

CALL for Endangered Languages: Challenges and Rewards

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Abstract

The interaction between CALL and Endangered Languages (EL) is an under-researched and under-exploited field. It is perhaps no surprise that this should be the case as CALL in the EL context has to address additional requirements and deal with extra constraints over and above those that prevail in mainstream CALL. This article introduces the topic of Endangered Languages and lists two classifications for Endangered Languages (Terralingua, 2000; Unesco, 1993). It outlines why a language becomes endangered and why it is important to save ELs. It identifies the special constraints that prevail in the EL CALL situation. These constraints determine the EL CALL requirements. In a case study, a software template and suggested syllabus have been developed for the production of CALL materials for ELs. A working example of courseware developed using the template is presented. Finally, the cultural dimension of EL CALL is outlined.

1. Introduction

Many of the world's 6000+ languages are endangered. Krauss (1992) estimates that as many as 90% of the world's languages are endangered or under threat. CALL may not traditionally be considered to be a potential solution to this problem, but this article discusses CALL in the Endangered Languages (EL) context and outlines its possibilities. Unlike mainstream CALL, EL CALL is a relatively new field and has to consider additional constraints and requirements. We identify the special requirements and constraints that prevail in the EL CALL situation. These extra constraints include very limited financial resources, limited technical and project management resources, lack of native speaker informants and potentially lack of documentation of the language. Often a standardised writing system is not even available. Moreover, there may also be strong social constraints that can limit what type of CALL courseware is culturally acceptable to a community. Mainstream CALL is inherently multidisciplinary and EL CALL even more so as it draws on the fields of sociology and anthropology, as well as other traditional CALL areas. Target users for EL CALL include groups as diverse as the local, often economically disadvantaged, community where some members still speak the EL and descendants of the local community one or two generations removed. These second and more removed generations have lost the language and often are interested in revitalising the language as part of their cultural identity. These constraints impact on EL CALL development. They determine the EL CALL requirements which include lean, low-cost and reusable solutions that do not involve reinventing the CALL wheel, the production of CALL courseware in multiple modalities from a single source and compatibility with language documentation efforts. Despite the severe financial and economic constraints, we identify some of the potential rewards EL CALL provides over and above the provision of language learning material. These include contribution to and cross-fertilisation with language documentation efforts as well as improved social prestige of the EL.

Ideally, an EL CALL solution provides both a software template and a curriculum template (in addition to the actual courseware) that can be maintained, reused, populated and extended by different EL CALL courseware developer groups. These groups can include members of the local EL community as well as local and external academics, educationalists and linguists. To minimise development cost, such a template should be designed to be portable to other ELs. At the same time it should be free of charge and lean as regards software and hardware requirements - this can rule out "bleeding edge"¹ technology and some existing, commercially available authoring systems. With this in mind, a software template and a suggested syllabus have been developed for the production of CALL materials for ELs and these are briefly introduced in this article. The software template provides the basic processing engine and data structures which non-programmers can use to develop CALL materials. A syllabus has been developed with the needs of EL beginners in mind. It shares many learning items with comparable syllabi for non-ELs (e.g. greetings and simple questions), while omitting some that may not be immediately relevant in the EL socio-cultural context. A working example of courseware that has been developed using the template (for Nawat, an endangered Uto-Aztec language of El Salvador) is presented. Finally, the theme of culture and ELs is considered. EL CALL faces many difficulties but there is one area that EL CALL has perhaps an advantage over mainstream CALL and that is culture. The learner community may already be familiar with the culture of the EL and may not have to start from scratch, as may be the case with other language learners. EL CALL can also provide the community with a previously unavailable forum for cultural expression.

2. Endangered Languages

¹ "bleeding edge" - so close to the edge it cuts or hurts (i.e. unproven new technologies).

An Endangered Language is one that is in danger of extinction. It is estimated that there are approximately 6000 or more languages spoken in the world today (Hale, 1992). Moreover, over 90% of them are in danger of disappearing, with some more endangered than others. Terralingua (2000) divides languages into three groups:

- Moribund (no longer learned by children),
- Endangered (those which will soon cease to be learned by children),
- Safe (neither moribund nor endangered).

UNESCO (Unesco, 1993) has the following category definitions of endangered languages:

- Extinct languages (other than the ancient ones),
- Possibly extinct languages (without reliable information of remaining speakers),
- Nearly extinct languages (with maximally tens of speakers, all elderly),
- Seriously endangered languages (with a more substantial number of speakers but practically without children among them),
- Endangered languages (with some child speakers but without an official or prestigious status),
- Not endangered languages.

In the context of this paper, an Endangered Language refers to the moribund and endangered languages of Terralingua (2000) and all but the not endangered languages of UNESCO (1993).

2.1 Why a Language Disappears

Woodbury (2002) reports that some people say language loss is inevitable, as it is an inherent part of general evolutionary processes. Indeed, languages do change and evolve over time (Aitchison, 1992). However, languages do not necessarily fit into the Darwinian concept of “survival of the fittest”. Languages do not usually disappear because they are “not as good” as other languages. All (mature) languages of the world allow their speakers to express themselves fully. This section reviews the reasons behind the demise of a language and argues that a language dies mainly for non-linguistic reasons.

Factors

There are many factors that contribute to the demise of a language. Most are extralinguistic in nature (historical, political, territorial, demographic, economic, sociocultural, sociolinguistic and those related to collective attitudes) (Dorian, 1982). In the past, colonialism was one of the main culprits. Colonialism brought with it a subtractive spread of languages. This occurs when an incoming language displaces and then replaces original languages. This happened extensively in the Americas, Australia and in parts of Africa and Europe (Terralingua, 2000).

