Towards Online Local Government Elections

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Abstract
Local governments around the world are already providing services to the public through the Internet. These range from rate information to payment of traffic fines and tourism promotion. Overall, the provision of online services is collectively referred to as ‘e-local government’. The purpose of e-local government initiatives is to increase the availability of government to its citizens, provide better services and enhance participation in local democracy. The last of these categories, increasing participation in local democracy through e-government, is the domain of online elections.

The primary goal of this study was to determine the current progress towards online local elections in New Zealand. We developed and used automated content categorisation software to analyse local government body web sites. The results of our content analysis over 78 local government bodies were then compared with other research in the area and local government online election strategy. Our findings showed that over a quarter of local government bodies do not provide any election-related information through their web site.

The remainder of the sites offer varying levels of election-related content quality in four main categories – general election information, candidate nomination information, voter registration and election results. We discovered that to date none of the New Zealand local councils offer online voting services and on average, local government web sites offer a low quality of election-related content. A number of “best-of-breed” sites that could serve as an example for local councils wishing to improve upon the quality of their offerings are identified and described.

Keywords: Local Government, Electronic Elections, e-Government.

This work was undertaken as study towards a BCom (Hons) in Information Systems at the University of Auckland – for a full version refer to Dunayev (2005).

1 Introduction

The motivation for this work lies in the rapid expansion of online access to government functions through the Internet. Worldwide Governments are investing in initiatives to open access to information, resources, communication and services via channels typically used for electronic commerce.

Government agencies are usually the leaders in communication technology commonly developed primarily for military use and later adopted by the general public – including the Internet. Since its inception the Internet has gained widespread usage, prompting governments to increasingly begin providing online services to the public. The broad category for this type of information and services provision is called “e-government”; it is the general description of a way to provide better access to government information and services. According to the New Zealand e-government strategy (Clifford, 2003) the Internet will be used to improve the quality of the services and provide greater opportunities to participate in the democratic process for the citizens.

E-government is now emerging as a viable method of offering a good number of government services – from local to global. On a central level governments now provide services such as immigration, social services, income protection and student loan applications through the Internet. Locally, city and regional authorities can arrange rubbish collection and traffic fines payment, amongst other things, online.

One of the services necessary to maintain this interaction still has a stigma of being “not quite ready” for the Internet – online elections. Because elections govern the process of appointing government officials, they are an essential part of a democratic government.

Compared with the larger central governments, the local government segment has a better opportunity to innovate in the elections field. The process of online elections is however very similar between the two types of government – both require the same basic steps of registering, voting, counting votes and presenting the election results. In local online elections there is higher potential for technical and political innovation and a realistic possibility that technology developed for it could later be used for the large-scale central government elections.

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In this study we focus on the information and the services provided via the Internet in regards to elections by the local government bodies in New Zealand. We present an analysis of the e-government strategy and compare current developments with the goals of e-local government deployment in New Zealand.

1.1 Study scope

This paper evaluates election information provided by local councils and compares the features and quality of their implementation to other research in the area. We will also compare them with the guidelines established by the central government in the e-government strategy. Our objective is to compare the current status of online elections presence in local government bodies with both the expectations laid out by the government and other research findings.

2 Background

2.1 E-government initiatives

Mahoney (2002) identified the goals of e-government as improving customer service, internal efficiency and citizen engagement. E-government initiatives are gaining momentum worldwide; they are seen as an innovation tool of governments across the developed world (Ronaghan, 2002). Similarly to other innovation drivers, there is an inherent risk in e-government implementations (Aichholzer, 2004) that is most commonly addressed in strategic planning of the initiatives.

Ronaghan (2002) identifies five stages of e-government development and implementation – the emerging, the enhanced, the interactive, the transactional and the seamless. A United Nations study was conducted in 2001 across 190 UN member states to assess their progress. The results of this study are shown in Figure 2-1:

![Figure 2-1: E-Government stages of implementation worldwide (Source: UN Study, 2001)](image)

Emerging nations have limited e-government capacity; if it is present, it is likely to focus on mostly static Internet sites with infrequently updated information.

