

# Is the Web being Used to Speak our Language?

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## He Āria

Ko te reo Māori kei runga i te ipurangi, me kī kei runga i te Tukatuku Ao Whānui, te kaupapa o tēnei tuhinga. Kātahi anō kia oti te āta tiroiro haere i ngā tūrangā ipurangi e kōrero ana i te reo Māori. Nō reira, ka whāki mai aua tatauranga o nāianei, me kī o te tau 2002, me ngā tatauranga hoki i kite atu i te tau 1998. Ka kōrerotia ngā painga, ngā pēhitanga me ngā whakatauranga mō te oranga o ngā reo tangata whenua i te ao ipurangi nei.

This paper presents results from extensive surveys of the usage of Māori language on the World Wide Web (WWW, Web) conducted in 1998 and 2002. Issues both supportive and detrimental relating to the use and publication of indigenous languages in the WWW will be highlighted. Specifically: how is the WWW being used to articulate the Māori language?

Two ‘snapshots’ of Web sites that used the Māori language were taken in January 1998 and November 2002 and the extent to which the sites utilise Māori is analysed. The results are what is naturally occurring; i.e., none of the Web pages have been built or altered with the surveys in mind. The results serve as an example of how an indigenous language can fare in the World Wide Web environment.

## The 1998 Māori Language Web Survey

The 1998 Māori Language Web Survey began in December 1997 and was completed in January 1998. It was the first survey to look at the amount of Māori language material on the Web.

Three strategies were used to find Māori language Web sites. The first was to list sites that were already known to the researcher — about a quarter of the sites that were eventually found.

The second strategy was to follow the links of those sites and also the links of sites that specifically listed Māori Web sites. For example, links were followed on the *Internet Guide*, *Ngā Matatiki Rorohiko*, *Aranui*, and *Māori Organisations in New Zealand* (these were all Web sites with lists of links to other Web sites of relevance to Māori). These links provided approximately half of the sites found.

The third strategy was to enter Māori terms into WWW search engines to see if they would reveal sites that had not previously been discovered. This accounted for the remaining quarter of the results. The search engines chosen were ones that were current at the time and included *Yahoo*, *Lycos*, *InfoSeek*, *Excite* and *Magellan*. The terms searched for were various combinations of: *Maori*, *reo*, *rangatiratanga*, *whanau*, *tangata*, and *tamariki*. These terms were chosen because they are common terms in Māori language but rare in other languages.

It was decided that Web pages relevant to this study had to be pages that had a significant amount of Māori language material. Hence pages that were found that had a small greeting in Māori, or a single proverb, phrase, song, or incantation in Māori were not considered to be significant enough to be included in this survey. The Māori material did not have to be text based, one site although presenting text in English, did make available 14 video clips that were in Māori.

It is possible that these three strategies did not detect all of the Māori language Web sites.

## 1998 Survey Results

In January 1998 there were 41 Web sites found, these 41 sites contained a total of 304 pages of Māori language content. The Web sites have been grouped by the amount of Māori language used on the Web site, or *levels of usage* as in Table 1. Of the total Web sites found 39% (16 sites) representing 68% (206) of the Web pages with Maori language content were written completely in Māori. There was a further 34% (14) sites representing 29% (87) of the Web pages where the majority of the information was in Māori. Although the remaining Web sites and Web pages had minimal to no texts that were available in Māori they still had enough Māori language resources to warrant inclusion in the survey.

Level	Description	Web sites	Web pages
I	Web site is completely in Māori	16	206
II	majority of information provided in Māori	14	87
III	minimal information in Māori	10	10
IV	no Māori texts but multimedia Māori language material available	1	1
		41	304

*Table 1: Level of Usage of Māori Language on Web sites 1998*

## Purpose of sites

The 41 sites were made available by 38 different organisations or individuals. The sites could be grouped into 12 different purposes (Table 2).

