comes from the application of CALL to an ESL context where issues of cross-cultural literacies were fairly transparent. This study presents CALL in the context of a minority indigenous Australian language whose speakers have a limited history of print literacies. Moreover, the informal location of the study, around Kunib dji homes, is an important factor in addition to the choice of hardware and software, in determining the effective roles the computer will play in CAN.

A second reason is to clarify the process of implementing electronic literacy in Ndj bbana outside the CALL context. Knowledge about the role of the computer in CAN will contribute to understanding the use of the computer to support the teaching and learning of Ndj bbana more generally, something that becomes more important in a changing Kunib dji world.

LITERATURE REVIEW

History of Kunib dji

Before contact, the Kunib dji all lived around what is now Maningrida. Altman (1987) has divided the post-contact history into "three broad phases that correspond closely to the government's policy of protection and preservation, assimilation and integration, and self determination and self management" (p. 2).

The *protection and preservation stage* dates from Kunib dji contact with Macassan fishermen early in the 20th century to the establishment of a trading post in 1957 (Altman, 1987, p. 2). The contact by outsiders in this phase was neither extensive nor permanent. Although there were missions established about at Goulburn Island and Milingimbi, both about 100 kilometres from Maningrida, the Kunib dji were "wholly at home" when the missionaries visited (Armstrong, 1967, p. 4).

The subsistence economy declined throughout the *assimilation and integration stage* and as a consequence the Kunib dji became "dependent upon welfare and handouts for survival" (Altman, 1987, p. 4). When Maningrida community officially opened in 1962, there was a hospital, a school, a store, and

administrative buildings as well as housing for white staff (Altman, p. 4). By 1966, the 118 Kunib dji were sharing their land with 554 other indigenous Australians made up of Rembarranga, Burarra, Nakarra, Kunwinjku, Gumawuwurk, and Gorrhone speakers (Armstrong, 1967, p. 5).

Rowley (1971) suggested that the isolated locations of reserves and missions, as well as the limited contact between indigenous and non-indigenous people, may have made the assimilation policies less effective. Such was the case in Maningrida. The Kunib dji lived in extremely poor conditions and worked in low-paying jobs whilst the Balanda lived in a separate housing estate and completely controlled Maningrida (Altman, 1987, p. 4).

A change of government in 1973 began a new phase of *self determination and self management* that continues today. The result of this change in Maningrida is the gradual return of local political power to the indigenous Australians. During this phase, all indigenous Australians had a right to education and the Ndj bbana bilingual program officially commenced in 1973 (Laughren, 2000, p. 6). Ndj bbana was used as a medium of literacy when school first began under a shelter near the Kunib dji homes in 1978. The relatively recent exposure of the Kunib dji to Ndj bbana print literacy with an aim to overcome disadvantage is a feature of their children's education.

Today, Ndj bbana is spoken by 150 Kunib dji in and around Maningrida (McKay, 2000, p. 167). There are approximately 1,600 indigenous Australians and 100 non-indigenous Australians also living in Maningrida. The Kunib dji are all multilingual, speaking Ndj bbana as their first language and English as their third or fourth language. While the levels of Ndj bbana and English print literacy are low, owing to a variety of complex social factors, the Kunib dji community members repeatedly request the maintenance and delivery of a Ndj bbana bilingual program. The provision of such a program is an important process of Kunib dji empowerment. A small part of this program is the development of CAN.

Roles of the Computer in CALL

Our understanding of the roles of the computer have developed with our understanding of the relationship between technology and language learning. This section begins by looking at its role as tutor and its role as tool. Learning paradigms will be linked to these roles.

The roles of the computer as a tutor and as a tool are complementary. As a tutor, the computer evaluates the user's input and responds to it, while as a tool, the computer is employed by the user to enhance his or her own learning or communication.

The role as tutor was initially identified by Taylor (1980, p. 3) where the computer "presents some subject material, the student responds, the computer evaluates the response and from the results of the evaluation, determines what to present next." Levy (1997a, p. 181) suggested in this role as a tutor, the computer is a "temporary substitute" for the teacher. As the capabilities of the computer evolved, the activities they supported became more open-ended. These open-ended activities are a characteristic of the computer as a tool.

The role of the computer as a tool is rather complex and will be split into three other roles for the purposes of this paper. The computer can take on a *conjectural* role, an *emancipatory* role, and a *collaborative* role while still satisfying the more generic role as a tool. In a conjectural role, the focus of the human computer interaction is on the content available for people to evaluate critically; the focus of the computer in the emancipatory role is on the empowerment of the users; while in the collaborative role, the human-to-human interaction remains the focus in a computer mediated environment. Each of these roles will now be examined in more detail starting with the tutor.