The majority of countries have reached the enhanced stage, with more up-to-date government information available on the Internet and links to other diverse sites that assist some form of government service.

A slightly smaller, but similar percentage of countries are at the interactive stage. These allow a greater level of sophistication in interaction and have abilities to process forms and applications online as well as access specialised information.

The current leaders in e-government initiatives have achieved the transactional stage, where complex transactions (such as passport and visa applications) can be processed through the Internet. Other online services range from payment of parking fines to complex taxation calculations and payments.

The UN study found no countries to yet be at the most advanced, seamless, stage of e-government adoption at which full integration of e-services across administrative boundaries becomes possible (Szeremeta, 2002). The seamless stage of e-government, amongst other services, includes the online voting system. From the time of the UN study this trend has continued and to date no central government has yet announced their readiness to provide complete election services via the Internet.

2.2 New Zealand government

The New Zealand government has two primary branches – central government and local government. Their responsibilities are shared between global strategy and policy development by central government and the management of local resources and provision of local services by local government. Here we are primarily interested in local governance.

2.2.1 New Zealand local government

Recent research places New Zealand as third on the leadership board in delivery of online e-government to the public, behind USA and Australia (Ronaghan, 2002). The New Zealand government is proactively taking a leading role in e-government implementation,
and, as stated on their web site, the vision of New Zealand’s e-government is to be the world leader.

This task is delegated to the State Services Commission (SSC), a government agency charged with designing and implementing the e-government strategy. A strategy update (Clifford, 2003) highlights the goals for the e-government initiative:

- Better services – more convenient and reliable, with lower compliance cost, higher quality and value;
- Cost effectiveness and efficiency – cheaper, better information and services for customers, and better value for taxpayers;
- Improved reputation – building an image of New Zealand as a modern nation, an attractive location for people and business;
- Greater participation by people in government – making it easier for those who wish to contribute; and
- Leadership – supporting the knowledge society through public sector innovation.

The New Zealand government has also identified three broad characteristics (outcomes) that distinguish successful e-government:

- Convenience and satisfaction – services provided anytime, anyhow, anywhere;
- Integration and efficiency – services that are integrated, customer-centric and efficient; and
- Participation – people will be better informed and better able to participate in government.

According to the SSC these outcomes will be achieved progressively through several phases of development.

### 2.3 Technology, politics and research

The greatest impact made by the Internet in the last decade has been the increase in ease of communication. The possibility of online interaction between anyone anywhere in the world created a thriving world-wide marketplace. Electronic commerce (EC) has enabled people to conduct transactions via the Internet, ranging in scale from simple online purchases to complex major banking and insurance financial transactions.

As more and more people use EC to conduct business on the Internet, citizens begin to expect governments to follow suit and offer continuous service at any time of the day.

The concept of e-government was designed with the goal to bring together a country's citizens, businesses and government, as well as increase the government’s availability to its citizens (Backus, 2001). Given good penetration of the Internet through the society, governments could offer seamless communication and service to the public.

Conducting the election voting process online has the potential to also improve voter turnout, a known problem for New Zealand local council elections. A 2002 online election in Estonia has shown voter participation to increase approximately 3.5% compared to previous year’s figures (Sharkey & Paynter, 2003).

In this study we look at the interaction between voters and the government. This type of interaction is frequently accomplished as an all-in-one portal providing virtually all services to the public, from basic information to complex transaction processing. Research points to portal technology already deployed in the USA, Britain, Australia and, New Zealand (Fung, 2004; Pons, 2004).

The New Zealand e-government initiative is based around an all-encompassing online portal targeted at businesses and general public alongside specialised offerings by individual government departments, such as the IRD (tax collection) and Companies Office (company registration). The main portal provides access to both information and services for mostly central and local government bodies.

The e-local government strategy was released in 2003 from collaborative work by Local Government New Zealand, the Society of Local Government Managers, the Association of Local Government Information Management, Local Government On-line, the State Services Commission, the Ministry of Economic Development and representatives from city, district and regional councils.