Purpose	Explanation	Web sites	Web pages
Māori Language	Web sites providing information about Māori language, including word lists, dictionaries and references	8	52
Personal	Personal information provided on home pages	8	18
Historic	Web sites providing historic information and/or historic texts	6	125
Health & Development	Web sites providing information about Māori health and Māori development	4	17
General Māori	Web sites providing general Māori information incl. sites listing WWW links to Māori information	3	26
Songs &/or Videos	Web sites providing songs/videos in Māori or text in Māori about songs/videos	3	19
Religion	Web sites providing religious information	3	4
Media	Web sites providing information about or for media sources, e.g. television, radio, newspapers	2	12
Nature	Web sites providing information about nature	1	20
Education & Resources	Web sites providing information about education and/or supplying educational resources	1	8
Tertiary	Tertiary Web sites	1	2
Financial	Web sites providing financial information	1	1
12 purposes		41	304

*Table 2: Purposes of Web sites in Māori - 1998*

Table 2 shows there were three predominant purposes for creating Web sites in the Māori language. The first was to provide information about the Māori language (19.5% of sites, 17.1% of pages), the second purpose was personal home pages (19.5% of sites, 5.9% of pages) and the third purpose was to

make available historic information or historic texts (14.6% of sites, 41.1% of pages). There were a further nine purposes identified which accounted for the remaining 46.3% of Web sites and the remaining 36.6% of Web pages.

### Navigation in Māori

Of the 41 Web sites found only 17% (7) offered the ability to navigate or follow links in the medium of Māori—that is, that Māori labels appear on hyperlinks or buttons that link to pages in Māori. The purpose of these sites were educational, personal, historic, general and health as can be seen in Table 3. While the percentage of Web sites navigating in Māori was low, the percentage of Web pages was reasonably high, 187 representing 62% of the total Web pages

Purpose	Web Sites	Web Pages
Education and Resources	2	17
Personal Web sites	2	13
Historic	1	121
General Māori	1	27
Health and Development	1	9
	7	187

Table 3: Māori Web Page Navigation in 1998

### Orthography

Sites were analysed for the manner that the lengthened vowel in the Māori language was represented. 73% of the Web sites and 38% of the Web pages did not signify the lengthening vowel. Two methods for representing the lengthened vowel were found. The first was to use a double vowel and this represented 5% of the Web sites and 7% of the Web pages. The second was to either use the umlaut character code with a font specialised to display a macron character instead of the umlaut character, or to use the true macron character with a Unicode UTF8 compliant font. The second method represented 22% of the Web sites and 55% of the Web pages.

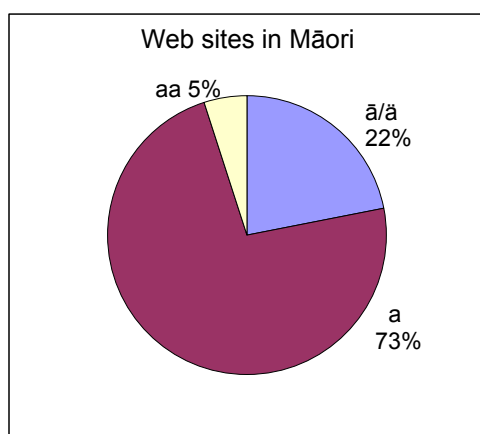


Figure 1: Web Site Orthography 1998

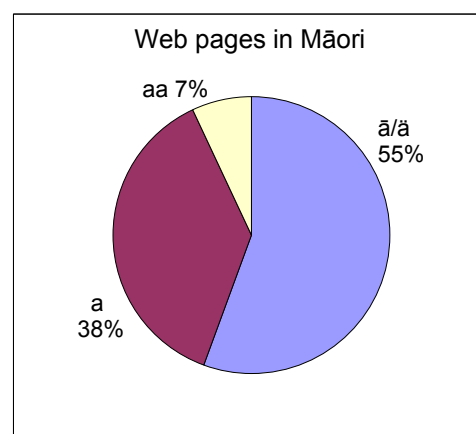


Figure 2: Web Page Orthography 1998

There appears to be a correlation between the number of pages in a site and the method used to represent the lengthened vowel. Personal Web pages did not show any usage of a macron character and the use of the double vowel in this environment was not very common. Unfortunately no data was collected as to which sites were using the umlaut character with specialised fonts and which sites were using the macron character with Unicode fonts.

Only a small number of sites were available over the Internet at the time of the 1998 survey. The Web pages that were available in Māori were mostly created by the New Zealand government and the majority of them were translations into Māori of pages that were available in English.