As a tool, the computer "augments human capabilities" (Levy, 1997a, p. 184). However, which humans have access to this augmentation is debatable, as highlighted in the exclusion of Kunib dji people from CALL. In this role, the computer needs to be "transparent," matching the tool to the task. One of the

challenges of implementing CAN is to keep the tool transparent for a group of people who have a limited print history. But this can be achieved by the use of appropriate hardware and software.

The role of the computer as a tool becomes ambiguous when the same CALL activity is used by conflicting groups, each as a tool of their own empowerment. For example, Warschauer and Lepeintre (1997) show how the use of electronic network in the classroom can be seen as a tool for a "Freirian community of co-investigators or a Foucauldian model of panopticon control"(p. 86). Viewing the roles of the computer from different perspectives is a useful approach to take in CAN given the diversity and complexity of individual Kunib dji literacies and the non-indigenous Australian involvement in the process of developing CAN resources. The expected roles of the computer in CAN will reflect the "scene of a struggle" (Feenberg, 1991, p. 14) as CALL will be deconstructed to fit a new cultural context.

Levy (1997a, p. 193) covers this problem of ambiguity of the role of the computer as a tool to some extent by linking it to learning paradigms. These learning paradigms were developed by Kemmis, Atkin, and Wright (1977) to "conceive the curriculum task" but also serve to further define the roles of the computer in CALL. As a tutor the computer incorporates instructional and revelatory learning while as a tool the computer covers conjectural and emancipatory learning. Conjectural learning is learner-initiated while with revelatory learning "the focus is on the computer supplying the appropriate data that reveals the pattern or the underlying rule" (Levy, p. 191). [Figure 1](#) below shows how the learning paradigms have been linked to the roles of the computer in CALL.

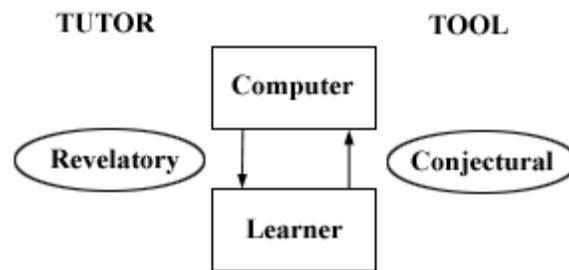


Figure 1.

When applying this model to CAN there are two contextual differences that need to be addressed. First, there could be multiple learners around the one computer. Second, the limited print and electronic literacy of the users would suggest the computer will need to play some sort of active role (i.e., as a tutor) to reveal and conjecture their form and content.

While the tutor/tool framework includes the roles of the computer identified by other CALL researchers (Higgins, 1983; Philips, 1987; Prescott, 1995; Wyatt, 1984), the emancipatory and collaborative roles could have some application to CAN. The emancipatory role was identified by Kemmis, Atkin, and Wright (1977, p. 29) from Computer Assisted Learning and is characterised by reducing "the inauthenticity of student labour." The emancipatory role of the computer in CAN would also be linked to the empowerment of the Kunib dji as a group "as we offer forms of instruction that are theirs by right" (Gee, 2000, p. 68). Such an application of the role of the computer gives the Kunib dji stake holders a greater choice in the mediums of Ndj bbana language learning and teaching.

An additional role that is worth noting is that of the collaborator where "the initiative is turned over to the student or group of students" (Wyatt, 1984, p. 7). New technologies have potential to enhance this collaboration amongst the students. Debski (1997, p. 60) suggests the new technologies used in CALL are best matched to a "goal orientated, activity and collaborative-based approach to language teaching."

New collaborations will be expected in CAN. There will not just be a collaboration between Kunib dji students but also students and community members as they become involved the creation of interactive Ndj bbana resources. There would be an expected collaboration between indigenous and non-indigenous

people in the implementation of CAN. The cultural literacies offered by the Kunib dji will be combined with the new forms of electronic literacy offered by specific non-indigenous Australians.

Computers in Indigenous Australian Education

There have only been limited studies conducted using the computer to support language learning with indigenous Australian students (e.g., Flear, 1989) and the roles of the computer have not been explicitly identified in any of the studies. However, such an approach is useful to identify the gaps in the research that can help our understanding of the application of the computer to indigenous Australian education.

