

Analysis of Wireless Local Area Network Web Based Information

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Abstract

Wireless security education to all types of user form a major part in the implementation of secure WLAN networks. Lack of education is a barrier to security and many users like to obtain security information from the Internet / Web using major search engines such as Yahoo! and Google. This paper provides an original evaluation of WLAN security information found on the major search engines. The findings are that there are many good sources of WLAN security information available if the correct search is performed. Users should look out for signs of poor information and poor website quality.

Keywords

Wireless, Local, Area, Network, WLAN, Web, Security, Education, Information

1 Introduction

There have been many issues with the security of wireless networks, the user education of such technologies, current product availability, current developments, and the effective implementation of secure networks.

The knowledge and education play a vital role. Not surprisingly, the Internet is regarded as a prime source of direct information for network security. It is very simple and efficient for a network installer / administrator to use a popular search engine to retrieve practical security information, by entering keywords.

A user may want information on a specific WLAN hardware with instructions for setting up, administration, current industry developments, security information, security standards, or just plain curiosity. A user may want a more predefined education programme or online learning approach.

This information is readily available but, just how reliable is this information? Is the information suitable, correct, relevant and accurate? How useful are the Internet resources for someone who wants to find out about WLAN and security? Are the

sources biased? Are there any costs involved? Is the information clearly presented? Is the website easy to use? These factors need to be considered.

The overall quality of a website may be very good in terms of presentation and information content. However there are some cases where information might be unformed, inaccurate and biased. The information might be quite low in volume, and not that useful. So this poses the question, just how good are the online resources for WLAN?

This paper is intended to propose an evaluation methodology and a summary of assessment of WLAN information websites, found from popular search engines. It is intended that the paper provide a starting point of the current state of WLAN security information on the web, that has not been widely and critically evaluated as of yet.

2 Evaluation Method

The main data collection medium was the Internet and fifty websites were evaluated. This number was decided due to the fact a user is unlikely to go beyond the first few search pages and only take the top few. A factor of user convenience was considered.

The two most popular Internet search engines were used to locate the web pages, these being Google (www.google.com) and Yahoo (www.yahoo.co.uk). The keywords entered in the search were, wlan security information, as the primary term.

Yahoo was the first search engine used with the websites given a number from 1 to 25 in order of their occurrence on the search engine. Google was used second and any repeating websites / pages will be ignored. They were given a number of 26 to 50, in order of precedence.

Websites containing WLAN information were assessed by the following criteria.

a) Information Quality

This table concerns the quality of the information provided in terms of the text and the information contained within. The table contains the following fields where a mark out of ten is given for each one.

- Authority – Does the work have a visible, qualified author with relevant credentials?
- Objectivity – Does the work have a clear objective?
- Authenticity – Where does the work originate? Is it authentic?
- Reliability – Is the information source trustworthy with evidence?
- Timeliness – Are the information and links up to date and current within the existing field?
- Relevance – Is the work is sufficient depth? Is the work usable and readable?

- Efficiency – Is the information well organised?

Total – The total mark of all information quality criteria. This is an overall mark out of 70 and gave an overall picture of the website's information quality.

b) Presentation

This table relates to the purely visual aspect of a website or webpage. It asks a range of usability and visual questions. Is a website pleasing and self-explanatory to a user?

- Search – Was the webpage / site easy to search with little effort?
- Navigation – Is the webpage / site easy to navigate around?
- Clarity – Is the webpage / site clearly presented and straightforward to understand?
- Style – Is the webpage style relevant and effective? Is the style pleasing on the eye?
- Colour Scheme – Is the colour scheme pleasant and easy to see? Do the colours clash?

Total – The total presentation criteria mark out of 50. This provided an overall figure for the presentation of the site.

A mark for each criterion, for each site was awarded the following banding was decided:

0 – Not useful at all or non existent. This is awarded when virtually no useful content or feature(s) are provided. This is of no usefulness to a potential end user.

1-3 Poor usefulness. This mark is given when a criterion presents very low, poor feature standard. This is of little usefulness to a user.

4-5 Some usefulness. The criterion is satisfied, providing some usefulness to a user.

6-7 Good usefulness. The criterion is assessed as being good usefulness to a user, with substantial evidence to back it up.

8-10 Excellent usefulness. The criterion is assessed as being excellent usefulness to a user, with substantial evidence to back it up.

It was agreed to have a second maker in order to provide a fairer mark and offer a second opinion. Each criterion was assessed on a rating of 0-10. With 0 being extremely poor, and 10 being excellent.

