An Examination of Trends in Elementary School Websites

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Abstract

This study examines how elementary schools are using their Web presence, comparing current research with previous studies. Using a random sample of elementary school websites in 1996, 1998, and 2003, the researchers noted various content, media elements, and maintenance issues. Findings indicate that the purpose of elementary school Web pages has become better defined over the years; most schools are using websites to provide information to parents and other members of the community. Findings also demonstrate increased use of certain media elements (such as photos, animations, and JavaScript). Media specialist and technology coordinators continue to create and maintain the majority of school Web pages, although there has been a shift in the gender of the "webmasters" – from male to female. The researchers discuss the various trends in school websites, and, based on these findings, provide recommendations for creating and maintaining school websites.

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Introduction

Technology has become a natural part of our every day lives – from multi-featured cell phones to computerized self-checkout lanes at the grocery store. Researchers note that technology "…continues to shrink in size and grow in power, as well as increase its presence in our everyday surroundings" (Barron, Orwig, Ivers, & Lilavois, 2002, p.2). According to the U.S. Census Bureau, over 54 percent of U.S. households had computers and Internet access at home in 2003. This is double the figure reported (26%) for home Internet access in 1998 (U.S. Census Bureau, 2004-2005).

Recent reports indicate that access to computers, the Internet, and other technologies is also improving for schools. In the fall of 2000, 93 percent of public schools had Internet access in the classroom, compared to 64 percent in 1999 (Parsad & Jones, 2005). Ten years ago, the goal of most schools was simply to "be on the Web" (Shaw, 2002, p. 48), and school websites were limited in content. With increased access to the Internet, schools are taking advantage of the Web as an instructional resource, delivery system, and a means to communicate with parents, community members, and the world at large.

Schools may use their presence on the Web for a variety of purposes: parent communication, sharing student work, school information, calls for collaboration, and so on. Researchers suggest that school personnel decide what they want their website to accomplish for them, identifying the target audience, necessary information, design, and maintenance (Cavanaugh, 2002-03; Reilly, 2003; Warlick, 2002; Wodarz, 2001). Levine (2002) notes that a school's website is a public relations tool, stating schools should be prepared to make investments into their websites for design and staff time to update and manage content. This study examines how elementary schools are currently using their Web presence and identifies various content, media elements, and maintenance issues. Current findings are compared with past findings to analyze trends in schools' Web presence.

Purpose of the Study

This study examined how elementary schools are using their Web presence, comparing current research with previous studies. Using a random sample of elementary school websites,

the researchers identified various content, media elements, and maintenance issues. They also examined equity and accessibility concerns. In particular, the following questions were addressed:

1. What types of information are posted on elementary school Web pages?
2. Which links are included in elementary school Web pages?
3. Which multimedia and programming elements are being incorporated into the design of elementary school Web pages?
4. Who is responsible for the development and maintenance of school websites?
5. How has the design and content of elementary school Web pages changed over the last seven years?

Data Collection

Data collection took place over three different time periods – March, 1996, March 1998, and March 2003. The March 1996 data set represents 55 randomly selected U.S. elementary schools; the 1998 data set included 107 schools. Both of these samples are based on school websites hosted on Web66, a popular registry of school Websites. Web66 was no longer available in 2003; users were directed to the Yahoo Education Directory. Thus, the 2003 data set represents 110 randomly selected U.S. elementary school websites from Yahoo's K-12 School Directory. The first data set represents a 5% sample; the 1998 and 2003 data sets represent 3% samples of the population (see Table 1). The samples were selected via a random number table.