Similarly to the five themes of the overall e-government strategy, e-local government strategy is focused around four key themes:

1. Providing easy on-line access to information and services
2. Developing innovative products and services
3. Enhancing the people’s participation in local democracy
4. Providing community leadership on e-business initiatives

Of these four, the third theme is of particular interest to this study as it directly relates to our topic of online election information presentation and associated services. It is aimed at increasing participation in local government democracy. Enhancing the people’s participation in local democracy can be categorised into the key result areas of online interaction (increasing Internet-based communication between the public and local government bodies) and online voting (directly participating in selection of future local government administrators).

Online interaction (or participation) is mostly dependent on the level of technological acceptance by the general public. In one of the early online voting system trials set up by St Mary’s Bank Credit Union in the USA it has been noted that “people who shop on
line, for example, would be more likely to use an online voting application than people who have a natural aversion to that" (Swedberg, 2004).

Online voting faces more technological problems relating to ensuring transactional security and fairness of the process.

The New Zealand e-local government timeline breaks down these key result areas into concrete deliverables with the aim of conducting the 2007 local government body elections via online means.

3 Methodology

3.1 Introduction

Our study goal is to compare existing research and government guidelines with real implementations by local government bodies – to achieve this goal we have used web site content analysis. This section defines the areas of web site functionality relevant to online elections, presents our chosen method in detail and discusses the local government online elections strategy and guidelines in anticipation of comparison with our findings.

3.2 Research method and design

While large-scale content analysis research has been previously performed, the methods outlined in Section 2 of this study usually followed the approach presented in Figure 3-1.

To achieve this level of granularity we need a robust research instrument that has the following features:

- Exhaustive search through a large number of web sites
- Data clustering and content analysis of the data collected
- Ranking system allowing comparison of features and quality of a given local government body web site
- Validity and reliability to allow reuse and comparison with future studies

This research instrument can be implemented as a software package – in particular, a system to rapidly collect a large number of sites and analyse their content against a set of factors will achieve this goal. It could also be tuned and improved to achieve a greater level of accuracy. More so, by using a software package our study could be replicated in the future or modified using different groupings of words to analyse facets of other industry sectors. By developing this software we can, amongst other things, analyse trends in online election implementation against time.

3.3 Web site content analysis

3.3.1 Web site content quality

Manual evaluation of web site quality can be subjectively performed using simple techniques (for example, measuring the complexity of a feature using a Likert scale), while automated quality analysis is usually more challenging. Similarly to the technology used by Internet search engines, performing machine-based quality analysis on web sites requires assumptions about the relationship between content and quality. A good initial approach to quality assessment (Atlam, Okada, Shishibori, & Aoe, 2002) is based on the assumption that frequency of keyword placement within a page will determine the relative quality of the information on the page.

The approach of ranking web sites according the frequency of keyword occurrence is well-known (Howard, 2004) and was initially utilised in web site content analysis by Internet search engines.

We believe that accurate results can be obtained in our study of local council web sites by indexing every page within a web site and developing a composite index of keyword occurrence within a particular cluster. The number of pages for a given feature could thus be used as a modifier weight to rank multi-page sites higher than simple one-page information sections.

3.3.2 Content analysis method

Figure 3-2 proposes the content analysis method used.
The steps outlined are addressed in greater detail:

**Step 1 – keyword definition**

First we must establish the relevant areas for our study that we will use to rate the web site offerings of online elections information and services. Secondly, a series of keywords that relate to a particular factor in the study must be defined.

The keywords are individual words and phrases that relate to each of the factors of interest. We have collated the themes from other e-local government research to generate appropriate categories.

**Step 2 – web site retrieval**

In this step we need to retrieve all pages of a particular web site and generate an index of keyword occurrences in each of the pages. To do this, a “mirror-crawler” search engine can be created and deployed. It will systematically “crawl” through each web page of every local government body web site and create an exact duplicate “mirror” on the local computer. The advantages to taking this approach rather than manual web site access are the speed at which the computer is able to access the web sites and the guaranteed accuracy of making sure each page within a web site is retrieved.