The role of the computer as a tutor has been linked by Woodside (1985) to the paradigm of indigenous Australian learning styles that were identified by Harris (1980). The choices implicit in choosing styles may be enumerated as follows:

- 1) Learning by observation and imitation versus verbal instruction.
- 2) Learning by personal trial and error versus verbal instruction and demonstration.
- 3) Learning in real-life activities versus practice in contrived settings.
- 4) Context specific learning versus generalised principles.
- 5) Personal-orientation versus information-orientation: absence of the institutionalised office of teacher. (Harris, p. 26-102)

The majority of studies have considered the use of computers to enhance Aboriginal learning styles (Coldwell, 1988; Darval, 1986; Flear, 1989; O'Donoghue, 1992), particularly in the role of tutor. When applying these learning styles to interactions with the computer, there are arguments for and against using them. Flear suggests the use of drill and practice software is not designed to support the social interaction amongst indigenous students. However, in a study that linked computer teaching styles and indigenous Australian learning styles, Woodside (1985) suggests the individualised responses on the computer removes the shame factor of incorrect answers.

O Donoghue (1992) identifies several reasons that contribute to Indigenous Australian s success at the computer. These social elements of this success comes from appealing to visual and spatial skills of the children and releasing the children from high level English of non-Indigenous teachers. As a medium the computer is patient, provides instant feedback and provides activities that are fun.

Fryer (1987) suggests the positive benefits of computers with indigenous Australian students reflect the absences of a formal teacher in their society. Computers give indigenous Australian students greater control of their own learning and transform the teachers into helpers rather than presenters of information.

Darvall (1986) used the computer to produce Wyaliba Word Lists as part of a wider use of computers throughout the school. The role of the computer in this study was as a tool, but the methodology of the study is ambiguous. The computer was used as a tool to generate word lists "which listed local dialect words" and has led to the use of "local words in the classroom in both written and oral forms" (p. 5, 7). The use of the computer to promote parental involvement in the school was also noted but this could have been due to the readers that were also developed in English as part of the program.

Czerniejewski (1989) used computers designed to enhance literacy acquisition in Aboriginal children's own languages, to facilitate the materials production process. Such a use of the computer identifies the role of the computer in providing structural support in for creating a print in indigenous Australian minority languages. At the time of reporting, this would have been relatively recent in for many indigenous Australian languages. The use of CAN will extend this role to provide the Kunib dji with electronic literacies as they create interactive Ndj bbana resources.

Henderson (1993) suggested that the production of locally culturally appropriate software for Aboriginal and Torres Strait Islander students presented the computer as a tool of empowerment. The use of such software means the learning task is open-ended "ensuring the learning context is meaningful" (p.328). This use of the computer aligns it with the emancipatory learning paradigm outlined by Kemmis et al. (1977). The use of CAN could provide a site of Kunib dji empowerment through the application of culturally embedded software that has been suggested by Henderson.

The final role of the computer identified in indigenous Australian education is one where the tutor and tool roles are integrated to produce a "hybrid system" (Levy, 1999). Dench (1990) found language controlled software on touch-sensitive boards was a "powerful tool in bilingual education" (p. 644). The study used touch-sensitive boards as a way of generating legal sentences from groups of pre-selected letters or words. However the meaning was limited by the restrictive nature of the form of the software.

Although the use of a tutor tool hybrid system will not be used in this study, the unrestricted use by Dench (1990) of hardware and software employed to support a minority indigenous Australian language is transferable to CAN. Computer assisted Ndj bbana that allows open ended Ndj bbana text creation and promotes Kunib dji involvement, will use hardware and software that "has gone before, rather than be led purely by the capabilities of the latest technical innovation" (Levy, 1997a, p. xi).

Culture

Kroeber and Kluckhohn (1963) reviewed 150 definitions of culture to present two common understandings:

- 1) culture is a way of life based on a system of shared meanings; and
- 2) culture is passed from one generation to another through the same system.

Other definitions include systems of standards for believing, perceiving, evaluating, and acting (Goodenough, 1981, p. 41).

Semioticians added to the understanding of culture from a meaning perspective. Culture was seen as a communal system of meanings that provides the means for human beings to translate their instincts, urges, needs, and other propensities into representational and communicative structures (Danesi & Perron, 1999, p. 14).

Signifiers have been used by semioticians in this translation process. Danesi and Perron (1999) have integrated the use of signifiers with Kroeber and Kluckhohn's ideas of culture:

Culture is a way of life based on a signifying order developed originally in a tribal context that is passed along through the signifying order from one generation to the next. (p. 23)

Such an approach to culture would have some merit in this study where the computer could be seen to present a new signifying system to the Kunib dji. Because the computer is a new cultural artefact in this study, other views of culture will be valuable that focus on the dynamics and ideology. Cope and Kalantsis (2000) approach culture from a design perspective that has a focus of change and transformation rather than stability and regularity. The view of transformation of culture "reconstructs meaning in a way which always adds something to the range of available representational resources" (Cope & Kalantsis, p. 204).