Each website was given a type classification number:

1. Retail Websites – Sites that sell products direct to a customer.
2. Company Product Websites – Sites detailing company product details.
3. Technical Information Websites – Sites aimed at providing a user with technical information, industry developments, technical news or useful information.
4. Help Websites – Websites with questions, answers, forums and trouble shooting websites. There has to be an element of interaction with the intention to help an end user specifically solve a problem.

5. User Websites – These are websites set up by individual users or groups of users from a non-corporate / profit making background with the intention of providing information to fellow users.
6. Academic Websites – This are websites provided from established, genuine educational establishments. They should provide some from of real world technical information.
7. Online Magazine / Subscription Websites – Online magazines or sites that require some form of subscription fee in order to access the information.
8. Other – These are websites that cannot be clearly classified in the above categories.

It was hoped that the classification and assessment scheme presented an adequate assessment method. It should be noted this was solely based on the evaluators' perceptions. The solid classification provided should also give a good picture of the type of information provider that is widely available.

3 Summary of Results

The following section provides a summary of the results found during the research and the key findings. Figure 1, shows the average criteria marks for the information quality. The precise marks were as follows: Authority – 5.76, Objectivity – 6.04, Authenticity – 6.76, Reliability – 6.48, Timeliness – 6.5, Relevance – 6.4 and Efficiency – 6.88. All criteria, apart from authority, on average produced a good level of usefulness and fell in good usefulness banding. The Authority criterion was on average 5.76 denoting some usefulness.

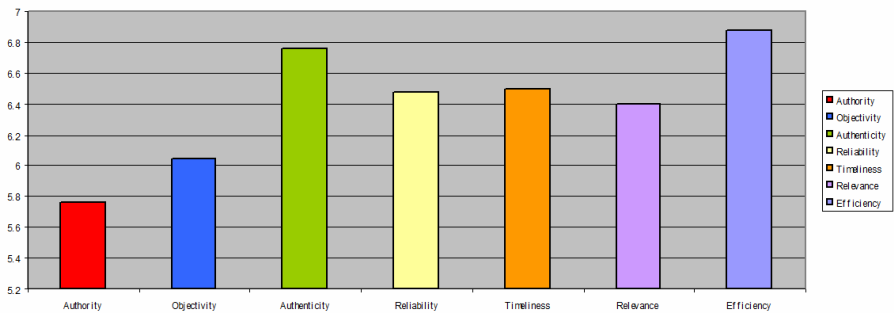


Figure 1: All Data Mean Information Criteria Marks

Figure 2, is a pie chart that presents the results in terms of the proportion of sites in a particular range. As can be seen, the 40 to 49 range were the most common aggregate marks. The average overall Information Quality mark was 44.82 or 64%. This denotes that on average the websites were awarded a good level of information quality. The frequency occurrence of the results were: Less than 10 – 3, 10 to 19 – 0, 20 to 29 – 1, 30 to 39 – 8, 40 to 49 – 20, 50 to 59 – 12, 60 to 70 – 6. Expressed in

percentages: Less than 10 – 6%, 10 – 19 – 0%, 20 to 29 – 2%, 30 to 39 – 16%, 40 to 49 – 40%, 50 to 59 – 24%, 60 to 70 – 12%

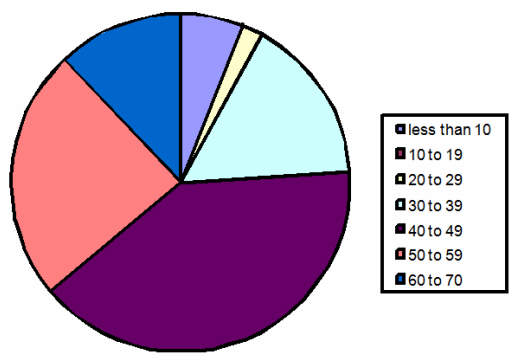


Figure 2: Pie Chart Breakdown of All Information Quality Overall Marks

Figure 3, summarises the mean Presentation Criteria results for all data in a bar chart. The precise results were as follows: Search – 5.72, Navigation – 7.42, Clarity – 7.4, Style – 7.2, and Colour Scheme – 7.14. All presentation criteria were awarded a good level of usefulness / quality on average, apart from the criterion Search which was awarded some usefulness on average. However at 5.72 this was very close to being of good usefulness. Figure 4 is a pie chart that presents the results in terms of the proportion of sites in a particular range. As can be seen, the 30 to 39 range were the most common aggregate marks, with an occurrence of 25 sites in that band. The average overall Presentation mark for all the data was 34.88 or 69.76%. This indicates that the presentation marks awarded were good, bordering on excellent. The frequencies of the overall presentation results are as follows: Less than 10 – 0, 10 to 19 – 2, 20 to 29 – 6, 30 to 39 – 25, 40 to 50 – 17. Expressed as percentages: Less than 10 – 0%, 10 to 19 – 4%, 20 to 29 – 12%, 30 to 39 – 50%, 40 to 50 – 34%.