Linguicism is defined as ideologies, structures and practices which are used to legitimise, effectuate, regulate and reproduce an unequal division of power and resources between groups which are defined on the basis of language (Skutnabb-Kangas, 1998). Linguistic genocide is prohibiting the use of the language of the group in daily interaction or in schools. Very often, linguicism and linguistic genocide were used to increase and maintain colonial power. Children who are not educated in their own language are unlikely to speak this language in turn to their own children. When there is discrimination of this kind, children are not allowed to identify positively with their mother tongue and culture. They may feel ashamed of their language, culture and community.

Destruction of habitats and ecological bases of the speakers of local languages, and forced assimilation also play their part in the demise of a language. In Australia and the West Indies, there was forced splitting up and transplanting of speech communities. Today, formal education systems and the mass media (including television - ‘cultural nerve gas’ as Krauss (1992) has called it) are direct main agents of linguistic (and cultural) genocide. One way to kill off a language is to teach another one.

Linguicide (language genocide) occurs when a language is “killed off” by a group (usually the dominant group in society) against the wishes of its speakers. Linguicide (whether intentional or not) is speeding up as local languages are excluded from the education system. In many parts of the world, the language and cultural rights of linguistic minorities are not being met (Terralingua, 2000).

The rise of nation states has been a major factor in selecting and consolidating national languages and sidelining others. Governments want national unity and often try to impose a national language policy. This usually has a detrimental effect on minority languages. Minorities and indigenous people are stigmatised as being traditional, backward, narrow and inferior. Parents encourage their children to speak the dominant language in the hope of improved social and economic status for their children (linguistic suicide). Linguistic suicide occurs when the

speakers of a language decide to “kill off” a language, usually because it is deemed to be no longer “worthwhile”.

The current push for globalisation generates serious and growing linguistic inequality. There is a worldwide economy that needs a worldwide market of information (usually in one of the world’s major languages and most often in English). Minority languages are being squeezed out. Industrialisation has boosted the process of linguistic standardisation as language diversity is seen as an obstacle to trade (Unesco, 2000).

2.2 Why Bother Saving an Endangered Language?

Language death is generally caused by social, political and economic factors. Given that is the way of the world, some may take a “so be it” stance – “if a language is going to die, let it die” philosophy. However, when a language dies, we lose not just the language itself, but cultural and scientific information (Hale, 1992). Language endangerment is a problem with humanistic and scientific consequences. This section reviews these consequences.

Most cultures stress the importance of language in human life. Although western culture sometimes considers the existence of many languages to be a “problem” (Tower of Babel), other cultures consider this diversity a good thing. For example, the Acoma Pueblo Indians of New Mexico believe that the mother goddess Iatiku causes people to speak different languages so that it is harder for them to quarrel (Gill and Sullivan, 1992).

However, the loss is not just of the language itself but can also mean the impoverishment of the cultural, spiritual and intellectual life of a people. The loss of a language may be voluntary or involuntary, but in either case, it is usually seen as a loss of social identity. Even if a community manages to shift its entire cultural heritage and ways of communication into a different language, an abrupt loss of tradition ensues. Human diversity is reduced each time a language is lost.

Losing a language and its cultural context is like burning a unique reference book of the natural world (UNEP News Release, 2001). Increasing attention is being paid to Traditional Ecological Knowledge (TEK). TEK is defined as a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationships of living beings (including humans) with one another and with their environment (Terralingua, 2000). Traditional Ecological Knowledge is endangered when a community’s language is endangered. For example, Aboriginal communities in Australia have knowledge about medicinal plants, their names and uses that could disappear when the community no longer has the language with which to describe them (Unesco, 1995).

Scientific Loss

On the scientific side, the loss of linguistic diversity will limit the possibilities to

- reconstruct linguistic prehistory (important for unravelling human prehistory),
- formulate and test theories of possible human language constructs and to analyse what this reveals about human cognition,
- study how young children acquire the range of diverse language structures that exist.

3. Target Groups

Given the highly threatened state of many ELs, it is important to avail of all potential language preservation mechanisms, one of which is CALL. This section reviews the various participants in the development of CALL materials for ELs and the different learner groups that may exist. Subsequent sections outline the constraints, requirements and rewards inherent in the CALL for ELs context. A working example of CALL courseware for an EL is also presented. This illustrates that despite the extra constraints and requirements that apply in the EL situation, it is possible and useful to develop CALL resources for these languages.

Our approach targets several potential participants in the EL CALL development and deployment processes. Figure 1 shows a simplified diagram of these participants and their interaction. The group of potential learners is composed of two sub-groups. The first sub-group is the members of the EL community. They live in the village or community where the language is still spoken, would tend to live in poor economic circumstances, have limited exposure to formal education and perhaps have low levels of literacy. The second sub-group consists of people one or more generations removed from the EL community. These people tend to live in better economic conditions than the other sub-group and also have higher levels of education and literacy. They would be interested in learning the language for heritage reason, similar to people in the United States who are interested

in studying their own heritage language (Morahg, 1996) (e.g. people who study Greek because their family originally came from Greece).