The transformation of cultures does not take place in a social vacuum. Smith (2000, p. 81) suggests "cultures can be conceptualised as a space within which struggles between social forces are conducted." One of these spaces is that of social subjectivity, "a domain that is wider than ideology but narrower than society" (Eagleton, 2000, p. 39). The changing space of CAN includes indigenous and non-indigenous people as well as groups of Kunib dji people constructing their own understandings.

Recently the use of the term *culture* has been challenged. Hannerz (2001, p. 68) suggests its use is a way of "underlying, even exaggerating, the difference." As the world becomes more globally connected these differences are neither absolute nor eternal. Nevertheless, in indigenous Australian education, there could be some truth to accepting difference. After many years of working with indigenous Australians, Harris (1980) suggests the following:

The two cultures are antithetic -- consisting of more opposites than similarities. They are warring against each other at their foundations. Recognising and accepting the truth of the term incompatible was for me in this study the point of theoretical liberation and the starting point for more effective educational theory to be applied to Aboriginal schools. (p. 9)

Even if this is an exaggeration, anybody who has worked in Maningrida would identify the difference between the Kunib dji and non-indigenous people as a daily reality. The rate of change of this difference also needs to be examined relative to the Kunib dji "global connectedness."

Lull (2001, p. 132) proposed the term *superculture* reflecting culture as a community but "based primary on the idea that of culture as a personal orientation and experience and on the dynamic ways that meaningful interaction, activities and identities are constructed by people through contemporary modes, codes and processes of human communication." A proposed superculture does not take into account the digital divide many indigenous people are facing, excluded from global connectedness for political and economic reasons. The Kunib dji have no way of actively participating on the Internet as only a handful of people have telephones and no one has a computer. Even if they did have access, they would be excluded from using their first language as there is no Ndj bbana on the Internet. In any case, all the Kunib dji live in the one location with limited levels of print literacy.

METHODOLOGY

This study used vignettes to describe the process of design, creation, and presentation of CAN using talking books on touch-screens in an informal context. Each talking book created was unique owing to the Kunib dji who chose to contribute to the integration of pictures sounds and print. The presentation of the material was also embedded in a dynamic movement of Kunib dji around the computer. Although data has been captured on video and analysed, observations and conclusions have also been developed from my partnerships with the Kunib dji people.

The talking books were displayed on a touch-screen outside variety of Kunib dji houses in Maningrida. These sessions took place at night when the screen was clearly viewed from the children and parents. As mentioned earlier the groups around the computer were dynamic and each vignette was a unique text in itself based on who was there present. Generally, there were groups of six to 10 children around the computer taking turns at accessing the talking books on the touch-screens.

For the purpose of this study, the interactions around the development and presentation of the talking books were recorded on video. This video data was supplemented with field notes and conversations with Kunib dji adults around the time of videoing. As the analysis progressed videos were classified in a collaborative manner between the researcher and a group of interested Kunib dji adults that grouped the videos as normative depictions, dramas and critical events as outlined by LeCompte and Schensul (1999, p. 181).

The results were triangulated amongst the adults to reach consensus about the English interpretation of the data and the behaviours that were observed around the computer. Nevertheless, the conceptual understandings presented in this paper based on this evidence is from a non-indigenous researcher's perspective.

Limitations of the Study

Owing to the unique historical and social context of this study, the transferability of the findings are limited. The limited and relatively recent exposure to vernacular print literacy in this remote indigenous Australian community have called for a special use of CAN for the Kunib dji. As technology and the Kunib dji change rapidly, there may be better tools that match the Kunib dji language learning needs in the very near future. This would include new technologies that would suit the Kunib dji choice of language programs, either in Ndj bbana or English.

A second limitation in this study is the absence of a metalanguage in Ndj bbana. The word for voice is *ng ddja* and paper is *dj rrang*. There are no words for letters, words, or sentences. The application of CALL in this context is compounded where text is manipulated in a electronic medium without any metalanguage.

Design of the Talking Books

The talking books were designed by a Balanda to support the Ndj bbana bilingual program. Owing to the limited history of contact with computers and the scripting that was needed to create such a resource, CAN would not have begun without this input. What is at stake here is the balance between the non-indigenous construction of a new form an indigenous Australian language verses the new meanings of Kunib dji understandings that are developed with the use of CAN.