Table 1: *Data Sets.*

Data Collection Dates	Number of Elementary Schools Registered on Web66/Yahoo Directory	Random Sample Number	Random Sample Percent
March 1996	1106	55	5%
March 1998	3567	107	3%
March 2003	3643	110	3%

Working independently, the researchers noted the following information about each site:

- Types of available content: information about the school, showcases of student work, classroom pages, teacher pages, community information, staff email addresses, update notices, calls for collaboration
- Destinations of functional links: local information, educational websites, search engines
- Presence or absence of media and programming elements: photos, animation, audio, video, image maps, mailto, counters, guest books, forms, frames, JavaScript
- Characteristics of designers/developers: gender, role

Data Analysis

The data collected about each of the types of information posted on elementary school Web pages were converted to percentages for the years 1996, 1998, and 2003 (see Tables 2-5). Differences in sample percentages were tested using logistic regression for each item in the framework (logistic regression was used instead of the usual Pearson chi-square because the former allows the overall test of significance to be disaggregated into specific contrasts between pairs of years). To determine when the changes were significant, the additional Logistic Regression statistical test was run to contrast the years. This allowed the researchers to determine if the significant trend occurred between 1996 and 1998, 1996 and 2003, and/or 1998 and 2003.

As noted in Table 2, information about the school (99%), staff e-mails (48%), and student work (44%) were the most prevalent types of information posted on elementary school Web pages in 2003. Significant trends over the years were noted in the categories of Information about School, Teacher Pages, Staff e-Mail and Collaboration.

The percentage of websites that included information about the school decreased significantly from 96% in 1996 to 84% in 1998, then experienced a significant increase to 99% in 2003. With regard to the amount of teacher pages posted, there was a significant upward trend between 1996 (5%) and the two later years 1998 (20%) and 2003 (21%). The number of websites that provided staff e-mail addresses increased significantly throughout the years, changing from 16% in 1996 to 30% in 1998 and, finally, to 48% by 2003. An interesting change in direction occurred with the amount of postings related to collaboration (see Figure 1). There was a significant upward trend between 1996 (5%) and 1998 (27%) and then a significant down change in direction in 2003 (3%).

Table 2
Tends in Types of Information Posted on Elementary Schools Web Pages

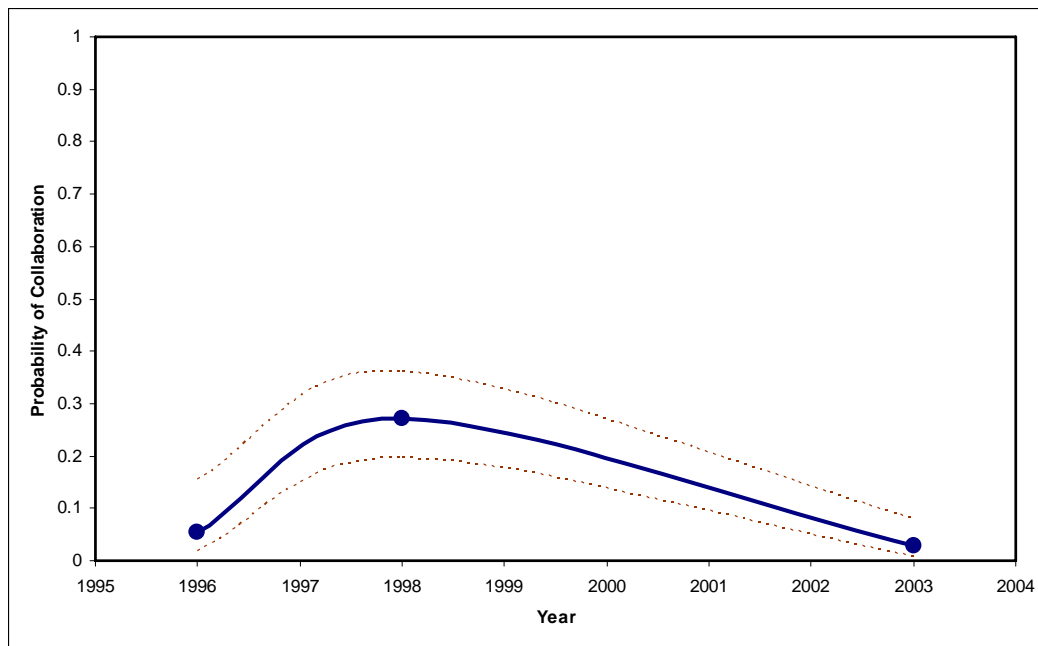|	Types of Information	1996	1998	2003
		Year		
*	Information about School	96%	84%	99%
	Student Work	49%	43%	44%
	Class Pages	40%	36%	31%
*	Teacher Pages	5%	20%	21%
	Local Info	25%	16%	21%
*	Staff e-mail	16%	30%	48%
	Update Notice	51%	38%	38%
*	Collaboration	5%	27%	3%