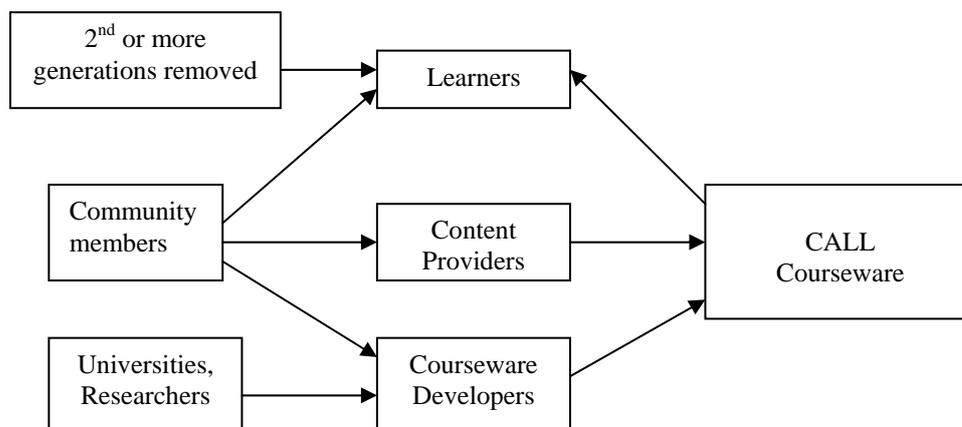


Figure 1: Target participant and user groups in EL CALL

The next group of users is the potential content providers. This group would consist of native speakers in the community interested in providing not only lesson material, but also poems, songs and stories. Other members of this group would include local universities who may have cultural and anthropological information to contribute to the system. A fourth user group is that of people who would use the template to develop CALL resources from scratch. They could choose to use the suggested syllabus or amend it to suit their own particular situation. Each group contributes their own constraints, which in turn determine the collective requirements of EL CALL.

4. Constraints

Many mainstream CALL practitioners feel that they do not have sufficient resources to do all that they want to or would like to do. They may feel that they do not have enough money to buy or develop software, that they lack the time to devote to CALL development and deployment and that they lack the necessary technological expertise. Furthermore, they may feel that it is hard to keep track of all the new developments happening in the world of CALL. These concerns also prevail in the EL CALL situation and are much more acute. Figure 2 lists the constraints that prevail in the EL CALL context, the reasons behind them and the group most associated with each constraint.

Constraint	Reason	Group
Extremely limited financial resources	Poor economic circumstances	Community members, others
Limited (if any) technical knowledge	May never have seen a computer	Community members
Limited (if any) technical support	May be no experts in the community	Community members, others
Limited project management skills	May be more used to agricultural working environment	Community members, others
Limited pedagogical skills	Limited experience of formal education	All
Limited time: macro Micro	Informants mainly elderly Informants may not have much spare time	Community members
Lack of potential informants	Few remaining competent speakers	Community members
Lack of a writing system	The language may never have been written before	Contributors
Social constraints	Social acceptability of EL CALL project	Community members

Figure 2: EL CALL Constraints

Limited Financial Resources

While mainstream CALL practitioners may feel they lack funds, the plight of EL CALL practitioners is much more difficult. Consider the situation where the lucky members of an EL community earn \$2 a day, where many people live below the poverty line, malnutrition levels are high and educational levels are low. Where is the surplus money available to develop "nice-to-have" but not "essential" CALL courseware? There is little commercial interest in EL CALL as there is generally no lucrative market for EL CALL courseware. It behoves CALL practitioners in this situation to be acutely aware of economics and to aim for the most cost efficient solution. This implies that state-of-the-art, high specification machines are unlikely to figure in the CALL development and deployment process², which in turn, places restrictions on what tools can be used. The issue of limited financial resources holds for each of the participants mentioned in Section 2.

Limited Technical Knowledge

Leaving aside financial considerations, there are also extra technological, time, logistical and social constraints that prevail. In the Western World, it can be assumed that most people have seen, if not used, a computer. Most people have some understanding of the potential of the computer and perhaps know someone who works in computing. If someone has a problem with a computer, there is usually someone (e.g. a friend or a professional service) that they can turn to for advice. However, in the EL context, these assumptions may not hold, especially for the EL community members.

Limited Technical Support

It is one thing to be able to use technology, it is another to be able to support that technology and fix problems when they occur. The formal and informal technical support networks that exist in mainstream CALL do not exist in the EL CALL situation. This means that no technological skills can be assumed and that the tools used in CALL courseware development should be as robust and easy to use for the non-expert computer user as possible. It means that the use of "bleeding edge" or leading edge technology is ruled out. While some technical support may be available to the participants who work with universities, it cannot be assumed that such support will be available out in the field. Furthermore, the access to and continued supply of something as basic (in the Western World) as electricity may be limited or non-existent.

Limited Project Management Skills

Many EL communities live in a world very different from the western world. Their life is based more on the natural world. Their time of rising, working and resting are more likely to be dictated by hours of natural daylight than by the time their boss expects to see them in the office. They may be unfamiliar with project management as practised in the Western World, although they may, informally, use their own project management techniques. This means that formal project planning and management skills cannot be assumed for this group. However, those with more exposure to formal education (e.g. university participants) may have previous project management experience.

Limited Pedagogical Skills

Pedagogical skills are obviously important in CALL. Many EL community members may have no or very little exposure to formal education. They may never have formally learnt another language before. Therefore, the whole concept of language pedagogy may not be part of the community's knowledge. Alternatively, they may have exposure to older language teaching techniques and may want to see them implemented in the CALL courseware. Understandably, there may be no knowledge of modern language pedagogical techniques in the community and this can place another constraint on the CALL development process. Furthermore, it cannot be assumed that those with higher levels of education have the necessary pedagogical skills either, as they may not have a pedagogical background.