There were many Māori tertiary and Māori secondary providers that had a presence on the WWW but none were written in Māori. Organisations such as Te Taura Whiri i Te Reo Māori and the Kōhanga Reo National Trust did not have Web sites. There were some great Māori tribal sites out there for tribes such as Tainui, Te Arawa and Ngai Tahu, but again there was nō use of the Māori language.

## The 2002 Māori Language Web Survey

In 2002, 4½ years after the initial survey was undertaken, another survey was conducted. The 1998 survey took just over a month, the 2002 survey continued for over 3 months. The second survey took longer as more sites were found. These results were current for November 2002.

A similar methodology to the first survey was utilised. Web sites supporting Māori language were found, then analysed to see if they met the requirements to be included in the survey. These sites were then analysed for Māori language content, purpose, navigation in Māori and orthography. However, due to the higher volume and greater variety of Māori Web pages it was decided to record some further characteristics. These included an extra rating in the level of Māori language support, the provider of the site, whether the sites had obtained funding from the Ministry of Education (MoE), the language of the Universal Resource Locator (URL), the distinction between the umlaut and macron character, and the availability of sound files.

### 2002 Survey Results

Sites known to the researcher were examined. These included the sites from the previous survey that still existed, and extended through to sites that the researcher had become aware about since 1998.

The next step was to follow sites' link pages in the hope of discovering previously unknown sites that were written in Māori. Particularly useful here were the following sites; *TKI, from Hawaiki to Hawaiki, Mark Laws, the Māori Internet Society, Te Roopu Whakahau, The National Library, and Pipers* (URLs are listed at the end of this article).

Finally a search for Māori terms using search engines was undertaken. Having spent significant time on the previous two steps the researcher was confident that most Māori language sites had been discovered. This was not however the case and further significant sites were discovered through the use of Web search engines. The engines used were: *Google, AlltheWeb, Altavista, Hotbot, Yahoo, SearchNZ, AccessNZ, Anzwers, and Metacrawler*. It was discovered that searching by single terms would yield too many irrelevant results (for example, searching using the term *Maori* returns hundreds of thousands of Web pages, the vast majority of which are not in the Māori language). Consequently three strings of terms were used: *reo pukapuka iwi, wawata rangatira mahi* and *mahi kupu ake*. These terms were chosen because they are common terms in the Māori language, are reasonably uncommon in other languages and do not require a macron character.

Its interesting to note that most search engines had a facility to search for documents in a particular language, for example search for a document in English, or in French or in German. However no search engines offered the ability to search for documents in the Māori language. The technology appears to be available but perhaps the user base on an international scale doesn't warrant the development costs of such a facility.

As in the 1998 survey Web sites that simply included brief Māori language phrases were discarded as this survey focused on identifying Web sites that provided significant usage of Māori. Refer to the 1998 survey for criteria for inclusion.

In November 2002 there were 100 Web sites and 30,346 Web pages found on the Web that had significant Māori language content. When examining the amount of Māori language on the Web site, the sites were characterised into five levels of Māori language usage, as shown in Table 5. There were

24% (24) of the total Web sites representing 83% (25,232) of the Web pages with Māori language content written completely in Māori. There was a further 20% (20) sites representing 3% (802) of the Web pages where 75% or more of the information was in Māori. There was 19% (19) sites representing less than 1% (204) of the Web pages where 25–75% of the information was in Māori. There was 23% (23) sites representing 14% (802) of the Web pages where 25% or less of the information was in Māori.

Usage	Description	Web sites	Web pages
I	Web site is completely in Māori	24	25,232
II	more than 75% of information in Māori	20	802
III	25%–75% information provided in Māori	19	204
IV	less than 25% of information in Māori	23	4107
V	no Māori text on site but multimedia Māori language material available for download	14	1
		100	30,346

*Table 5: Māori Language Usage 2002*

There were 14 Web sites that did not use the Māori language in the text of the Web site but still provided resources in the Māori language that could be downloaded. These downloadable resources included documents that had been written in Māori, Māori dictionaries, sound files/tapes in Māori, and video files in Māori.