* $p < .05$

Figure 1. Predicted Probability of Collaboration by Year with 95% Confidence Intervals

Another area of interest was the destination of links that are incorporated into school websites. As illustrated in Table 3, over half of the school websites have included links to educational websites over the years. The number of schools with links to search engines has steadily increased (from 31% to 39% to 41%), although this trend has not been significant. A significant downward trend was found for the inclusion of local information links between 1996 and 1998 and between 1996 and 2003; however, the change between 1998 and 2003 was not significant (see Figure 2).

Table 3
Trends in Destinations of Functional Links

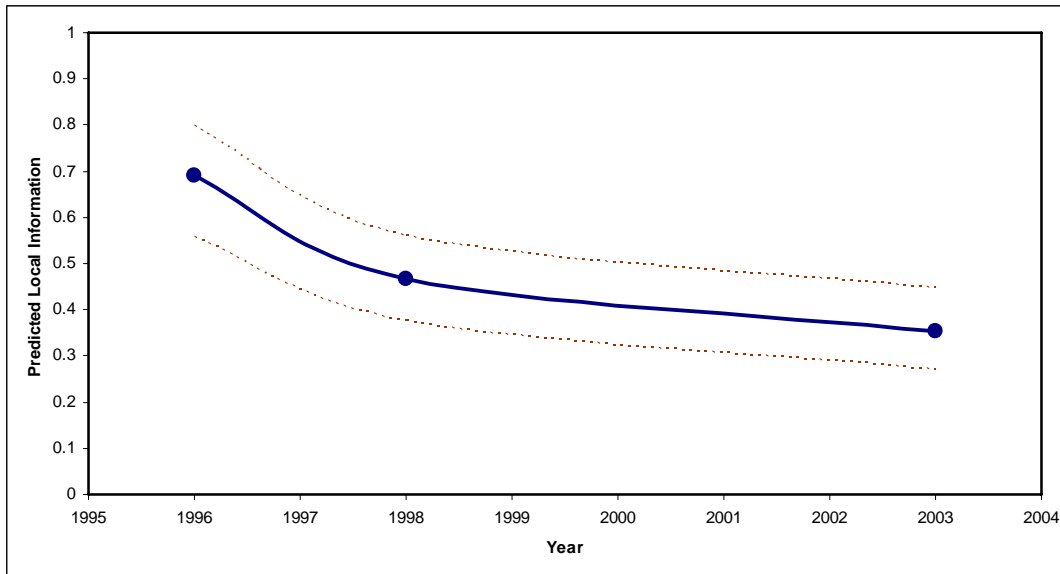| Links	Year		
	1996	1998	2003
* Local Information	69%	47%	35%
Educational Websites	65%	65%	58%
Search Engines	31%	39%	41%

* $p < .05$

Figure 2. Predicted Probability of Local Information by Year with 95% Confidence Intervals.

Advances in both hardware and software have changed the potential for media elements on Web pages since 1996. Increased bandwidth, via cable modems, DSL, and leased data lines, is available in many homes and schools. In addition, Web editors, such as DreamWeaver, FrontPage, and Composer, enable the addition of enhanced components, such as frames, imagemaps, and JavaScript, without complex programming. It is not surprising to note significant increases in photographs, animation, frames, and Java/JavaScript over the years (see Table 4). Websites that included photographs showed little change between 1996 (82%) and 1998 (84%), then increased significantly by 2003 (94%). A similar trend was seen for Java/JavaScript, which was included on only a few websites in 1996 (5%) and 1998 (7%). Between 1998 and 2003, there was a significant increase – up to 40% (see Figure 3). The trend to include animations, imagemaps, and frames on elementary websites also increased significantly from 1996 to 2003.