Time Constraints

The time constraints that exist in the EL context are very real ones. There are both macro and micro time constraints to consider. On the macro level, it may be the case that the remaining speakers are elderly and that no younger members of the community speak the language. The remaining speakers may be in poor health. This implies that CALL courseware (and language documentation exercises) should be undertaken immediately and not at some unspecified date in the future. EL communities simply do not have the luxury of waiting until the courseware has been comprehensively designed before development and deployment, as potential informants may be too ill to participate or may no longer be alive.

On the micro level, potential informants may not have the time on a day-to-day basis to work extensively with a CALL practitioner. Even though informants may be paid for their work, they may still need time to do their

² This is not to imply that out-dated machines should be used.

other tasks during the day (e.g. work on the land or prepare food). This means that time management skills are particularly important and that sessions with informants should be carefully planned, potential problems foreseen and possible solutions prepared in advance so that the limited time available is used to the full.

Other participants may have their own time constraints. Many university participants may have limited "free time" in which to work with an EL community and may not necessarily be free when it is most opportune for the EL community members.

Lack of Informants

Mainstream CALL does not have to worry about lack of potential informants. However, this is a very limiting constraint in the EL context. It is impossible to develop CALL materials without information on the language. It is difficult (and perhaps unwise) to develop CALL materials without native speakers. In the EL context, there may not be many remaining speakers. Those that can speak the language may not want to be involved in a CALL project. Others may be quite ill or unable to speak clearly. Speakers may have forgotten some of the language due to lack of use. Others may not be competent or feel unsure of their ability in the language. Speakers will not be trained linguists and will not be able to describe the language linguistically

Lack of a Writing System

A further possible constraint may be the lack of a writing system. Many of the world's 6000+ languages do not have a writing system, as they are purely oral. Mainstream CALL may have to deal with spelling discrepancies, but it can assume that an agreed writing system exists for the (non-endangered) language in question. The development of a writing system is never a purely technical exercise and must be handled carefully. Mühlhäusler (2002) reports on the divisions that arose in the Norfolk Island speaking community due to the attempted introduction of a writing system.

Undocumented Language

One of the most basic potential constraints is that the language may never have been previously documented. While it is hard to develop CALL courseware for well-documented and understood languages such as English and French, it is much more difficult for undocumented languages. Some languages may have been partially documented and while this existing documentation can be a good starting point, sometimes it can cause confusion, especially if the quality and correctness of the content are not of a high standard. If the language has never have been previously documented, it is extremely difficult to develop language learning materials, let alone CALL materials for it.

Social Constraints

There may also be social constraints. Members of the EL community may place little value on their language and consider it "useless". They may fail to see the need or desirability of developing CALL courseware for it. Local politics may also come into play. Deciding who takes part in the project and which informants are used may be a difficult task. It is difficult for the non-speaker or novice to determine who is the most competent speaker, or who would be the most suitable speaker to work with. There may be rival factions within the community who would prefer "their" members to work on the project to the exclusion of people from other factions. Community members may perceive that the CALL practitioner is going to make a fortune out of the project (at their expense). While working with EL communities is not a lucrative area in which to work, from the point of view of the EL community members, it may seem to be so. It is important to understand the social impact of a CALL project on a community and to realise that there are internal (perhaps hidden) events and agendas operating in parallel.

Summary

In summary, the extra constraints that prevail in the EL situation are many. They include lack of financial resources, lack of time, lack of technical, pedagogical and project management expertise, lack of linguistic knowledge and resources, lack of a writing system or previous language documentation and, possibly, little understood local social and political factors.

5. Requirements

The constraints outlined above in Section 4 determine the extra requirements in EL CALL over and above those that prevail in mainstream CALL. Economic, social, technical and educational issues arise that must be taken into consideration when developing, producing and deploying CALL materials. As many EL communities live in poor economic conditions, the cost of developing CALL materials should be as low as possible to enable the development to take place at all. Furthermore, the community may not wish to use what limited funds may be

available to something that is potentially low-down on its list of priorities. Figure 3 lists the principal requirements of EL CALL. It outlines why they must be taken into consideration and their related constraints.

Lean Software

The tools used to develop CALL materials should be lean in terms of system requirements, as access to high-spec machines cannot be assumed. The tools should be easy to use and not have a steep learning curve. They should facilitate rapid prototyping so that all members of the development team can review that material early on in the development process to allow quick changes. Changes should be easy to make (to ensure that they are made) and be easily visible.

No Reinventing the Wheel

It should not be necessary to "reinvent the wheel" in CALL terms. Felix (1999) points out that for the world's Most Commonly Taught Languages, there is already a wealth of material available and CALL practitioners should concentrate on using what good resources are available rather than developing new resources from scratch. An EL community should be able to avail of previous CALL research and learn from the experience of others, even if, as is likely, there is no material currently available for their language. It is important to incorporate good practices from mainstream CALL into the EL CALL courseware. Just because EL communities have limited resources does not mean that they cannot avail of world class CALL knowledge. However, because of limited computing and pedagogical resources it is probably important to avoid "bleeding edge" technologies, both from the CALL domain and on the technology front. EL CALL does not have the luxury to learn from mistakes.