There were two stages to the design process. The first was the evaluation of CALL resources available for the specific Kunib dji context. Due to the Kunib dji living in the one location and the limited history of print literacy, the use of the Internet was not seen as the best software match for CAN. The multimedia phase of CALL development on the other hand, characterised by the use of hypermedia where learners can navigate with the click of a mouse (Warschauer, 1996), showed some potential in this context. The limited computer literacy needed to access the CAN resources, together with the integrated presentation of text sound and graphics motivated the development of simple talking books in Ndj bbana.

The second phase of the design process was to author a contextually relevant electronic resource. The talking books were originally created in Hypercard but have recently been scripted in *Lingo* for *Director*. The aim of the design was to keep the program simple, so non-indigenous teachers and Kunib dji community members could own more of the creation process. All pages of the books have identical elements of text sound and pictures. When each page is opened the text is highlighted as it is read. An example of a page of these books is seen below in [Figure 2](#). A completed book can be seen by clicking [here](#).

**Barra-róddjiba barra-rówa
barra-réndjeya mikkombo.**



Figure 2. An example of page from a talking book

While the software complemented the production of Ndj bbana books in the school, the access to the finished books was an issue. While many of the talking books were created in the community, there were problems presenting the material back to the Kunib dji. After one touch-screen was successfully tested in the pre-school, several of these were purchased from a grant with the intention of providing access to the talking books by Kunib dji community members with limited computer literacy.

Creating the Talking Books

Talking books have been created in several different ways. A description of two successful ways the talking books have been used follows.

One starting point was the creation of talking books from already finished Ndj bbana texts. The Kunib dji children become familiar with the text and when they had understanding of the sequence, they acted out the scenes around the community. This often attracted lots of attention from Kunib dji community members. The computer was usually taken out into the community and the digital pictures taken of the scenes by the children were downloaded onto the computer while other children typed the text into the computer at a later stage. Each page of the text was read, often by different community members, and was recorded by the Kunib dji literacy worker or a non-indigenous teacher using the computer. The sound, text and pictures were all matched together and the text was synchronised to highlight the words as it was read.

Another starting point was the negotiated texts from whole language experiences, which usually began with recording these events on the digital camera. A text was negotiated between the Kunib dji literacy worker and the students and was then matched to a variety of pictures. Sometimes the texts were negotiated with community members and the students on the excursion. The sound was recorded after the literacy worker had checked the entire text with other community members to gain a consensus.

Presentation of Talking Books on Touch-Screens

The touch-screens were taken to a variety of locations around the community. While the creation of the talking books has mostly happened during school time, their presentation has occurred after school hours, most popularly in the evenings. The presentation of the finished talking books is in direct competition with other life-world obligations and entertainment. Based on my observations they compete significantly.

When viewing the finished talking books on the touch-screen, there are often up to four generations of people gathered around the computer. There are two components of this language learning site: one involves the interaction with the computer and the other is the interactions between the Kunib dji. Although each talking book can be stopped at any time, they are usually viewed from start to finish. When the books are finished there are commands from a variety of people to the child delegated to be in control of the screen. The simplified form of the talking books is complimented by the dynamic and complex social construction where a variety of literacies mark the site of CAN.

Another setting of CAN is just one or two people at the touch-screen. The site of CAN can change from a dozen people to one when a car comes past that is going to the football game. When there are only a couple of people, the children can tinker with the form to reveal the rules of navigation and learn through repetitive exposure of the content. Free from the demands of more senior people or their peers, the children can play the same page over as many times as they like. However, these opportunities are fairly short lived and as more people gather around the touch-screen, the focus changes to one of repetitively examining the content of the talking books. An example of the use of the talking books on the touch-screen in a Kunib dji family context is shown in [Figure 3](#).



Figure 3. The context of Computer Assisted Ndj bbana in Maningrida

RESULTS: THE ROLE OF THE COMPUTER IN CAN

There are three findings in this study regarding the roles of the computer. First, it is possible to discern the roles that have already been identified by other researchers. Second, some of the roles that have already been identified find new applications. Finally, there are new roles for the computer in CAN that have not yet been described in the literature.

Applying Collaboration and Emancipation

There are two roles of the computer that have been identified in CALL that directly describe CAN. First, the computer was a *tool of collaboration* amongst the students (Debski, 1997; Levy 1997b; Warschauer & Donaghy, 1997). One example was the critical use of the digital camera by the students. After some initial instructions and modelling from the teacher, the students were very quick to learn how to capture images to their satisfaction. The computer played an important part immediately reflecting to the children their attempts at taking pictures for the stories in the books. This was often done using a laptop in the community. Before the use of the digital camera, the films took between 1 and 3 weeks to be processed in Darwin. This made continuity of production very difficult. The digital camera, on the other hand, promoted meaningful collaboration amongst the students as they came to control an immediate electronic text production process. An example of the use of the digital camera contextualising the literacy resources is shown in the linked [talking book](#).