After retrieving the sites, an index of their keywords has to be created to assist with future analysis. It is arranged in an array and contains information related to the count of the number of keywords across different pages.

Our search engine retrieved every page of every local government body web site in New Zealand and generated the index of keywords and frequency of their occurrence in the pages.

It is possible that some keywords can feature a disproportionate number of times on certain pages. This is likely to the result of a static menu structure present across all of the pages. We solve this by including mechanisms to differentiate between content and navigational elements of the web site and exclude navigational elements from our analysis.

**Step 3 – clustering web pages**

This step of the process separates the pages into clusters according to frequency of keyword occurrence and assigns a score to each of the clusters.

Clustering the web pages is a key area in determining the usefulness of our research instrument. By separating the pages into clusters relating to our factors we gain an insight into what sites contain more information about each of the factors, and proceed to generate scores for web sites across clusters and ultimately identify “best-of-breed” web sites.

For a web site to attain a high ranking in a cluster, it must contain multiple occurrences of keywords related to that cluster across one or more of its pages. The site is then assigned a score and ranked against other web sites with a presence in the cluster.

**Step 4 – results presentation**

As a final step we present the information ranked by the score obtained in the previous step.

The overall indices are calculated based on the aggregate of the total scores; the best scoring sites are ranked at the top and are considered to appropriately convey elements of content quality. A good visual representation of the results is a radar plot showing the scores of each web site in each of the categories of interest.

From the final presented results we can proceed to make comparisons to other research and government guidelines.

### 3.4 Local government body elections factors

As neither the local nor the central government specify what exactly the elements required for online elections information and services presentation should be, we will refer to other research in the field to determine our categories.

The 2005 iteration of the New Zealand e-local government survey (Paynter 2005) is relevant to this study. The survey is aimed at local government bodies, and amongst others, contains the following online election-oriented questions:

- **What information was available for the 2004 local body elections at your site?**
- **How much was spent on providing information/resources about the elections at your online site? (Estimate the cost if in person-hours)**

For our study, the areas of interest, or categories, are derived from the answer options to the first of these questions. There are five unique areas of information
and features related to online elections we expect to be offered through e-local government initiatives. We define them in Figure 3-3:

![Online elections content categories](image)

Figure 3-3: Online elections content categories

### 4 Results

A preliminary assessment of the sites revealed that no local government body supported online voting in New Zealand. This category was eliminated and the analysis rerun. Fig 4-1 shows the quality of content in the Candidate Information (“Candidate”), Voter Registration (“Voter”), General Information (“Information”) and Election Results (“Results”) areas.

![Overall council web site scores across four categories](image)

Figure 4-1 Overall council web site scores across four categories.

Environment Bay of Plenty Regional Council, Otorohanga District Council and Auckland Regional Council are the three distinguishable “best-of-breed” leader sites, seen as the outer-most lines on the radar plot. There are further six sites with moderate online elections offering (score > 50), 21 sites with some online elections information (score ≥ 10), 31 sites with few election services (score between 1 and 10) and eighteen council sites remain free of election-related information. The data collected in the study is now sufficiently accurate and reliable to use a basis for our comparison with other research in the field.

#### 4.1 E-local government online survey

The progress of e-local government implementation in New Zealand has been measured since 2002 by a yearly survey administered by John Paynter and Maria Fung. The current iteration of the survey (Paynter 2005) had 35 respondents from varying local government bodies. The government sectors that were represented are shown in Figure 4-2.

![Council web site survey respondents by government sector](image)

Figure 4-2: Council web site survey respondents by government sector

The survey is particularly relevant to this study in question 14 – “What information was available for the 2004 local body elections at your site?” The survey results are presented in Figure 4-3:

![Council web site scores across five categories](image)

Figure 4-3: Council web site scores across five categories

The respondents rank General Voting Information as the most common feature found on local government web sites, followed by Election Results, Candidate Information, Voting Instructions, Elector (Voter) Registration and other categories. A single respondent included online election voting as a feature offered by the site; however this may relate to a feature being tested in preparation for the 2007 local government body elections that is yet unavailable to the public as no other local government communication agency, such as LGOL, has yet announced this significant breakthrough.