Requirement	Reason	Related Constraint
Development tools and products need to be lean in terms of system requirements	High spec. machines not available	Limited financial resources
Avoid "reinventing the wheel" in terms of CALL	Limited resources	Limited financial resources, lack of tech. knowledge and pedagogical skills
Speedy development/Rapid prototyping	Lack of understanding of CALL Informants may disappear	Time constraints, lack of informants, limited project mgt. skills
Reliable materials	Novice computer users	Limited tech. knowledge
Clear, easy to use materials	Minimise cognitive load of courseware	Limited tech. knowledge
Different modalities	Computer access may be limited	Limited financial resources
Informant feels comfortable with data collection	Anthropological considerations	Social issues
Ability to control access to data	Data may be considered sensitive	Social issues
Consider language documentation issue	Possible synergistic links	Undocumented language, lack of a writing system
Consider PR potential	May improve social prestige of EL	Social issues

Figure 3: EL CALL Requirements

Speedy Development and Rapid Prototyping

Speedy development is an important requirement in the EL CALL context. This is not to imply that EL CALL development should be faster than mainstream CALL; rather that the develop/test/deploy cycle should have more iterations than is perhaps the case in mainstream CALL. This requirement arises because the EL community may not have a full understanding of what CALL materials can and cannot do, so it is important to provide early prototypes of potential materials, both as an educational tool and as a starting point for future development. Also, it may be the case that there is limited knowledge within the community about the language. Thus, prototypes can be continually reviewed by the community so that errors or misunderstandings in terms of material content can be cleared up. The age and availability of informants also contributes to this requirement.

Easy-to-Use, Reliable Materials

It is imperative that the developed materials are reliable. Many EL community members will be novice computer users and an unreliable system will undermine their confidence in the computer and in the CALL courseware. The learners must be made to feel that they will not "break the system" and that they are free to use

the courseware as they wish. Furthermore, the user interface of developed materials should be clear and consistent. Novice computer users may have to learn many things in order to be able to use the courseware and it is essential to minimise the cognitive load associated with actually using the courseware.

Multiple Modalities

In mainstream CALL, the computer is the focus of material delivery. However, in the EL CALL context, it is important to provide the material in a variety of modalities. Therefore, communities that currently do not have access to computer can still avail of the material if it is provided in printed format. While one of the main aims of CALL should be to provide features that cannot exist in a printed format (Felix, 1999), EL CALL design needs to be able to produce a printed equivalent of the online materials. In addition, the electronic version should be available both via a website on the Internet (for those who may wish to access the courseware in an Internet café in a big town, for example) and a CD (for those who have access to a computer but do not have access to the Internet).

Ensure Informant Comfortable with Data Collection Process

In mainstream CALL, social and anthropological issues do not usually arise in the development, production and deployment of CALL courseware. However, in the EL situation, there are important social and anthropological dimensions that cannot be ignored. Often, the EL has low social prestige both within the EL community and in the wider community. People may feel ashamed to speak the language, afraid to admit that they speak it or consider it useless to speak it. The area of data collection must be carefully planned so that informants feel happy with the process and are comfortable with providing the source materials. This is not usually an issue in mainstream CALL. For example, when developing CALL materials for English or French, CALL practitioners can usually assume access to willing informants and even if these are not available, they have access to a wealth of already existing material on the language.

Anthropological and Ethical Issues

There are anthropological and ethical issues involved in EL CALL. For the worlds MCLTs, the issue of restricting who should or can learn the language does not arise. While there may be restrictions about use or manipulation of recorded speech, in general there are no taboos about recording and dissemination of people's voices. Furthermore, the concept of some parts of the language being kept a secret from learners does not exist.

However, in the EL context, some or all of these issues may arise. For example, some Native Americans do not want anyone that is not a member of the tribe or native community to learn their language. They feel that their language is part of who they are and only members of the community have a right to learn the language. Some Aboriginal people in Australia do not want recordings and images of people who have died to be stored and used after their death. Some language communities have "secret languages" that are only to be used in special circumstances or in sacred rites and do not wish them to be spoken outside of these situations or by those not entitled to do so. Obviously, these and other issues need to be discussed and addressed before the development of CALL materials. It is imperative that the EL community supports any EL CALL projects that are undertaken³, both for ethical reasons and pragmatic ones (i.e. if no one is willing to be an informant, it will not be possible to develop any materials).

Consider Language Documentation Issues

When CALL courseware is being designed, normally only the content is considered and not its wider context. However, in the EL situation, language documentation efforts (past, present and future) must be taken into consideration. Any CALL materials developed must aim to be compatible with any such efforts. Given the scarcity of resources, it would be unfortunate to develop CALL materials that cannot be integrated with, or contribute to, language documentation efforts in an EL community. Resources are too limited to be able to afford parallel, non-compatible projects. Indeed, the development of CALL courseware may be the seed for language documentation efforts.

Consider Public Relations Potential

Some EL communities may wish to restrict access to their language resources. However, other EL communities may view the development of CALL courseware as an opportunity for some positive public relations for their

³ It may be the case that not all members of the EL community support CALL projects, as each community may have members that do not support the idea. It is important that the community as a body agrees with the goals of any such project or at the very least, does not object to it.

language (and community). So, while mainstream CALL practitioners do not have to worry about the social impact of their work, practitioners in the EL context must take it into consideration. They must also bear in mind that EL community members may wish to use the CALL courseware for things outside the main area of language learning (e.g. positive publicity in the national press and television). The lack of social prestige is one of the main factors for the decline of a language and some communities may view the development of CALL courseware as a tool to counteract the normally negative portrayals of the language.

Summary

In short, tools in the EL CALL context must be lean, free or low-cost and facilitate rapid-prototyping. The developed courseware should be clear, consistent, reliable, easy to use and be available in multiple modalities. The social acceptability of developing and using CALL courseware should be discussed with the EL community in question. Furthermore, CALL practitioners in the EL context should be aware of the other potential uses of CALL courseware such as providing positive publicity for the EL community and a contribution to language documentation projects.