The second role that has already been identified by CALL and can be applied to CAN is one of *emancipation*. While creating the talking books, both students and adults were unlocking the knowledge of the computer. The students were exposed to simple multimedia capabilities of the computer in their own language. Once the students and Kunib dji knew the possibilities of the media, they then began to control the exploitation of the multimedia form to present their message in a variety of channels in Ndj bbana. The popular book *Marr kama Nga-b yanga Mud kkang* (Buy Me a Truck) is one example of the use of the computer as a tool of emancipation. The students acted out a book that was 10 years old,

then added sounds to create a production that reinforced cultural relationships and appropriate Kunib dji behaviour. The added channels of sound and the contextual pictures using the digital camera extended the meaning the children took from the talking books so created. The use of the digital camera gives the children access to embedded cultural cues that reflect their life-worlds better than generic illustrations found in the original printed book. The control of the camera by the children is also an important liberating process in the creation of Ndj bbana texts.

Extending Conjecture and Collaboration

There are also roles that have been identified in CALL that need to be extended when used in CAN. One is that of conjecture which needs to be extended in two ways to include a CAN context. First, owing to the simple nature of the talking books, the form of the computer as a new media was conjectured. Students have the opportunity in an informal context to test their ideas of forms of print and electronic literacies throughout the production of the talking books. The talking books supported the students matching and sequencing of the forms of pictures, sounds and text for example.

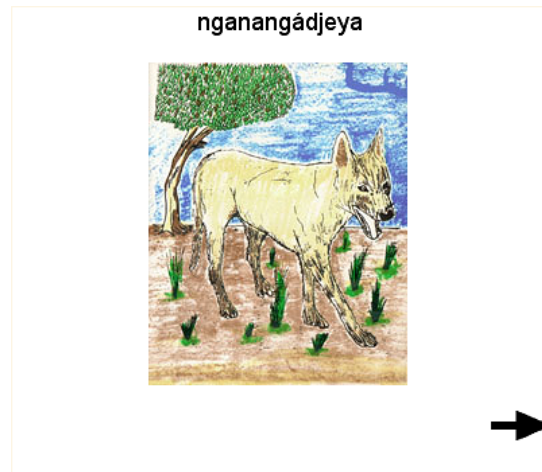
The second way this role is different in a CAN is its supplementary nature. Owing to the large numbers of community members around the computer, any content that is to be tested by the user has most probably been scrutinised by some other member of the group around the computer. One example of this is the navigational commands given to the computer to access the different talking books in a complex and dynamic social context. This can be seen in the following video of the children interacting around the touch-screen.



Movie 1. [NOTE: In the Web version, this is a playable movie.]

The younger children who interact with the computer are told by the older children which books to choose. The children learn to navigate by suggestions from other people who have used the computer before. Rather than individually tinkering with the computer's symbolic representations, the child operating the touch-screen learns a variety of embedded Kunib dji discourses as he asserts or negotiates his choice with other children.

Another extension of the computer's roles is one as a collaborative tool. This collaboration happened amongst the children, between children and parents, and between Kunib dji and non-indigenous people. The computer as a collaborative tool amongst the students has been discussed above. While the computer has been found to support interest and knowledge exchanges between the school and community members (Fleer, 1989), the informal context of this study promoted parent and child collaboration. The parents not only played an active role in the recording process, they also validated the language used in the resources adding status to CAN. This is shown in [Movie 2](#), the popular book *Dj ya Barrang dja K ma Ngabarram yiba* (We Don't Eat These Animals):



Movie 2. [NOTE: In the Web version, this is a playable movie.]

While the above example is a simple case of a young child repeating her grandmother's reading, the collaboration across generations may change as the users become more confident with the signifying system found in the talking books. [One community member](#) tells of what happened when the adults and children used the computer in her house.

Collaboration also took place between Kunib dji and non-indigenous people. However, this is best discussed by including it in a new role of the computer examined in the next section.

Presenting Cultural Transformation

The new role of the computer that will be presented here is to support Kunib dji cultural transformation. There are at least three ways the computer in CAN moves beyond "augmenting human behaviour" (Levy, 1997a) to transforming Kunib dji life-worlds.

First, the computer in CAN increases the available means of expression for the Kunib dji. The electronic literacy that the Kunib dji learn while creating and interacting with CAN resources have not only integrated both oral and print literacies, they have begun the process of demystifying electronic literacy in general. While still in the early stages of implementation, the computer serves as a tool of expanding the Kunib dji world and its representation through application of hardware and software.