There were some significant downward trends between 1996 and 2003 also. For example, counters on Web pages were used significantly less over the years – 35% in 1996; 21% in 1998;

and 17% in 2003. Likewise, less schools included a guestbook in 2003 (only 2%) as opposed to 9% in 1996 and 8% in 1998. There was also a significant downward trend in the use of mailto links between 1998 (86%) and 2003 (71%).

Table 4
Trends in Multimedia and Programming Elements

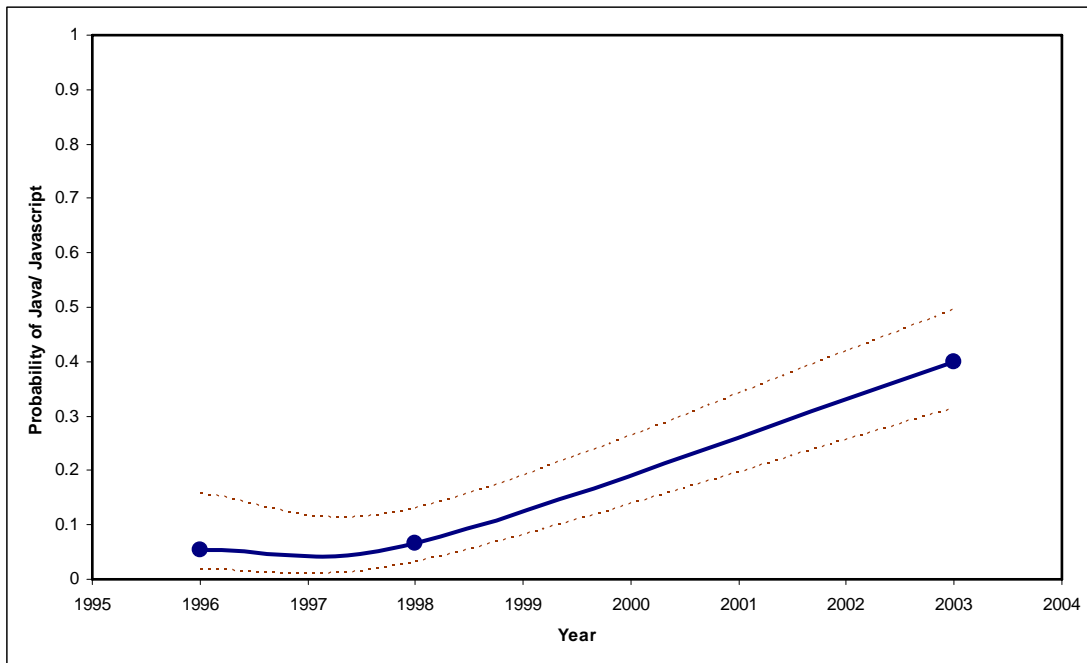|		Year		
Elements		1996	1998	2003
*	Photographs	82%	84%	94%
*	Animation	11%	46%	56%
	Audio	4%	11%	6%
	Video	2%	1%	4%
*	Mailto	82%	86%	71%
	Forms	4%	6%	13%
*	Counter	35%	21%	17%
*	Guestbook	9%	8%	2%
	Imagemap	2%	5%	11%
*	Frames	0%	12%	16%
*	Java/JavaScript	5%	7%	40%

* $p < .05$

Figure 3. Predicted Probability of Java/JavaScript by Year with 95% Confidence Levels.

The final section of analysis examined the agents responsible for the development and maintenance of school websites. The "typical" webmaster in 2003 was a female (74%), media/technology specialist (59%). Significant trends over the years were noted for teachers,

media/tech specialists, and principals (see Table 5). There were also significant trends found in the gender of the agents responsible for the development and maintenance of school websites

A significant downward trend in the teacher being responsible for the development and maintenance of school websites was noted over the period of time between 1996 (40%) and 2003 (20%); however, when examining this trend in smaller increments of time between the years 1996 and 1998 and between 1998 and 2003, the changes were not significant. In contrast, a significant upward trend in the responsibilities of media/tech specialist was noted between 1996 (25%), 1998 (48%) and between 1996 and 2003 (59%). There was also a significant downward trends in the responsibilities of the principal for developing and maintaining school websites between 1998 (8%) and 2003 (0%).