6. Rewards

Having reviewed the constraints and the requirements that they impose on the field of EL CALL, it may seem an overwhelming task to develop CALL courseware in this context. The next section presents a template that has been developed to enable the production of CALL materials for Endangered Languages and illustrates courseware that has been developed for the Nawat (Pipil)⁴ language of El Salvador using the template. This section outlines some of the rewards that can be obtained by developing CALL materials for Endangered Languages and these are shown in Figure 4.

Rewards
1. Provision of language learning material
2. Contribution to language documentation efforts
3. Improve social prestige for the EL
4. Other benefits
- cultural expression
- language policies
- foster community spirit

Figure 4: Some of the EL CALL Rewards

Provision of Language Learning Material

There are three main benefits that accrue from EL CALL. The first, and most obvious, is the provision of language learning material for the language. This means that there are resources available for teaching the language and provides some hope for language maintenance/revival efforts. This is not to imply that the existence of the materials alone will solve the problems of language disappearance, but it provides a foundation for language learning efforts (for the future, even if this is not an option in the present). For this reason, the multimodal requirement to provide a web-based, a CD-based and a printed version of the CALL material is important in the EL context, to ensure that even those communities that lack computing resources can available of the developed material.

Contribution to Language Documentation Efforts

The second benefit is the contribution an EL CALL project can make to language documentation efforts of the community. If there are currently no such projects underway, an EL CALL project can act as a catalyst for a language documentation project. If there are projects underway, the EL CALL project should be able to leverage the knowledge already gained by the project and it should strive to be compatible with the project (e.g. in terms of a writing system and the storage and encoding (e.g. XML⁵) of data if possible).

Social Benefits

The third benefit is a social one. Very often, an EL occupies a position of low social prestige in a community. An EL CALL project can raise the social profile of the language both within and outside the community.

⁴ Nawat is known as Pipil in the linguistics literature but the Pipil people themselves call the language Nawat (or Nahuat in Spanish).

⁵ XML - eXtensible Mark-up Language. It can be used to store data in a structured format (XML 1999, 2000).

Community members may be proud to see their language on a computer and it may help to dispel some of the notions about the language, especially among the younger members of the community that the language is "just for the old people" and "cannot be part of the modern world". For people outside the community, it can provide heretofore unknown information about the language (and also its community and culture) and present the language generally in a positive light. Indeed, people from the mainstream (i.e. non-EL) community, may be surprised to find that there are still speakers of the EL.

Other Benefits

There are other benefits to be gained by developing EL CALL materials. For example, it can provide a forum for cultural expression (Auld, 2002; see also Section 8). Craig (1992) reports that it can have a positive effect on government linguistic policies. If the CALL courseware includes discussion groups, notice boards and chat-rooms, these can provide further social benefits to the EL community (Buszard-Welscher, 2001; Ward, 2002b). It can also provide an opportunity for the nurturing of a symbiotic relationship between universities and their local EL communities (Ward, 2002a).

7. A Working Example

This section presents a generic software template and syllabus that has been developed to enable the production of CALL materials for Endangered Languages and illustrates specific courseware that has been developed for the Nawat (Pipil) language of El Salvador using the template. The template falls into the tutor category as defined by Levy (1997). The template does not claim to be a "silver bullet" for CALL in the EL context and it must be noted that CALL courseware developed specifically for a given language would produce better CALL courseware for that particular language (e.g. Auld, 2002). However, it provides a generic template for developing CALL materials, given the constraints that prevail in the EL situation. What follows is a brief description of the template, a more detailed explanation is available in Ward (2002e).

7.1 The Software Template and Syllabus

The template includes XML-based software (W3C, 2000; XML 2000, 2001; Pawson, 2001; XSL, 2001) for the creation of web-based, CD-based and printed language independent CALL materials as well as a suggested syllabus that can be modified as required. The template is designed to meet most of the requirements outlined in Section 5. It is lean (in terms of system requirements), it is free, it is robust and it aims to incorporate good CALL techniques. It was designed based on Hubbard's (1996) Methodological Framework. It is easy to use and facilitates rapid prototyping, with modifications immediately available at the touch of a button. It supports an incremental development of courseware and new lessons can be developed when the need arises. The Linguistic Data Consortium is investigating ways of establishing common database structures for linguistics databases (LEW, 2000; LEW 2001). XML technologies will form an important part of these designs. This will be important for current and future language documentation projects and the fact that the template uses XML technologies means that it will be compatible with such efforts. A further benefit of using XML technologies is that they are Unicode⁶ (2001) compatible. This means that any writing system that has been encoded in Unicode can use the template to develop CALL courseware. See Ward (2002c) for more information on the use of XML technologies in CALL. Xt⁷ (Clark, 1999) software used the XSL⁸ (XSL, 2001) files to convert the XML data files into the generated courseware. Figure 5 shows the overall system architecture. The shaded boxes are the inputs the courseware developer must supply to the system.

7.2 Nawat courseware

The template software and syllabus were used to develop CALL courseware for the Nawat language of El Salvador (Campbell, 1985; Ward, 2002d). Grimes (2002) reports that there are approximately 20 remaining speakers. Based on field trips to El Salvador, we estimate that there are slightly more, but still less than 100 speakers. The speakers are mainly elderly and live in poor economic circumstances. Nawat was banned and has had a tragic history. It has now been replaced by Spanish as the language of communication of the Pipil. Nawat shares many of the characteristics of ELs and is a good test case for the generic CALL template.