### **Purpose of the sites**

The 2002 survey highlighted a new leading purpose that of education: Web sites providing information about education and/or supplying educational resources (26.0% of sites, 16.3% of pages). The second purpose was to provide information about the Māori language (12.0% of sites, 6.5% of pages) followed by the third purpose of making available historic information or historic texts (8.0% of sites, 61.8% of pages). There were also 8 school Web sites found with pages written in Māori (8.0% of sites, 0.1% of pages). Perhaps the emergence and increasing presence of the education sector in Māori language Web sites is a reflection of the changing political attitudes in New Zealand towards the place of Māori language in education. There were a further eleven purposes identified covering a wide range of topics and accounting for the remaining 46% of Web sites and the remaining 15.3% of Web pages.

Purpose	Explanation	Web sites	Web pages
Education & Resources	Web sites providing information about education and/or supplying educational resources	26	4962
Māori Language	Web sites providing information about Māori language, including word lists, dictionaries and references	12	1984
Historic	Web sites providing historic information / historic texts	8	18742
Schools	School Web sites	8	53
Religion	Web sites providing religious information	7	4051
Health and Development	Web sites providing information about Māori health and Māori development	7	77
General Māori	Web sites providing general Māori information incl. sites listing WWW links to Māori information	6	79
Media	Media Web sites	6	27
Library	Library Web sites	5	238
Law	Web sites providing information relating to the Law	4	10
Nature	Web sites providing information about nature	3	81
Personal	Personal Information provided on home pages	3	16
Songs & Video	Web sites providing songs/videos in Māori or text in	2	18

Purpose	Explanation	Web sites	Web pages
	Māori about songs/video		
Computing	Web sites providing information about computing	2	6
Tertiary	Tertiary Web sites	1	2
15 purposes		100	30346

*Table 6: Purpose of Māori Language Web sites 2002*

### Provider of the sites

The New Zealand central government (particularly the Ministry of Education, Te Puni Kōkiri and the National Library) is the entity that has created the largest number of Web sites in Māori (28% of sites, 21% of pages). Tertiary institutes have created the largest number of Web pages in the Māori language (9% of sites, 63% of pages) however the number is somewhat misleading, as this figure includes two large document collections, served at two different universities, that total 18,940 pages. The amount of Māori language content offered by International Organisations is similarly skewed (7% of sites, 13% of pages) as 4046 of these pages are derived from three sites where the full text of the Bible is available.

Organisation	Web sites	Web pages
Central Government	28	6335
Tertiary Institutions	9	18970
Education Initiatives	8	94
Schools (all levels)	8	53
International Organisations	7	4050
Commercial Organisations	6	152
Individuals	6	35
Local Government	4	190
Māori Org.s/Interest Groups	4	69
Tribal Groups	3	70
Media	3	27

*Table 7: Entities Responsible for Māori Language Web sites 2002*

Before the survey was undertaken it was expected that the Ministry of Education would be responsible for funding a large percentage of the Web sites in the Māori language due to its commitment to supporting Māori medium education. Ministry of Education funded pages totalled 78%, with the tertiary collections accounting for a significant proportion (Figure 3). It was however quite surprising to note that the actual percentage of Web sites supported by the MoE was as low as 21% (Figure 4).

The results look quite promising for Māori language for two reasons. Firstly, it shows there is not a reliance on MoE funding to produce Web sites in Māori. Secondly, when major collection Web sites containing Māori language material are being placed on-line, the MoE is prepared to support them.