When changes were examined with regard to the gender of the webmaster, the most interesting finding was the consistently significant increase in the number of females. In 1996, 35% of the websites had female webmasters; in 1998, 54% were female, and in 2003, the number has risen to 74% (see Figure 4). The opposite, downward trend of male webmasters was significant between 1998 (40%) and 2003 (15%).

Table 5
Trends in Responsibility for the Development and Maintenance of School Websites

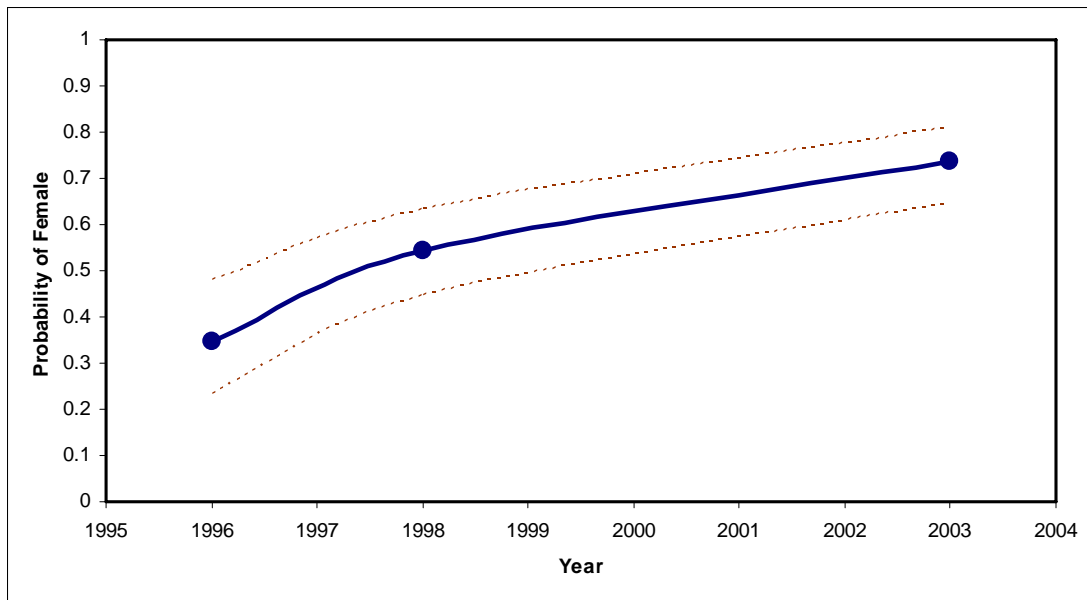|	Responsible Agent	Year		
		1996	1998	2003
*	Teacher	40%	27%	20%
*	Media/tech specialist	25%	48%	59%
*	Principal	5%	8%	0%
	University	5%	2%	0%
	Teacher/Student	5%	6%	11%
	Teacher/Student/Parent	0%	2%	4%
	Business	7%	6%	4%
*	Other	11%	0%	2%
*	Male	44%	40%	15%
*	Female	35%	54%	74%
*	Combined	20%	6%	11%
*	$p < .05$			

Figure 4. Predicted Probability of Female by Year with 95% Confidence Intervals.

Discussion

  The interpretation of the results of this research must be tempered with recognition of its limitations. First, the elementary school websites that were analyzed represent only a sample of websites rather than the complete corpus. Although the random sampling design employed provides a representative sample of websites, the potential impact of sampling error must not be neglected. In addition, the websites reviewed from the sample schools were those that were listed on Web66 or Yahoo directories. These directories represent only a portion of the elementary schools that maintain a Web presence. The potential exists that the websites that were analyzed may not be representative of all elementary schools.