The CALL courseware contains 12 language lessons. Each lesson has three sections. Each section contains a conversation in both spoken and written formats, a translation, a vocabulary, an explanation and an interactive exercise. The interactive activities and exercises were developed using Hot Potatoes software (Holmes and Arneil, 1998, 2001; Hot Potatoes, 2001)). Part of the Hot Potatoes software was reverse engineered in order to separate the data from the processing engine (i.e. JavaScript code). The courseware also provides online help on

⁶ Unicode is the most widely accepted standard for representing characters from many of the world's languages.

⁷ Xt is a tool that can be used to convert XML data files into other file types, in this case into HTML files.

⁸ XSL - eXtensible Stylesheet Language. It is used to describe how to display an XML document.

how to use the courseware, language learning tips, grammar revision sections, notes on the alphabet, a dictionary and cultural information. Figure 5 shows an example section page. There are two versions of the courseware, one in Spanish (for the people in El Salvador) and one in English (for people interested in Nawat who do not speak Spanish). (Note that this is culturally acceptable for the Pipil people, but may not be the case for other EL communities).

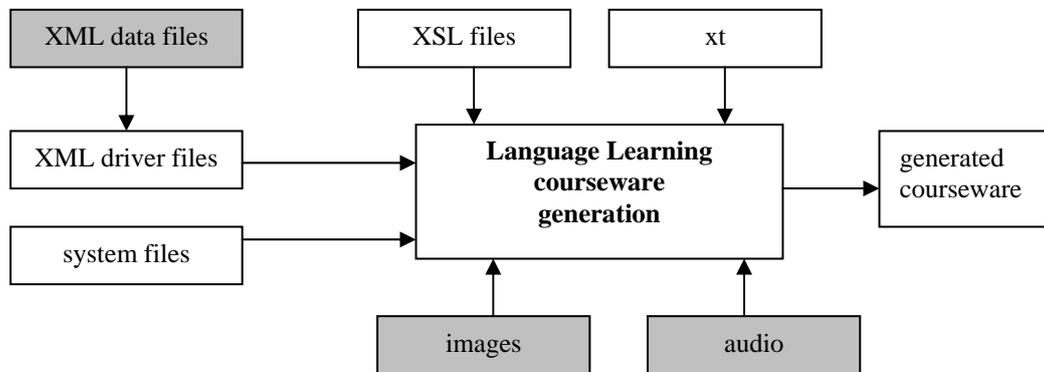


Figure 5: Overall system architecture

The User Interface is clear and consistent. There is a panel on the left-hand side of the screen that is available on all screens so that learners can always get back to "somewhere safe" if they feel that they are lost inside the system. Each section follows the same format so the cognitive load required to use the courseware is minimised. Different learning styles are catered for: audio learners may want to hear the conversation, some learners may prefer to read the text first, while other learners may prefer to see a translation first. Language learning tips (Oxford, 1990) are also provided.

The spoken conversation can be listened to in its entirety or line by line. Where possible, culturally appropriate images have been used in each lesson and culturally non-specific images have been used for the generic parts of the courseware. Most of these images come for the resources at the University of Victoria, Canada (UVIC, 2001). For example, Figure 6 shows a picture of a woman carrying a basket on her head and a man in a hat waving to her. In El Salvador, this would be a typical scene, as women are often carry large baskets on their head.

The courseware is available on the Internet, both at the Universidad de Don Bosco in El Salvador (UDB, 2001) and in Ireland (Ward, 2001), so that those without computer access can use the courseware in an Internet café or local school. It is also available on CD for those who have computer access but do not have Internet access. Crucially, the courseware is also available in printed format, so that people in the community can have access to the courseware even if they lack computer access. Right from the beginning, the courseware has been designed to support the printed format. Figure 7 shows an example section from the printed version of the courseware. The printed version of the courseware was generated from the same source files as the online version of the courseware. This is obviously very desirable as it ensures that changes made to the online version are made simultaneously to the printed version and that both versions are kept aligned.

8. CALL, Culture and Endangered Languages

Language and culture are inherently intertwined and obviously culture plays an important part in CALL courseware. The interaction between CALL, culture and ELs will be mentioned briefly here (see Auld (2002) for an interesting report on CALL and Ndjébbana, an Australian indigenous language). ELs are generally disadvantaged in most aspects of CALL. However, they may have a unique advantage when considering culture. While second and foreign language learners may be unfamiliar with the culture of the L2 community, EL learners, who come from the EL community, live in (almost) the same culture as the EL speakers. They can understand many of the cultural references in the CALL courseware and most of the materials and settings will be familiar to them. For example, learners from El Salvador will be familiar with the lifestyle portrayed in the Nawat courseware, as it is also *their* culture. There is no need to explain the cultural context of the courseware.

Even learners one or two generations removed from the EL community will have a greater understanding of the target culture than a learner from a different culture. They may still share some of the EL culture and may recall other aspects of the culture by recalling things their parents or grandparents said or did.