ANOVA revealed significant differences ($F = 2.869, P <0.05$) between the mean values of the scores in four categories of government sectors. We can graphically present this by contrasting the contribution by different sectors to the total number of web sites with the total score of each sector.

Figure 4-4 shows the percentage of contribution by each of the sectors to the total number of e-local government web sites.
Regional councils lead both the average and the maximum scores, showing the presence of local government bodies with excellent election content. The other three sectors have similar average score values and the presence of web sites not offering any election-related information is seen in every sector.

5.1 Comparison with survey data

Our content analysis and the e-local government survey present comparable results (Figure 5-1).

The General Information area is closely comparable between our findings and the councils’ view of the field. Similarly comparable is the importance of offering election results, the second highest ranked area in our findings. However, the amount of Candidate Information found across council web sites is lower than indicated in the survey, likely due to the quality of candidate information presented through local government body web sites.

Voter registration is ranked low in both cases, as it is usually a function delegated to Elections NZ and most local councils do not offer localised online voter registration services.

Overall, our findings are roughly comparable to the results of the e-local government survey. This validates our research instrument and the automated content analysis software.

5.2 Comparison with similar research

Fung (2004) has conducted an extensive research of e-local government web sites in New Zealand. This was done by performing manual content analysis of the available council web sites across all feature-related categories. As these were the same web sites as investigated by our study, it is of interest to compare our findings with Fung’s using Spearman’s Rank Correlation, a technique used to test the direction and strength of the relationship between two sets of data.

Our findings at 90% confidence level show that there is no correlation between the rank of the web site determined by us and the rank presented by Fung (r_s = 0.18, n = 78, R crit (0.10 = .22)). This can be attributed to the difference in scope between the two studies. Our research instrument was targeted exclusively at election-related features of the sites, while Fung’s
analysis covered all areas of information that could be present on a local government body web site. It is thus not possible to predict the election-related information based on the overall score of an e-local government web site.

5.3 Local government strategy comparison

In our study we have noted that the State Services Commission has plans to move towards electronic voting in e-local government by the 2007 elections. To achieve this goal the government requires operational directives towards what constitutes as an “online election” offering from local government bodies, and how it can be developed and deployed. This is not yet available from either of the two government agencies charged with implementing the e-government strategy, namely the State Services Commission and Local Government Online.

We have discovered that a significant proportion of e-local government web sites have no election-related content or services, potentially hindering the plans of conducting the 2007 elections exclusively through electronic means.

5.4 Overseas comparison

The e-government initiatives across the world heavily rely on the all-in-one portal framework created by government branches to offer exhaustive information and services to the public. While research points towards this as a trend across all major e-government adopters, such as USA, Australia and Britain (Forbes, 2002; Fung, 2004; Pons, 2004) our study has found this to not be the case in New Zealand on the local government level.

We have discovered that while there is an e-local government portal, it is devoid of content and does not provide any services to the public. Instead, each of the local council bodies have elected to design and develop their own customised online offering, with varying level of quality.

Sharkey and Paynter (2003) argue that a shift towards online election can increase voter turnout. A recent local government election in Estonia is cited as an example of this trend; however nothing similar has yet been held in New Zealand so a comparison cannot be made.

Further overseas comparison of e-local government web sites is problematic due to the differences in political environments between nations. However, with appropriately chosen factors and keywords, the automated web site content analysis software developed in this study can provide a means for comparison of the data collected.

5.5 Study limitations

Our research has focused on only one of the services seamless e-government needs to provide. The provision of electronic services is equally important to all three branches of the government, and the services provided by the executive, judicial and legislative branches are vast. Some of them are unsuitable for access through e-government, and majority of others do not necessarily share the same trends in development and adoption as online elections.