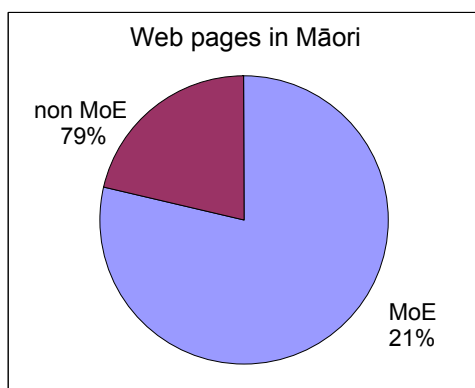


Figure 3: MoE funded Pages 2002

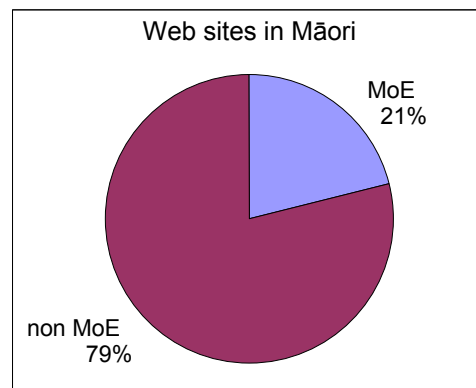


Figure 4: MoE funded Sites 2002

### Navigation in Māori

There were 42 Māori language Web sites in 2002 that offered the ability to navigate or follow links in the medium of Māori—that is, that Māori labels appear on hyperlinks or buttons that link to pages in Māori. This represented less than half of the Web sites (42%). However, in terms of actual Web pages this represented 86% of the total pages found.

Purpose	Sites	Pages
Education/Educ. Resources	19	6876
Historic Information	7	18633
Library	5	238
Māori Language	4	40
General Māori Information	2	90
Health, Services, & Develop.	2	59
Schools	2	11
Media	1	13
8	42	25960

Table 8: Māori used in Navigation in 2002

The number of Web sites that wrote URL's in the Māori language was also noted in 2002. Apart from the Education/Educational Resources purpose it appears that providers of the Māori language Web sites did not consider it important to create URLs that were written in Māori. Only 24% of Web sites and 23% of Web pages had URLs that were written in Māori (Table 9).

Purpose	Sites	Pages
Education/Educ. Resources	15	6831
Schools	2	11
Māori Language	2	10
Media	2	8
Historic Information	1	58
Health, Services, & Develop	1	47
General Māori Information	1	8
7	24	6973

Table 9: URLs written in Māori 2002

## Orthography

The 2002 survey also analysed sites for the manner that the lengthening vowel was represented. 54% of the sites and 30% of the pages did not signify the lengthened vowel. The double vowel method was seen on 1% of the sites and less than 1% of the pages. The 2002 analysis separated the umlaut character with specialised fonts method and the macron character with Unicode fonts method into distinct categories. The umlaut symbol was noted on 24% of the Web sites and 8% of the Web pages and the macron symbol was noted on 21% of the Web sites and 62% of the Web pages.

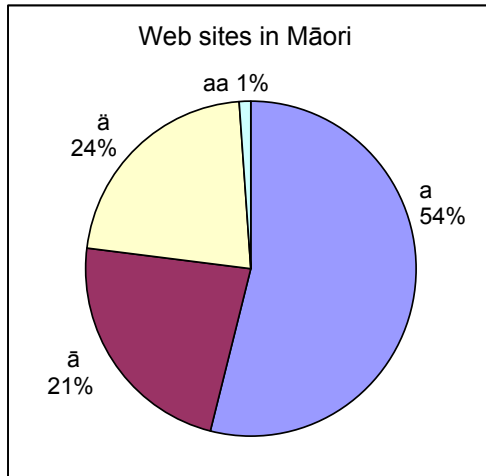


Figure 5: Web Site Orthography 2002

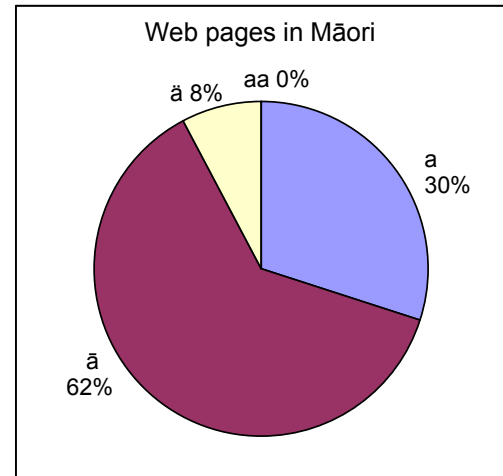


Figure 6: Web Page Orthography 2002

Many of the older sites used older methods to generate (or bypass) the lengthened vowel character (i.e. no representation at all of the macron character, or an umlaut symbol with specialised fonts), whereas newer sites tended to use the macron character and a Unicode font. Te Puni Kōkiri produced a report titled *The Macronisation of Web Content* (Ryniker, 2000). The report recommends full compliance with the Unicode Character Set UTF8 (also defined by the ISO Standard ISO-10646) to represent the macron character. In recognition that operating systems and application software are not completely compliant with the UTF8 character set, the report suggests using 7 bit ASCII with numeric character references to define characters outside of the standard character set. Te Puni Kōkiri then proceeded to use its recommendations to good effect on its own Web site. Web sites created by the National Library are an excellent example of how correct Māori language orthography can be displayed.