The following video of the creating the talking book *Yibarda* gives an example of how Kunib dji lifeworlds are transformed in CAN:



Movie 3. [NOTE: In the Web version, this is a playable movie.]

There are two ways the participants' views of the world were expanded. First, the Kunib dji woman used the computer to negotiate the text to be read to her father. As this negotiation continued, the computer was almost an invisible part of her reading, something which she only started using a few hours earlier. The

second expansion was the recording of the words spoken by the old man. After a few phrases and testing the microphone, he quickly took on the task at hand with help from his daughter. His participation meant he had a voice, in more ways than one, in the new realm of Ndj bbana talking books.

The second way the computer serves to transform the Kunib dji world is the non-indigenous and indigenous interactions around the computer. Repeatedly, I called on Kunib dji community members to explain to me some of the many complexities of Ndj bbana language, while I also responded to explicit questions about the capabilities of the computer. The explanations about the computer were usually done in English and then translated to the group of community members by a Kunib dji literacy worker. The Kunib dji were learning two forms of literacy while producing CAN resources: the electronic literacies embedded in CAN and their social literacies as they challenged a non-indigenous person to explain components of their social life-world. The "shunting backwards and forwards between one life-world context and another" (Cope & Kalantzis, 2000, p. 211) that happens during the development of CAN resources, supports the transformation of Kunib dji life-worlds.

Finally, the hybridity of Ndj bbana represented in the talking books provides a new transformation of the Kunib dji life-worlds. Hybridity and voice are the two elements of cultural transformation identified by Cope and Kalantzis (2000, p. 204). The elements of hybridity and voice fit well with wider models of cultural and linguistic pluralism across a variety of media proposed by the New London Group (1996). However, on a small scale in the Kunib dji context, the cultural and linguistic pluralism is temporal, rather than global spatial as proposed above. The talking books give younger Ndj bbana speakers access to new media where their texts add to the hybridity of their language rather than supporting the maintenance of a print form of Ndj bbana that was constructed more than 25 years ago. Where the computer is used to record and subsequently reveal the "simplification and regularisation of the language amongst the younger speakers" (McKay, 2000, p. 176), it serves to reflect the diversity of spoken Ndj bbana to the stake holders of the bilingual program. Used repetitively, the talking books present this hybrid construction of Ndj bbana through which individual Kunib dji 's will use make meaning of their changing life-worlds. The computer conjectures this hybrid representation of Ndj bbana present in the talking books as the channel of sound is added to the text production process.

The example of this hybridity can be seen in the talking book *Njarra-b na M kkombo Malabun wa* (We Went Fishing at Malabun wa). This book highlights the hybrid construction of Ndj bbana from the younger speakers reading the book and from the older speakers who contributed the names of the three different fish. The voices of older and younger speakers are included in the text, which was made during a 5-day excursion to Malabun wa.

Ideological Implications

There are several ideological implications for the use of the computer as a tool of Kunib dji cultural transformation. These include the loss of linguistic diversity, the pathway to global connectedness, and the changing responsibilities of non-indigenous people to promote Kunib dji electronic literacies.

First, the use of the CAN to support the move from an oral to a print literacy may have ideological implications if compared to other indigenous experiences of the Pacific. M l h usler (1990, p. 189) suggests that languages were literally reduced to writing when vernacular literacy in was introduced to those languages. He also suggested this process of moving from an oral to print culture "contributed to the creation of communicative inequalities and decreasing heterogeneity" (p. 213). CAN, on the other hand, supports and preserves the Ndj bbana diversity. This is achieved by its design and application. From a design perspective, channels of text, sound, and pictures from a variety of contributors are integrated to create the talking books. After one old man saw the computer in action the following conversation about how it could be used was recorded. He viewed the extra channels of the multimedia ones in which he could participate in the text production process.

The popularity of the touch-screens suggests the children are willing to access over and over again a variety of Ndj bbana stories in the absence of their authors. A "broadened social-semiotic perspective" (Walton, 1996, p. 3) is available to the children through CAN, a situation which has implications for global learning. At least [one](#) Kunib dji community member has identified the use of the electronic literacies of the non-indigenous people as a desirable characteristic for the Kunib dji .

A second ideological observation on the role of the computer as a tool of cultural transformation comes when we remember that the Kunib dji are choosing to use a tool that could lead to global connectedness. While levels of print literacy are generally low amongst the Kunib dji, they are choosing to interact with a Ndj bbana electronic resource that has print content. Non-indigenous people have a certain responsibility to extend the choices available to the Kunib dji. Levels of print literacy, in the short term, are still low, but some Kunib dji could become electronically literate in order to be ambassadors of the Internet for their people. Another approach would be for non-indigenous people to develop new ways of accessing the Internet so that people like the Kunib dji can have a voice.