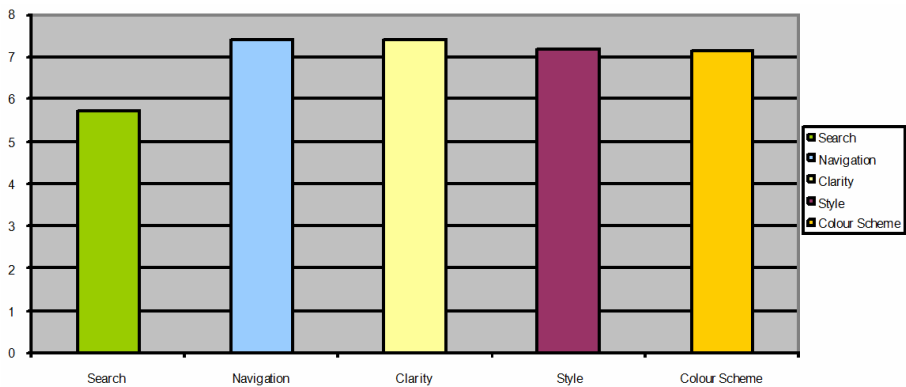


Figure 3: All Mean Presentation Criteria Marks

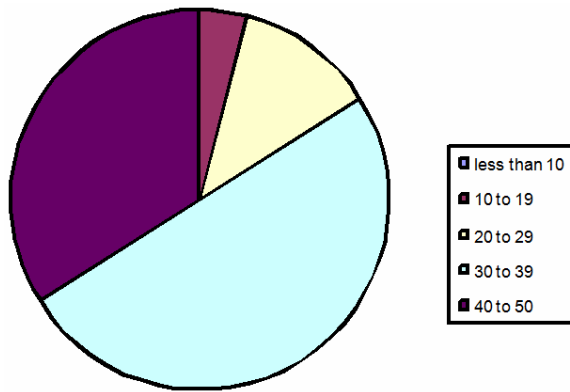


Figure 4: Pie Chart Breakdown of All Presentation Overall Marks

4 Method Effectiveness

To summarise the evaluation method had the following effective points:

- Easy to implement
- Easy to understand
- Breakdown to Information Quality and Presentation
- Tables defined by evaluation criteria
- Marks out of 10 and an aggregate mark
- Comparative
- Adaptable
- Real world type model

The method could be improved by:

- More time to gather data
- Larger volume of website data
- Many markers / evaluators
- User feedback
- Specific modification of evaluation criteria according to information analysed
- Derived information metrics (e.g. number of pieces of useful information per page)
- Derived presentation metrics

5 Conclusions

At present the main search engines (Google and Yahoo) provide an excellent source of high quality WLAN security information. The search engines are easy to use and

only require a few keywords and a click to produce a results page. A user does not necessarily have to go beyond the first few pages for generic WLAN information.

There are many useful URLs that cover topic areas such as general information to more specialised information. Much is dependant upon what the user is looking for. Some websites / pages are of very poor quality; many (especially those first encountered) provided a good-to-excellent source of information.

What makes a good WLAN information site is open to debate, especially the visual aspect of a website. What one person sees as clear another may see as unclear. The project has particularly identified that quite often WLAN information sites are lacking objectivity and in particular authority. In many cases no authors, credentials, or organisations are cited. This may have an impact upon the user's perception of the information and the confidence they hold it in. It is unlikely a user will take note of information they think is unsubstantiated.

User education is a vital weapon to improve security and knowledgeable people can place hardware and software safeguards to protect their WLANs from intruders / attackers / eavesdroppers. If a user is ignorant of issues it is unlikely they will be addressed, perhaps compromising the WLAN security. While some websites have been evaluated as being of good quality their effects on large numbers of WLAN users remains to be seen.

A method for WLAN security information evaluation has been presented in this paper. Ultimately it's usefulness depends on the accessibility, accuracy, correctness, application potential, understandably and information conveyance to the end user. Websites can also change frequently in terms of content and visual style

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