It was disappointing to note that when the 2002 survey was conducted that the Ministry of Education's bilingual portal, Te Kete Ipurangi, was not offering any solution for displaying the macron character. However this has since been rectified with a unique cookie solution which gives the user the ability to define the type of orthography most suitable for the user's computer.

The 2002 survey found a large number of sound files of oral Māori were available, 704, from a wide variety of sites. Almost all of the files were recorded from native speakers. As revitalization efforts stress the importance of mastering the oral language, the ability to hear it over the Internet is particularly important.

By 2002 there were a number of facilities that allowed site users to communicate with others in the Māori language—these were not available in 1998 (although they were available early in the decade through bulletin board systems like Te Wahapū, see Benton 1996). Some Web sites offer the ability to give feedback to site maintainers by email in the Māori language, one site offered the ability to send greeting cards in Māori (see the National Library Web site) and another site had two bulletin boards that only use Māori language (see Aotearoalive Web site).

A third positive finding was the inclusion of attractive Māori graphics in many of the Web sites. It appears that as Māori presence and Māori language increases on the Web so does Māori imagery.



Māori language is not the predominant language in New Zealand. This was often apparent in many of the Web sites. Many of the Web sites were bilingual, in English and Māori, and often the Māori content was not as extensive as the English content. Another disappointing characteristic noted was that when hyper-linking through the Māori version of a bilingual Web site the reader is often transported into the English version of the site. This even occurred in instances when the Māori language version of Web page actually existed.

A lot of sites were very close to 100% Māori language but there was invariably a word, a phrase, a button, or a copyright notice somewhere that was in English.

There is not a standard orthography used on the Web sites to display the lengthened vowel (Figure 1,2, 5, & 6). This diversity is problematic for users, who may not be able to display special characters, or who will experience difficulty in searching for words containing lengthened vowels—for example, should the searcher type Maori, Maaori, Māori, or Māori? With some search engines, it will not matter so much as accented and unaccented characters are treated the same, but double vowels will still often not be picked up automatically, even in a *sounds like* search.

Funding is an issue for the development of Māori language content. Some sites stated that they would prefer to be able to translate more Māori language texts for the Web but were prevented from doing so by funding constraints.

There appears to be a lack of support from entities that perhaps should be giving more support for the use of Māori on the Internet. Surprisingly, many entities that are concerned with Māori Medium Education have little or no presence on the Web. All tertiary institutes and many schools that teach Māori language have Web sites, but these Web sites have few Web pages that are in the Māori language. Many Web sites about Māori art and Māori media are exclusively in the English language.

But perhaps the most disappointing of all is the level of support for Māori language content by Māori tribal groups. In two listings of tribal links, the first has one Web page (out of 50) that has significant Māori language content (see Kotahi Mano Kāiika), the second has two (out of 66) that have significant Māori language content (see Pipers NZ Pages).

## Comparisons between the 1998 and 2002 surveys

As one survey was completed in January 1998 and the other in November 2002 comparisons are able to be drawn about the presence of the Māori language on the Web over a four and a half year time period. The raw results showed that in the four year time period the number of Web pages had increased 100 fold (from 300 to 30,000) but the number of Web sites using the Māori language had little more than doubled (from 41 to 100).