  The results of this study suggest that there has been a shift over the last seven years in how schools are using their Web presence   It appears as though more schools are using their Web presence as a means to communicate information about their school – using their website as a public relations tool. The audience seems to be parents and other community members. There has been a significant increase in staff email, teacher pages, and information about the school. Contrasting this with data collected in 1996 and 1998, there has been a significant decrease in the use of school websites for collaboration and a steady drop (though not significant) in the use of class pages. School websites appear to focus on the management and communication of school policies, events, and other information relative to the operation of the school.

  Each data collection period – 1996, 1998, and 2003 – documented that a high percentage of the sampled school websites provided information about their school (e.g.,

address, phone numbers, maps, etc.). Nearly all school Web pages incorporated some kind of digital image, also. In addition, the sophistication and layout of school Web pages has been increasingly enhanced by the use of animations, Java and JavaScript. This may be the result of the increased availability, sophistication, and ease of use of software programs for Web page development. The use of counters and guestbooks has significantly declined over the past seven years. These novelties may have become overshadowed by more sophisticated uses of technology on school Web pages. The emphasis no longer appears to be on collecting data from visitors, but rather providing visitors with information.

Compared to March 1998 data, there is a significant decline in the use of links to local information, and a slight increase in the placement of links to search engines. Links to education websites remained almost constant. A trend of school Web pages seems to be toward focusing on information relative to the school and its goals, away from a generalized, undefined presence. The use of the mailto command has decreased significantly since 1998. Faculty and staff email addresses remain posted, however.

Another trend that emerged from the data is that more and more media specialists and technology coordinators are creating school websites. This may be an indication that one of the standard roles or assumed responsibilities of a school's media specialist/technology coordinator is the creation and maintenance of the school's website. Fewer males than females appear to be involved in the creation and maintenance of school Web pages, probably because there are fewer male than female educators in elementary education. In fact, current data suggest females far exceed males (74 percent to 15 percent, respectively) in school Web page responsibilities. When compared to the data collected in 1996, the researchers found a higher percentage of males than females (44% vs. 35%) serving as webmaster. In 1998, the researchers noted that more female than males (54% vs. 40%) were serving as webmasters. There has been a significant increase in the percentage of female webmasters over the last seven years. This could, perhaps, indicate that more and more female teachers and technology specialists are being trained in website creation and maintenance. Additional research is needed in this area.

Conclusions and Recommendations

As suggested by Shaw (2002), Cavanaugh (2002-03), Warlick (2002), and Wodarz (2001), school personnel need to decide what they want their website to accomplish for their school. This includes identifying the target audience and deciding on the type of information to post on the school website, how the website will be designed, and how the website will be maintained. If the target audience is parents and other members of the community, school

personnel need to consider what kinds of information will be most helpful to parents and other members of the community. Creators of school websites need to ask, "What information will parents and other members of the community find helpful on our school website?" It is recommended that creators of school websites conduct a needs analysis once they have determined the purpose of their website and decided upon the target audience.

Once the information for the website has been determined and compiled, creators need to consider how the website will be designed. They should keep in mind the needs of those who speak and read in another language other than English and those with disabilities. School websites should be designed to meet U.S. Section 508 Guidelines, also. In addition, it is important to determine how the target audience will be accessing the school's website – standard 56K modem or DSL/cable; Macintosh or Windows platforms, etc. This will guide creators in the choice of graphics, video, resource support, and so on. They should strive to create an interactive website that offers current and useful information, and be prepared to invest the necessary time and funding to support it.

Several years ago, Ivers and Barron (1999) noted that the purpose of elementary school Web pages was not well defined; many websites had no clear purpose other than "being on the Web." The current study suggests that the purpose of elementary school Web pages is taking definition, that schools are using their Web presence to provide information to parents and other members of the community. As more and more households obtain Internet access, school Web pages may simplify and expand communication between parents, school personnel, and other members of the community.

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