CAN takes place in a context with low levels of Ndj bbana literacy and spasmodic attendance patterns at school. The willingness of the children to access the touch-screens in this context suggests the re-evaluation of the roles and responsibilities of staff in the school and community. Because the medium can present contextually created resources that are repetitively accessed, it may be more effective for some aspects of education and community development training than classroom-based learning. While the Kunib dji choose to use the touch-screens, there is an ideological challenge to examine non-indigenous roles and responsibilities to enhance and support the use of computers in this context. The long-term benefits of this would support more Kunib dji people making choices about global connectedness discussed above. The role of the computer in presenting Ndj bbana electronic literacies to the young children is the first stage in this process.

The willingness of children to access the computer is complemented by the community members' wish to use the computer to support the teaching and learning of Ndj bbana as one experienced [Kunib dji teacher](#) told me.

FUTURE RESEARCH

There are two roles of the computer that would be worthy of more research. First the computer as a tool of non-indigenous and indigenous collaboration needs to be addressed. The role of the computer to support cross cultural collaboration needs to be linked to the desired responsibilities and authorities of the people involved. The role of the computer to support indigenous self-determination needs more research. Such research is essential if the indigenous peoples are to have access to CALL research and development that will empower their life-worlds.

The second area of future research is the role of the computer as a meta-research tool in an indigenous Australian context. The touch-screens in this study would provide an excellent tool of for reporting research back to indigenous people. Reports commissioned to investigate social issues with indigenous Australians could be presented on touch-screens based in community organisations to make the results more accessible. Such reporting back, particularly if it was done in the community members first language, would see the computer play a role to support the emancipation of indigenous Australians.

CONCLUSIONS

When applying pedagogical principals to CALL, Wyatt (1988) outlines the need to for a fit between the "computer's capabilities and the demands of language pedagogy" (p. 86). This study would broaden this fit when CALL is used to support an indigenous language. There needs to be a fit between the computer's capabilities and the demands of language pedagogy and cultural constructions of the indigenous community. This study has attempted to provide such a fit, by using appropriate hardware and software to present Ndj bbana language and Kunib dji culture in a new form that makes a wider construction of

cultural literacy more accessible and controllable to groups of Kunib dji community members in an informal context.

This study has presented the role of the computer from the design, creation, and presentation of CAN resources. The development of Ndj bbana talking books and their subsequent presentation on the touch-screens reinforces the computer as tool of collaboration and emancipation where the students practice constructing contextual texts in their first language. Due to the limited history of both vernacular print literacy and the limited exposure and access to English print literacy, the computer serves to conjecture a link between print and oral literacies by the repetitive presentation of the talking books on the touch screens. This study found the community involvement around the touch-screens supported a supplementary conjectural role of the computer, with social language learning happening at the site of CAN. The collaborative role of the computer between students and community members constructed CAN as a more integrated site of language learning where there were often more than three generations of Kunib dji around the computer.

This study also found the computer supported Kunib dji cultural transformation by increasing their available designs of meaning. While the Kunib dji are interacting around the touch-screens they are integrating new literacies into their complex lifeworlds. The computer was used in this study to represent a hybrid form of Ndj bbana, which also supports the transformation of Kunib dji culture. The inclusive nature of Ndj bbana talking books allowed a range of Kunib dji voices to be spoken across a variety of channels which could be heard on demand in the Kunib dji homes.

The ready acceptance of the computer as a new cultural artifact demands a review of educational roles and responsibilities of people involved in Kunib dji education. The active engagement with the touch-screens in the Kunib dji houses also calls for the development of a framework that would give the Kunib dji a voice in the new global discourses that are supported by the technological literacies the Kunib dji are now learning.

While the creation of the talking books extended the Kunib dji's electronic literacies, the role of the computer as a tool of cultural transformation was identified. Using the computer to create and present Ndj bbana talking books, the Kunib dji means of expression were extended. The non-indigenous and indigenous collaboration around the computer not only expanded the Kunib dji understandings of the new form of media; it constructed a site where explanations of life-worlds were explicitly presented between two cultures. The inclusive nature of the talking books allowed younger Kunib dji to have a voice in the creation of Ndj bbana texts. The hybrid nature of the talking books constructed a changing Ndj bbana and their presentation invited a critical analysis of this language shift by Kunib dji stakeholders.

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