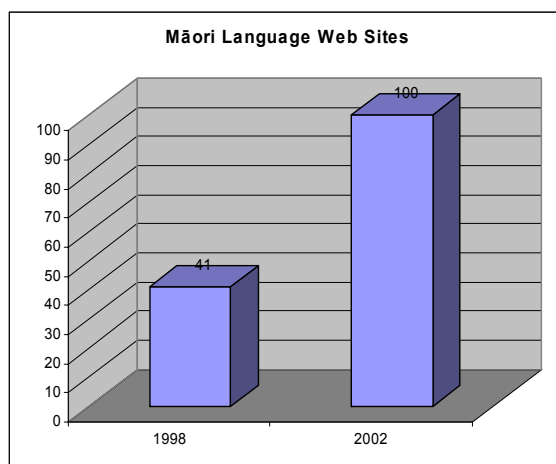


Figure 5: Web Sites 1998 vs. 2002

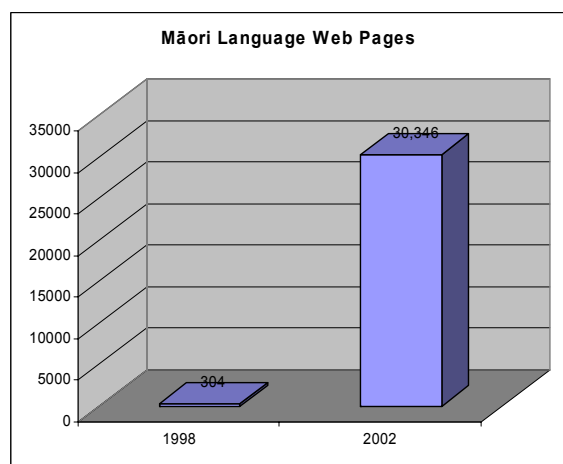


Figure 6: Web Pages 1998 vs. 2002

The large ratio of pages per site can be explained by some sites deciding to provide some large collections of Māori language texts over the Web. Of the total number Web pages found in the 2002 survey, 92% of the Web pages came from 7% of the Web sites [26998/30346] these consisted of a Newspaper collection (~17,000 Web pages), a Ministry of Education resource collection (~4,000 Web pages), a collection on Māori publications (~1950 Web pages), a collection of historic information (~1000 Web pages) and three Māori bibles (each of ~1350 Web pages).

The four year time period has seen the emergence of education as the main purpose for Māori language Web sites, accounting for more than a quarter of all of the Web sites. This may reflect the current political environment in New Zealand and the initiatives being undertaken for Māori language. Historic information and personal interest in Māori language were, and still are, significant reasons for creating Māori language Web sites.

One in six of all Māori language Web sites in the 1998 survey were provided by the New Zealand government. Four and a half years later central and local government were responsible for one in three sites; the National Library, a major provider of Māori language Web materials, is included in this grouping. Considering that the Ministry of Education is responsible for 78% of all the Web pages we can see that the New Zealand government is becoming more supportive of Māori language Web sites.

Coupled with this is the rise in support from education providers. In 2002 tertiary providers, education initiatives and schools together account for 1 in 4 of all Web sites, where in 1998 this was one in 13. Since this is where some of the large Māori language collections are located, this grouping accounts for 63% of the total Web pages.

It was disappointing to note in 1998, that apart from some personal Web sites, Māori tribes and Māori organisations were not providing any Web material in Māori. The 2002 survey found 3 tribal groups and 4 Māori organisations/interest groups that were prepared to make information available in Māori, this increased from 0 to 7% in terms of Web sites and from 0 to 0.4% in terms of Web pages. This is not a significant increase.

Navigation throughout the site in Māori had increased significantly from the 1998 to 2002 survey. In 1998 only seven of the 41 sites (17%) supported Māori language navigation while in 2002 this had increased to 42 of the total 100 sites (42%). In general the larger the site (in terms of Māori language Web pages) the higher the chances were that the site could be navigated completely in Māori.

The increased use of Māori in navigation throughout a Web site could be due to two things. As Web literacy increases over time, and creators of Web sites become more skilled, then it follows that it must be easier for them to create more Māori language pathways, including buttons and hyperlinks in Māori. Also, with larger Web sites there is more funding and time allocated to the Māori language component and consequently more likelihood that matters such as navigation in Māori are likely to be addressed.

Obviously the easiest way to overcome the orthography problem of trying to display the macron character is to either ignore it or put it into the too hard category and thus simply display the long vowels as standard (or non-macronised) vowels. 73% of Web sites took this approach in 1998, however by 2004 this percentage had decreased to 54%. The double vowel method also decreased from 5% of Web sites to the lowly 1%, represented by an old set of Web pages that survived until November 2002 (and these pages have since been removed).