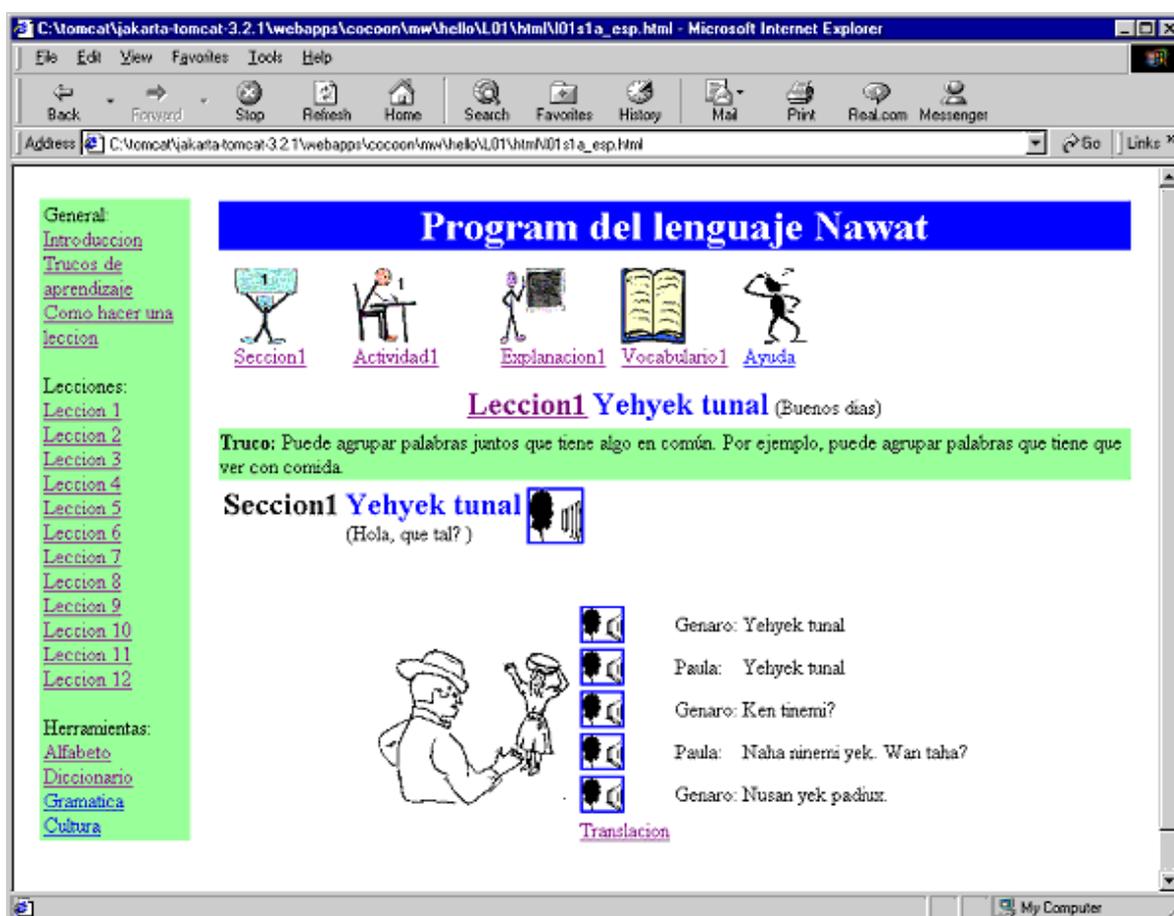


Figure 6: Section page from the Nawat courseware

One further observation on the theme of CALL, culture and ELs is the fact that the development of CALL materials provides a forum for the public and external presentation of cultural information. Communities can have a platform for publicising their songs and stories. Anecdotes and phrases that community members may have felt were not of much interest outside the community can be sources of useful information in the language learning context. Cultural items permeate the language used in CALL courseware, even if they are not explicitly identified. For example, in the Nawat courseware, most time references are in relation to the sun (rather than a specific time of day), there is little formality between speakers and various references to the family appear throughout the courseware. This reflects the way of life of the Pipil people, whose daily life revolves around the natural time determinants and who tend to live with or close to other family members.

9. Conclusion

CALL in the EL context faces many extra requirements and constraints. EL CALL requirements include requirements that might be classified as "nice-to-have" in the mainstream CALL context. These include the necessity of a lean, low-cost solution that does not involve reinventing the CALL wheel, that produces CALL courseware in multiple modalities and that is compatible with language documentation efforts. Likewise, some of the EL CALL constraints also occur in the mainstream CALL situation but to a lesser extent. The extra constraints include very limited financial resources, limited technical and project management skills, lack of speakers and potentially lack of documentation on the language and even a writing system. However, there are several potential rewards including a contribution to language documentation efforts and raising the social prestige of the language. While EL CALL is more challenging than mainstream CALL, it is possible to develop simple, yet effective CALL resources for ELs. A generic software template and syllabus have been developed

specifically for the production of CALL materials for ELs. The software has been used to develop CALL courseware for Nawat, an EL of El Salvador.

Lección 1 : yehyek tunal

Sección: 1 **yehyek tunal**
(Buen Día)

Genaro: yehyek tunal
Paula: yehyek tunal
Genaro: ken tinemi?
Paula: naha ninemi yek. wan taha?
Genaro: nusan yek padiux.



ken tinemi? ¿Qué tal?
"Ken" significa "cómo". Palabras para preguntas (por ejemplo cómo) normalmente vienen al inicio de la oración. "nemi" es como los verbos ser y estar. La parte para la persona que hace la acción se agrega al inicio del verbo. En este caso, se agrega "ti" (para "usted") a "nemi" que da "tinemi" (que significa "usted es/está").

naha ninemi yek. Estoy bien.
"ni" es la parte para "yo", y entonces "ninemi" significa "yo soy" o "yo estoy". Se puede omitir el "naha" (yo) porque "ninemi" ya tiene la parte de "yo". "yek" significa "bien".

Figure 7: Sample page from the printed version of the courseware

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