Furthermore, this research is focused exclusively on New Zealand e-local government and a comparison across different nations at the local government level can be problematic. While similar in their goals and purposes, local government bodies in different countries have varied political structures and hierarchies. New Zealand follows a two-tier government hierarchy – other countries could have additional elements in the government system. For example, in Australia and the USA the local council structure is separately determined by each of the state governments, which function independently from the central, federal government. This could make the applicability of this research limited to New Zealand.

As we mentioned in the first chapter, e-government can include technology other than the Internet. Various other forms of telecommunication (telephones, facsimiles and mobile phones for example) are actively used by government to reach the public. While the Internet is currently prevalent for access through desktop personal computers, we are experiencing a strong move to the mobile market. As other advanced technology becomes more available, the importance of the Internet communication channel, as it is used now, may become different.

6 Conclusion

From our analysis of government strategy, results and other research in the e-government field, we have found the emergence of e-government offerings to be a global trend. The process of e-government rollout is firmly set – the strategy is established and as the technology is improving, more advanced services could become ready for access through the Internet and other communication channels.

From existing research we have come to expect the e-government field to be a rapidly growing area of government innovation. The provision of online election information and services is essential for governments to reach the seamless stage of e-government development stage, and the New Zealand government has recognised it by including the area in both the central and the local e-government strategy.

Participation in democracy is often cited as one of the motivations for e-government. As voter turnout remains in a downward spiral around the 50% mark for New Zealand local government elections, improving it will help accomplish this goal. It has been shown in overseas studies that e-local government online elections have a potential to improve voter turnout and hence have the capability to directly contribute towards an increase in the participation of citizens in democracy.
We have distinguished five factors related to online election services: general elections information, candidate information, voter registration, current and past election results, and online voting.

Of these areas, three are well represented in top e-local government implementations – they are general elections information, election results and candidate information, in the order of quality of implementation. Voter registration has proved to offer only a very small contribution to score of the web sites; this is likely due to the excellent voter registration service provided by the central government in form of Elections NZ both online and via other means. Nevertheless, local government elections registration processes can be different to the ones used by the central government. An explanation of the enrolment process and eligibility to vote in a particular area on the council web site provides a valuable service. We have found that none of the local council web sites provide online voting services.

Having conducted the web site content analysis, we have discovered that on average, local council web sites have a low quality of content relating to online elections. This contrasts with the State Services Commission strategy to have e-voting in local government body elections electronically enabled by 2007. We believe that in order for this to happen, e-local government web sites should already have an adequate foundation of services essential for online voting. The first steps towards online voting are offering appropriate content in election-related categories.

This was found to be true in some cases; a number of local councils provided information across the four main election categories, most noticeably in the general information and election results areas. We identified Environment Bay of Plenty Regional Council, Otorohanga District Council and Auckland Regional Council as the top three distinguishable “best-of-breed” leader sites. However, sites like these were few and overall the e-local government field did not show signs of a foundation to build e-voting systems on.

When considering the different sectors of local government, we have found that regional councils are more prepared for the shift towards e-government than their territorial and unitary counterparts. Nevertheless, there are still sites offering little or no election-related information in each of the local government sectors leaving potential for improvement.

The current state of the field could be attributed to the fact that e-local government does not yet have a unified approach to online elections and voting. The e-government strategy does not yet specify an operational plan of the process and requirements for online voting at local government level. A development of this plan is in progress and should be available in the future. Until it is released, the government can not provide guidelines of what Internet-enabled services constitute a complete “online elections” offering from a local council body.

A comparison with an on-going e-local authority survey shows that participating local councils have an accurate understanding of the general information, candidate information and election results features they need to currently be offering, but are still behind in the voter registration and online voting. The implications for local council bodies show areas of potential improvement. To achieve the strategy of being a world-leader in e-government, New Zealand e-local government web sites need to improve on the level of election-related information and services offered through their web sites.

This can be aided by following examples of “best-of-breed” sites identified in this study. Four relevant categories identified in this study, namely general election information, candidate information, voter registration services and election results, can already be incorporated into e-local government web sites by using existing technology. Implementation of the final category, online voting, could then follow on the basis of this foundation.

7 References