Consequently there has been an increase in the usage of either the macron symbol or the umlaut symbol with specialised fonts. It seems that the larger the site the more likelihood that the site will be committed to finding a correct solution. The usage of the macron symbol has increased and as later operating systems and application software finds it easier to implement standard Unicode characters, the macron is likely to become the preferred orthography with Web sites written in Māori.

Although there was a significant amount of Māori language text available on the Web, some 30,000 plus Web pages, this is mostly due to a few significant collections being placed on-line. The increase in Māori language Web sites from 41 to 100 in a four and a half year period is not a large increase in terms of Web growth.

It was disappointing to note that most of the new sites were still a translation of an English site and the reader, while reading the Māori language pages, was often transferred to the English version of the site. Perhaps this is a consequence of the Government being primarily English based and also the main contributor of Māori language Web sites.

What is encouraging though is to see that sites are more committed to providing more resources available in Māori, e.g. the ability to be interactive in Māori, the large increase in sound files, the high quality graphics and the increased amount of Web sites that allow navigation in Māori.

It is still disappointing to note that Māori tribal groups, Māori organisations, Māori education authorities and even education entities that teach Māori language are still not creating Māori language Web sites.

## Summary

In the last five years the proportion of non-English speaking people using the Web has increased from 38.5% at the end of 1997 to 64.8% in March 2003 (see Global Reach Web site). Clearly the Internet is a medium with the potential to empower indigenous language usage.

The surveys described in this paper have shown that there is a significant amount of Māori language material currently available over the Web. Although the rate of increase in Māori language Web sites is not large the number of Web pages and consequently the amount of Māori language texts has increased substantially.

The New Zealand government, through its various agencies including the Ministry of Education and the National Library, has been responsible for creating and/or financially supporting more than three quarters of Māori language Web pages. This seems a little surprising considering the suppressive history of the colonial government but perhaps is reflective of the changing attitudes towards Māori language and perhaps credit should also be given to the determination and fortitude of Māori staff and civil servants who work in these departments.

However it shouldn't be the case that the New Zealand government is accorded the role of principal caretaker of the Māori language in the Web environment. Māori tribal groups and Māori authorities must begin to take responsibility when placing information on line that the Māori language receives the recognition and presence that it deserves.

At the beginning of this paper the question was asked: is the Web being used to articulate the Māori language? The two surveys have shown that a substantial number of Māori language texts have been and continue to be placed on-line. Further there has been an increase in the amount of sound files available on-line. Consequently the question can be partially answered by saying that the Web is being used to make the Māori language available.

Further investigation needs to be undertaken to determine whether the Māori language resources and texts that are being made available are in fact being used. The next logical step is to log and analyse user interactions with Māori language Web sites.

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## References:

Web sites as mentioned in text:

Te Kete Ipurangi – The Online Learning Centre  
of the Ministry of Education [www.tki.org.nz](http://www.tki.org.nz)

From Hawaiki to Hawaiki, Web site  
by Ross Himona [www.maaori.com](http://www.maaori.com)

Mark Laws Personal Web site [www.kel.otago.ac.nz/maaka](http://www.kel.otago.ac.nz/maaka)

Māori Internet Society	<a href="http://www.nzmis.org.nz">www.nzmis.org.nz</a>
Te Roopu Whakahau	<a href="http://www.trw.org.nz">www.trw.org.nz</a>
National Library of NZ	<a href="http://www.natlib.govt.nz">www.natlib.govt.nz</a>
Pipers NZ Pages; NZ Māori Web sites	<a href="http://www.piperpat.co.nz/nz/maori">www.piperpat.co.nz/nz/maori</a>
Aotearoa Live	<a href="http://www.aotearoalive.com">www.aotearoalive.com</a>
Kotahi Mano Kāika	<a href="http://www.kotahimanokaika.com/maori/links-m.html">www.kotahimanokaika.com/maori/links-m.html</a>
Pipers NZ Pages; NZ Māori Iwi and Marae	<a href="http://www.piperpat.co.nz/nz/maori/whanau.html">www.piperpat.co.nz/nz/maori/whanau.html</a>
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